Information Sheet on Ramsar Wetlands (RIS)

1. Name and address of the compiler of this form

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Designation date | Site Reference Number

Ellen Zimmerman, The East Kootenay Environmental Society spokesperson, upper Columbia Valley
Box 1496, Golden, BC V0A 1H0, Ph/Fax: 250-348-2225
Email: ellenzim@uniserve.com
With research by Paula Rodriguez de la Vega, bio.
For The East Kootenay Environmental Society, Box 8, Kimberley, BC V1A 2Y5
Ph: 250-427-9325, fax: 250-427-3535, email: ekes@ekes.org Website: www.wildsight.ca
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2. Date this sheet was completed/updated: May, 2004

3. Country: Canada

4. Name of the Ramsar site: Columbia Wetlands

5. Map of site included

a) hard copy (required for inclusion of site in the Ramsar List): *yes* x -or- *no* ☐

b) digital (electronic) format (optional): *yes* x -or- *no* ☐

6. Geographical coordinates

The Columbia Wetlands complex is those lands in the East Kootenay region of British Columbia, Canada which are subject to flooding of the Columbia River from Canal Flats north to the head of the Mica Reservoir.

The selected Ramsar site is located within the larger Columbia Wetland complex. It consists of two polygons located in the upstream and downstream areas of the Windermere Lake, several kilometers apart (Windermere Lake is not included in the selected Ramsar site). The smaller, southern most polygon has its southern boundary located just north of Fairmont Hot Springs in the marshy area forming Tatley slough and the northern boundary at the south of Windermere Lake. The southern unit has a centre at 115º 54' West and 50º 22' North. The larger northern unit has its approximate center at 116º 32' West and 51º 1' North.

7. General location

The Columbia Wetlands are located in the Southeastern portion of the province of British Columbia, Canada. Because the Columbia Wetlands are approximately 180 Km long, several towns and cities are located along its length. These are primarily accessed by Hwy. No. 95, at an 880-Km distance from Vancouver, British Columbia and 350 Km distance from Calgary, Alberta. The following is a list of the centers located along the wetlands from south to north, along with their estimated population, and the administrative region to which they belong.

Name of center (standing)	*Population estimate* [1]	**Jurisdiction**
Canal Flats (U)	753	East Kootenays Regional District
Fairmont Hot Springs (U)	364	East Kootenays Regional District
Windermere	1 273	East Kootenays Regional District
Invermere (C)	2858	East Kootenays Regional District
Athalmere	237	East Kootenays Regional District
Wilmer	332	East Kootenays Regional District
Columbia Lake Indian Reserve	80	East Kootenays Regional District
Radium Hot Springs	583	East Kootenays Regional District
Edgewater	588	East Kootenays Regional District
Spillimacheen	246	East Kootenays Regional District
Harrogate (U)	266	Columbia-Shuswap Regional District
Castledale (U)	Unknown	Columbia-Shuswap Regional District
Parson (U)	Unknown	Columbia-Shuswap Regional District
Nicholson (U)	1 101	Columbia-Shuswap Regional District
Golden (T)	4020	Columbia-Shuswap Regional District
Edelweiss (U)	Unknown	Columbia-Shuswap Regional District
Moberly (U)	Unknown	Columbia-Shuswap Regional District
Blaeberry (U)	636	Columbia-Shuswap Regional District
Donald Station (U)	137	Columbia-Shuswap Regional District

Standing Definitions: U – Unincorporated community; C – City; T – Town

1. Information was adapted from the 1996/2001 electoral censuses.

8. Elevation: 813m maximum to 777m minimum above sea level

9. Area

15,069.8 ha. This includes the provincial lands encompassed by the Columbia Wetlands Wildlife Management Area, the Canadian Wildlife Service (CWS), National Wildlife Areas, BC Parks and reserves, and lands owned by the Nature Trust of BC and leased to and managed by either the CWS or the Province. The proposed area does not include First Nations reserve lands or private lands.

10. Overview

The extensive wetlands of the upper Columbia River are one of the longest continuous wetlands in North America, the only remaining natural portion of the Columbia River within Canada and support a spectacular array of wildlife. The majority of this wetland system is contained within the Columbia Wetlands Wildlife Management Area.

The Columbia Wetlands floodplain is recognized as having regional, provincial, national, and international significance. The province of British Columbia has legislated the crown land portion of the Columbia Wetlands as a Wildlife Management Area under the BC Wildlife Act. The Canadian Wildlife Service has designated properties at Wilmer, Brisco, Spillimacheen and Harrogate as the Columbia National Wildlife Area. In recognition of its global ecological importance, in 2000, the Columbia Wetlands were selected from a number of Canadian applicants to be a partner in the Living Lakes Network, an international organization created and coordinated by the Global Nature Fund and the German Environmental Aid Association.

The Columbia Wetlands are a contiguous mosaic of diverse wetlands, aquatic and riparian habitats, including open water, river channels, sloughs, marshes, grasslands and shrub and forest communities. The most prevalent habitat type is Marsh. Because so much of the Columbia River's wetland

ecosystems have been lost through damming, draining, dyking and flooding, the Columbia Wetlands' importance for migratory birds and other wildlife is especially critical. During spring and fall migration periods, tens of thousands of individual birds representing hundreds of species can be found resting and feeding in the Columbia Wetlands.

The Columbia Wetlands are not just important for breeding and migratory habitat for waterfowl, wading birds, songbirds and raptors. The Wetlands also support spawning and rearing habitat for a number of indigenous and endemic fish species and provide important habitat for ungulates, large predators, numerous furbearers, small mammals, amphibians and reptiles.

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11. Ramsar Criteria

1 • **2** • **3** • **4** • **5** • **6** • **7** • **8**

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12. Justification for the application of each Criterion listed in 11. above.

Criterion 1:

The Columbia Wetland area is the largest of its kind in British Columbia, or elsewhere in the Pacific Northwest of North America, and contains the last free-flowing section of the Columbia River in Canada. 95 percent of the Columbia Wetlands remain in their natural, dynamic state and support a rich mosaic of diverse and important wildlife habitats, and leaving many options available for management. The diversity of habitats and related wildlife stem from regionally singular geomorphic history, hydrological conditions and climate. These wetlands support important, intricate food chains that play a key role in the water cycle, and as resting and nesting habitat for migratory and resident birds.

The Columbia River Wetland Complex is the headwaters of trans-boundary Columbia River which, after flowing in two directions through southeastern BC and Washington, empties into the Pacific Ocean, just west of Portland, Oregon. The Columbia River and wetlands are the only remaining natural stretch of this river in Canada. This is also the largest intact wetland in the region.

Please see section 18 for more details.

Criterion 2:

The following species which are present in the site were found to have vulnerable, endangered or threatened status in either the IUCN Red List; CITES Appendix I; Environment Canada (SARA / COSEWIC); and/or the Convention on Migratory Species (CMS):

- Bull trout (*Salvelinus confluentus*): IUCN Red List
- Peregrine falcon (*Falco peregrinus*): CITES Appendix I and Environment Canada
- Badger (*Taxidea taxus*): Both *jacksoni* and *jeffersonii* subspecies are considered as 'endangered' by Environment Canada
- Grizzly bears are classified as "extirpated" by Environment Canada

Criterion 3:

The Columbia wetlands contain a regionally unparalleled diversity of habitat types, 16 in all. Around 216 species of birds and mammals are known to occur in the wetlands and this variety of habitats and vertebrate species is regionally significant. Pedology et al (1983). The Columbia Wetlands perform a critical role in the East Kootenay Trench ecosection, of which 61% is suitable as habitat for waterfowl

while 88% of the area is of some importance in meeting the seasonal needs of waterfowl and water-dependent bird species, and 50% of it is important ungulate winter range (Pedology et al., 1983).

Criterion 4:

The Columbia Wetlands provides nesting and rearing capacity important for over 180 species of birds and support upwards of 24 nesting pairs of osprey (*Pandion haliaetus*) in the second highest known density of nesting osprey in BC Pedology et al (1983). The Columbia Wetlands provide critical habitat in winter months to wildlife populations that migrate to higher elevation during the rest of the year in the Canadian Mountain Park ecosystems. The spectacular spring migration of tundra swans is an event heralding the change of seasons. 1200 swans have been counted in single day counts (1977, spring: Pedology et al (1983). Single day counts have recorded 15000 ducks in 1976 and 30,000 American coots in 1967 fall Pedology et al (1983). Band records throughout the western states of North America as well as central and South America have tracked birds breeding and migrating though the Columbia Wetlands. In addition, these wetlands are also home to the second largest concentration of Great Blue Herons in western Canada with a colony of more than 300 pairs. Large nesting concentrations of bald eagles and osprey take advantage of the many non- sport fish species as their main food source.

Among the most representative bird species that use the wetland are ducks, geese, swans, grebes, loons, coot, sandhill cranes, white-faced ibis, white pelicans, great blue heron communities, American bitterns, Trumpeter swans, red-neck grebes, short-eared owls, flammulated owl, bald eagle and white sturgeon. Mammal species relying on this wetland/grassland ecosystem also include moose, black and grizzly bear and up to 90% of the elk and 70 % of the deer population of the region Pedology et al (1983) in the Rocky Mountain Trench, apart from various other smaller furbearers. Finally, other species of no lesser importance, such as the painted turtle, have also been identified in the area.

On the assumption that about 45% of the winter population of western Canada geese consists of pairs that will nest the following spring, the approximately 800 nesting pairs in the wetlands represent about 3% of the total of breeding pairs for this sub-species. Pedology et al (1983).

Criteria 5 and 6:

On the basis of direct census the wetlands are known to support in excess of 30,000 coots during the fall migration Pedology et al (1983), p.43. Spring counts have totaled in excess of 10,000 swans, geese and ducks (1,200 swans, 2,000 geese, 1,000 diving ducks, and 7,000 dabbling ducks). Pedology et al (1983). 15,000 ducks of all species in the autumn and more than 1200 (1977) tundra swans (*Cygnus columbianus*) in the spring have been counted in single day bird counts (1977), Pedology et al (1983).

The estimated average annual production of some 2,000 western Canada geese (*Branta canadensis moffitti)* represents, after fall hunter mortality of some 45%, about 1% of the total estimated North American winter population of about 120,000. Pedology et al (1983).

Criteria 7 and 8:

11 indigenous fish species: bull trout (*Salvelinus confleuntus*), burbot (*Lota lota*), cutthroat trout (*Oncorhynchus clarki*), largescale sucker (*Catostomus macrocheilus*), mountain whitefish (*Prosopium williamsoni*), northern pikeminnow (*Ptychocheilus oregonensis*), peamouth chub (*Mylocheilus caurinus*), rainbow trout (*Oncorhy mykiss*), redside shiner (*Richardsonius balteatus*), torrent sculpin (*Cottus rhoteus*) and chiselmouth chub (*Acrocheilus alutaceus*); and 4 introduced: brook trout (*Salvelinus fontinalis*), kokanee (*Oncorhynchus nerka*), largemouth bass (*Micropterus salmoides*) and pumpkinseed (*Lepomis gibbosus*), which depend on the Columbia River and Wetlands.

The Columbia Wetlands represent an important spawning and feeding area as well as migration path for several dependent species, notably chislemounth chub, bull trout and kokanee salmon. Rocky mountain whitefish, ling cod (burbot), and several varieties of trout all breed in the Columbia River, and the rare chiselmouth chub is known to spawn and carry out its entire lifecycle in the Columbia Wetlands.

Kokanee were introduced from 1982 to 1985. In 1990 an estimated 360,000 to 500,000 kokanee returned to spawn in the headwaters of the Columbia. The kokanee have taken over the spawning beds of the original salmon populations, and use the wetlands for migration between spawning habitat and juvenile/adult habitat. Bull trout preys on kokanee eggs.

Sources*:* Department of Fisheries and Oceans/Ministry of Water, Land, and Air Protection, Fish habitat Inventory and Stream Summary (FISS) Maps.

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13. Biogeography

a) biogeographic region:

The Columbia Wetlands fall within the 1º 19´ 12´´latitude: the Rocky Mountain Biogeographic Province. The stretch of the Columbia River in British Columbia that extends from Invermere to Donald spans two biogeoclimatic zones (BGCZ): the Interior-Douglas Fir (IDF) zone, characterized by the drier interior climate found in the B.C., and the Interior Cedar-Hemlock (ICH), which is the wetter climate zone found in the interior. (BC Ministry of Forests 1991).

b) biogeographic regionalization scheme

M. Udvardy's "A Classification of the Biogeographical Provinces of the World" IUCN. 1975.

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14. Physical features of the site

Physiography

The Columbia wetlands are along a low gradient (19cm/km, 1 ft/mi) portion of the Columbia River, near its headwaters. The floodplain is 3-5 km wide and is dominated by wetland and sedge habitats. The main channel of the Columbia River meanders from side to side and around the alluvial fans at the outflows of the various tributaries. The damming effect of these fans has created Columbia Lake, Windermere Lake and the shallow floodplain areas that form the Columbia Wetlands. Marshes and ponds have formed within the bends of the river, forming an almost continuous wetland.

Soils

The brunisolic, chernozemic, gleysolic and regosolic soil orders are present in the Columbia River Wetland Complex. Because of the periodic deposition of materials by water, the gleysolic and regisolic orders dominate the marsh system proper. Brunisolic and chernosemic soils are confined to better drained areas. The fluvial process forms the parent materials for the wetland soils on an ongoing basis. From Canal Flats to Golden, fine texture materials (silts and fine sands) are deposited and host aquatic plant communities. North of Golden, the Kicking Horse tributary and steeper gradient produce coarser textured, better-drained sediments that support forest and shrub dominated vegetation. (Pedology consultants, 1983.)

Water quality

Water quality is excellent with some issues related to flows off golf courses and from septic fields in the Invermere and Fairmont areas. The river waters are silt laden for the spring and summer period due to glacial water sources on many of the tributaries in the Purcell Range. Water depths are generally less than 3 m.

Hydrology

The Columbia River Wetland Complex is a remarkable landform over 1600 Km long and 3 to 5 Km wide. The Columbia River flows north from its headwaters at Columbia Lake, into Lake Windermere and north another 20 kilometers past the community of Golden, where it flows into the Kinbasket Reservoir, the impoundment resulting from the Mica Dam at Revelstoke. From Revelstoke, it flows south into Lake Revelstoke and the Arrow Lakes before crossing the Canada-U.S.A. border just south of Trail, British Columbia. From Columbia Lake to Donald, the Columbia River drops less than 65m (200ft) in 180Km of valley. As a result, the main channel of the Columbia River meanders from side to side and around the alluvial fans at the outflows of the various tributaries. Marshes and ponds have formed within the bends of the river, forming an almost continuous wetland.

The flow of the Columbia River at Fairmont Hot Springs, at the south end of the proposed Ramsar site, ranges from an average high of 35.6 m^3/s during the spring freshet in June to an average of 3.83 m^3/s in January. At Donald Station, at the north boundary of the proposed Ramsar site, the corresponding averages are 528 m^3/s and 32.4 m3/s respectively. Relatively high flows can persist well into summer depending on the snow-loads of its headwater streams. The low gradient of the Columbia River from Columbia Lake to Golden (l9 cm/Km) and from Golden to Donald Station (47 cm/Km), the flat relief of the valley floor, seasonal flooding and the damming effects of the numerous fans of tributary streams maintain the water table above or near the ground surface for most of the summer period. The river level will change directly in response to changes in discharge while water level in the wetlands will change at varying rates depending on their degree of connectedness to the river channels.

These ideal conditions result in an incredible array of marshes, ponds, swamps, flowing water and standing water. Hydrological conditions are a dominating influence throughout the wetlands, which are fed by over 80 mountain streams. The Columbia River is very dynamic with major spring freshets that flood out of the channel and into the surrounding wetlands on a regular basis, driving the ecology of these wetlands. The majority of the wetlands fill from the river in spring, then water levels decline slowly over the summer and fall until many of the wetlands are dry by early winter.

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15. Physical features of the catchment area

Location, Surface Area and General Features

The upper Columbia River Valley is located in the Rocky Mountain Trench in southeastern British Columbia, Canada. In all the valley is about 225 kilometers long between 50º 09’ north latitude, 114º 56’ west longitude and 51º 32’ latitude and 117º 16’ longitude. The width of the valley varies from 3.2 Km to 12.8 Km and covers approximately 111,014 hectares. Northward from the source of the Columbia River at Canal Flats, the Rocky Mountain Trench has the appearance of a wide, eroded valley with an uneven bottom. The Columbia River channel is at the lowest elevation on the eastern side. Columbia Lake is at 810 meters and Windermere Lake at 799 meters above sea level.

On the west side, the Purcell and Selkirk Mountains stand as remnants of ancient volcanoes reaching heights of over 3000 meters. On the east, the more ragged peaks of the Rocky Mountains are the younger geological feature. Formed by uplift, the Canadian Rockies also reach heights of 3000 meters. The towering peaks of both ranges remain snow-capped in summer. There are no foothills and the mountains seem to grow directly from the valley bottom except for intermittent benches.

General Soil Types

Above the Columbia River Channel throughout the length of the mapped area, the trench bottom is occupied by till deposits with a rolling surface, broken, here and there, by rock outcroppings and by the coulees of streams. Dark Brown soils, brown wooded soils, gray wooded soils, podzolized gray wooded soils, wigwam soil complex, regosolic spoils and organic soils (deep peat). The topography of the region consists of rough mountainous land, rock outcroppings, bluffs and ravines, swamp, ponds, and lakes.

General Land use: Historic/current

The Columbia River system is of great significance to the K'tunaxa / Kinbasket First Nations. The Columbia Lake Band presently lives on the shores of Columbia Lake. The wetlands have a long history of occupation by indigenous peoples. Humans have relied on the Columbia River system for thousands of years. In Windermere, one of many archaeological sites in and around the Columbia Wetlands, artifacts dating from 5,000 to 7,000 years ago have been found. Camps and settlements of the K'tunaxa people, as well as dozens of underground pit houses of the Shuswap people are located between Canal Flats and Golden. Prior to the development of hydro-electric projects downstream, the Columbia River was a major salmon river. The salmon were not only an important staple for the K'tunaxa peoples at various times throughout their long history but were also traded in exchange for buffalo meat with plains natives.

The Columbia Wetlands continue to hold important cultural values to the indigenous peoples. In addition, the wetlands provide more recently established communities with opportunities for hunting, fishing, trapping, wildlife viewing, nature study, recreation, tourism, spiritual development, and scientific research.

Two First Nations bands of the K'tunaxa Kinbasket Tribal Council have traditional lands adjacent to and encompassing the Columbia Wetlands Wildlife Management Area. The Shuswap Band Reserve is located near Athalmere and the Columbia Lake Band at the south end of Windermere Lake. Their traditional territory includes most of the Kootenay region and extends southwards into Montana and Idaho, in the United States. Traditional activities include hunting, trapping and fishing as well as harvesting of natural flora. Current land uses include agriculture, primarily ranching, beef cattle production, hay and forge crops, commercial forestry, (harvesting and processing), mining, wildlife viewing, trapping, hunting, and tourism.

Climate

The high mountains on either side of the wetlands dominate the climate. The Selkirk and Purcell Mountain Ranges to the west create a barrier against moist maritime Pacific air. In winter, the Rocky Mountains tend to protect the area from the cold, continental arctic air that covers the prairies for prolonged periods. Sometimes this air mass does cross over resulting in periods of –20°C for one to three weeks annually. The mean summer temperature in the area is 16° C.

Average summer rainfall is 16.5 cm. In winter, average snowfall in the north end is greater (178 cm) than in the south end (81 cm).

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16. Hydrological values

The Columbia River wetland ecosystem also performs essential biological functions. Vegetation and soils reduce the impact of floods by slowing and storing floodwater. Acting as large sponges, wetlands soak up water from rain-storms, snow and glacier melt and then release it gradually, over

time, to provide streams and groundwater with a steady supply of fresh water. This function serves to greatly reduce the likelihood or severity of downstream flooding. Severe floods occurred on the Columbia River and its major tributaries in 1894, 1916, 1948, 1972 and 1974.

Due to the glacial origins of the tributaries of the Columbia River, they are cold and carry very high sediment loads which have assisted in the creation of the Columbia wetlands through the damming effect of their deltas. The marsh system has a dynamic nature due to annual inundation and active fluvial processes that result in continuous habitat changes. The Columbia Wetlands Wildlife Management Area is subject to large annual fluctuations in water level which in turn affect the species utilizing the river and wetlands as well as human use of the river and wetlands

Typically, the water discharge is low and stable during the winter (snow accumulation) with high water occurring in spring (beginning of snowmelt) and continuing throughout most of the summer (snow and glacier melt) with river levels beginning to decline by August and returning to near winter flows by the end of September. Normally, minimum flows occur in late February or early March. The wide range in discharge over a single year is a result of much of the volume of the Columbia River originating from snowmelt. The date when the spring freshet begins is variable, depending on the prevailing temperature. Peak flows are also dependent on weather and depth of the snow pack and therefore will generally be greatest in years of high precipitation. BC Hydro maintains a number of snow courses in the upper Columbia Drainage where the snow pack is monitored from January to May in order to predict the volume of runoff into the basin.

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17. Wetland Types

a) presence:

Inland: **L • M • N • O • P • Q • R • Sp • Ss • Tp Ts • U • Va •**
Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:

O, Ts, Tp,M, P, W, Xf, Xp, N, Y, U

Refer to Table 1 (below) for an overview of habitat types and the corresponding area (as %) covered by them.

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18. General ecological features

1. The Columbia Wetlands is comprised of several riparian and wetland habitat classes within the Interior Douglas-fir and the Interior Cedar-Hemlock Biogeoclimatic Zones (Braumandl and Curran, 1992). The wetlands lie within several variants:
    a. The Undifferentiated Interior Douglas-fir variant exists from Canal Flats to Invermere.
    b. The Kootenay Dry Mild Interior Douglas fir variant occurs from Invermere north to the Blaeberry River.
    c. The Kootenay Moist Cool Interior Cedar Hemlock variant exists on the west side of the wetlands from the Spillimacheen to the Blaeberry Rivers.
    d. The Golden Moist Warm Interior Cedar Hemlock variant occurs from Blaeberry River to Donald.

2. The vegetation in the wetlands is determined by the impact of seasonal flooding and the interaction with local soils and climate. Considerable effort went into the habitat classification mapping in the "Opportunities for Conservation and Recreation Development in the Columbia River Wetlands" study (enclosed as Reference). A summary of the habitat types and the area of each type are given Table 1.

Table 1. Summary of Habitat types and Areas for the Columbia River Wetlands (*Pedology consultants, 1983*).

HABITAT TYPE	DEFINITION	% OF AREA
MARSH	Peat-filled wetlands	35.18
WATER	Standing and flowing water	31.32
DECIDUOUS FOREST	Deciduous dominated forest	12.40
CONIFEROUS FOREST	Conifer dominated forest	4.17
MIXED FOREST	Mixed conifer and deciduous forest	6.05
ANTHROPOGENIC	Land modified by Humans	4.58
MEADOW	Land dominated by Grass species	0.39
NON-VEGETATED	River bars and unvegetated areas	1.54
POND	Small water bodies	0.09
SWAMP	Wet areas dominated by shrubs/trees	0.09
SHRUB THICKET	Shrub dominated areas	4.19
TOTAL		100.00

a) Marsh habitat types.

This is the most prevalent habitat type, covering a total of 9,219 ha (35% of the study area). Marshes are highly variable and different plant communities occur, depending on site-specific conditions. Marsh units were classified as M1 (15% of the study area) if they have permanent standing water and are dominated by cattail and bulrush. Marsh units classified as M2 (20% of the study area) have periodic standing water and are dominated by sedges and horsetail. Please refer to Pedology et al. (1983) for more details.

b) Water Habitat types

Water habitats have been divided into 4 habitat types on the basis of flow, depth and percentage of aquatic plant cover. These habitats occupy a total of 8,027 hectares and account for 31% of the study area.

c) Forest habitat types

Three forested habitat types were mapped – deciduous, coniferous and mixed. These account for 22% of the study area. Deciduous habitats are found along levees and stable portions of the floodplain, and are typically composed of large, old cottonwood trees with a thick shrub cover of red-osier dogwood, alder, rose and willow. Mixed forests as

well as coniferous habitats occur where soils have better drainage, usually on the higher parts of the floodplain and fluvial fans.

d) Shrub thickets

Shrub thickets occur within the wetlands in areas adjacent to water bodies, along levees and on alluvial fans. Shrub thickets total 1,100 ha and make up 4% of the study area. These have been mapped as two habitat types, depending on moisture regime. SM1 communities have the water table at or near the surface, while SM2 sites have relatively mesic soil conditions.

e) Other habitat types

Less extensive, but nonetheless valuable, habitat types include swamp habitats (23 ha), ponds (23 ha), meadows (102 ha) and non-vegetated areas (405 ha). Together these make up 2.1% of the study area. Non-vegetated areas include river bars or lake edges that lack appreciable cover.

f) Anthropogenic map units

Only 1,200 ha (4.6% of the study area) are described as "anthropogenic", which is defined as created or significantly altered by human activity. These are mostly abandoned or cultivated lands along with gravel pits, log dumps and residential areas. Most of these are located in the private lands that are not included as the subject of this application.

It is significant that the Columbia Wetlands remain largely undeveloped. Those habitat types that can be considered true wetlands are dominant: marshes, swamps, open water, fens and non-vegetated sites together account for 17,877 hectares, or 68% of the study area (note: the study area includes private lands that are not part of the Ramsar site). Furthermore, the present hydrologic conditions preclude intensive commercial, agricultural, or urban development of the area.

Habitat types and complexes occupy about 16,000 hectares (61% of the study area by Pedology et al. 1983). Habitat types of less general importance to waterfowl but which provide some specific needs include forest deciduous and forest mixed units used by tree nesting waterfowl, passerines and raptors and permanent flowing water of importance to molting and fish-eating waterfowl. In total about 88% of the study area is of some importance in meeting the seasonal needs of the various waterfowl species (Pedology et al. 1983).

Birds breeding and migrating through the wetlands have been found in many U.S. states, and band recoveries there indicate that ducks and geese from the marshes are found throughout Washington, Idaho, Oregon, California, Montana, Utah, Colorado, and Wyoming at other times of the year.

Seventy five percent of the Wetlands have the seasonal capability to support ungulate species (Pedology et al. 1983). Substantial winter use of the wetlands by white-tailed deer, elk, moose, and mule deer occurs on forested, marsh, meadow, swamp, and shrub thicket habitats approximating 50% of the entire area. In summer, white-tailed deer and cow and calf moose depend on much of the submergent vegetation.

The intricate connections between the myriad of plant, invertebrate, and vertebrate life and the non-living components of the wetlands have not yet been studied in detail. Much remains to be discovered.

The Columbia River's adjacent riparian areas have also been identified as important connectivity corridors for wildlife movement. Many riparian and wetland animals depend on these natural corridors for their north-south movements.

19. Noteworthy flora:

Vegetation on levees and in some slightly drier areas includes trees such as white spruce (*Picea glauca*), black cottonwood (*Populus trichocarpa*), and aspen (*Populus tremuloides*), and shrubs such as willow (*Salix lasiandra*), alder (*Alinus tenuifolia*), rose (*Rosa nutkana* var. *hispida*) and red-osier dogwood (*Cornus stolonifera*). On the floodplain itself, there is a mosaic of emergent species, including hard stem bulrush (*Typha latifolia*), cattail horsetail (*Equisetum hyemale, Equisetum arvense*) which provides the bulk of the diet of the elk populations, and sedges (*carex* spp). There are also a variety of submergents and other aquatic plants such as pondweeds (*potamogenton spp.*), bladderwort (*Utricularia vulgaris*), yellow water lily (*Nuphar variegatum*), water milfoil (*Myriophyllum exalbescens*), muskgrass (*Chara vulgaris*), white water crowfoot (*Ranunculus subrigidus*), arrowhead (*Sagittaria cuneata*), and maiad (*Najas spp.*). (Pedology Consultants et al., 1983).

Floodwaters flowing into floodplain marshes eventually settle, but not before coating aquatic plants with fine silt. When the water of the marshes clears, the result is a general abundance of submergents. Shrub thickets occur within the wetlands adjacent to water bodies, along levees and on fluvial fans. Birch (*Betula occidentalis*) and bluegrass (*poa spp.*) are common. (Pedology Consultants et al., 1983).

Forested deciduous habitat is found along levees and the more stable portions of the floodplain. On fluvial fans and where soils are better drained, such as on higher parts of the floodplain, mixed coniferous and deciduous, and forested coniferous habitat are found. Significantly, north of Golden the alluvial fans, natural islands, and levees host predominately white spruce with a lesser Douglas fir component.

Mature cottonwoods (60-100 years of age) along the main channel provide increasingly rare nesting habitat for raptors and great blue heron. Black cottonwood (*Populus trichocarpa*) is a species of concern because of the high degree of decay and restricted stand recruitment. The natural levees, ranging in width from 3 to 50m, channel the river and support stands of cottonwood and shrubs of variable sizes due to considerable difference in mean snowfall and rainfall (Ohanjanian, 1996). Immature trees are found throughout the Columbia Wetlands. Old growth cottonwoods are found in isolated areas throughout the marshes south of Golden. In many places, however, scattered snags and partially dead trees that remain are accompanied by an understory of birch, alder, willow or shrubs (Ohanjanian, 1996).

Rare Plant Communities

Scientific Name	Common Name	BGCZ/ Site Series	Eco - Unit	Prov. List	New
Betula glandulosa - Equisetum	Scrub birch - horsetail	IDFdm2/06	BH	Blue	No
Carex utriculata - Carex aquatilis marsh	Beaked sedge - water sedge marsh	IDFun/00 IDFdm2/00	SM	not ranked	Yes
Typha latifolia marsh	Great bulrush marsh	IDFun/00 IDFdm2/00	BU	not ranked	Yes

Note: BGCZ stands for "Biogeoclimatic Zone".

20. Noteworthy fauna

Because the Rocky Mountain Trench is an important migration corridor for birds in the Pacific Flyway, the Columbia River and its associated wetlands have many important fauna. Trumpeter swans (*Cygnus buccinator*) and tundra swans (*C. columbianus*) numbering in excess of 1,000 pass through the area during migration. Common loons (*Gaviaimmer*) breed in the shallow lagoons. Most dabbling duck species pass through the valley but mallards (*Anas platyrhynchos*), American wigeon (*A. americana*), and teal (*A.crecca, A cyanoptera,* and *A. discors*) also breed there in large numbers. Among divers common goldeneyes (*Bucephala clangula*) are most common as are redheads (*Aythis americana*) and canvasback (*A. valisineria*) in the fall. Old stands of cottonwood formed on the levees are especially important habitat for such cavity nesters as wood duck (*Aix sponsa*), bufflehead (*Bucephala albeola*) and hooded merganser (*Lophodytes cucullatus*). The wetlands are also important for staging and breeding Canada geese (*Branta canadensis*). More than half of the 9,000 bird population of the western race of Canada geese migrates through the marshes, and over 1,200 pairs are estimated to breed in the area. The value of the marshes to molting geese is not well documented but it is considered to be exceptionally high. Several colonies of great blue herons (*Ardea herodias*) are also situated in the valley. Coots (*Fulica americana*) are summer residents. Ten species of diurnal birds of prey and eight species of owls are commonly found in the area.

21. Social and cultural values

The southeast corner of British Columbia has excellent opportunity to protect and sustain natural wilderness areas. 60,000 people live in this 16,000 square mile region that has one of the most diverse and dense populations of large mammals on the continent. More than 100 000 large mammals from 11 species make their home in the valley.

The East Kootenay contains critical habitats and connectivity corridors for species threatened and endangered in Canada and the United States. It links transboundary conservation and pollution control initiatives through the Rocky Mountains and major river systems such as the Columbia, Kootenay and Flathead. The region encompasses the critical habitats of the Rocky and Purcell Mountains (Rocky Mountain Trench), the headwaters of the Columbia River system and includes pristine wetlands and grassland habitats for birds on the North American flyway.

The Columbia Wetlands are critical to fisheries production for the Canadian portion of the Columbia Basin, being the only non-dammed portion. Fisheries values are primarily sport fishing, no commercial fisheries exists. Non-sport fish production is critical to the bird and wildlife populations. Forestry is an important economic element of the region but there is very little commercial forest found within the wetland area.

At present, the Columbia Wetlands hold important cultural values to the indigenous peoples. In addition, the wetlands provide present communities with opportunities for hunting, fishing, trapping, wildlife viewing, nature study, recreation, tourism, spiritual development, and scientific research.

The history of the region was shaped by interaction between the European explorers and fur-traders and the native people. Most influential among them was David Thompson, cartographer, explorer and naturalist sought a route to the Pacific Ocean and established a number of outposts on the upper Columbia River. Thompson enlisted the help and support of the Kootenay people of the region.

Two First Nations bands of the K'tunaxa Kinbasket Tribal Council have traditional lands adjacent to and encompassing the Columbia Wetlands Wildlife Management Area. The Shuswap Band Reserve is

located near Athalmere and the Columbia Lake Band at the south end of Windermere Lake. Their traditional territory includes most of the Kootenay region and extends southwards into Montana and Idaho. Traditional activities include hunting, trapping and fishing as well as harvesting of natural flora.

22. Land tenure/ownership

(a) within the Ramsar site:

National Wildlife Areas (Jurisdiction of Government of Canada)

The Columbia National Wildlife Area is comprised of four units, three of which are owned by the Nature Trust of British Columbia and leased to the Canadian Wildlife Service. The fourth is owned by the federal Crown.

A. Wilmer Marsh Unit

Created in 1978, this unit is located five Km. west of Radium.

B. Brisco Unit

Created in 1983, this unit is owned by the Nature Trust and leased to the Canadian Wildlife Service.

C. Spillimacheen Unit

Created in 1983, this unit is owned by the Nature Trust and leased to the Canadian Wildlife Service.

D. Harrogate Unit

Created in 1994, this unit is owned by the Nature Trust and leased to the Canadian Wildlife Service.

Columbia Wetlands Wildlife Management Area (Jurisdiction of the Province of British Columbia)

The 180 kilometer long wetlands, located in the Rocky Mountain Trench between Columbia Lake and Donald were designated a Wildlife Management Area by the government of British Columbia. This designation provides for some habitat enhancement, hunting and fishing and for sanctuaries and ecological reserves. Wildlife and ecosystem protection are legislated to receive top priority in all management decisions. Note that two properties are owned by The Nature Trust of BC and leased to the province:

A. RCMP Flats acquired by The Nature Trust in 1980 and leased to the province.

B. Hoodoos/Hofert acquired by The Nature Trust of BC in 2003 and leased to the province, of which 124 ha of the 4037 ha property is included in the Columbia wetlands.

(b) In the surrounding area:

The surrounding lands are for the most part British Columbia Lands, with a percentage of private lands.

23. Current land (including water) use

(a) Within the Ramsar site

The lands are for the primary use as sanctuary for wildlife, to maintain wildlife habitat, for recreational activities that complement the maintenance of wildlife and wildlife habitat, for hunting, trapping, and fishing, for wildlife viewing.

Fishing: Fishing effort for the Columbia Wetlands has been estimated at about 4,000 angler days; 200 days on Windermere lake, 1,000 days on Columbia Lake, and 1,000 on the mainstem Columbia River. Sport fishing is concentrated on rainbow trout, mountain whitefish, and Dolly Varden.

Hunting: Pedology et al (1983) estimated that waterfowl hunting accounted for about 3,000 recreation days per year (1976-1980). Most of this use came from local hunters. Birds breeding and migrating through the wetlands provide significant hunting opportunities throughout the Pacific Flyway. A few elk and moose are harvested from the wetlands. Most ungulates (with the exception of some white-tailed deer) are still on high elevation summer ranges during most of the hunting season.

Commercial wildlife use: There are nine guiding territories that include parts of the wetlands. While there is virtually no guided hunting in the floodplain, the wetlands do provide critical winter habitat for ungulates that are later hunted elsewhere in the guiding territories. About 26 registered trap lines are located wholly or partly in the wetlands. Trapped species include muskrat, beaver, squirrel, mink, marten, and weasel (Pedology et al, 1983).

Communities

The communities of Fairmont Hot Springs, Windermere, Radium Hot Springs, Edgewater, Brisco, Spillimacheen, Harrogate, Nicholson and Donald are located adjacent to the Columbia Valley Wetlands and have a combined population in excess of 1600 full time residents (Statistics Canada 2001). Invermere and Golden are also located in the study area supporting a combined population of 10,575 residents (Statistics Canada 2001). In addition to the permanent populations, the communities in the Columbia Valley have a significant base of part time vacation residents. While not included in census date, they are an economically and culturally significant part of the communities of the trench.

With nearly 200 residents participating in open houses during 1998 these communities played a significant role in the development of the Columbia Wetlands Wildlife Management Plan. Community involvement in the annual Wings Over the Rockies Bird Festival indicates the continued importance of the Columbia River and wetlands to its neighbouring communities. During the 2002 festival, events were held in 7 of the communities in the study area and over 150 local individuals and businesses provided sponsorship for this event in 2002.

Other Land Uses

Other land uses in the area include, farming operations (hay) and ranching; golf courses, hotels, resorts and vacation homes; gravel crushing operations, sawmills, timber harvesting, and tourism. According to the BC Ministry of Sustainable Resource Management Website there are 11 active water withdrawal permits in the project area. These include:

- One permit for processing water.
- Two permits for wetland conservation by Ducks Unlimited.
- Three permits for power storage by BC Hydro.

- Three permits for watering of resort and golf course grounds; and two permits for processes relating to operations at a sawmill in Golden.

(b) in the surroundings/catchment: see Section 16.

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24. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects

(a) within the Ramsar site

Historically, in the latter part of the nineteenth century and up until 1915, human impacts affected the general ecosystem of the Columbia Wetlands. During this time, sternwheelers operated on the main channel of the Columbia River, which was deepened by government dredge. Water control structures were built on side channels to keep water in the main channel of the river. When this era ended in 1915, with the completion of the railway, the dredging ended and the structures slowly decayed and collapsed. Wetlands were also burned so that they could be farmed for hay during this period. Despite this, for almost the last 100 years, the physical disturbances caused by humans have been minor.

The face of the Columbia Valley is changing. Both in the huge new ski resort in Golden and in the expansions to existing ski resorts in Invermere data shows both communities and the previously sparsely settled rural areas in between are experiencing unprecedented levels of population growth. With demand for recreation escalating daily, the effects on the natural area are inevitable. Settlements and communities along the Columbia Wetlands contribute to a sewage disposal problem. The increasingly accelerated growth in both resident and visitor populations and the resultant demand for recreational opportunities may be the biggest immediate threat to the ecological functions of the wetlands. Unrestricted motorized boating affects wildlife, fish spawning and waterfowl. With uncontrolled and increased recreational activities, invasive species may increase or worsen their impacts. The WMA provides objectives that need to be followed but there is no human management plan. No human carrying capacity study has been done for the wetlands.

In the case of natural factors, the glacial silt deposits which make up the bench lands from Canal Flats to Brisco are very susceptible to erosion, land slippage and slope collapse (Kelley and Holland, 1961).

(b) in the surrounding area

Land use in the surrounding area has been much more problematic. Decades of timber harvest and road building have impacted the ecological integrity of lands surrounding the Columbia Wetlands. Residential and commercial construction and development in adjacent communities has and continues to have potential negative impacts. Unplanned and uncontrolled growth and development in rural areas also impacts both the amount of ground water and the amount of waste that filters into the wetlands.

Tourism impacts, notably golf courses built adjacent or near the wetlands contribute to potential eutrophication, with pesticide and fertilizer residues ending up in the Wetlands.

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25. Conservation measures taken

The Ministry of Environment has designated the Columbia Wetlands as a Wildlife Management Area (WMA) under the BC Wildlife Act by provincial Government Order in Council, 1996. This designation affords priority to wildlife considerations under the BC Wildlife Act while human recreational uses and historical uses such as fishing, hunting, and trapping continue. In 1997, the provincial government instigated regulation limiting the horsepower to 10 hp or less of any

conveyance entering the boundary of the WMA. The regulation was designed to keep snowmobiles and all-terrain vehicles off the Wetlands in the winter when 90% of the regions ungulate population depends on an ability to paw through uncompacted snow to reach their food source, the horsetail (equisetum). The regulation was also designed to limit vessels of large motor size and jet boats and jet skis from directly disturbing wildlife, from causing brood separations, nest abandonment, increased preditation, pollution and spreading invasive non-native species. However the regulation as it pertains to vessels was challenged in the courts and struck down, January 2002 by British Columbia's highest court. The courts found that only the Federal government of Canada was able to regulate vessels.

This RIS includes all the lands encompassed by the WMA. The province manages the WMA according to the visions, principles, and objectives noted in section 21 (the Management plan is appended to this application). The Canadian Wildlife Service manages the Columbia National Wildlife Area as a bird sanctuary; certain activities are not allowed. Burgess James Gadsen Provincial Park is also managed to the highest level of protection, with no hunting or trapping allowed.

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26. Conservation measures proposed but not yet implemented

Currently, the EKES, along with another local NGO, has applied for a 10 hp or less restriction under the boating regulations of the Canada Shipping Act. The application was accepted by the agency in charge, the Canadian coastguard, and is being processed. A review and update of the WMA management plan is also underway.

A human carrying capacity study would be of benefit to implement conservation measures on the number of recreation & business permits issued for the Columbia Wetlands. (Although the BC Wildlife Act and WMA have regulations to protect wildlife, there is no official plan on the amount of activity allowed in wetlands).

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27. Current scientific research and facilities

Research on the population status of burbot (ling) is presently ongoing (Hutchinson).
Badger study in adjacent grassland habits. (Sylvan Consulting)
Cottonwood study (Ohanjanian/Jamieson)
Bat surveys in the general area (Holroyd et al. 1993, Rasheed and Holroyd, 1995)
Freshwater fishes of the Columbia Basin, B.C. Peter Troffe Royal BC Museum. Includes checklist of native, rare, and introduced fish in Columbia Basin.
Grasses of the Columbia Basin. Heather Stewart. Royal BC Museum.
Small mammals of the Columbia Basin. David Nagorsen. Royal BC Museum.
Territorial mollusks of the Columbia Basin. Phil Lambert. Royal BC Museum.
Surveys for Short-eared Owls and American Bitterns, Columbia basin Trust, 2003
Blue Heron Study/ Columbia basin Trust, 2003

No research facilities exist in the area.

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28. Current conservation education

Two annual spring festivals take place in the area: the Golden Spring to Life Festival, and the Invermere Wings Over the Rockies Festival. Both of these festivals primary objectives are raising awareness, and educating the public regarding the importance of wetlands. In both of these festivals, local schools and community groups participate in educational programs. Friends of the Columbia wetlands kiosks and displays, EKES (see Section 1) brochures, displays, newspaper articles.

Several proposals have been put forward to develop Interpretive/Educational/Informational Centers throughout the valley: the Columbia Wetlands Center (Radium Hot Springs), the Radium Hot Springs visitor Reception Center, The Rocky Mountain Trench Interpretive Center (Golden), the Columbia Reflection Lake Wildlife Viewing Area (Golden) and Lake Windermere Resort (Athalmere).

EKES offers the Magic Basin Field Trips Eco System Awareness School Program to 100 elementary schools of the Columbia Basin to explore the wetlands, grasslands, forest and old growth forests of the region. The program offers teachers of grades 4-7 a curriculum-based program.

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29. Current recreation and tourism

A major highway was built close to the marshes as well as several rapidly developing destination resorts. The opportunities provided by the marshes are available to both locals and visitors and thus add to the attractiveness of the area for tourist development. Wetland tourism is seasonal, peaking during spring and summer. Winter tourism is minimal as most of the winter tourism is concentrated on backcountry skiing at winter destination resorts at high elevation.

Wildlife viewing: This includes activities such as wildlife observation, bird watching, photography, painting, and nature study. Some figures suggest that such activities account for a far greater amount of recreation in the wetlands than hunting and fishing combined (Jamieson, 1996). Pedology et al (1983) estimated that in 1990, non-consumptive recreation in the wetlands accounted for 180,700 user days. Two wildlife-viewing operations (float trips) exist in the Columbia Wetlands.

In the Provincial Parks and Reserve Lands amenities include picnic areas, developed beach, and washrooms. Wetland habitat protection is also included as part of this area. Burgess & James Gadsden Provincial Park comprising 401 hectares is located 8 km west of Golden. This park does not have any formal visitor facilities but Ducks Unlimited dykes provide access to marsh and riparian areas on the Columbia River. It is adjacent to the Trans Canada highway, where a roadside stop provides access.

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30. Jurisdiction

British Columbia Ministry of Water, Land, Air Protection
Canadian Wildlife Service, Pacific/Yukon Region

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31. Management authority

BC Parks, the RCMP Flats (236 hectares at Edgewater) and the Hoodoos / Hofert (124 ha of the 4037 ha property that is within the Columbia Wetlands) are Nature Trust owned and leased to the province and, the Columbia Wetland Wildlife Management Area are managed by:
BC Ministry of Water, Land, and Air Protection
Parks and Protected areas/ Ecological stewardship department
Wayne Stetski, Regional manager
205 Industrial Road G
Cranbrook, BC V1C 7G5
Ph. 250-489-8540 fax: 250-489-8506

Columbia National Wildlife Area
National Wildlife Area Manager
Pacific Wildlife Research Centre
5421 Robertson Road, RR #1
Delta, British Columbia
V4K 3N2
Ph: (604) 940-4700
Fax: ++ (1) 604 946 7022

e-mail: Ken.Brock@ec.gc.ca

(See attached letters of support from CWS, Nature Trust, BC MWLAP)

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ANNEX. Vision, Mission and Goals of the Management Plan

A management plan (attached to the application and referenced throughout this application) collated the best scientific and social information and input available, establishing a vision and principles and goals for the Columbia Wetlands management (the top goals and objectives are included below):

VISION

- The Columbia River Wetlands will continue to function as a flood-plain ecosystem with a complex biological community governed by natural fluvial and ecological processes.

GOALS

- To maintain self-sustaining populations of indigenous fish, wildlife and plant species in the Columbia Wetlands WMA.

- To maintain wildlife populations at the long term sustainable carrying capacity of the natural habitats in the WMA.

- To manage wildlife populations and plant communities to ensure balance and the continuance of all indigenous species.

Based on these goals, "guiding principles" were developed to provide an interpretation of how the vision and goals of the WMA will be achieved in day-to-day management decisions in the WMA.

- Principle 1: All activity that occurs in the WMA must have a neutral or positive effect on wildlife, fish and plant communities. Many of the people consulted saw this principle as a "litmus test" for deciding what kinds of activities should occur in the wetlands.

- Principle 2: Natural fluvial, climatic and ecological processes (flood, fire, natural changes in the river channel) will remain the primary determinant of the condition of the wetlands and other habitats.