
Species At Risk Assessment Fort Langley National Historic Site



Fraser's River: View Looking Down from Fort Langley
James Madison Alden, 1858

March 2002

**Parks Canada
Ecosystem Services
Western Canada Service Centre**



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1.0 INTRODUCTION

The Fort Langley National Historic Site is located within the Fraser Valley of southwestern British Columbia. The Site encompasses the 1840 location of the Fort. The Fort location has been extensively modified by human activities. Natural areas are limited to a relic floodplain of the Fraser River.

As part of its national program for managing species at risk, Parks Canada is currently compiling lists of species for all of its facilities throughout Canada. The list of species for the Fort Langley National Historic Site will facilitate the development of a management plan for the Site, including restoration of natural features that may provide important habitat functions for species at risk.

This report presents an overview of natural features that occur within the Fort Langley National Historic Site. A review of species at risk within the Fraser Valley, and the applicability of the list of species to the Site, is presented. Recommendations regarding field species inventories and site restoration are provided.

2.0 LAND AND WATER USES

The Fort Langley National Historic Site encompasses approximately 8.4 hectares along the south bank of Bedford Channel, a side channel of the Fraser River located between McMillan Island and the mainland (Figure 1). The Site is located entirely within the municipality of the Township of Langley. It is divided by River Road (a local arterial road), and twin railway tracks operated by the Canadian National Railway Company. The southern portion of the Site encompasses 6.9 hectares and contains the structural elements of Fort Langley. The northern portion encompasses 1.5 hectares and contains a portion of wooded floodplain that is a relic feature of a relatively expansive floodplain that once characterized upper Bedford Channel.

The Fort was constructed at its present location in 1840. This complex originally enclosed an area 192 metres by 73 metres in size. Fort Langley was initially a fur trade post. It eventually operated a fishery and an extensive farm. Goods, such as furs, grains and salted beef, pork and salmon were shipped over seas. Fort Langley was the transshipment depot for the interior (Fort Kamloops). Trade goods and supplies shipped from Fort Victoria were packed at Fort Langley for distribution inland. During the gold rush (1858), Fort Langley was the starting point for the Fraser River gold fields. It prospered as a supplier of provisions to prospectors. The landing for watercraft, from canoes to river boats (e.g. S.S. Beaver), was located at the western end of the northern portion of the Site, immediately upstream of today's Fort Langley Marina Park (Township of Langley).

The Fort Langley farm was expanded in the 1860's. The farm was subdivided and lots sold from 1878 to 1886. Farming continues to be the primary land use east of the Site. Farm land immediately southwest of the Site has been converted to residential housing.



Figure 1. Fort Langley National Historic Site
Scale 1:5000

Fort Langley National
Historic Site (existing
legal boundary)

The palisade was dismantled in 1864. Fort Langley ceased operations as a company post in 1886. It was established as a National Historic Park in 1955. The existing structures represent facility improvements and renovation/reconstruction efforts conducted since 1955. The park receive 69,158 visitors from April 01, 2001 to March 31, 2002. Visitation during this period was highest during July (14,225 visitors) and lowest during January (908 visitors) (St-Amour, pers.comm.¹).

The rail line was constructed in 1913 by Great Northern Rail. This line was bought from Great Northern Rail by Canadian National Railway in 1918. Current rail line use is entirely by freight trains. Line use is highest during August (approximately 25 trains per day) and lowest during December (approximately 20 trains per day) (St. Jean, pers. comm.²). The present configuration of River Road was established at the time of rail line construction. Approximately 1270 vehicles currently use River Road on a daily basis (Berg, pers. comm.³)

A small sport fishery occurs within Bedford Channel. Bar fishing occurs infrequently along the northern margin of the Site. Pleasure watercraft, including power boats and jet skis, berth and launch at Fort Langley Marina Park and use Bedford Channel.

3.0 NATURAL FEATURES

The account of land and water uses establishes a general environmental setting for the Site. Detailed observations and data regarding natural features, such as vegetation communities and fish and wildlife use of the Site and proximal areas, is not available. A reconnaissance survey of the site was conducted on September 19, 2001 to document outstanding natural features of the Site.

The **northern portion of the Site** (northern property) is a remnant of a relatively expansive floodplain that once characterized the southern shoreline of Bedford Channel. The majority of the floodplain and a relatively large flood channel has been converted to a dredge spoil transfer pit, a sod farm and a small airport (Figure 2).

Bedford Channel is a side channel of the Fraser River. It is separated from the main hydraulic channel of the Fraser River by McMillan and Brae islands. Water levels within Bedford Channel are tidally influenced. Tidal changes in water levels within Bedford Channel are less than 1.0 metre and 0.4 metre, respectively, during low and high discharges⁴.

A small dyke was constructed along the shoreline of the northern property during the late 1940's. It is uncertain as to whether it was constructed for flood protection or as a fill road. It was contiguous with a fill area at the western end of the northern property (Figure 3). The fill was

¹ **St-Amour, G. 2002.** personal communication, April 05, 2002. Parks Canada

² **St-Jean, M. 2001.** personal communication, July 31, 2001. Canadian National Railway Company.

³ **Berg, E. 2001.** personal communication, July 31, 2001. Township of Langley.

⁴ **Schriek, W. 1998.** Bedford Channel. June 8, 1998 letter addressed to Mr. Lothar Wiwjorra, Aplin and Martin Consultants Ltd. Hay and Company Consultants Inc. 5p.

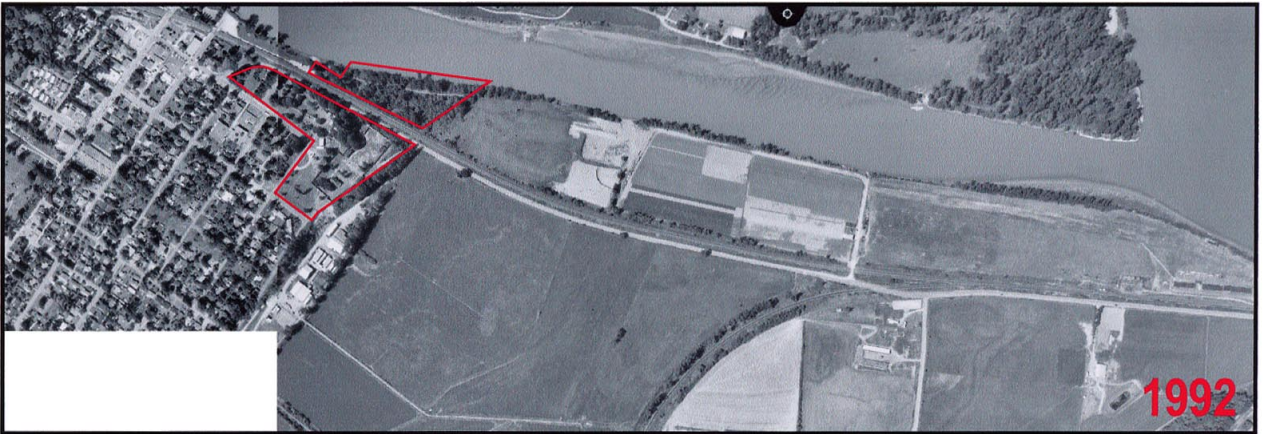
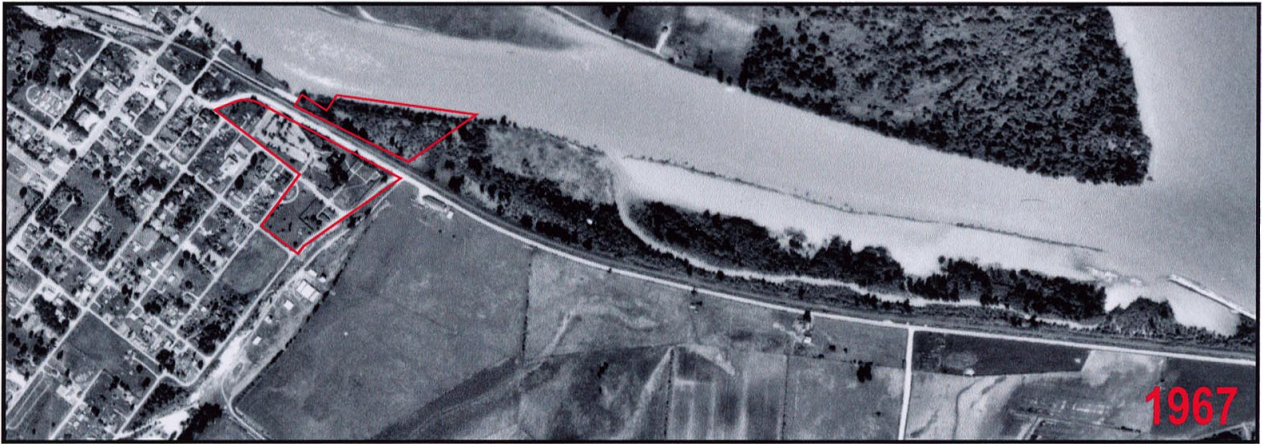
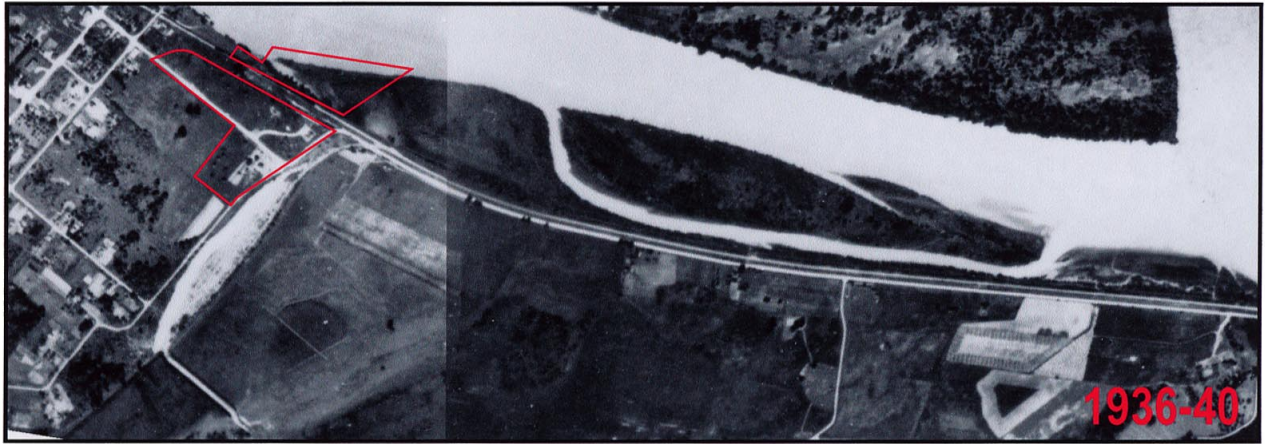


Figure 2. Historical conversion of floodplain within upper Bedford Channel



Figure 3. Outstanding site features
 Scale 1:2000



distinguishable as lawn. The dyke and fill have essentially removed the interior of the northern property from all but the highest flood events of the Fraser River.

The removal of the interior of the northern property from the active floodplain of the Fraser River has not pre-empted the persistence of a native plant assemblage characteristic of floodplains of the lower Fraser River. It is apparent that the dyke is permeable, and that during high flows and high tide water penetrates the dyke and enters the property. The property also drains poorly and likely retains rain water for long periods. Despite its physical alienation from the Fraser River, the wetland is best classified as floodplain swamp as defined by the Canadian Wetland Classification System (National Wetlands Working Group, 1997⁵).

The floodplain swamp is defined by two species assemblages (Figure 3). The wettest portion of the swamp was characterized by Pacific willow (*Salix lasiandra*) (Figure 4). Black cottonwood (*Populus trichocarpa*) occurred sporadically within this assemblage. Grasses dominated the understory. Reed canary grass (*Phalaris arundinacea*) was the most prevalent grass species. Mannagrass (*Glyceria elata*) occurred along the margins of mud pannes. The occurrence of duckweed (*Lemna minor*) upon the surface of the mud suggests that standing water was recently present, and of sufficient tenure to sustain this floating aquatic. Pacific treefrogs (*Hyla regilla*) were heard within this assemblage.

The drier portion of the swamp, located within the eastern centre portion of the property, and along the southern margin of the dyke and northern margin of the rail line fill slope, was characterized by an assemblage of shrub and tree species. These species included Pacific willow, Sitka willow (*S. sitchensis*), red osier dogwood (*Cornus stolonifera*), black twinberry (*Lonicera involucrata*), hawthorn (*Crataegus douglasii*), hardhack (*Spiraea douglasii*), salmonberry (*Rubus spectabilis*), Nootka rose (*Rosa nutkana*), cascara (*Rhamnus purshiana*), paper birch (*Betula papyrifera*), red alder (*Alnus rubra*) and black cottonwood. Reed canary grass occurred as sporadic groundcover.



Figure 4. Pacific willow dominated floodplain swamp.

The western margin of the road that defines the approximate eastern margin of the northern property was characterized by sapling black cottonwood and Himalayan blackberry (*Rubus*

⁵ National Wetlands Working Group. 1997. The Canadian Wetland Classification System. 2nd Edition. B.G. Warner and C.D.A. Rubec (Eds.). Wetlands Research Centre, Waterloo, ON. 68p.

discolor). Evening nightshade (*Solanum dulcamara*), reed canary grass and sword fern (*Polystichum munitum*) were conspicuous. This fringe assemblage of species intergraded with the shrub-tree assemblage of the floodplain swamp.

Two western toads (*Bufo boreas*) were observed along the road margin. Birds observed along the interface of the two plant assemblages included chestnut backed chickadee (*Parus rufescens*), robin (*Turdus migratorius*), Swainson's thrush (*Catharus ustulatus*), northwestern crow (*Corvus caurinus*) and cedar waxwing (*Bombycilla cedrorum*).



Figure 5. Dyke path and associated vegetation.

An assemblage of species indicative of waste and/or disturbed sites occurred along the margins of the dyke path (Figure 5) and the western end of the property. Domestic garden species were also observed along the dyke margin. These domestic species included English oak (*Quercus robur*), black walnut (*Juglans nigra*), apple (*Malus sylvestris* var. *domestica*), pear (*Pyrus communis*), pear apple (*Pyrus pyrifolia*), rose (*Rosa* sp.), violet (*Viola* sp.) and iris (*Iris* sp.). The domestic species occurred principally at one location along the dyke, approximately 100 metres west of the northeast corner of the property. The species may be relics of a previous human residence or the gardening endeavours of an individual that once regularly visited the site. These plants were disjunct from landscape waste at the western end of the site. Landscape waste, evidently generated by activities associated with the maintenance of the southern portion of the Site, has been disposed of at a location immediately east of the lawn fill area.

Upland, likely a relic of the natural grade from the shoreline of Bedford Channel to the Fort, occurs along the margin of the fill ballast of the rail line within the western half of the northern property. It is characterized by a treed woodland. Conspicuous tree species included Douglas fir (*Pseudotsuga menziesii*), broadleaf maple (*Acer macrophyllum*) and black cottonwood. Domestic cherry (*Prunus* sp.) occurred throughout the woodland. The northern margin of the woodland intergraded with the floodplain swamp. The southern margin appeared to be impacted by maintenance of the rail line. It was defined by several shrubs, the most conspicuous of which were elderberry (*Sambucus racemosa*), Nootka rose and Himalayan blackberry. Bracken fern (*Pteridium aquilinum*) was a conspicuous groundcover species.

The riverward margin of the dyke was characterized by a fringe woodland that falls under the Canadian Wetland Classification Systems' classification of riverine swamp (National Wetlands Working Group, 1997).



Figure 6. Riverine swamp and sand beach along Bedford Channel.

Under low to moderate discharge within the Fraser River, the rooting horizon is inundated during higher high tide events. The rooting horizon emerges during most low tide events (Figure 6). A sand beach is exposed throughout the entire length of shoreline fronting the property during most low tide events.

The riverine swamp is characterized by both shrub and tree species. These included black cottonwood, red alder, cascara, paper birch, Pacific willow, Sitka willow, Mackenzie willow (*S. rigida* var. *mackenzieana*), red osier dogwood, black twinberry, hawthorn and snowberry (*Symphoricarpos albus*). English ivy (*Hedera helix*) was observed growing upon some of the larger shrubs and trees. Reed canary grass occurred within open areas of the woodland. Licorice fern (*Blechnum spicant*) was a conspicuous ground cover species within closed areas of the woodland. The front of the swamp was deeply incised at some locations, with the roots of shrubs and trees exposed. Marsh was absent from the shoreline.

The scars of beaver (*Castor canadensis*) foraging were borne by many of the shrubs and trees, in particular red osier dogwood. Haul out areas and scat occurred throughout the woodland. Signs of flicker (*Colaptes auratus*) foraging were evident on several of the large trees. Killdeer (*Charadrius vociferus*) and glaucous-winged gulls (*Larus glaucescens*) were observed along the shoreline.

The **southern portion of the Site** (southern property) accommodates the interpretative facilities, including the palisade and interior buildings, and the visitor orientation centre. Vehicle parking and maintenance buildings are also supported. Areas surrounding these facilities are landscaped. Landscape treatments range from lawn, single to clustered plantings of trees, to intergraded plantings of groundcover, shrubs and trees. The planting prescriptions include both native and exotic species.

The only area within the southern property that does not appear to be regularly maintained is the escarpment between the northern palisade and River Road. It is characterized by a woodland comprised of a mix of shrubs and trees. Conspicuous trees included Douglas fir, broadleaf maple, black cottonwood and red alder. Conspicuous shrubs included Pacific willow, Sitka willow, red osier dogwood and Himalayan blackberry. Active recruitment of exotic landscape species, such as English oak and pin oak (*Q. palustris*), was evident.

4.0 SPECIES AT RISK

A detailed inventory of plant and wildlife species, conducted during all seasons of the year, was beyond the scope of this management exercise. In lieu of such an inventory, a compilation of species of management concern was conducted by comparing Site conditions with the habitat requirements of indigenous species, subspecies, variety, or geographically defined population of wild fauna or flora at risk within the Fraser Lowland Ecoregion, Lower Mainland Ecoregion, Georgia Depression Ecoprovince. The Fraser Lowland Ecoregion consists of the Fraser River delta, estuary, lowlands and associated uplands (Demarchi, 1996⁶). Two lists were utilized to

⁶ Demarchi, D.A. 1996. An Introduction to the Ecoregions of British Columbia. <http://srmwww.gov.bc.ca/rib/wis/eco/bcecode.html>. BC Ministry of Environment, Lands and Parks, Victoria, BC.

achieve this compilation: the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) list of species at risk in Canada; and the species status lists for British Columbia prepared by the British Columbia Conservation Data Centre (CDC), British Columbia Ministry of Sustainable Resource Management.

Four (4) COSEWIC risk categories are considered in the species compilation. **Extirpated** species are those species that no longer exist in the wild in Canada, but occur elsewhere. **Endangered** species are those species facing imminent extirpation or extinction. **Threatened** species are those species that are likely to become endangered if limiting factors are not reversed. **Special Concern** species are those species that are of special concern because of the characteristics that make them particularly sensitive to human activities or human events. The risk categories **Not at Risk** and **Data Deficient**, whereby so designated species, respectively, are either those that have been evaluated and found to be not at risk or those for which there is insufficient scientific information to support status designation, were not considered in the species compilation (COSEWIC, 2001⁷).

Two (2) ranked criteria are used by the CDC; species are designated to either red or blue lists. **Red-listed** species are candidates for legal designation as threatened or endangered. Threatened species include indigenous plant and wildlife likely to become endangered in British Columbia if factors affecting their vulnerability are not reversed. Endangered species include those threatened with imminent extinction or extirpation throughout all or a significant portion of their provincial range. **Blue-listed** species are considered to be vulnerable or sensitive, and are prospective candidates for the red-list. Vulnerable species include indigenous plant and wildlife that are particularly at risk within British Columbia due to low or possibly declining populations (CDC, 2000⁸).

In the absence of detailed species inventory data for the Site, the compilation of species utilizes information organized according to the Biogeoclimatic Ecosystem Classification (BEC). The BEC system is widely utilized by resource managers to provide a biological and ecological framework for ecosystem management. The system divides the province into fourteen distinct biogeoclimatic zones and subzones, describing provincial and regional forests and their management status and significance over broad geographical areas. Stevens⁹ summarizes basic and essential information on wildlife according to species or species group, which are in turn organized according to geographical area. The province's 94 geoclimatic subzones are grouped into 49 subzone groups for wildlife.

4.1 Wildlife

The Site is located within the Maritime Wildlife Subzone Group of the Fraser Lowland (FRL) Ecoregion of the Eastern Variant of the Very Dry Maritime Subzone (xm1) of the Coastal

⁷ **COSEWIC, 2001.** Canadian Species at Risk, November 2001. Committee on the Status of Endangered Wildlife in Canada. COSEWIC Secretariat, Ottawa, ON. 32p.

⁸ **CDC, 2000.** Glossary of CDC Terms, April 2000. <http://srmwww.gov.bc.ca/cdc.glossary.htm>. British Columbia Conservation Data Centre, Ministry of Sustainable Resource Management, Victoria, BC.

⁹ **Stevens, V. 1995.** Wildlife Diversity in British Columbia: Distribution and Habitat Use of Amphibians, Reptiles, Birds, and Mammals in Biogeoclimatic Zones. Working Paper 04/1995. Co-published by the BC Ministry of Forests and BC Ministry of Environment, Lands and Parks, Victoria, BC. 288 p.

Western Hemlock (CWH) biogeoclimatic zone. A total of 451 taxa utilize the CWH, of which 13 are amphibians, 6 are reptiles, 327 are birds, and 105 are mammals³. Wildlife species at risk that may occur at the Site are listed below.

4.1.1 Vertebrates

The following COSEWIC listed species exhibit existing and/or historic distribution ranges that include the Site. There are no **Extirpated** listed species for the Site. **Endangered** listed species include only the northern spotted owl (*Strix occidentalis caurina*). **Threatened** listed species include the Pacific water shrew (*Sorex bendirii*), marbled murrelet (*Brachyramphus marmoratus*) and anatum peregrine falcon (*Falco peregrinus anatum*). Listed species of **Special Concern** include the grizzly bear (*Ursus arctos*), Keen's long-eared bat (*Myotis keenii*), short-eared owl (*Asio flammeus*), barn owl (*Tyto alba*), Lewis's woodpecker (*Melanerpes lewis*), Pacific great blue heron (*Ardea herodias fannini*), northern red-legged frog (*Rana aurora*), coast tailed frog (*Ascaphus truei*), green sturgeon (*Acipenser medirostris*) and white sturgeon (*A. transmontanus*).

CDC **Red-listed** species that exhibit existing and/or historic distribution ranges that include the Site include the long-tailed weasel (*Mustela frenata altifrontalis*), Pacific water shrew, southern red-backed vole (*Clethrionomys gapperi occidentalis*), Keen's long-eared bat, marbled murrelet, anatum peregrine falcon, northern spotted owl, western meadowlark (Georgia Depression population) (*Sturnella neglecta* population 1), western bluebird (Georgia Depression population) (*Sialia mexicana* population 1), purple martin (*Progne subis*), Lewis's woodpecker (Georgia Depression population; population 1), western grebe (*Aechmophorus occidentalis*), double-crested cormorant (*Phalacrocorax auritus*), pygmy longfin smelt (*Spirinchus* species 1), green sturgeon and white sturgeon (Fraser River population; population 4).

CDC **Blue-listed** species that exhibit existing and/or historic distribution ranges that include the Site include the grizzly bear, Trowbridge's shrew (*Sorex trowbridgii*), Townsend's big-eared bat (*Corynorhinus townsendii*), short-eared owl, barn owl, band-tailed pigeon (*Columba fasciata*), green heron (*Butorides virescens*), Pacific great blue heron, American bittern (*Botaurus lentiginosus*), coast tailed frog, northern red-legged frog, brassy minnow (*Hybognathus hankinsoni*), eulachon (*Thaleichthys pacificus*), Dolly Varden trout (*Salvelinus malma*), bull trout (*S. confluentus*) and cutthroat trout (*Oncorhynchus clarki* subsp. *clarki*).

COSEWIC and CDC listed vertebrates that exhibit existing and/or historic distribution ranges (Canadian Wildlife Service, 2001¹⁰) that include the Site are presented in Table 1.

¹⁰ Canadian Wildlife Service. 2001. Species at Risk, April 2001. <http://www.speciesatrisk.gc.ca>. Environment Canada, Ottawa, ON.

**Table 1. Fort Langley National Historic Site
COSEWIC and CDC Listed Vertebrate Species**

Species	COSEWIC	CDC
northern spotted owl <i>Strix occidentalis caurina</i>	Endangered	Red
Pacific water shrew <i>Sorex bendirii</i>	Threatened	Red
marbled murrelet <i>Brachyramphus marmoratus</i>	Threatened	Red
anatum peregrine falcon <i>Falco peregrinus anatum</i>	Threatened	Red
grizzly bear <i>Ursus arctos</i>	Special Concern	Blue
long-tailed weasel <i>Mustela frenata altifrontalis</i>		Red
southern red-backed vole <i>Clethrionomys gapperi occidentalis</i>		Red
Trowbridge's shrew <i>Sorex trowbridgii</i>		Blue
Keen's long-eared bat <i>Myotis keenii</i>	Special Concern	Red
Townsend's big-eared bat <i>Corynorhinus townsendii</i>		Blue
short-eared owl <i>Asio flammeus</i>	Special Concern	Blue
barn owl <i>Tyto alba</i>	Special Concern	Blue
Lewis's woodpecker <i>Melanerpes lewis</i>	Special Concern	Red
green heron <i>Butorides virescens</i>		Blue
Pacific great blue heron <i>Ardea herodias fannini</i>	Special Concern	Blue
American bittern <i>Botaurus lentiginosus</i>		Blue

Table 1. Fort Langley National Historic Site contd COSEWIC and CDC Listed Vertebrate Species		
Species	COSEWIC	CDC
double-crested cormorant <i>Phalacrocorax auritus</i>		Red
western grebe <i>Aechmophorus occidentalis</i>		Red
band-tailed pigeon <i>Columba fasciata</i>		Blue
western meadowlark <i>Sturnella neglecta</i>		Red
western bluebird <i>Sialia mexicana</i>		Red
purple martin <i>Progne subis</i>		Red
northern red-legged frog <i>Rana aurora</i>	Special Concern	Blue
coast tailed frog <i>Ascaphus truei</i>	Special Concern	Blue
brassy minnow <i>Hybognathus hankinsoni</i>		Blue
Dolly Varden trout <i>Salvelinus malma</i>		Blue
bull trout <i>Salvelinus confluentus</i>		Blue
cutthroat trout <i>Oncorhynchus clarki clarki</i>		Blue
pygmy longfin smelt <i>Spirinchus species 1</i>		Red
eulachon <i>Thaleichthys pacificus</i>		Blue
green sturgeon <i>Acipenser medirostris</i>	Special Concern	Red
white sturgeon <i>Acipenser transmontanus</i>	Special Concern	Red

4.1.2 Invertebrates

The only COSEWIC listed species that exhibits an existing and/or historic distribution range that includes the Site is the monarch butterfly (*Danaus plexippus*). It is a **Special Concern** listed species.

One hundred seventy-one (171) invertebrate species are **Red-** and **Blue-listed** within British Columbia. As these lists are not provided for the individual forest districts, and detailed distribution range maps are not readily available, species listed in the red- and blue-lists were compared with species of special interest in the Georgia Depression (Lower Mainland)¹¹. A total of 15 species appear in both sources.

Red-listed species include Pacific robber fly (*Lasiopogon pacificus*), swamp seed bug (*Nysius paludicolus*), Anderson's water boatman (*Cenocorixa andersoni*), California plant bug (*Tupiocoris californicus*), damsel bug (*Nabicula propinqua*), shield-backed bug (*Camirus porosus*), grappletail (*Octogomphus specularis*), and Johnson's hairstreak (*Loranthomitoura johnsoni*).

Blue-listed species include Willamet's robber fly (*Lasiopogon willametti*), black-tipped darner (*Aeshna tuberculifera*), black petaltail (*Tanypteryx hageni*), western river cruiser (*Macromia magnifica*), western pondhawk (*Erythemis collocata*), blue dasher (*Pachydiplax longipennis*), and Bremner's fritillary (*Speyeria zerene bremnerii*). COSEWIC and CDC listed invertebrates that exhibit existing and/or historic distribution ranges that include the site are presented in Table 2.

4.2 Plants

There are no COSEWIC listed species that have been documented to occur within the Chilliwack Forest District. Accordingly, it is highly unlikely that any COSEWIC listed species occur at the Site.

The CDC rare natural plant community tracking list contains 59 communities within the Chilliwack Forest District; none of these natural plant communities are present at the Site.

4.2.1 Vascular Plants

The CDC tracking list for rare vascular plants contains 104 species for the Chilliwack Forest District. Site conditions do not address the habitat requirements of many of these species. Site conditions may suit the habitat requirements of the following listed species.

¹¹ Scudder, G.G.E. 1996. Terrestrial and freshwater invertebrates of British Columbia: priorities for inventory and descriptive research. Working Paper 09/1996. BC Ministry of Forests and BC Ministry of Environment, Lands and Parks, Victoria, BC. 206p.

Table 2. Fort Langley National Historic Site COSEWIC and CDC Listed Invertebrate Species		
Species	COSEWIC	CDC
monarch butterfly (<i>Danaus plexippus</i>)	Special Concern	
Bremner's fritillary (<i>Speyeria zerene bremnerii</i>)		Blue
Pacific robber fly (<i>Lasiopogon pacificus</i>)		Red
Willamet's robber fly (<i>Lasiopogon willametti</i>)		Blue
swamp seed bug (<i>Nysius paludicolus</i>)		Red
Anderson's water boatman (<i>Cenocorixa andersoni</i>)		Red
California plant bug (<i>Tupiocoris californicus</i>)		Red
damsel bug (<i>Nabicala propinqua</i>)		Red
shield-backed bug (<i>Camirus porosus</i>)		Red
grappletail (<i>Octogomphus specularis</i>)		Red
Johnson's hairstreak (<i>Loranthomitoura johnsoni</i>)		Red
black-tipped darner (<i>Aeshna tuberculifera</i>)		Blue
black petaltail (<i>Tanypteryx hageni</i>)		Blue
western river cruiser (<i>Macromia magnifica</i>)		Blue
western pondhawk (<i>Erythemis collocata</i>)		Blue
blue dasher (<i>Pachydiplax longipennis</i>)		Blue

Red-listed species include Carolina meadow foxtail (*Alopecurus carolinianus*), cut-leaved water-parsnip (*Berula erecta*), small-flowered bitter-cress (*Cardamine parviflora* var. *arenicola*), green-fruited sedge (*Carex interrupta*), Muhlenberg's centaury (*Centaurium muehlenbergii*), Austin's phantom orchid (*Cephalanthera austini*), western hawksbeard (*Crepis occidentalis* subsp. *pumila*), Nuttall's sunflower (*Helianthus nuttallii* var. *nuttallii*), false-pimpernel (*Lindernia dubia* var. *anagallidea*), stream-bank lupine (*Lupinus rivularis*), needle-leaved navarretia (*Navarretia intertexta*), sachaline knotweed (*Polygonum douglasii* subsp. *johnstonii*), blue vervain (*Verbena hastata* var. *scabra*), pink water speedwell (*Veronica catenata*), and northern water-meal (*Wolffia borealis*).

Blue-listed species include beggarticks (*Bidens amplissima*), two-edged water-starwort (*Callitriche heterophylla* subsp. *heterophylla*), yellow marsh-marigold (*Caltha palustris* var. *palustris*), bigleaf sedge (*Carex amplifolia*), bearded sedge (*C. comosa*), green-sheathed sedge (*C. feta*), pointed broom sedge (*C. scoparia*), fox sedge (*C. vulpinoidea*), five-angled dodder (*Cuscuta pentagona*), three-flowered waterwort (*Elatine rubella*), small spike-rush (*Eleocharis parvula*), beaked spike-rush (*E. rostellata*), Nuttall's waterweed (*Elodea nuttallii*), purple-leaved willowherb (*Epilobium ciliatum* subsp. *watsonii*), rough bedstraw (*Galium mexicanum* subsp. *asperulum*), slender-spike mannagrass (*Glyceria leptostachya*), western mannagrass (*G. occidentalis*), mountain sneezeweed (*Helenium autumnale* var. *grandiflorum*), Pacific waterleaf (*Hydrophyllum tenuipes*), western St. John's-wort (*H. scouleri* subsp. *nortoniae*), pointed rush (*Juncus oxymiris*), Regel's rush (*J. regelii*), rice cutgrass (*Leersia oryzoides*), flowering quillwort (*Lilaea scilloides*), Smith's melic (*Melica smithii*), leafy mitrewort (*Mitella caulescens*), water-pepper (*Polygonum hydropiperoides*), Kellogg's knotweed (*P. polygaloides* subsp. *kelloggii*), western pearlwort (*Sagina decumbens* subsp. *occidentalis*), lance-leaved figwort (*Scrophularia lanceolata*), and Howell's violet (*Viola howellii*).

4.2.2 Bryophytes

There are a total of 86 and 279 species of moss that are red- and blue-listed within British Columbia, respectively. As these lists are not provided for the individual forest districts, species listed in the red- and blue-lists were compared with rare and endangered mosses found within the Georgia Depression Ecoprovince¹². A total of 12 species appear in both sources.

Red-listed species include *Bryum violaceum*, *Discelium nudum*, *Fabronia pusilla*, *Fissidens pauperculus*, *Micromitrium tenerum*, *Orthotrichum tenellum*, *Physcomitrium immersum*, *Pseudephemerum nitidum*, and *Tortella humilis*.

Blue-listed species include *Bryum gemmiparum*, *Callicladium haldanianum*, and *Rhizomnium punctatum*.

¹² Ryan, M.W. 1996. Bryophytes of British Columbia: rare species and priorities for inventory. Working Paper 12/1996. BC Ministry of Forests and BC Ministry of Environment, Lands and Parks, Victoria, BC. 100p.

5.0 MANAGEMENT RECOMMENDATIONS

5.1 Regional Management

Management of species at risk should consider the regional context of prospective management prescriptions. Other natural areas in immediate proximity to the Fort Langley National Historic Site are likely important to the natural resource values sustained by the Site. Collectively, the Site and these other areas are likely more important to the vigour of local populations of species than any one of these locations are individually.

Some of these natural areas are protected within Greater Vancouver Regional District Parks (GVRD Parks). Specifically, these areas occur within Kanaka Creek Regional Park, Derby Reach Regional Park and Brae Island Regional Park (Figure 7). Ecological inventories and valuations have recently been conducted for the parks at Kanaka Creek and Brae Island. Management plans are currently being developed for these parks. It is recommended that a dialogue be initiated with GVRD Park managers to explore a comprehensive management strategy for species at risk within these natural areas.

The Salmon River is confluent with the Fraser River approximately 1 kilometre downstream of the Site. The floodplain of the Salmon River surrounds the eastern, southern and western margins of the town of Fort Langley. Agriculture is the primary land use. Relic flood channels are still prevalent, with many of these channels having been converted to field drainage ditches. A contiguous riparian woodland flanks the main channel of the Salmon River.

The Fraser River dyke traverses the mouth of the Salmon River. Drainage of the Salmon River and surrounding floodplain is controlled by a pump station and floodbox facility.

Despite the Fraser River dyke, the Salmon River and its relatively vast floodplain is invariably linked to the shoreline environments of the Fraser River, including the Site. The shorelines of the Fraser and Salmon rivers are a contiguous landscape feature that is exploited by many plants and wildlife. Many wildlife species likely move freely between the two shoreline environments.

As for the GVRD Parks, consideration of the Salmon River and its floodplain should be included in management prescriptions for the Site regarding species at risk. Unfortunately, in contrast to the clearly defined management authority of GVRD Parks for lands

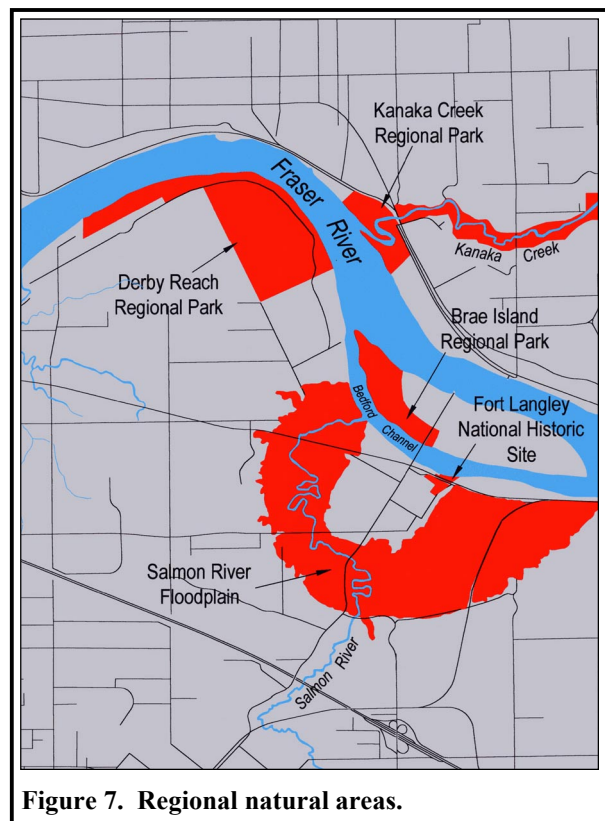


Figure 7. Regional natural areas.

encompassed within regional parks, there is no single management body that can be approached to represent all of the land uses within the Salmon River and its floodplain. The Langley Environmental Partners Society, the Salmon River Stewardship Society, Fisheries and Oceans Canada, Environment Canada (Canadian Wildlife Service), British Columbia Ministry of Water, Land and Air Protection, the Township of Langley and private landowners are obvious partners in the management of species at risk in the regional context of the Site with regard to the Salmon River and its floodplain.

It is recommended that every effort be made to achieve a collaborative management strategy for the region as presented by Figure 7.

5.2 Local Management

Recommendations for the management of species at risk focus upon two actions for the northern property, specifically:

- the detailed inventory of plant and wildlife species that use the site; and
- the restoration of seasonal flooding of the floodplain swamp by Fraser River waters.

Recommendations for the management of species at risk for the southern property are not presented.

5.2.1 Detailed Inventory of Plant and Wildlife Species

The compilation of species at risk for the Site provides the basis of a methodology for the inventory of species. For **plants**, the list has screened species that suit Site conditions. Site surveys can focus upon the flowering period for each of the plants, and/or conditions conducive to high vigour (e.g. late spring for vascular aquatics when ponding is prevalent during fair weather). Both flowers and vigorous above-ground growth enhance detectability. Flowers and fruits allow ready identification of species.

The Site has already been stratified into two primary plant community types (i.e. riverine swamp and floodplain swamp). These community types should be further stratified into distinct assemblages of species that indicate microsite conditions (e.g. soil moisture, exposure, etc.). Permanent monitoring plots would be located within each of the stratified assemblages. As the primary objective of monitoring is to compile an inventory of species for the Site, the plots can vary in size so as to adequately represent the stratified assemblages.

There is often a high fidelity between the plants that occupy an area and **invertebrate wildlife** that may be found utilizing that area (e.g. milkweed (*Asclepius* spp.) and the monarch butterfly). Further, the temporal abundance of an invertebrate is often linked to a key phase in the seasonal growth of a plant (e.g. flowering, seed production, etc.). Accordingly, it is recommended that the plots established to monitor plant species also be utilized to compile an inventory of invertebrates for the Site. Invertebrates may be surveyed using traps, nets or through direct observation. The plant and invertebrate surveys could be conducted concurrently.

The species at risk listed in Table 1 represent **vertebrate wildlife** species that exhibit an existing and/or historic range of distribution that includes the Site. It is unlikely, however, that some of these species utilize the Site due to the lack of suitable habitat and/or the proximity of relatively high intensity human activities. The grizzly bear does not occur within the Fraser Lowland Ecosection (Lofroth, 1994¹³). The northern spotted owl and marbled murrelet are associated with late successional and old-growth forests (Canadian Wildlife Service, 2001^{14,15}); these community types do not occur at, or in close proximity to the Site. The coast tailed frog requires cold, clear mountain streams (Canadian Wildlife Service, 2001¹⁶); such streams do not occur on the Site. The anatum peregrine falcon has specific habitat requirements for its nest site, nesting territory, and home range (Canadian Wildlife Service, 2001¹⁷). The Site does not sustain features suitable for a nest site, and as a result, a nesting territory. Sumas Mountain, if utilized by a falcon pair for nesting, would render the Site within the bounds of a home range. However, there is no record of falcon nesting at Sumas Mountain. The operation of an active quarry along much of the north face of the mountain likely pre-empts use of the immediate area by falcons. The aforementioned species should be excluded from any consideration of management of species at risk.

The list in Table 1 includes species that, if occurring at the Site, would likely only occur within the unvegetated foreshore environment immediately fronting the riparian swamp. It is unlikely that a management prescription would specifically target this environment; beaching of watercraft during low water, due to the Site's immediate proximity to Fraser River Marina Park, may be the only activity that requires the attention of Parks Canada managers. Species likely limited to the unvegetated foreshore environment include the American bittern, double-crested cormorant, western grebe, brassy minnow, Dolly Varden trout, bull trout, cutthroat trout, pygmy longfin smelt, eulachon, green sturgeon and white sturgeon. Although these species should not be necessarily ignored as part of an inventory program for wildlife, they should only be prioritized if the inventory was expanded to encompass a regional context.

The remaining species include those species that once occurred within immediate proximity to the Site and continue to occur regionally (e.g. Lewis' woodpecker and purple martin) and those species for which a concerted inventory on a regional context has not been adequately conducted and suitable habitats may exist at the Site (e.g. Pacific water shrew and southern red-backed vole).

For vertebrate wildlife species, surveys may focus upon seasonal abundance (e.g. staging during migration, nesting) or patterns of use (e.g. dusk foraging by owls). Direct observation conducted on a regular basis may be the primary method of inventory. Live-trapping may be the only

¹³ **Lofroth, E.C.** 1994. Grizzly Bears in British Columbia. Ministry of Water, Land and Air Protection. wlapwww.gov.bc.ca/wld/pub/grzz_br.htm. Province of British Columbia. 7p.

¹⁴ **Canadian Wildlife Service.** 2001. Northern Spotted Owl, April 2001. www.speciesatrisk.gc.ca. Species ID=33. Environment Canada, Ottawa, ON. 5p.

¹⁵ **Canadian Wildlife Service.** 2001. Marbled Murrelet, April 2001. www.speciesatrisk.gc.ca. Species ID=39. Environment Canada, Ottawa, ON. 6p.

¹⁶ **Canadian Wildlife Service.** 2001. Coast Tailed Frog, April 2001. www.speciesatrisk.gc.ca. Species ID=631. Environment Canada, Ottawa, ON. 3p.

¹⁷ **Canadian Wildlife Service.** 2001. Anatum Peregrine Falcon, April 2001. www.speciesatrisk.gc.ca. Species ID=582. Environment Canada, Ottawa, ON. 6p.

suitable means of inventory for some species (e.g. Trowbridge's shrew). The species list, with consideration of comments afforded particular species, provides a clear focus for the field inventory of species.

5.2.2 Restoration of Seasonal Flooding of the Floodplain Swamp

The natural heritage of the northern property is its representation of a floodplain environment that was prevalent throughout the Fort's history as a trading post and depot. The assemblage of plant species that comprise the swamp is likely representative of the species assemblage that occupied the site historically. The persistence of saturated soil conditions can hinder the seral succession of wetland plant communities; the floodplain swamp, in particular that portion of the swamp characterized by Pacific willow, appears to have persisted since the early 1900's. The topography of the property, with the exception of the dyke and fill at the western end of the site, has not appreciably changed during the past 65 years. Restoration of seasonal flooding of the floodplain swamp by Fraser River waters would, in turn, restore functional habitat values for plants and wildlife associated with seasonal flooding.

The 1936-40 aerial photograph (see Figure 2) of the northern property depicts a backwater channel at the western end of the site. The open end of the channel was confluent with Bedford Channel at the approximate location of existing lawn, east of the parking lot and boat ramp of Fort Langley Marina Park (see Figure 3). The lawn is located on fill. It is recommended that the fill and dyke at the western end of the site be excavated and removed to restore the original configuration of the backwater channel. It is anticipated that there will be a marked transition between fill and native soils. The depth of the channel would correspond to the surface elevation of native soils.

Pockets of fill within other areas of the property, such as the landscape waste disposal site, should be removed. The dyke should be breached at locations contiguous with existing low points within the riverine swamp to facilitate flooding of the floodplain swamp during high water. Care must be taken as to not significantly impact the root masses of large trees.

A trail network is proposed for the northern property by Parks Canada managers (Parks Canada, 1995¹⁸). The trail network design should be integrated with the restoration of a natural flooding regime. Portions of the dyke could be used for the foundation of the trail. A bridge should cross the restored channel. Bridge abutments should be located on existing fill. Boardwalks would convey pedestrian and bicycle traffic across breaches in the dyke. If a trail loop is desired across the floodplain swamp, the trail should consist entirely of boardwalk (Figure 8). A fill trail would impact



Figure 8. Boardwalk across floodplain swamp of Kanaka Creek Regional Park.

¹⁸ Parks Canada, 1995. Fort Langley National Historic Site Management Plan. Parks Canada, Vancouver, BC. 41p.

the hydrology of the property, and likely change the plant species assemblage of the swamp. A primary objective of any trail network within the northern property should be to retain the species assemblage of the floodplain swamp.