

MANAGEMENT PLAN

April 2004



for Columbia Wetlands
Wildlife Management Area



Ministry of Water, Land
and Air Protection

Columbia Wetland Wildlife
Management Area

Management Plan

Prepared by
Environmental Stewardship Division
Kootenay Region
Cranbrook BC

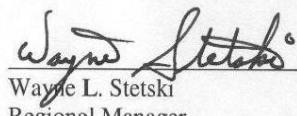
Columbia Wetland Wildlife Management Area

Management Plan

Re-endorsement:

After internal review of the Columbia Wetlands Wildlife Management Area Operational Plan 1998-2002 in March 2004, it was determined that the management direction that was established continues to be relevant and therefore the management plan has been re-endorsed by the Ministry of Water, Land and Air Protection. Other than some minor edits to format, updating agency names and roles and updating the status of the proposed boating restriction regulation, the plan is retained as originally developed in 1998. The Columbia Wetlands Management Plan 2004 will be reviewed in five years, in 2009.

Approved by:



Wayne L. Stetski
Regional Manager
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Date: April 23/04

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Executive Summary

The Columbia Wetlands is one of the largest contiguous systems of wetland habitats in North America. It is situated between Fairmont Hot Springs and Donald in the Rocky Mountain Trench in south-eastern British Columbia. The wetlands stretch for a distance of 180 kilometres and encompass over 13,800 hectares. In 1996 a Wildlife Management Area was established in the wetlands to secure the land base, but allows other activities to take place, subject to the needs of wildlife. This plan provides:

- An overview of the resources of the area.
- A vision, goals and guiding principles for the WMA.
- A list of potential enhancement options.
- Strategies for managing human activities.

Discussions with a variety of interest groups were carried out as the plan was being developed and three public meetings were held, in Invermere, Brisco and Golden. The plan was developed based in large part on that input.

The Columbia Wetlands are a vital component of the Pacific Flyway; provide feeding and resting sites which are used intensively by waterfowl during spring and fall migrations. Canada geese nest in the wetlands as do a variety of dabbling and diving ducks. The deciduous and mixed forest communities that occur near the wetlands are of special importance to cavity nesting ducks and great blue herons. The river and larger water bodies support abundant populations of coarse fish that provide food for mergansers, loons, grebes, osprey, herons, kingfishers and bald eagles. Marsh vegetation, such as cattails and other emergents, provides over-water nesting and feeding habitat for some duck species, marsh wrens and blackbirds. The deciduous forest communities in the WMA provide important habitat for songbirds and cavity nesters. White-tailed deer, elk, and moose make extensive use of the Columbia Wetlands in winter. Beaver and muskrat are common throughout the Columbia Wetlands, and the area is of importance to local mink and otter populations. It is also an important area for several species of amphibians and reptiles.

Two species, the Northern Leopard Frog and the White Sturgeon (Columbia River population) are listed as “critically imperilled” for this area. There is little evidence that either species presently occurs in the wetlands.

The Columbia Wetlands offer opportunities for a range of recreational activities including wildlife viewing, hunting, fishing and trapping. The wetlands and the channels of the Columbia River are used by canoeists and other boaters. In recent years there has been some use of the river channel by jet boats and more recently, by jet-skis. The wetlands are also used in the winter by cross-country skiers and snowmobilers, primarily adjacent to the communities along the wetlands.

Four big game guiding operations in the upper Columbia occupy territories in the mountains on either side of the Columbia Wetlands and there are several traplines in the wetlands. Two

wildlife viewing operations run interpretative float trips in the Golden area. A variety of other operations has started up in recent years or is planned for the future.

The Columbia River system has a long history of occupation by indigenous peoples. Camps and settlements of the Ktunaxa 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 Upper Columbia was a major salmon spawning area. Salmon were an important staple for the Ktunaxa and Shuswap peoples.

Flooding, high water tables and climate limit land capability for agriculture within the Columbia Wetlands. There are two Crown range permits in the wetlands. Commercial forest occurs only on the few sites. Mineral values may occur at depth under the wetlands but would be difficult to access due to the deep overburden of silts and gravel that lie beneath the marshes.

A vision and goals for the WMA were developed to reflect the views of the public concerning this area and to provide direction for the management of the WMA.

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.
- To enhance habitats where there will be no or minimal impact on the natural evolution of the landscape and where enhancement replicates or replaces natural processes.
- To maintain a sense of wildness and solitude in the WMA.
- To maintain the aesthetic quality of the wetlands.
- To provide opportunities for the public to appreciate, study, and view wildlife in their natural habitats.
- To provide opportunities for first nations people to carry on their traditional uses of the area.
- To permit commercial tourism operations to provide opportunities for the public to appreciate, study, and view wildlife in their natural habitats.
- To manage and regulate extractive resource uses that are compatible with the purpose and consistent with the goals of the WMA.
- To provide opportunities for scientific study that will contribute to an understanding of the ecological function and dynamics of the wetlands.
- To provide opportunities for the education of the public about the ecological processes at work in the wetlands and the goals and programs of the WMA.

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.

Guiding Principles:

- **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 we talked to 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.
- **Principle 3:** Only wildlife habitat enhancement projects that do not compromise natural processes in the wetlands and have minimal visual impact, will be considered.
- **Principle 4:** Management effort will be directed at the entire range of species present, with special consideration given only in the case of endangered species.
- **Principle 5:** Endangered or threatened species for which appropriate habitats exist in the WMA, will receive particular attention in the management of the area.
- **Principle 6:** Those uses that encourage the enjoyment of wildlife and natural landscapes will be given priority over other uses.
- **Principle 7:** Traditional uses, as described in the “East Kootenay Table Columbia River Marshlands Agreement” will continue in the WMA.
- **Principle 8:** Traditional use by first nations will continue in the WMA.
- **Principle 9:** A high quality recreational experience will be maintained for those using the wetlands.

Based on these goals and guiding principles, the following management actions will be considered in the wetlands.

Habitat Management

No extensive habitat management will occur, except under specific circumstances. The priority for the next five years will be the acquisition of baseline data and monitoring of vegetation, water quality and in some cases, wildlife numbers and population health. Among the projects that may be considered are:

- **Establishing baseline data on the vegetation of the wetlands.** Monitoring sites should be developed to document changes in the vegetation found in the WMA.
- **Monitoring water quality.** Human activity adjacent to the wetlands could affect water quality and thus fish and wildlife population levels in the wetlands.
- **Documenting the ecological and human history of the wetlands.** A better understanding of the factors that have defined land forms, vegetation and wildlife numbers in the past will assist in managing the WMA in the future.
- **Baseline surveys of fish populations.** The Columbia River supports significant populations of non sportfish that in turn support a wide variety of wildlife species. Potential habitat

changes that could affect these fish populations are difficult to predict without some baseline life history data on all of the fish populations in the system.

- **Status of cottonwoods stands.** Several people have observed what appears to be a decline in vitality of cottonwood stands along the levees in the wetlands. Further work is required to identify the agents causing early decay characteristics in younger and mature trees and determine if there are significant differences between long term mortality and recruitment rates in cottonwood stands.
- **Songbird surveys.** Riparian areas are very important as nesting areas for songbirds. Nesting surveys should be carried out to provide baseline data on their use of riparian habitats in the WMA.
- **Installation of nest boxes for cavity nesting birds.** A variety of birds use cavities for nesting in this habitat type. However, before a major program is initiated, a survey should be carried out to see if a nest box program can be justified. If there are sufficient natural cavities, then such a program may not be productive.
- **An assessment of habitat management options on alluvial fan sites.** An assessment of enhancement and protection options should be developed for areas at the outflow of Horsethief Creek, Forester Creek, Bugaboo Creek and Spillimacheen River. These sites support a mix of deciduous and coniferous forest, shrub and meadow areas. These are very important sites for wintering ungulates and are important nesting areas for a variety of bird species.
- **Browse rejuvenation by slashing or burning.** There is some indication that burning in the wetlands makes more browse available, however there are no good data on this issue. Further work is required on the degree to which burning increases the availability and palatability of browse.
- **Identification of “special habitats” and an inventory of species using such sites.** Clay bank sites used by swallows, very old stands of Douglas-fir along the edges of the wetlands and rubble and steep rock habitats that may be important to some reptiles should be inventoried.
- **Management of cross-valley movement corridors:** Portions of the WMA near Radium Hot Springs and Fairmont will be managed to maintain their value as movement corridors and to maintain winter range values for bighorn sheep and other ungulates. Forest ingrowth is a major problem in these areas and active habitat enhancement may occur.

Wildlife Management

The management of wildlife populations in the wetlands is a shared responsibility between the Canadian Wildlife Service (waterfowl and other migrants) and the Environmental Stewardship Division (ESD) of the Ministry of Water, Land and Air Protection (WLAP) for other wildlife.

- Waterfowl harvest strategies will be developed co-operatively between the CWS and ESD. The Canadian Wildlife Service will continue to monitor nesting success and fall migrant numbers. No seasons and harvests specific to the WMA are planned.

The Management of Human Activity in the WMA

The management of human activity will be based on the vision, goals and principles articulated in this plan. A regulation was proposed in September 1997 that limited access to the wetlands to “motorized conveyances of less than ten horsepower”. This issue was a major concern during the period in which this management plan was being developed and is being pursued. Hunting, fishing, wildlife viewing and boating (using small motors) will remain as important uses in the wetlands with the exception of those places closed under other regulations. Trapping, guide-outfitting and commercial wildlife viewing operations will continue. Grazing by cattle will continue on the permitted areas, subject to range use plans, but will not be considered in other areas. Logging, on appropriate sites, will be considered on a site specific basis.

- Research on all aspects of the Columbia wetlands system will be supported, especially research which addresses habitat and wildlife management issues relevant to the WMA. Education of the public on the values of wetlands will be an important use of the wetlands. Proposals for educational activities will be considered on a case by case basis. All of these activities will be managed consistent with the vision, goals and guiding principles articulated in this plan.
- There are four parcels of land within the wetlands that are managed by the CWS. CWS has updated their management plan for these lands such that their plan are consistent with the management of the WMA.
- The CPR railway is the major industrial intrusion in the wetlands. Many concerns were raised during the public meetings concerning the impact of the railway on the wetlands. Contact will be made with CPR to discuss these concerns and develop a long term relationship with the company to deal with these issues.
- The Ministry and First Nations communities have common concerns in the wetlands. First Nations will be consulted if major management actions are required that go beyond what is laid out in this plan.
- The public, stakeholders and government agencies will be consulted if major management actions are required that go beyond that laid out in this plan. The concept of “river keepers” or other means to involve local people in the ongoing management and protection of the wetlands will be explored.

1.0 Introduction

The Columbia Wetlands is one of the largest contiguous systems of wetland habitats in North America. Although agricultural, residential, commercial and forest development occurs along its edges, most of the marshes have remained in their natural condition.

In 1994, the Regional Land Use Planning process carried out by the Commission on Resources and Environment (CORE 1994) identified this area as a high priority for special status as a conservation area. Both the CORE Report to government and the subsequent East Kootenay Land Use Plan developed by government, recommended “special management” status for this area.

In 1996, the Columbia Wetlands was established as a Wildlife Management Area (WMA). This status secures the land base, but allows other activities to take place such as forestry and mineral exploration, subject to the needs of wildlife. This management plan provides direction for the long term management of the WMA. It consists of the following major components:

- An overview of the resources, with reference to more detailed descriptions in other reports.
- A management vision, goals and guiding principles, potential enhancement options and strategies for managing human activities.
- An appendix describing public input into the development of this document.
- An appendix describing the status of rare and endangered species that use the wetlands.
- An appendix with 1:100,000 scale maps of the WMA.

2.0 General Description of the WMA

Below is a brief description of the resources of the Columbia Wetlands. More detailed descriptions are included in Pedology Consultants et al. 1983, Hennan 1975, Jamieson and Ohanianian 1993, Jamieson 1996, Jamieson 1996a and others.

2.1 Location

The Columbia River Wetlands are situated between Canal Flats and Donald in the East Kootenay Trench Ecoregion in south-eastern British Columbia (Figure 1.). They extend for a distance of approximately 180 kilometres and encompass over 13,800 hectares. The majority of these wetlands are included in the Columbia Wetlands WMA which stretches from Fairmont Hot Springs to Donald. The wetlands between Canal Flats and Fairmont have been included in the East side of Columbia Lake WMA.

Location map

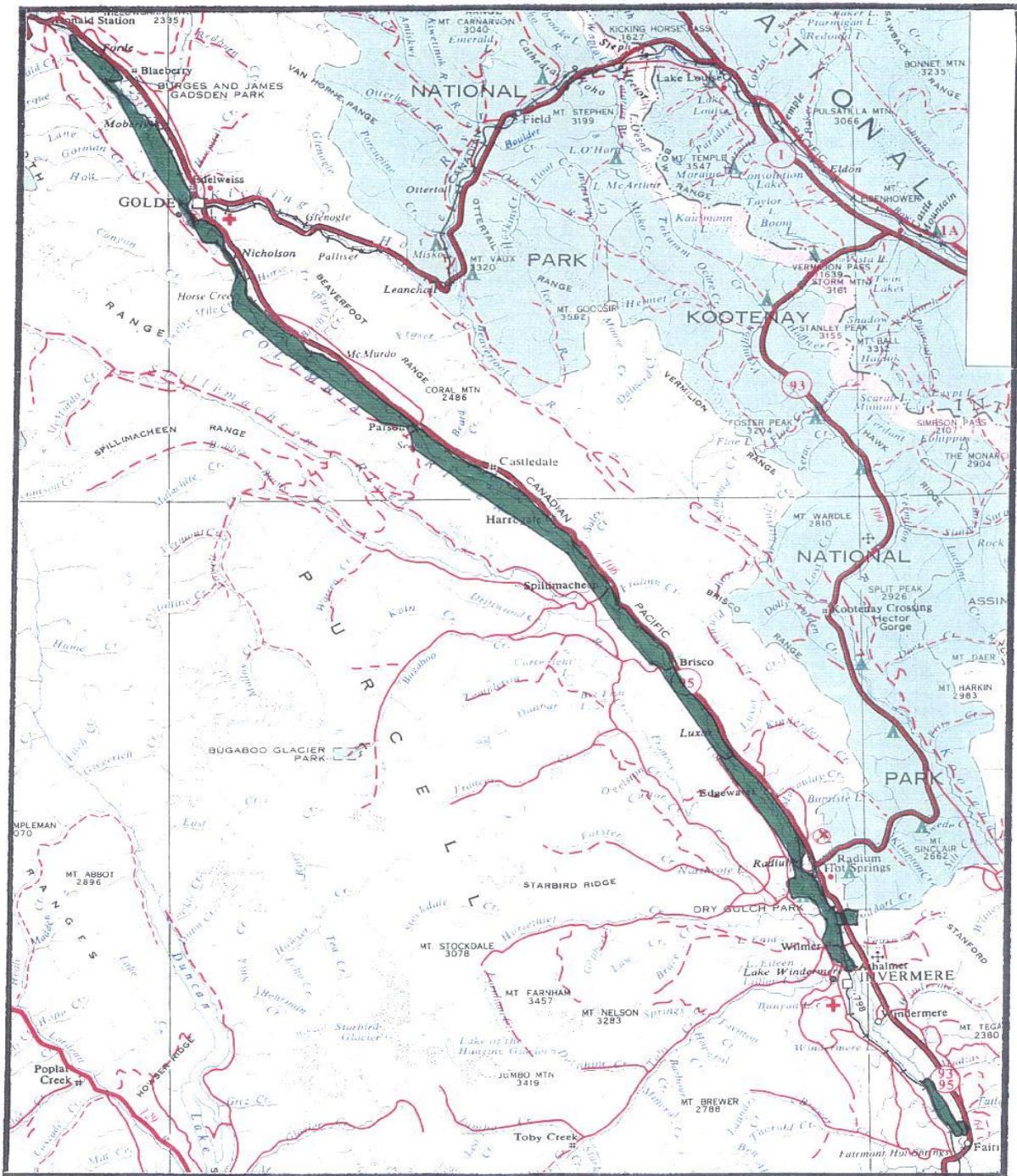


Figure 1. The location of the Columbia Wetlands Wildlife Management Area in south-eastern B.C.

2.2 Land Status

The WMA includes all provincial Crown lands in the wetlands. There are some federal lands and Nature Trust of B.C. lands that are managed by the Canadian Wildlife Service in the wetlands. These lands and one provincial park are not included in the WMA. The adjacent benchlands to the east are almost entirely private or native lands while to the west the land is primarily Crown with some private land associated with the communities of Invermere, Athalmer, Brisco, Spillimacheen and Nicholsen.

2.3 Physiography

The wetlands are located in the Rocky Mountain Trench, a long, wide valley between the Rocky Mountains to the east and the Purcell Mountains to the west. The Trench is 3 to 5 km wide with sloping benches on either side of the valley floor. The Columbia River floodplain is very flat and varies from 1-2 km in width.

2.4 Hydrology

The Columbia River has a very low gradient of 19 cm/km (approximately 1 foot per mile) from Columbia Lake to Golden. 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. 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 (Figure 2.). The combination of low river gradient, the flat valley floor and seasonal flooding keeps the water table near the ground surface throughout the summer.

The hydrological cycle and fluvial* processes of the Columbia River are major factors affecting all ecological processes and values in the wetlands. The deposition of silts in this area during the glacial era (Sawicki 1990) helped to shape the valley and wetlands. Silt deposition (6,568 tonnes km according to Locking 1983) and the deposition of the majority of these silts upstream of constrictions to the river flow created by cross-valley alluvial fans (Quin 1982) are important factors in the ecology of the wetlands. The flow of the Columbia River at Fairmont Hot Springs at the upstream end of the wetlands ranges from an average high of 35.6 m in June to an average low of 3.83 m in January. At Donald Station, at the downstream end, corresponding averages are much higher (528 m and 32.4 m respectively) since the wetlands are fed by over 80 streams draining the mountain ranges on either side of the valley. Severe floods occur on the Columbia River and its major tributaries on an irregular basis (1894, 1916, 1948, 1972 and 1974).

* “Fluvial processes describe the actions of flowing waters that erode river banks, deposit silt and sand and in other ways alter the nature of areas adjacent to waterways.

Air Photo



Figure 2. The marshes and wetlands of the Columbia Wetlands
(air photo 30BCC-916, No. 164), between Parson and McMurdo.

3.0 Resource Values and Land Use

3.1 Vegetation

The vegetation of the wetlands was classified and mapped by Pedology Consultants et al. 1983. A total of 26,208 hectares of wetland, from Canal Flats to Donald, were classified as indicated in Table 1: Bio-terrain mapping is available for a small portion of the wetlands in the Radium Hot Springs area (Ketcheson 1996).

Table 1: Summary of Vegetation Types in the Columbia Wetlands (Pedology Consultants et al. 1983).

TYPE	DEFINITION	HA % OF AREA
MARSH	Peat-filled wetlands	9218.7 35.18%
WATER	Standing and flowing water	8207.1 31.32%
DECIDUOUS FOREST	Deciduous dominated forest	3250.2 12.40%
MIXED FOREST	Mixed conifer and deciduous forest	1586.7 6.05%
ANTHROPOGENTC	Land modified by man	1200.3 4.58%
SHRUB THICKET	Shrub dominated areas	1099.4 4.19%
CONIFEROUS FOREST	Conifer dominated forest	1092.8 4.17%
NON-VEGETATED	River bars and un-vegetated areas	404.9 1.54%
MEADOW	Land dominated by grass species	101.8 0.39%
POND	Small water bodies	22.8 0.09%
SWAMP	Wet areas dominated by shrubs/trees	23.1 0.09%
TOTAL	26207.8	100.00%

These riparian and wetland habitat classes occur within the Interior Douglas-fir (IDF) and the Interior Cedar-Hemlock (ICR) Biogeoclimatic Zones (Braumandi and Curran. 1992.). Vegetation on levees and in some slightly drier areas includes trees such as hybrid white spruce, black cottonwood, and aspen, and shrubs such as “willow, alder, rose and red-osier dogwood. On the flood-plain itself there is a mosaic of emergent species, including hardstem bulrush (or scouring rush), cattail, horsetail and sedges. There is also a variety of submergents and other aquatic plants such as bladderwort, pondweed, yellow water lily and arrowhead in the ponds and marshes.

The WMA also includes bench land areas at Dry Gulch and near Fairmont. These sites support a variety of grassland and forest types typical of the Rocky Mountain Trench These are described in detail in Ketcheson 1996.

3.1.1 Human Impacts on Vegetation

The vegetation in the wetlands is the result of fluvial processes (seasonal flooding, silt deposition, levee creation), interacting with climate and soils over the millennia. However, over the last century, human use has also had an important influence. Today there are almost no conifers growing on the levees adjacent to the main channel. However, in 1890 there was sufficient spruce (some cedar) on the levees to support a mill that was established at Golden in 1890 (H. Mitchell, pers. comm.). The trees were cut and floated down the river to the mill. From the late 1800s until 1915 when the railway was built, the Columbia River was the major artery for transport up and down the valley. Sternwheelers, (generally 60 feet long with a 60 foot barge in front) operated from Golden to Invermere, occasionally going as far as Columbia Lake in the spring. During this period the main river channel was deepened by a government dredge (B. Blakely, pers. comm.) and dams were built across the entrance and exits of the side channels and major wetlands to keep water in the main channel. This action likely altered the water table, annual hydrologic cycle and vegetation in the wetlands. The wetlands were also burned on a regular basis (B. Mitchell and others, pers. comm.) to remove debris so they could be hayed during this period. When the stern-wheeler era ended in 1915 with the building of the railway, the dredging ended and the water control structures slowly decayed. As these structures collapsed and the main channel filled with silt again, the water table in the wetlands probably increased, again altering the vegetation.

In effect what we see today is not an “unaltered natural” system, but a system that has evolved from a system that was heavily altered by human actions early in the century. The status of cottonwood stands and wetland vegetation should be viewed in that context.

3.2 Wildlife

3.2.1 Wildlife Habitat Types

There are several important wildlife habitat types in the wetlands. These are:

- Flowing Water - The Columbia River and side streams flowing into the river. Open Water Lakes and Ponds - Lakes and ponds without emergent vegetation. Marsh - Permanent wetlands with emergent vegetation.
- Shrub Thicket - Willow dominated thickets occurring along the edges of many of the wetlands.
- Sedge Meadow - Seasonally flooded wetlands, generally a combination of mudflats, dwarf scouring rush stands and sedge dominated wet meadows.
- Levee Vegetation - Cottonwood stands with a shrub understory found along the main river channels.
- Mixed forests on alluvial fans - A mix of deciduous and coniferous forest found where streams and rivers enter the wetlands.
- Riparian Flats from Moberly to Donald - An area dominated by coniferous forests types.
- Other wetlands habitats - Bogs, fens and swamp occur in a few areas. Habitats adjacent to the wetlands - Clay cliffs, grasslands and coniferous forests.

These habitat types are based on the vegetation and land form descriptions above, but are presented in a slightly different form to simplify the discussion of habitat enhancement options.

3.2.2 Wildlife Use

The Columbia Wetlands provide seasonal and year-round habitat for a large number of wildlife species.

Migratory waterfowl: The Columbia Wetlands are a vital component of the Pacific Flyway, a waterfowl migration route which stretches from nesting areas on the Arctic Ocean to wintering grounds in South America. The Columbia Wetlands provide feeding and resting sites which are used intensively by several species of ducks, geese, swans and other migrants during spring and fall migrations. More than 1000 tundra swans use the area in the spring; trumpeter swans also appear regularly in migration. Single day counts have revealed more than 15,000 ducks in autumn (Caspell et al. 1979, Kaiser et al. 1977, 1977a, Kaiser Ct al. 1978). Canada geese (1200 pairs) breed and nest in the wetlands as do a variety of dabbling and diving ducks. Nesting success is high for geese since most goslings are hatched before the spring flood, however the annual spring flood makes for relatively poor nesting success for most ground nesting duck species.

The deciduous and mixed forest communities that occur near the wetlands are of special importance to cavity nesting ducks and great blue herons. There are several great blue heron rookeries and at least 24 pairs of osprey in the wetlands (Forbes et al. 1985). Permanent water bodies support abundant populations of coarse fish that provide food for mergansers, loons, grebes, osprey, herons, kingfishers and bald eagles. Marsh vegetation, such as cattails and other emergents, provides over-water nesting and feeding habitat for some duck species, marsh wrens and blackbirds.

Ungulates: White-tailed deer, elk, and moose make extensive use of the Columbia Wetlands in winter. The wetlands were classified as Class 2, 3 and 4 throughout in the Canada Land Inventory; however these areas are associated with benchland areas which are Class I ungulate winter range (Canadian Wildlife Service, 1971). The wetlands are especially important for elk; 90% of the elk in the Upper Columbia basin winter in or adjacent to the wetlands. Estimates from recent aerial surveys indicate winter populations of approximately 200 moose, mostly from Parson north, 500 elk, primarily on the alluvial fans of tributary streams south of Parson and in excess of 1,000 White-tailed deer, found mostly south of Spillimacheen (L. Ingham, per. comm.). Mule deer also use the marshes on occasion, but tend to spend most of the winter on the benchlands above the marshes. In the summer, the wetlands support white-tailed deer and moose while the elk herds move up into the high country on either side of the valley.

Large Predators: Cougar, wolf and coyote occur in the wetlands, primarily in the winter when ungulates are using the area. Black bear use the wetlands in summer and fall. There is little use of the wetlands by collared grizzly bear in the Golden to Donald portion of the WMA (B. McClellan, pers. comm.). Tracks of a large grizzly bear were observed on the river near Brisco in Oct. 1997 (T. Munson, pers. comm.). Prior to 1936 when salmon spawned in the Upper

Columbia, the wetlands were likely a concentration area for grizzly bear (See Appendix H) during the spawning season.

Fur-bearers: Beaver and muskrat are common throughout the Columbia Wetlands, and the area is of great importance to local mink and otter populations. The push-ups created by muskrats are used by a variety of waterfowl for resting and are important nest platforms for Canada geese, black terns and other species. The marshes have been a major source of fur for local trappers (M. Yadernuk, pers. comm.) for several decades.

Small Mammals: A variety of other small mammals inhabit the marshes, however there is little information on these species. Small mammal inventories have been carried out at Wilmer (Simpson and Kelsall 1978) and bat surveys have been carried out in the general area (Hoiroyd et al. 1993, Rasheed and Holroyd 1995).

Passerines (Songbirds): The deciduous forest communities in the WMA provide important habitat for songbirds. Deciduous communities are largely restricted to moist, riparian zones in the East Kootenay Trench, and the Columbia Wetlands provide the largest contiguous tract of this valuable habitat type. This habitat type is of concern in the East Kootenay (Jamieson and Ohanjanian 1993). Some surveys of nesting birds have been carried out in the marshes as part of a larger survey of the Columbia Valley (Leung and Simpson 1994). The Wilmer Unit of the Columbia National Wildlife Area and the alluvial fan of Horsethief Creek are especially important areas for a variety of warblers and other songbirds (L. Halverson, pers. comm.). Recent research by the Canadian Wildlife Service and others have found that deciduous riparian habitats are very important for migrating song-birds, as resting and feeding areas during migration (R. Millikin, pers. comm.).

Raptors: The Columbia valley is a major flyway for many species of hawks and eagles during the spring and fall migration. A wide variety of raptors also use the marshes as summer habitat (Ptingle 1979). Ospreys and bald eagles are very common. Turkey Vultures are seen in this area, although this is close to the northern extent of their range. Peregrine Falcon, Prairie Falcon and other hawks and owls of concern are visitors to the area but there are no known nesting areas.

Cavity Nesters: The Pileated woodpecker is the most important primary cavity excavator and is a forest bird of concern in the East Kootenay (Ohanjanian 1991). This species requires large black cottonwood and western larch trees and snags as nesting habitat. These birds use large diameter cottonwood in the wetlands for nesting and their abandoned cavities are used by a wide variety of other species. Risks to the other habitats they use (logging etc.) increases the importance of these deciduous trees for the maintenance of this species. There are also a wide variety of secondary cavity nesters (birds using cavities created by other species) in the wetlands. Birch snags are also important for tree swallows, violet green swallows, chickadees and other small cavity nesters (R. Ferguson, pers. comm.). There are little inventory data available on their use of the wetlands, although they are common, especially in cottonwood snags (L. Halverson, pers. comm.). Kingfishers and swallows also use cavities excavated in the clay banks along the wetlands.

Amphibians and Reptiles: The wetland and riparian areas of the Columbia wetlands are the largest and most important area in the region for maintaining populations of several species of amphibians and reptiles, including the leopard frog, painted turtle, rubber boa, and other species of management concern in this region (see Appendix H.).

Invertebrates: Very little work has been done on butterflies and moths in this area although there is some information on dragonflies (J. Shepherd, pers. comm.). The provincial museum plans to do some work on freshwater mussels in 1998 in the East Kootenay (S. Canning, pers. comm.). Mussels do occur in Windermere Lake, but are unlikely to occur in the wetlands since they require a gravel substrate on the river bottom.

3.3 Fisheries

In the East Kootenay, fish species diversity is greatest in the larger water bodies, with 17 species present (Jamieson and Ohanjanian 1993 a). The species diversity in Columbia and Windermere Lakes has benefited from their connections to major river systems and from the introduction of many species of sports fish. The Upper Columbia River supports a variety of sports fish including westslope cutthroat trout, rainbow trout, bull trout, mountain whitefish, largemouth bass (in Windermere Lake only), burbot (ling cod) and migrant kokanee. Many non sportfish species are also present throughout the wetlands including pumpkinseed, peamouth chub, northern squawfish, largescale sucker, longnose sucker and redside shiner. (Griffith, 1994). These species are an important food source for many of the wildlife species found in the wetlands. Very little is known about these fish stocks. Burbot are presently being studied in Columbia Lake and their numbers seem to be increasing. (B. Westover, pers. comm.). The upper Columbia River is also an important migration route, particularly for spawning kokanee from Kinbasket Lake.

3.4 Rare and Endangered Species

The species of greatest concern in the wetlands are the Northern Leopard Frog and the White Sturgeon (Columbia River population). Both are listed as Si or critically imperilled in B.C. (BC Conservation Data Centre 1998). There is little evidence that either species occurs at present in the wetlands. Two other species are listed as imperilled (S2), the Prairie Falcon and the Short-eared Owl. Both species have been observed in the wetlands but little is known about their status. There are several species that are listed as vulnerable (S3). Of these species, only one (bull trout) is considered vulnerable (G3) globally. The local status of all of these species is described in Appendix H, along with a description of species which are of local concern. There are also several plants and plant communities that are of concern. These are also described in Appendix H.

3.5 Recreation

Outdoor recreation activities are very important and popular throughout the East Kootenay region. The Columbia Wetlands offer opportunities for a range of recreational activities including wildlife viewing, hunting, fishing, trapping, photography and nature appreciation. The Columbia River provides one of the very few opportunities for a 3-5 day canoe or boat trip through semi-wild country remaining in the Kootenay Region.

3.5.1 Wildlife Viewing

The Columbia Wetlands and adjacent areas provide opportunities for wildlife viewing from Highway 95, from several roads which traverse the floodplain, and from a boat or canoe on the river and wetlands. In early spring elk, deer, bighorn sheep and moose can still be seen on their winter ranges, and waterfowl are beginning to reappear. As many as 1,200 tundra swans have been observed in the wetlands in mid-March, and many geese and ducks have also returned. By mid-April, geese may be observed nesting on the muskrat push ups, islands, and artificial nest platforms built by local rod and gun clubs. Herons can be seen returning to one of the several large heron rookeries found in the wetlands. Nesting birds occupy the wetlands throughout the summer, along with muskrats, beavers and white-tailed deer. By mid-August, the early fall migration begins. Single day counts of 14,000 waterfowl have been observed during the peak of the fall migration in late September, while small numbers of mallards, goldeneye and geese remain in the area until freeze up. By this time, elk and deer are returning to their winter ranges in and adjacent to the wetlands.

Although there are no recent studies, Pedology et al. 1983 indicated that 86,000 recreation days were spent wildlife viewing in 1980 and projected non-consumptive use at 144,000 recreation days in 1990. Both the resident and tourist population has grown greatly since 1980, and it is believed that growth in non-consumptive use of the Columbia Wetlands has increased significantly in recent years. A detailed development plan for wildlife viewing in the wetlands has been carried out (Sylvan 1991). They suggest the development of several viewing sites along the wetlands.

3.5.2 Waterfowl Hunting

Waterfowl hunting is an important use of the wetlands in the fall. In previous decades waterfowl hunting was much more extensive than it is today. In the 1930's there were at least two hunting lodges on the wetlands, catering to bird hunters (W. Wolfenden, pers. comm.). Today, local hunters account for the majority of the hunters. The National Wildlife Area lands at Spillimacheen, Reflection Lake at Golden, Bergenham Wildlife Sanctuary and Burges and James Gadsden Provincial Park are closed to hunting.

3.5.3 Big Game Hunting

The East Kootenay region is one of the most important hunting areas in the province and is recognised internationally as a big game hunting area. The Columbia Wetlands provide critical wintering habitat for deer, elk and moose. The marshes are used extensively by local hunters in September and October.

3.5.4 Fishing

Populations of rainbow trout, bull trout, mountain whitefish and burbot are found in the main Columbia River and lower reaches of tributary streams. Sport fishing is concentrated on rainbow trout in the spring, and mountain whitefish and bull trout in the fall, generally at the mouths of major tributary streams. In general these rivers and streams are relatively unproductive due to their glacial origin.

3.5.5 Boating

The wetlands and the channels of the Columbia River have been used for decades by canoeists and other boaters. In recent years there has been some use of the river channel by jet boats and more recently, by personal water craft (jet-skis).

3.5.6 Winter Use

The wetlands are also used in the winter by cross-country skiers and snowmobilers, primarily adjacent to the communities along the wetlands. Use would appear to be higher at the north end of the wetlands where there are greater snow depths.

3.6 Commercial Wildlife Use

Four big game guiding operations in the upper Columbia occupy territories in the mountains on either side of the Columbia Wetlands. The wetlands provide critical winter habitat for the big game species upon which the guides depend; the wetlands therefore contribute in a very important way to the viability of these guiding operations. Little guided hunting occurs in the wetlands except late in the season.

There are several traplines in the wetlands. Trappers take a variety of wetland fur species, the most important of which are beaver and muskrat.

The popularity of commercial wildlife viewing expeditions has been increasing world-wide over the last ten years. In the Columbia Wetlands, two operations have carried out interpretative float trips for several years, primarily in the Golden area. One unlicensed operator has recently initiated jet boat tours in the Invermere area. A variety of other operations have started up in recent years or are planned for the future, as is discussed later in this report.

3.7 Heritage and Cultural Values

The Columbia River system has a long history of occupation by indigenous peoples and there are numerous archaeological and traditional use sites of importance to native people in the wetlands. Artefacts dating from 5,000 to 7,000 years ago have been found at Windermere, and this is only one of many sites in and around the Columbia Wetlands (W. Choquette, pers. comm.). Camps and settlements of the Ktunaxa 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 hydroelectric projects downstream, the Columbia River was a major salmon river. Salmon were an important staple for the Ktunaxa and Shuswap peoples (see Salmon in Appendix II.).

3.8 Agriculture

Flooding, high water tables and climate all limit land capability for agriculture within the Columbia Wetlands. Opportunities for dyking and conversion of marsh areas to agriculture use are limited by high drainage costs, high dyking costs and poorly drained soils. Attempts to dyke portions of the wetlands in the past have not been successful (E. Rasmussen, pers. comm.). There is very little of the wetland that is in the Agriculture Land Reserve. Where private lands occur in the marshes they are sometimes used for late season grazing at low water levels. There are

two Crown range permits in the wetlands: one at Radium (E. Garbowski) and one north of Brisco at the outlet of the Bugaboo River (P. Feldmann).

3.9 Forestry

Commercial forest occurs only on the few sites with better drainage capabilities, but the extent of this area is limited (Jamieson 1996, Jamieson and Ohanjanian 1993). The majority of potential commercial forest types are found between Moberly and Donald, however most of this area is within the riparian zone and there are substantial limitations to harvesting options. The forest sector indicated during the CORE process that this area was not of importance to their industry.

3.10 Mineral Values

Mineral values may occur at depth under the wetlands, but intensive exploration in the WMA has not taken place and is unlikely to occur due to the deep overburden of silts and gravel throughout most of the WMA. Consequently there are no known mineral occurrences in the WMA (according to MEM's Minfile database), and very little is known of the potential for mineralization. There are currently no active exploration programmes, and there is only a very small amount of incidental overlap with valid mineral tenures (in the Brisco area).

4.0 Planning Process

4.1 Data Gathering

This operational plan is based on the strategic direction provided in the proposal that lead to the creation of the WMA (Jamieson 1996). The recommendations of the Regional Land Use Planning Table concerning the future management of the area and the Regional Land Use Plan were also considered. Management plans from several other areas were consulted (Anon 1990, 1994, 1995, Jamieson 1996a) as well as the Planning Guide to Wildlife Management Areas (Wildlife Branch, Ministry of Water, Land and Air Protection 1996.). A literature review on the impacts of recreational use on a variety of wetland species was carried out.

4.2 Public Consultation

Discussions with a variety of interest groups were carried out as the plan was being developed. Three public meetings were held, in Invermere, Brisco and Golden on Nov. 12-14, 1997. A comment sheet was provided at all of these meetings. An assessment of this input and a review of all the meetings held are included in Appendix I. In January 1998, after all comments had been received, a letter describing what we had heard was sent out to all people that had provided addresses in the registration list for the meetings or through other contacts. Where possible, the weight of public comment on different issues is noted in the text of the management plan. All of the information received during this process is included in a file available at the Wildlife Branch, Cranbrook.

5.0 Management Plan

5.1 Vision and Goals

The following vision, goals and guiding principles have been developed to guide management actions in the WMA. They are based on a draft vision and goals that were provided to interest groups and to those who attended the public meetings. These draft statements were supported by the majority of those who returned the comment sheets.

Vision

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

Almost everyone consulted wanted to see the wetlands remain in a natural state, allowing full rein for natural processes to occur uninterrupted. Several individuals and groups made the point that the Upper Columbia River is the only portion of the main stem Columbia that remains uncontrolled by dam flows. (Wetland and riparian cottonwood habitats are severely restricted in the Columbia Basin as the result of dam construction and other human activities (Jamieson and Ohanjanian 1993)). It is one of the few remaining natural waterways remaining in the entire Columbia Basin.



Photo: By Cheryl Chapman

Goals

Primary Goal

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

There was unanimous agreement among those consulted that maintaining wildlife values should be the major goal in the WMA.

Secondary Goals

Goals for the maintenance of fish, wildlife and plant communities.

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

There was little interest expressed in increasing or maintaining any species at artificially high levels, for any purpose.

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

There was general agreement that all species in the wetlands were important and that management prescriptions should consider the full range of plant and animal species. The health of heron rookeries, for example, should not be compromised by management to increase the numbers of Canada geese.

- To enhance habitats where there will be no or minimal impact on the natural evolution of the landscape and where enhancement replicates or replaces natural processes.**

Most people were opposed to any habitat enhancement projects that would have a major impact on the present ecological processes and aesthetic values in the wetlands.

Goals for Human Use of the Wetlands.

- To maintain a sense of wildness and solitude in the WMA.**

From our discussions with people who use the wetlands it is obvious that one of the major attractions of the wetlands is the opportunity to get away from the noise of human communities and into a natural, quiet landscape. The majority of people consulted appreciated the uncrowded, high quality wildlife viewing and recreational experiences that the wetlands provide. To the degree possible, managers should try to maintain the quality of experience for people using the wetlands. For most people this means a low level of other visitors and other human activity seen or heard.

- To maintain the aesthetic quality of the wetlands.**

The wetlands provide the foreground for an exceptional mountain viewscape. That viewscape is an important attraction both for visitors who enter the wetlands and for those who look down on

the wetlands from viewpoints along Highway 95. It is also very important to the people who live in the communities and on the farms adjacent to the ‘wetlands.

- **To provide opportunities for the public to appreciate, study, and view natural landscapes, plant communities and wildlife in their natural habitats.**
- **To provide opportunities for First Nations people to carry on their traditional uses of the area.**
- **To permit opportunities for commercial tourism operations that encourages their clients to appreciate, study, and view natural landscapes and wildlife in their natural habitats.**

Those consulted generally supported commercial use in the WMA, but only those tourism activities related to the enjoyment of wildlife and natural landscapes.

- **To manage and regulate extractive resource uses consistent with the vision, goals and guiding principles of the WMA.**

Other resource uses (e.g. agriculture, forest harvesting, mineral exploration and development) are permissible, but are subject to the goals established above as well as all applicable legislation. The nature of the landscape is such that there are generally few opportunities for these kinds of activities.

- **To provide opportunities for scientific study that will contribute to an understanding of the function and dynamics of the wetlands.**
- **To provide opportunities for the education of the public about the ecological processes at work in the wetlands and the goals and programs of the WMA.**

5.2 Guiding Principles

The following guiding principles will be applied to ongoing management decisions; they provide an interpretation of how the vision and goals of the WMA will be achieved. They are based on the goals set above and discussions with and comments from the people consulted during the development of this plan.

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 we talked to saw this principle as a “litmus test” for deciding what kinds of activities should occur in the wetlands. One of the greatest difficulties in assessing the acceptability of various uses of the WMA will lie in our ability to determine the potential impacts of human activities. Starting from the premise that any human activity will have some impact, and using this guiding principle, managers can decide and measure this impact and then decide if a particular use is acceptable, and at what level of use. It is likely that some activities

will be unacceptable at any level while others will be tolerable at low levels of intensity, but intolerable at greater intensities. This kind of analysis will form the basis of an assessment of any proposed activity and a starting point for regulating that activity. Part of this assessment will be a consideration of cumulative effects, to ensure that the total impact of human activity does not have a negative impact on wildlife values.

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.

The Upper Columbia River flood-plain is an extensive, unique and mostly “pristine” area in terms of hydrological and ecological processes. The primary objective will be to maintain the wetlands and surrounding habitats in a natural state. Managers will maintain a hands-off approach in attempting to manage or alter major natural processes in the area. This is the message we received from the vast majority of those consulted during the development of this plan. Direct intervention to repair or diffuse natural processes will be considered only where potentially catastrophic changes may occur that will impact on the survival of endangered species or will impact on private lands in or adjacent to the wetlands.

The natural processes that most affect the wetlands are:

Annual Flooding: The Columbia Wetlands are a natural, dynamic system that is changing continuously as a result of annual spring flooding and flood episodes such as occurred in 1948. Flooding can have positive and negative impacts on the habitats found in the wetlands. Horsethief Creek, for example, could alter its course during a spring flood and run into the Wilmer Slough, drastically altering its value as a wetland. In the very long term (100-200 years), this kind of change may be a benefit to the productivity of the area, but in the short term it would have major impacts on waterfowl values and the aesthetics of the area. It would be tempting for managers to try to alter the stream course back to its original channel to maintain present values in the wetlands. More subtle changes (e.g. cottonwood mortality as a result of beaver activity, changes in wetland vegetation as a result of fluctuations in muskrat populations) could provide even more difficult decisions for managers.

Wildfire: There is little data on the pre-historic level of fire in the marshes and what impact that might have had on the original, pre-settlement ecological processes. The adjacent forests burned on a relatively short cycle (40-80 years) in the south portion of the wetlands, but on a longer cycle in the wetter forests at the north end. Natural fires, if they occurred in the wetlands, probably occurred in the early spring and fall at low water levels. From the 1940's to 1960's, fire was used as a management tool to benefit cattle grazing and wildlife use. The most recent management burn was carried out in 1988 at Twelve Mile Slough south of Nicholsen. Recent work on burning in the wetlands (Ferguson 1997) suggests that enhancement burns do not increase the forage quantity in sedge meadow systems, but may be a factor in providing high quality browse.

Until better data are available on historic levels of fire, enhancement burns will be used very conservatively; if at all, with strict guidelines to ensure that all wildlife and plant species are

considered before burning is attempted. Wild fires will be put out with the assistance of the B.C. Forest Service. A “let burn policy” is not an option in this area since there is extensive human activity and private land in nearby areas.

Beaver and muskrat populations: Beaver and muskrat populations are important ecological factors in the wetlands, as are the natural fluctuations of their populations that occur. Beaver can have a major impact on the survival of cottonwood and other deciduous trees. Muskrat alter the density of reed and cattail stands in the process of building their push-ups. These species will be managed conservatively (low rates of harvest) until the dynamics of these species, their food supplies, and predation are better understood. Trapping will continue as a traditional use, subject to the goals and principles expressed here and subject to the annual trapping regulations.

Principle 3: Only wildlife habitat enhancement projects that do not compromise natural processes in the wetlands and have minimal visual impact will be considered.

Most people consulted were emphatic that major human interventions, such as the dyking and water control projects that have taken place at the Creston Valley Wildlife Management Area, should not occur here. In addition, the dynamic fluvial processes that occur (annual flooding and other natural processes), dictate that only relatively minor habitat alterations are possible without excessive expense and high annual operating cost to maintain such structures. In general, the Columbia wetlands do not lend themselves to a high level of habitat enhancement. Rather, the objective will be to allow natural processes to maintain, and at times, alter natural habitats. During the public input process it was suggested that habitat enhancement occur only where local impacts in similar habitats (i.e. loss of cottonwood stands and cavity nesting options adjacent to the wetlands) need to be mitigated. However, the ESD may also need to consider losses in these habitats across the basin and continent, especially where rare or endangered species are concerned. Because habitats are being lost or modified on regional and larger scales, wildlife managers may have to consider the efficacy of enhancements of wildlife habitats or wildlife populations on lands that have been secured for wildlife purposes. Such actions will only be taken for species that presently occur in the wetlands, or did occur in the past.

Therefore, within the constraints imposed by natural biophysical processes within the WMA, efforts may be made to:

- Improve habitat for selected species or species groups to maintain regional populations at desirable levels.
- Introduce or re-introduce species which are endangered or of management concern regionally, provincially or nationally.

In so doing, a concerted effort will be made to keep enhancement techniques as “natural” and “natural-looking” as possible while efficiently achieving the desired results. Nest boxes, for example, would be designed to blend in with the natural vegetation.

Principle 4: Management effort will be directed at the entire range of species present, with special consideration given only in the case of endangered species.

A diversity of wildlife species live in the wetlands. Management effort will be directed at the entire range of species present, except in the case of endangered species. One species will not be

increased at the expense of another, except in the case where recovering an endangered species requires the control of another species (a predator perhaps) for a specific time frame.

Principle 5: Endangered or threatened species for which appropriate habitats exist in the WMA, will receive particular attention in the management of the area.

The nature of the wetlands and the species present are such that there do not seem to be any immediate concerns relating to endangered species, with the exception of leopard frogs. If such concerns arise in the future, then that concern should be addressed as a priority in the WMA. The greater the geographic scope of the risk of endangerment, (at risk across the continent, vs. being at risk in B or in the Kootenay), the higher the priority for habitat enhancement and population management in the WMA.

Principle 6: Public use that encourages the enjoyment of wildlife and natural landscapes will be given priority over other uses.

Public use, enjoyment and study of fish and wildlife and their habitats will be accommodated where and when it can be established that those uses are not in conflict with the goals and guiding principles described above. The people consulted were almost unanimous in supporting this approach. Activities that are not related to the enjoyment of wildlife and landscapes will be given low priority. (For example, canoe or boat races, fishing derbies or water ski regattas would not be considered as acceptable activities).

Principle 7: Existing uses, as described in the “East Kootenay Table Columbia River Marshlands Agreement” will continue in the WMA.

The “East Kootenay Table Columbia River Marshlands Agreement” developed by several “interests” at the East Kootenay Negotiating Table (CORE 1995), was signed by all of the participants in that process. According to that agreement, the primary objective of the WMA should be to maintain wildlife habitat values and allow for the continuance of existing uses (hunting, fishing, wildlife viewing, camping and hiking) that have occurred for many years in the wetlands. Trapping and the use by two commercial nature tour operations were also recognised as existing uses of the area. Visual quality was also recognised as important, as were cultural and heritage values associated with stern wheeler docking sites. The grazing of domestic stock was also recognised as an existing use. However, on the assumption that the past levels or intensity of use were also a consideration in the sustainability of those activities, the level of use will be a determinant in future decisions regarding these uses.

Principle 8: Traditional use by First Nations will continue in the WMA.

The Columbia Wetlands have been used by native people for several centuries as a gathering, fishing, hunting, trapping and settlement area. Their use of the wetlands will continue subject to agreements and regulations developed between WLAP, the Ktunaxa Kinbasket Tribal Council, the Shuswap Nation Tribal Council and the Shuswap and Columbia Lake Bands.

Principle 9: A high quality recreational experience will be maintained for those using the wetlands.

At present, the wetlands see relatively low levels of human use. This use may increase in the future, eventually impacting on the quality of experience provided to visitors and on the productivity and health of plant and animal communities. The quality of the experience may be affected at a lower threshold than the level of use that will impact wildlife populations. If and when this level of use occurs, human use in the wetlands will be managed to maintain a high quality experience for visitors and to minimise impacts on vegetation and wildlife populations.

5.3 Short Term Objectives

Specific objectives for the management of the WMA (i.e. tasks that can be accomplished within a specific time-frame) are difficult to set at this point since there is insufficient baseline data on wildlife and plant communities in the wetlands. The primary objective of managers in the 2004-2009 period should be:

- To develop a better understanding of the “ecological history” of the wetlands to identify factors that may affect the present status of the wetlands.
- To establish a long term monitoring program to measure changes in plant communities.
- To establish baseline data on fish and wildlife populations.

Based on this information, specific habitat and population objectives may be set in the next generation of this management plan.

The options for habitat management, wildlife and fisheries population management and the management of human activity are provided below.

5.4 Habitat Management

There are a variety of options for enhancing wildlife values in the wetlands. However, these options are limited by both public concerns and physical conditions, as expressed in the guiding principles described above. The projects that appear to have public support (i.e. minimal impact on the landscape) and are technically sound, are described below, for each major habitat type. More detail on the design of these potential projects is provided in Appendix IV. Options that will not be considered are also listed with an explanation of why that option will not be considered.

5.4. 1 General Habitat Issues

There are three areas that should be considered that are not directly related to specific species or habitat types, but are important tools for monitoring overall ecosystem health.

1. Vegetation and land form monitoring:

Tools should be developed that will allow managers to identify long term changes in vegetation and in the river channel. Historic photographs of the wetlands should be collected and archived.

Air photos of the wetlands dating from as far back as possible, should be collected and maintained. Photos should be taken of marked sites in the wetlands every five years and during major flood events. The objective would be to document change in the ecological condition of the wetlands. A sampling of vegetation types and mapping of sample sites should also be considered, along with surveys for rare and endangered plant species.

2. Water quality monitoring:

In the long term, potential pollution of the Columbia River and its tributaries could have a major impact on the ecosystem health of the wetlands. Records of water quality, including nutrient loading, should be collected and archived.

3. Documenting the ecological and human history of the wetlands:

A better understanding of the factors that have defined land forms, vegetation and wildlife numbers in the past will assist in managing the WMA in the future. Information on the pre-contact status of the wetlands, especially in terms of the nutrient input provided by salmon, should be investigated. The impact of human activities on the wetlands post-contact should also be considered and documented, up to the present era.

5.4.2 Flowing Water

The Columbia River and its tributaries provide important habitat for several fish species and a variety of birds and mammals that depend on that fishery. The species most commonly seen on the river itself are beaver, otter, osprey, bald eagle, common merganser, kingfishers and in spring and fall, staging waterfowl. Portions of the shoreline are also used by wading birds.

Habitat management options include:

1. Baseline surveys of fish populations:

The Columbia River and associated wetlands presently do not support a major recreational sports fishery. It does, however, support significant populations of non sport fish that in turn support a wide variety of wildlife species. Potential habitat changes that could affect these fish populations are difficult to predict without some baseline life history data on all of the fish populations in the system. Fisheries surveys should be carried out on a 5 to 10 year cycle to document potential changes due to pollution, silt load, climate change, etc.

2. Identification of old salmon spawning areas:

Investigations related to the treaty process may identify areas used by salmon prior to the closure of the dams on the lower Columbia. These sites have historic and interpretative value. In the long term, some interest has been expressed in seeing salmon re-established in the Columbia River system and these sites would be of importance if this was considered.

3. Maintenance and improvement of spawning areas on the major tributaries:

Although the main channel of the Columbia River is silt bottomed for most of its length, the tributary streams have gravel bottoms and may provide good spawning habitat. Little information is presently available, but as information is acquired, there may be options for habitat improvement for a variety of species. Burbot and bull trout will be the focus of this work.

Major spawning channel developments (as at Meadow Creek) will not be considered in the WMA, unless required for the maintenance of a species at risk.

5.4.3 Open Water Ponds and Lakes

There are several larger ponds with extensive areas of open water and relatively deep water (>2 m). These ponds support coarse fish and are important to osprey, eagles, otter and other species. Thurber (1983) indicates several of these ponds as osprey feeding areas. They are also used by staging waterfowl. Where these lakes drop in level in the fall, they provide mud flats used by shore birds and other species. Habitat management options include:

Baseline surveys of fish populations:

The open water wetlands should be included in the baseline studies recommended in the previous section.

5.4.4 Marshes

This is the most prevalent habitat type in the wetlands. Marshes here are highly variable and different plant communities occur, depending on site-specific conditions. Although these marshes are excellent staging habitat for migratory birds, annual flooding and the lack of upland nesting sites result in poor nesting success for most species of waterfowl. Water management projects (dykes and water controls) could be used to enhance certain habitats and increasing the productivity of the wetlands for a wide range of wildlife species in the Columbia Wetlands. However, the options for these kinds of habitat management actions are limited by:

- the low cost: benefit ratio of major enhancement works due to the high construction and maintenance costs
- aesthetic considerations
- the lack of suitably juxtaposed and flood-safe upland nesting areas for many species of ducks
- a lack of public support for high impact enhancement projects.

Large scale dyking and pumping projects were considered in the 1970's, the period during which Ducks Unlimited (DU) Moberly Marsh Project was constructed. At that time, consideration was being given by British Columbia Hydro to the channelization of the Columbia River to accommodate the increased flows that would have resulted from the Kootenay Diversion hydro electric project. Ducks Unlimited did surveys looking at developing wetland areas adjacent to the channel (Pelletier 1974, Hennan 1975, Carson 1976). Moberly Marsh is the only one of these projects that was carried out. One small DU style project has been carried out in recent years on private land near Parson. Projects of this kind will not be considered in the future with the one exception described below.

1. Managing water levels in wetlands isolated from annual flooding by the CPR grade:

There are several sites along the east edge of the wetlands where the railway grade acts as a "control structure" and marshes have developed that have more stable water levels than are found in the wetlands system itself. Diverting nearby stream water into some of these areas to maintain water levels may be an option in a few cases. This option is presently being considered for Reflection Lake at Golden by the Columbia Basin Fish and Wildlife Compensation Program.

2. Goose Nesting Platforms:

Local rod and gun clubs have installed a large number of goose nesting platforms in the wetlands over the last twenty five years. Goose nesting success and goose populations have increased substantially as a result. However, since geese arrive earlier in the spring and/or are more aggressive than osprey or herons, they have taken over osprey and heron nesting sites, to the potential detriment of these species. Goose populations are also high enough now that their impact on hay fields has become a concern to local ranchers. As a result, the platform construction program has been curtailed. The long term objective will be to maintain and replace goose nesting platforms only in areas located away from the major heron rookeries and, for aesthetic reasons, away from marshes that are obvious from Highway 95. The ESD will work with local rod and gun clubs and other interest groups to maintain the number of nesting platforms at the present level or at a level that does not impact on other species or on aesthetic values.

3. Floating Nesting Platforms:

Small, floating nesting platforms (too small to be used by geese) have been suggested as an option for improving nesting success for those species that nest over water, however there is no literature on the effectiveness of small platforms. The creation of loafing and grit sites area also options that might be considered in the long term. None of these options appear to have applicability in the Columbia Wetlands in the immediate future.

5.4.5 Levee Vegetation

One of the most important habitat types in the wetlands is the deciduous habitat found along the river levees and stable portions of the flood plain. This type is typically composed of large, old cottonwood trees with a thick shrub cover of red-osier dogwood, alder, rose and willow. Where there are large cottonwood stems, they provide important cavity nesting sites for pileated woodpecker and the variety of species that use their abandoned nest holes, such as wood ducks, mergansers, goldeneye, bufflehead, kestrels, tree swallows, and red squirrels. Eagles, osprey and blue herons also nest in these trees. The trees and shrubs are also important nesting areas for a variety of songbirds. These sites are also used as feeding areas and for bank houses by beaver. In winter these sites are used by moose and other ungulates as browsing areas, resting sites and travel corridors. Habitat management options include:

1. Status of cottonwoods stands:

Several people have observed what appears to be a decline in vitality of cottonwood stands along the levees in the wetlands. There appears to be large numbers number of small, yet decadent trees in some parts of the wetlands. Preliminary work (Ohanjaman, and Teske. 1996) indicates that there are concerns with the status of cottonwood stands in the wetlands. Old growth is the most limited age class. Relic, old trees occur in remnant, highly fragmented locations throughout the marshes but large, intact stands are rare. The largest such stand is found on private land at Nicholsen. The largest contiguous stands of mature (not old growth) trees occur south of Moberly, at Spillimacheen and at Horsethief Creek. Mature trees found along the levees between Brisco and Parson (with the largest concentration occurring in the Spillimacheen area) show much breakage and decay. It is doubtful that many of these trees will ever reach a large diameter (>60 cm) which is optimum for pileated woodpecker nesting, and beneficial for heron colonies

and bald eagle nest construction. Immature trees are found throughout the Columbia marshes. A mixture of age classes indicates that recruitment is successful and that reproduction, either clonal or through seed, is occurring, or has occurred in the past. Many of the “ribbons” of mature cottonwood that occur along the river courses, however, are remnants of old stands, and do not show a variety of age classes. In many places the scattered snags and partially dead trees which remain are accompanied by an under storey not of young cottonwood, but of birch, alder, willow or shrubs. These stands are common between Radium and Parson but are of questionable viability in the long term. Further work is required to:

- Identify age class structure and process in cottonwood stands.
- Identify agents causing early decay characteristics in younger and mature trees. affecting the survival of older age cottonwood stands.
- Determine if there are significant differences between long term mortality and recruitment rates in cottonwood stands.

More detailed work on this issue should be considered a priority.

2. Protection of older age cottonwood stands:

A major mortality factor in older age cottonwood is falling by beaver. Low beaver pelt prices in recent years may mean that beaver populations are higher than they may have been in earlier decades. Projects have been carried out on the Kootenay and Elk Rivers to protect cottonwoods by wrapping wire mesh around their base. Monitoring of these projects suggests that this strategy is effective (P. Ohanjanian, pers. comm.). Some cottonwood protection has been carried out by the CBFWCP in the wetlands. Further projects of this type should be considered in the wetlands, with eagle and osprey nesting trees and heron rookeries as a priority.

This strategy may not prove effective in the long term if protecting older age cottonwoods results in the beaver shifting to feeding on younger age cottonwood. If this is the case, then the beaver could remove the next generation of cottonwoods which would result in a shortage of older age cottonwoods 50-100 years from now. An alternative would be to encourage trappers to take more beaver and maintain beaver populations at a low level; however this is unlikely to be popular with the general. Further consideration of this problem may be required if the assessment of recruitment to cottonwood stands finds that, in fact, older age cottonwood stands are at risk.

3. Protection of heron rookeries: The sites used by blue heron for nesting could be identified as critical wildlife areas within the WMA. However, there has been some shifting of nesting sites in recent years (W. Houlbrook, pers. comm.). If this kind of protection is considered necessary, the most effective strategy would be to classify all the older age cottonwood sites as critical wildlife areas.

4. Platforms for Bald eagles, osprey, and great blue herons:

These birds respond to the erection of nest platforms, a measure that could be considered if populations were at critically low levels. The preferred approach, however, is the maintenance of mature stands of cottonwoods throughout the WMA, coupled with protection of these sites from disturbance. It is unlikely that platforms could be designed that would not be used by geese. There is questionable public support for projects such as this that would be obvious man-made structures in the wetlands. No platforms will be built unless significant problems occur in the future with the status of these species. Consideration should be given to putting up platforms for

bald eagles and osprey on adjacent benchlands at some distance from the wetlands (> .5 km) where the sites would be less likely to be used by Canada geese.

5. Creating natural snags:

Girdling of mature conifers along the wetlands, to create snags could be considered if inventories revealed that natural cavities or natural nest platform sites were limiting nesting for cavity nesting birds. This approach would be more acceptable than artificial platforms or bird boxes in terms of maintaining the natural character of the area, but should await the results of the cottonwood assessment. Mature cottonwoods will not be girdled since the decay characteristics of this species are such that they are already decadent before many of these reach adequate diameters for use by pileated woodpeckers, and since live deciduous trees are important for species such as thrushes and warblers and need to be maintained for these species.

5. Install nest boxes for cavity nesting birds:

A variety of birds use cavities for nesting in this habitat type. The CBFWCP has about 120 nest boxes established in the wetlands at present. However, before a larger program is initiated, a survey should be carried out to see if a major nest box program can be justified. If there are sufficient natural cavities, i.e. there are numerous natural cavities that are not being used (given that home range and food availability are not limiting), then such a program may not be productive. Species that should be considered include wood ducks, mergansers, bufflehead, kestrels and tree swallows. A nest box program is ongoing at the C\TW but maintenance problems have limited its success (B. Stusnofi pers. comm.). The local, regional, provincial and continental status of the cavity nesters affected should be considered in defining the extent of such a program.

6. Songbird surveys:

Riparian areas are important as nesting areas for songbirds. Nesting surveys should be carried out to provide baseline data on their use of riparian habitats in the WMA. These areas also play a very important role in providing stop-over sites for songbirds during migration. A program of developing monitoring sites for songbird migration is developing in B.C. The establishment of such a site in the wetlands should be supported.

5.4.6 Mixed Forests On Fluvial Fans

In several areas where side tributaries enter the wetlands there are alluvial fans that support a mix of deciduous and coniferous forest, shrub and meadow areas. These are very important sites for wintering ungulates. The majority of the elk seen in aerial surveys are found on these sites (L. Ingham, pers. comm.). These are also very important areas for song birds and cavity nesters. The most important of these sites are:

Horsethief Creek - A mix of provincial and federal Crown lands and private land.

Forester Creek - A mix of provincial Crown and private land.

Kindersley Creek - Private land.

Luxor Creek - Private land.

Templeton Creek - Almost entirely private land.

Bugaboo and Spilhimacheen Rivers - A mix of private, provincial and federal Crown land.

Canyon Creek (Nicholsen) - Almost entirely private.

Twelve Mile Creek and the alluvial fan of an unnamed creek south of Twelve Mile Creek
Kicking Horse River (Golden) - Entirely private, townsite of Golden.
Blaeberry River - Private.

Options on Crown land are limited on most of these sites. Further, some people that we consulted felt that these areas should be left to return to older age forest and that habitat enhancement should take place on adjacent benchlands rather than in the WMA. Habitat management options include:

1. An assessment of habitat management options on these sites and adjacent areas: An assessment of enhancement and protection options should be developed for each of these sites where there is significant provincial Crown land. These sites are at the outflow of Horsethief Creek, Forester Creek, Bugaboo Creek and Spillimacheen River. The full range of options on these sites should be considered.

2. Work with private land owners:

Based on the results of the assessment, a program could be developed to work co-operatively with land owners in these areas to maintain and enhance wildlife values.

3. Cottonwood and bird surveys:

Since many of these sites contain cottonwood as part of the stand, these areas should be included in survey of cottonwood status, the program for protecting older age cottonwood, the survey of cavity nesting birds and songbird surveys suggested above.

5.4.7 Sedge Meadows

There are extensive sedge meadows in the wetlands that are used by elk in winter. Some work has been completed recently on the use of this habitat type in the Nicholson area. This habitat type may also be important for some bird species and small mammals, however that use is limited by annual flooding of most of these sites. Habitat management options include:

1. Bird surveys:

This habitat type should be surveyed to identify bird use, including use of the mud flats left after temporary wetlands drain out in the late summer and fall, by shorebirds.

2. Enhancement burns for ungulates:

Prescribed fires have been used in the past to improve habitat for ungulates in the wetlands. In the winter of 1996/97, the Golden Rod and Gun Club funded a project that looked at the primary habitats and key forage species of elk in that area (Ferguson 1997). As part of that study he burned two small plots in the sedge meadow type. He found no significant difference between production (kg/ha of forage produced) on burned and unburned sedge sites in the following fall. This would suggest that enhancement burns in sedge meadow communities are of marginal value for ungulates.

5.4.8 Shrub Communities

There are extensive shrub communities in the slightly drier portions of the wetlands, supporting alder, willow, hawthorn, red osier and high bush cranberry. These are important habitat areas for moose, elk, white-tailed deer and a variety of songbirds. Shrub thickets total 1,100 hectares and make up 4% of the study area. Habitat management options include:

1. Songbird surveys:

These habitats should be included in nesting and migrant use surveys. These inventories should be carried out prior to initiating any extensive enhancement work for ungulates.

2. Browse rejuvenation by slashing or burning:

There is some indication that burning in the wetlands may rejuvenate decadent willow stands and potentially makes more browse available (B. Ferguson 1997), however there are no good data on this issue. Further work is required on the degree to which burning increases the availability and palatability of browse and the degree to which ungulates depend on deciduous browse in the wetlands in severe winters. There are several practical issues in relation to enhancement burning in the wetlands:

- After at least two decades without burning, litter and dead material has built up around the base of many willow plants. When this material burns it may kill the plant.
- There are major concerns about the loss of cottonwood stands in areas adjacent to enhancement burns.
- Present ungulate populations do not appear to be utilising even a minor proportion of the available browse (based on observations by one of the authors during field work in the fall of 1997), following a very severe winter. Ungulate populations do not appear to be even close to habitat carrying capacity, at least as defined by the browse component of their diet.
- Smoke and air quality issues may be a concern, especially close to the larger communities. Based on these arguments, enhancement burning will continue to be considered as part of the array of management tools available, but no burning will be attempted in the first five years of the management plan or until there is good scientific evidence of the benefits of this kind of enhancement in these habitat types.

5.4.9 Riparian Flats - Moberly To Donald

Between Moberly and Donald there are extensive areas of riparian river flats. This area provides important thermal and snow interception cover for wintering moose. It also provides important scenic values from along the Tran Canada Highway and may be a unique example of a “boreal spruce” type created by a frost pocket. Logging options in this area are severely restricted by Forest Practices Code restrictions in riparian areas. No enhancement will be attempted in this area. The vegetative uniqueness of this site should be investigated.

5.4.10 OTHER WETLAND HABITATS

Bogs, fens and “swamp” (wet areas that support shrubs and small trees) were identified in the vegetation classification carried out by Pedology Consultants et al. (1983). These types occupy a very small proportion of the wetlands. No enhancement action will be considered in these types. Non-vegetated areas (river bars and mud flats) were also identified in Pedology Consultants et al. (1983). These areas are important for shorebirds, however there are few habitat enhancement options in such habitats.

5.4.11 Habitats Adjacent To The Wetlands

Clay cliffs: There are several sites along the wetlands where clay cliffs and banks provide nesting sites for bank and northern rough-winged swallows, belted kingfisher, owls and other cavity nesters. Habitat management options include:

1. Identify sites used by bank nesting birds:

The major sites should be identified using standard survey techniques (Ethier 1995).

2. Protection of swallow nesting sites:

The sites used by swallow and other birds for nesting could be identified as critical wildlife areas where they occur within the WMA.

3. Protection of sites on adjacent private land:

As a first step, land owners should be notified concerning the value of these sites, in the long term conservation easements could be considered for the major sites. Many of the sites are located in the cut created in the development of the railway grade and are on the CPR right-of-way.

Rubble and steep rock habitats: The wetlands run along the steep base of Steamboat Mountain between Edgewater and Brisco. There are several steep rock sites adjacent to the river that may support rubber boa snakes (observed by I. Jack) and perhaps some other reptiles or small mammals of concern. Habitat management options include:

1. Investigate these sites for the presence of reptiles or small mammals of concern:

Standard survey techniques should be applied.

2. Protection of sites if species of concern are found: Such areas should be designated as critical wildlife areas if necessary.

Adjacent forests: There are extensive coniferous forests along the west side of the wetlands. These areas may be important in providing nesting habitat for wetland birds requiring cavities for nesting and other species living in the ecotone between wetland and forest. Habitat management options include:

1. Protect older age Douglas fir sites:

Along the slopes of Steamboat Mountain there are some Douglas fir stands over 500 years old (I. Jack, L. Halverson, pers. comm.). Values on these sites should be assessed. If justified, these areas should be given critical wildlife habitat status or treated as old growth areas under the FPC. Qualifying trees should be registered with the British Columbia Conservation Data Centre.

2. Maintaining cavity nesting sites and other wildlife values:

There are a variety of bird and mammal species that use the forest adjacent to the wetland. However, there is little information on what species use the wetland-forest edge and the effect logging may have on their habitat. Studies of bat species, songbirds, cavity nesters and other species are required, in co-operation with the forest companies involved to identify the needs of species that are not considered under the Forest Practices Code. (funding for such studies could come from Forest Renewal BC). Where it is found that specific species require special management or retention of old growth, then an agreement should be negotiated with the companies to ensure that these values are maintained. The visual impacts of logging on views from Highway 95 across the flyer is also an important concern.

Adjacent Farmland: Farm fields adjacent to wetlands are often used for nesting by certain species of ducks, especially mallard. Such nests are often destroyed by haying or grazing. An extensive program of leasing and managing grasslands (developing “dense nesting cover”) to increase nesting success of upland-nesting ducks is in place on the prairies. In situations where abundant wetland breeding and brood-rearing habitat exists and where upland cover is the primary limiting factor, such techniques can be cost-effective. In the Columbia Wetlands, however, there is an abundance of good nesting habitat within the wetlands (before flooding), on the river levees, and in adjacent upland fields and idle land, such that the ducks have many potential nest sites to choose from and would not likely be attracted in significant numbers to habitat managed specifically for that purpose.

Biodiversity Corridors: Movement corridors across the Trench between the major mountain ranges for ungulates and predators was considered a priority in the regional land use plan (CORE 1994, Hamilton and Utzig 1995). Two cross-valley corridors have been included in the WMA, at Fairmont (Lot 112) and at Dry Gulch, south of Radium Hot Springs. These areas will be managed to maintain them in a natural state, to maintain their value as movement corridors and to maintain winter range values for bighorn sheep and other ungulates. Public access by vehicle will be controlled under the 10 HP regulation or other regulations. A habitat management plan should be developed for this part of the WMA, as part of a habitat plan for the Radium Hot Springs/Stoddart Creek sheep herd. Forest ingrowth is a major problem in this area and enhancement burns, thinning and logging will be considered on these sites.

5.4.12 Habitat Management for Generalist Species

Several wildlife species use a variety of habitat types over the year or during migration. These include turkey vulture, hawks, falcons, bears and ungulates. There are no obvious habitat enhancement options for these species, except to maintain ecosystem quality.

5.5 Wildlife Management

The management of wildlife populations in the wetlands is a shared responsibility between Environment Canada (Canadian Wildlife Service) for migratory birds and the Ministry of Water, Land and Air Protection (WLAP), Environmental Stewardship Division (ESD) for other wildlife.

5.5.1 Waterfowl Harvest Management

Waterfowl harvest strategies are developed co-operatively between the CWS and WLAP. The objective of this management plan will be to maintain waterfowl populations and waterfowl hunting opportunities in the WMA, subject to the goals and guiding principles. Seasons and harvests have been stable for many years and little change is expected. Some concern was expressed by the farming community that the goose season has been shortened. It now begins on September 10 (primarily to harmonise with other season openings). Until two years ago, it opened September 1. Returning to the earlier opening date would assist Columbia Valley farmers in reducing the impact of geese grazing on their fields at that time of year. Canada Goose populations may be stabilised or reduced, to reduce their impact on blue heron nesting success.

The Canadian Wildlife Service will continue to monitor nesting success and fall migrant numbers, dependent on funding availability and will share that information with WLAP. At present there are no programs in B.C. to provide mitigation or compensation for farmers impacted by wildlife use of their lands. Wildlife damage by waterfowl in this area is not a major concern at present.

5.5.2 MIGRATORY BIRD MANAGEMENT

As a result of concern over continent wide declines in neotropical migrants, the CWS and the US Fish and Wildlife Service are establishing a network of long term monitoring stations. The program has three sites in B.C., at Vaseux Lake, Rocky Point (near Victoria) and at Mackenzie. These sites are run by volunteers with direction for the CWS. The objective is to provide continent wide data to determine the importance of riparian areas to migrants and compare the importance of different sites and habitat types. It will also look at feeding and cover elements important for riparian management. Establishing a site in the WMA should be considered.

5.5.3 Management of Large Mammal Harvest

Responsibility for the management of large mammals lies with WLAP. No seasons or harvests specific to the WMA are planned. Trapping and hunting will be managed through the general regulation setting process.

5.5.4 Management of Small Mammals

No specific management prescriptions are planned for small mammals or fur-bearers at this time. Muskrat and beaver populations and harvest should be monitored, given the important role these species play in the wetlands. Some management of beaver populations may be considered, based on the outcome of the cottonwood status report proposed earlier.

5.5.5 Rare and Endangered Species and Habitats

Management activities will be in keeping with WLAP's policy regarding the protection of endangered, threatened and sensitive species. Important immediate concerns are the status of leopard frog and the need to maintain large diameter cottonwoods in forests along the wetlands for cavity nesting birds. Leopard frogs may be re-introduced to the wetlands, depending on the outcome of studies of this species at Creston.

In a WMA, WLAP will assume responsibility for rare plants. An inventory to identify plants of concern in all the vegetation types found in the wetlands should be carried out. Milkweed sites which are critical habitat for Monarch butterfly should be identified as part of this survey.

5.5.6 Management of Noxious Weeds

The introduced species of most concern for the Columbia Wetlands is purple loosestrife. This wetland invader, introduced from Eurasia, has been spreading through mid-latitude North America since late in the last century. Natural biological control mechanisms were not imported with the plant and its spread has become rampant. Only recently have a few such control agents been released in Canada and effective control is still a long way off. One plant was found along the highway at Moberly Marsh in 1997, and was pulled (Paul Goodkey, weed specialist for the Shuswap-Columbia Regional District, pers. comm.). If purple loosestrife became established in the CWWMA, it could have devastating effects on the native flora and fauna.

Knapweed and leafy spurge (in Stoddart Creek) are also a concern in drier areas of the WMA. Noxious weeds will be eliminated or controlled. Biological controls will be used where they are effective. Herbicides will be considered in the benchland portions of the WMA, where a present control program for leafy spurge is underway, but not in the wetland portion of the WMA.

5.5.7 FISHERIES MANAGEMENT

Fishing seasons and bag limits are determined by WLAP. The Upper Columbia River is exempt from the general winter/spring closure and provides angling opportunities for whitefish, bull

trout, burbot and rainbow trout. Most angling occurs at the confluence of the mainstream Columbia and its tributary streams.

Large-mouthed bass were introduced illegally into the wetlands in the 1970's. The issue concerning the maintenance of bass in the wetlands is addressed by Griffith 1994 and 1994a. These reports looked at potential bass habitat from Invermere to Golden. They found large-mouthed bass only in Windermere Lake. Although bass were found in five ponds in the wetlands in the last two decades, these populations appear to have died out. Their work indicates that the wetlands are not deep enough and thus do not maintain oxygen levels sufficient for overwintering. Also, the average summer water temperatures were marginal for bass. Based on these data and the concern that bass are an introduced species that may affect natural fish populations in the wetlands, no future introductions of bass will be considered.

A project to monitor non sport fish populations has been described in the habitat section.

5.6 The Management of Human Activity

The management of human activity will be based on the vision, goals and principles articulated in this management plan. In the next five years, activities will be regulated as described below.

5.6.1 Access and Motorized Activities

A boating regulation was proposed in September 1997 that limited access to the wetlands to "motorized conveyances of less than ten horsepower". This issue was a major concern during the period in which this management plan was being developed. Regulation of motorized activity was supported by the majority of the people we talked to, after the reasons for the regulation and the limitations of other management options were explained. Public comment on this issue is included in Appendix I. Establishing the boating restriction regulation is being pursued with the federal government (Canadian Coastguard) who has jurisdiction over navigable waters.

For the land component of the WMA, with the exception of a few rights-of-way, a restriction of motorized access was established in August 1997 under Section 7 of the Wildlife Act and states that 'no person may enter the Wildlife Management Area with a conveyance of any description which is powered by a motor which exceeds a rating of ten horsepower'.

5.6.2 Hunting

Hunting will continue in the wetlands with the exception of those places closed to hunting under other regulations. Hunting on adjacent federal lands (CNWA) will remain under the control of CWS through the Canada Wildlife Act. The present level of hunting activity is quite low. Need for further controls or season changes are unlikely in the near future.

5.6.3 Wildlife Viewing

Wildlife viewing is and will remain a major use in the WMA. If this activity increases in the future, use will be managed consistent with the guiding principles and goals. The major concern is the potential impact on species nesting and roosting along the river channel. Any proposals for

structures to facilitate wildlife viewing (viewing towers, boardwalks) will be considered on a case by case basis.

5.6.4 Trapping and Outfitting

Except for several small areas, the Columbia Wetlands are allocated to existing traplines. Trapping will continue in the WMA. The current “open” areas will not be reallocated. In the event of a forfeiture of an existing line, a decision on reallocation would be made based on the guiding principles and management concerns at that time. Problem animals in areas outside established traplines will be trapped by permit where necessary. Based on an assessment of the status of cottonwoods in the wetlands, there may be some requirement to manage beaver populations.

Portions of the WMA are part of several guiding territories. That use will continue subject to all regulations. Those areas not presently part of a guiding territory will not be reallocated and further expansion of guide territories within the Columbia Wetlands WMA will not be considered.

5.6.5 Commercial Recreation

The present level of commercial wildlife viewing use is low, however the numbers of unlicensed operators has increased substantially in recent years, especially in the Golden area. Commercial operations in the WMA will be managed according to the following principles:

- Only those operations that are based on wildlife viewing or other wildlife related activity will be considered. Snowmobile tours for example, would not be allowed. Non intrusive activities such as ski-touring would be considered, subject to the goals and guiding principles expressed in this plan.
- When new operations are proposed, the onus will be on the proponent to demonstrate that the operation will have “a positive or neutral impact on wildlife values” in the WMA and will comply with the goals and guiding principles of the WMA.
- A process for licensing operators and vetting proposals for commercial activities is in place for the province. The Commercial Backcountry Recreation Policy (CBR) will apply in the WMA. Proposals received by Land and Water BC will be referred to the ESD of the Ministry of Water, Land, and Air Protection. If the proposal is in agreement with the goals and principles of the WMA, the proposal will then proceed through the regular CBR process, including comment from interest groups and the public.

5.5.6 Other Recreation Use

Canoe races and other activities not related to the enjoyment of wildlife recreation will not be considered. Special permits may be considered for some activities if they meet the goals and guiding principles of the plan.

5.6.7 Agriculture

Grazing by cattle will continue on the permitted areas, subject to range use plans and established grazing rotation plans, but will not be considered in other areas. Enhancement burns and fencing proposals will be considered on a case by case basis. Other activities (landfill, dyking, and cultivation) will not be considered in the WMA, although they may occur on adjacent private land in the wetlands.

5.6.8 Forest Harvest

Logging, on appropriate sites, is a permitted use in Wildlife Management Areas, subject to the goals and principles of this management plan.. However, productive conifer forests are a minor component of the WMA. Jamieson and Ohanjanian 1993 provide estimates of the total volume of timber in the WMA. Regulations under the Forest Practises Code would severely limit logging options in much of this area due to constraints now required for logging in riparian areas.

5.6.9 Water Resources

All facilities for water level management or the use of water from the wetlands, the Columbia River or its tributaries will be licensed under the standard procedures in WLAP and will be subject to the goals and guiding principles of this management plan.

5.6.10 Mineral Resources

Mineral exploration and development is not expected to be a major activity in the WMA. However, the area is available for mineral tenure acquisition. Exploration and development of subsurface resources (including oil and gas) are acceptable activities, subject to: the vision, goals and guiding principles of the WMA and all applicable legislation. Due to the narrow width of the WMA, it may be possible to access any mineral deposits found in the future, for purposes of development and production, from outside the boundaries (i.e. underground development).

5.6.11 Land Alienation

Land alienations within the wetland system will not be entertained except where very small alienations can be shown to improve the viability of contiguous and developed private land while maintaining or improving wildlife values in the WMA, or where small area leases are required to develop the infrastructure for wildlife viewing sites. In these cases, alienations will be subject to the goals and guiding principles of this plan.

5.6.12 Other

Demand for land uses other than those already described are not anticipated at this time. Further alienations for the construction of additional roadways across the wetlands will not be considered, as provided in the “wetlands agreement” developed during the CORE process.

If programs for mosquito control are proposed in the future, they will be dealt with on a case by case basis. Control using BIT (Vectobac) will be preferred to the use of more noxious chemicals.

5.7 Research, Monitoring and Educational Activities

5.7.1 Research

Research on all aspects of the Columbia wetlands system will be supported, especially research which addresses habitat and wildlife management issues relevant to the WMA. The area will provide an excellent field site for university students and researchers and their participation will be encouraged. Those research projects that address the problems identified in this management plan will be given assistance, where possible. Some concern was expressed by local people about projects that would involve the collaring of large numbers of animals, as they perceive is happening in the National Parks. Researchers working in the wetlands will be directed to consider this issue and to consider non-intrusive methods of monitoring and research. All research projects will be subject to the goals and guiding principles of this plan.

5.7.2 Population and Habitat Monitoring

A habitat and population monitoring program will be conducted to identify subtle alterations in habitat condition and wildlife population status as identified in this management plan.

5.7.3 Monitoring of Human Use

In order to manage human use and its impacts in the WMA, some means of monitoring human use, primarily recreational and commercial use, should be developed. Records are available on the “person days” of use provided by commercial operators, however there are no tools at present for monitoring non-commercial recreational use. This may not be a concern in this first five year plan but should be considered in subsequent plans.

5.7.4 Educational Activities

Education on the values of wetlands should be an important part of use of the wetlands. A visitor centre has been proposed and will be supported. School education programs should be encouraged. Proposals for educational activities will be considered on a case by case basis, subject to the guiding principles. School education programs should be encouraged. Proposals for educational activities will be considered on a case by case basis.

5.8 Administrative Issues

There are several issues concerning the administration of the WMA in relation to the management of lands adjacent to the WMA by other agencies.

5.8.1 Relationship To Adjacent Park Lands

There are several small provincial parks and park reserves located in or adjacent to the marshes. These are:

Spillimacheen Provincial Park Reserve: This is a block of Crown land at the mouth of the Spillimacheen River that has been a park reserve for some time, however, no park development has taken place and none is anticipated. The wetland portion of the park reserve has been included in the WMA.

Burges and James Gadsden Provincial Park: This area was donated to the province in 1964. The park provides protection for 352 ha of marsh and riparian habitat, part of which has been developed for waterfowl by Ducks Unlimited. There is no road access to the park and no facilities; few options exist for developing such facilities without the purchase of private lands between the park and the highway (Anon. 1987). These lands have not been included within the Columbia Wetlands Management Plan.

5.8.2 Relationship to Canadian Wildlife Service Lands

There are four parcels of land (the Columbia National Wildlife Area) within the wetlands that are managed by the CWS. The management of the CNWA will continue to be governed by the federal Wildlife Area Regulations under the Canada Wildlife Act. There are specific regulations that apply to the federal lands that are more restrictive than those applying provincial crown or private lands. Activities such as hunting, trapping, commercial activities or specific public use that may be allowed on provincial crown land may not be permitted on the federal lands. Many wildlife values, however, will be managed in concert with the WMA as the objectives of both management plans are similar.

5.8.3 Relationship to Provincial Wildlife Properties.

RCMP Flats: The Nature Trust of B.C. owns 236 hectares of wetland near the town of Edgewater. These lands are leased to the Ministry of Water, Land and Air Protection. No enhancement activity has taken place. These lands have been included within the WMA.

Bergenham Wildlife Sanctuary: A small portion of this property is part of the Moberly Marsh (12 ha); the remainder (187.6 ha) is associated forested benchland north of Golden. The wetland portion of this sanctuary will be managed in concert with the remainder of the WMA. The benchland portion of the sanctuary east of the highway is presently managed by the Wildlife Branch in co-operation with the Golden Rod and Gun Club (as a wood lot) and that relationship will continue. The present no shooting zone will be maintained.

5.8.4 Relationship to Canadian Pacific Railway Lands

The CPR railway is the major industrial intrusion in the wetlands, running the entire length of the wetlands, on the west side from Fairmont to Invermere, crossing the wetlands below Athalmer and running along the east side to Donald. Many concerns were raised during the public

meetings concerning the impact of the railway on the wetlands. Dumping of garbage and pollutants into the wetlands, the impact of coal dust, side-casting into the wetlands where the right-of-way has been expanded and weed control issues were all mentioned. Contact should be made with CPR to discuss these concerns and develop a long term relationship with the company to deal with these issues. Plans should be developed to deal with a major train derailment that could potentially dump large volumes of coal and possibly other industrial commodities into the wetlands. During December 1997, the entire volume of shipments east and west was using this route since the “circle” tunnel at Field was closed. A wide variety of industrial chemicals were probably being transported along this route during that time.

5.8.5 Relationship to Heritage Rivers Program

The Columbia River has been proposed for provincial heritage river status. If that status is given to the river, it will provide recognition of the importance of the river but does not confer further protection or imply specific management. No changes in the management plan are expected as a result of this designation, if it occurs.

5.8.6 Designation as a Ramsar Site

Local interest groups have expressed an interest in pursuing RAMSAR designation to identify the international importance of this wetland.

5.8.7 Management Agreements between Agencies

In the long term, management agreements dealing with issues of common concern may be required with a variety of government agencies and industrial concerns. These will evolve over the next five years and should be considered in detail in the second five year plan.

5.8.8 Enforcement Policy

Enforcement of the Wildlife Act and regulations within the WMA is the responsibility of the Conservation Officer Service within WLAP. The Parks and Protection Areas Section of the Ministry are responsible for overall management and may in future also have enforcement authority. Enforcement of the Water and Land Acts, etc., will be carried out by the appropriate agencies. Regulation enforcement for the federal lands in the wetlands is the responsibility of Environment Canada.

5.8.9 Response to Major Flood Events

Concerns were raised at the public meetings concerning the impact the WMA would have on the ability of communities to respond to major flood events. This issue is of primary concern at Athalmer and Golden, although issues may arise at other communities along the wetlands. The manager of the WMA will work with communities to develop contingency plans that will allow

for immediate actions within the WMA in emergency situations, as provided under the Provincial Emergency Program.

5.8.10 Boundary Concerns

Appendix III. provides 1:100,000 scale maps of the WMA. The proposed WMA is indicated in light green. Federal lands managed by the Canadian Wildlife Service are indicated in pink, provincial and national parks are in dark green, crown lands under lease are red and lands managed by the Wildlife Branch are indicated in orange. There are several areas where minor boundary issues have been resolved; these are discussed in Appendix IV. A folio of 1:20,000 scale maps is available at the WLAP office in Cranbrook.

5.8.11 Future Public Involvement in the Management of the WMA

The public, stakeholders and government agencies will be consulted if major management actions are required beyond those outlined in this plan. The concept of “river keepers” or other means to involve local people in the ongoing management and protection of the wetlands will be explored. Consideration will be given to creating a public advisory group to provide input into the management of the area, perhaps in concert with the similar group (the Columbia Wildlife Area Management Advisory Committee) in place for the federal National Wildlife Area.

5.8.12 First Nations Involvement in the Management of the WMA

The Land and Resource Management section of the Ktunaxa Kinbasket Tribal Council was consulted during the development of this management plan. WLAP and First Nations communities have common concerns in the wetlands in at least three areas.

There are possible research and inventory projects which could be undertaken jointly. Numerous recorded and unrecorded archaeological sites exist in the Columbia Valley Wetlands WMA, which have not been monitored for impact of erosion, ‘pot hunting’ of artifacts and other degradation, since the sites were surveyed in the 1970’s. These sites should be re-located and records made of their condition. Similarly, information has been and will be gathered by the Ktunaxa Kinbasket Tribal Council regarding the traditional use sites within the WMA. These sites should be documented. The protection of these archaeological and traditional use sites is of particular concern to First Nations and will be addressed in the immediate future.

The concept of “joint stewardship” and “joint management” will be investigated with First Nations. These are complex issues; however the wetlands provide a good opportunity to explore the opportunities and issues inherent in these concepts. The Columbia Lake and Shuswap Bands have Indian Reserve lands adjacent to the Columbia Wetlands WMA. These two Band Councils and the Tribal Councils will be involved in the discussion of management issues which may affect these lands.

5.8.13 LONG TERM FUNDING FOR THE WMA

The WMA is a large area and is a major responsibility for the ESD. Since there are also other government agency responsibilities in the wetlands, the option exists for developing a co-operative funding strategy between the ESD, Land and Water BC and the Canadian Wildlife Service. Funding for specific habitat monitoring and enhancement projects will be pursued with several funding agencies including:

- Columbia Basin Fish and Wildlife Compensation Program
- Habitat Conservation Trust Fund of BC
- Columbia Basin Trust
- The Phase 4 Resource Inventory Program as part of Treaty Process
- Wildlife Habitat Canada
- Forest Renewal BC
- Ducks Unlimited
- Elk Foundation
- other private conservation organisations
- Friends of the Columbia Wetlands
- Columbia Basin Trust

6.0 Provisions for Review

The management plan will be reviewed in five years, in 2009, then every ten years following, subject to major management issues arising in the intervening years.

7.0 Conclusions

This management plan was developed with the assistance of a large number of people in the Columbia Valley that were very concerned with the future of the wetlands. While the plan that has evolved differs somewhat in direction from other Wildlife Management Areas in the province (where more active management is practised), this plan reflects the desire of people in the area to maintain and protect a very important natural ecosystem where wildness and natural processes prevail. The Ministry will continue to work with the people of the Upper Columbia Basin to ensure that this natural treasure is maintained in perpetuity.

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9.0 Appendices

Appendix I. Public Input into the Management Plan

Appendix II A Review Of Rare And Endangered Species

Appendix III. Maps of WMA Boundary (1:100,000 Scale)

Appendix IV. Boundary Description*

Appendix V. Five Year Work Plan*

* Appendices IV and V form part of the plan but are not included in the bound report. Appendix IV includes a series of large maps (scale 1:20,000) showing the boundaries and a verbal description of the boundaries and notes of where there are adjustments to ensure no private land is in the WMA. It is available at the Ministry of Water, Land and Air Protection (WLAP) office in Cranbrook, B.C. Also available at that office are appendices describing the boundary of the WMA. Appendix V is a suggested phasing of the possible enhancement, inventory and research projects identified in the plan. This has not been approved or budgeted.

Appendix I: Public Input into the Management Plan

This appendix includes:

- The letter to participants in the public process.
- Copy of Comment Sheet.
- Further information is the public comments received is available on file at the Wildlife Branch in Cranbrook, including:
 - A record of the Public Meetings (notes recorded by Ed Hennan).
 - Record of other meetings held.

Letter to participants

The following letter was sent in March 1998 to all those who participated in the public meetings and consultative process to describe what we heard from people. It provides an overview of the comments received during the public consultation.

Dear Participant;

Re: Assessment of comments received during the public input process for the development of a management plan for the Columbia Wetlands Wildlife Management Area.

This letter is being sent to everyone who attended the public meetings and left an address on a meeting attendance list. The purpose is to describe what we heard and give all those involved some understanding of the discussion that went on at meetings that they may not have attended. Three public meetings were held at Invermere, Golden and Brisco in November, 1997 concerning the management of the Columbia Wetlands WMA. About 40 people attended the Invermere and Brisco meeting and about 115 people were in attendance at Golden. We also met with individuals and groups from September through January.

Discussions at the meetings were dominated by the horse power regulation issue. Other management issues played a larger role in the discussions held with groups before and after the public meetings.

Vision and Goals for the WMA

- The vision and goals statements provided for discussion were supported by the vast majority of those who returned the comment sheets from the meetings. A further goal concerning the

maintenance of viewscapes along the wetlands was included based on comments received from several people.

- There was unanimous agreement that maintaining wildlife values was the major goal in the WMA.
- Almost everyone we consulted wanted to see the wetlands remain in a natural state. Several individuals and groups made the point that the Upper Columbia River is one of the few remaining natural waterways remaining in the Columbia Basin. (Wetland and riparian cottonwood habitats are severely restricted in the Columbia Basin as the result of dam construction and other human activities).

- Most people consulted were emphatic that major earth moving activities, such as the dyking and water control projects should not occur here. In general, the Columbia wetlands do not lend themselves to a high level of habitat enhancement. Rather, the objective will be to maintain the present habitat values and allow natural processes to maintain and at times, alter these natural habitats. People felt that managers should adopt a “hands-off” approach to managing the area.
- There was unanimous agreement that the wildlife and “wildness” of the WMA must be protected. Not notwithstanding the kind of vehicle people prefer to use, everyone who used the wetlands did so because they enjoyed the wildlife, natural scenery and solitude they found there.
- The primary human use in the WMA should be those activities related to enjoying wildlife and natural landscapes.
- From our discussions with people who use the wetlands it is obvious that one of the major attractions is the opportunity to get away from human dominated landscapes and into a natural, quiet landscape. The majority of people we talked to appreciate the uncrowded, high quality wildlife viewing opportunities and recreational experiences that the wetlands provide.
- Many people suggested that we should maintain the aesthetic quality of views of the wetlands, especially from communities, homes and from viewpoints along Highway 93 on the east side of the wetlands.
- Many people felt that any activity that occurs in the WMA should have a neutral or positive effect on wildlife and fisheries values. They saw this as a “litmus test” for deciding what kinds of activities should occur in the wetlands.
- Existing uses, as described in the “East Kootenay Table Columbia River Marshlands Agreement” should continue in the WMA. This agreement, developed at the East Kootenay Negotiating Table (CORE 1995), was signed by all of the participants. According to that agreement, the primary objective of the WMA should be to maintain wildlife habitat values and allow for the continuance of existing uses (hunting, fishing, wildlife viewing, camping and hiking) that have occurred for many years in the wetlands. Trapping and the use by two commercial rafting and canoeing operations were also recognised as existing uses of the area.

Planning Process

- The process used in establishing the order for a 10 hp limit was considered by many people to be non-consultative. Many people felt insulted by the way in which this restriction was imposed. This strong reaction to this regulation is the result of a sense of being over-regulated in general and especially concerning hunting and fishing regulations; and a sense of a lack of consultation on a variety of resource issues that has affected residents of this area.

Recreational and Tourism Use

- There was disagreement about projections of levels of recreational use of the WMA over the long term. Some felt that growth would be “explosive”; some felt that such projections were exaggerated.
- There is little question that the WMA can and should be used to provide recreational opportunities; it’s a matter of what types of activities are acceptable and to what level of intensity.
- There was some support for the idea of self-regulation of recreational activities; i.e. the users would police themselves and use educational materials to promote appropriate behaviour.
- There was some concern with public access. There are only a few developed access points in the wetlands.

Other Uses

- The management of activities on the CPR rail line was a concern for many people. Chemical pollution, cut-and-fill practices, coal dust, noise, the destruction of wildlife by collisions on the tracks and weed control were all mentioned.
- A question was raised concerning how WMA status would affect options for communities to respond to flood events, especially at Golden.
- Concern was expressed concerning water quality and how that would affect the wetlands.

10 HP issue

Based on the letters written and the responses to the comments sheets we have received so far, we think it is fair to say the following:

- The question of who has jurisdiction (federal vs provincial) for the management of boating on the Columbia River was raised at all meetings.
- The majority of responses have been in favour of the 10 HP restriction. We have no way of knowing how directly this reflects the feeling of the entire community, since a campaign has been mounted from both sides to generate letters. Almost all of the letters supporting the regulation were individually written letters while most of the letters opposed to the regulation were faxes or copies of the same form letter. It is obvious from the letters and from all the people we have talked to that everyone involved cares very passionately about the wetlands.
- There was disagreement about whether or not motor boats and other motorized conveyances disturb or would disturb wildlife. Some felt that canoes and cross-country skiers had as much or more impact.
- There seemed to be universal opposition to the use of jet-skis in the wetlands. Very few people supported their use in the river channel.
- Some people felt that the trains running up and down the valley are a greater disturbance to

wildlife than current levels of boating.

- The issue of prop wash and wake from larger boats affecting river banks and creating a safety hazard for small craft was brought up by several people.
- Several people indicated that community support for any regulation is very important if it is to be effective.
- The point was made by several people that options for boating for people in Golden are limited. The Mica reservoir is cold and full of debris and dangerous to boat in. Many smaller local lakes have HP regulations in place or are very small.
- Some people suggested that there would be a large compliance problem with present regulation, unless it had widespread community support.
- One of the positive aspects of the 10 HP regulation is that it is easily enforceable. Several people pointed out that a speed limit on the river would be very difficult to enforce with the present level of enforcement staff available to either the Conservation Officer Service, the RCMP or the Coast Guard.

Commercial use

- There was general support for wildlife based tourism operations in the WMA, if managed appropriately and carefully regulated.
- There were a variety of suggestions on how best to license such operations. Some suggested tenures limited to specific parts of the river, other suggested annual permits rather than longer term tenures.

Public Involvement

- Several people suggested that there should be a “Friends of the Columbia Wetlands” group established. Others suggested that a committee involving local people should be established to assist in managing the wetlands. The idea of “river keepers” was suggested by others.

First Nations Involvement

The Ktunaxa Kinbasket Tribal Council and the Shuswap and Columbia Lake bands expressed a variety of concerns related to their long standing traditional uses in the wetlands. They are concerned about the destruction of native use sites along the Columbia River and the possible impact of WMA status on their options for exercising their traditional rights in the area.

COMMENT SHEETS

Comment sheets were provided at the meetings. Below is an assessment of the balance of opinion on the major issues as indicated by the comment sheets returned. Thirty one comment

sheets were received. Many people commented on only some sections and points, thus the disparity in numbers.

- The vision statement was supported by 16 people and opposed by none.
- Twelve people wanted to retain the wild character of the area and one was opposed.
- Thirteen people wanted to allow natural forces to continue to act in the wetlands (except where it would affect private land), one was opposed.
- Fifteen people supported tourism operations in the wetlands, if they were carefully regulated and directed at the appreciation of natural values, four we opposed.
- Six people supported wildlife and fisheries enhancement in the wetlands and fifteen were opposed. In most cases enhancement was supported only to prevent the disappearance of species or for dealing with specific, defined concerns.
- Nineteen people supported the 10 horse power restriction and ten we opposed.

A variety of other issues were addressed at the meetings that could not be included here. We have considered all input and where possible, have incorporated those ideas and concerns in the management plan.

Thank you for participating in this process and helping us to develop this plan.

Dave Phelps
Ministry of Environment, Lands and Parks

Bob Jamieson
BioQuest International Consulting Ltd.

Ed Hennan
Legacy Wildlife Consulting

This comment sheet was provided to those who attended the public meetings and were the basis for discussion with groups we met with after Nov. 15.

COMMENT SHEET

A VISION, GOALS AND APPROACH TO PUBLIC INPUT FOR THE COLUMBIA WETLANDS WILDLIFE MANAGEMENT AREA

VISION

- The Columbia River Wetlands will remain a complex floodplain ecosystem with a substantially unchanged biological community predominantly governed by natural ecological processes.

Revisions/other ideas:

GOALS

PRIMARY GOAL

- To manage and maintain wildlife habitat in the Columbia wetlands to ensure abundant, diverse and self-sustaining populations of fish and wildlife species.

Revisions/other ideas:

Goals for Wildlife Management

- To maintain and enhance populations and habitats of wildlife species that occur within the WMA, and to attain optimum population levels within available habitats. (The emphasis of habitat management will be equally allocated to migratory waterfowl, ungulates, endangered species and other wildlife. Management prescriptions will ensure that the habitat needs of all plant and animal species are accommodated).
- To enhance habitats for wildlife where such projects will have minor impacts on the landscape. The balance of the area will be protected and managed via a “leave alone” policy where natural processes will be allowed full rein. Habitat enhancement projects will complement the existing dynamic natural processes.

Revisions/other ideas:

Goal for Recreation and Use

- To provide opportunities for the public to appreciate, study, and view wildlife in their natural habitats. (This would be the primary human use in the WMA).
- To maintain a sense of wildness and solitude in the WMA, and to encourage only those uses that maintain that sense of wildness.
- To accommodate other resource uses that are compatible with and compliments the primary objectives of the WMA.
- To maintain a high quality natural experience for those using the wetlands, as measured in terms of wildlife viewing options, quality recreational experience and a low level of other visitors and other human activity seen or heard.

Revisions/other ideas:

Approach to Public Involvement

- The public, stakeholders and government agencies will be consulted on an ongoing basis concerning all major management actions taken in the WMA. The management plan will be reviewed every 10 years.
- The WMA manager will actively include affected First Nation communities in the public process that will help to define management actions in the WMA. Subject to wildlife conservation concerns, First Nations interests will be accommodated within the Management Plan. Designation and management of WMAs is without prejudice to future land claim settlements.

Revisions/other ideas:

MANAGEMENT ISSUES

The role of dynamic natural processes in the WMA.

The Columbia Wetlands are a dynamic natural system that are changing continuously as a result of natural erosion, flood episodes, fire, beaver impacts on cottonwood stands and other natural processes.

How should managers respond to major natural events that may compromise wildlife and scenic values in the wetlands?

Type and extent of enhancement activities to take place

Some wildlife enhancement activities (dyking, water control structures), if developed, could have a significant impact on the landscape and aesthetic values.

Projects being considered to date are:

Baseline surveys of fish populations in the Columbia River and the wetlands, including coarse fish used by ospreys, mergansers, otters and other fish-eating wildlife species.

Dyked wetlands to stable water levels for nesting waterfowl and species of concern such as sandhill cranes and canvasback ducks.

Nesting platforms for geese and other species

A survey of use by cavity nesting birds of presently available cavities (primarily in cottonwood trees).

A survey of songbirds using the wetlands for nesting and during migration.

Further work on the status of cottonwoods stands in the wetlands.

Enhancement of some sites for ungulates and songbirds by maintaining a mix of forest, shrub areas and grassland openings in areas where major side tributaries come into the wetlands.

A survey of bird and mammal species that use coniferous forest areas adjacent to the wetlands for nesting but feed or otherwise live in the wetlands.

What types of enhancement should take place?

How much enhancement activity do you want to see?

RECREATIONAL USE

Please give us your ideas on what kinds of uses should be given priority in the wetlands.

What uses should not be allowed?

COMMERCIAL USE

How many and what kind of commercial tourism operations should be allowed in the wetlands?

How should they be regulated?

MANAGEMENT OF VEHICLE AND BOAT USE

Which option do you prefer for the regulation of motorized use in the wetlands?

(Circle your most preferred option, indicate others that you might support with a check mark).

- Retain 10 HP reg. (permits for trappers for larger motors, other specific uses)
- Increase horsepower of vehicles and boats allowed.
- Remove HP regulation completely
- Remove regulation, impose a 10 HP regulation in 5-10 years if use increases.
- Limit use and motor size during specific periods and seasons.
- Remove high recreational use areas from the WMA - e.g. Milligan Lake
- Provide special areas within WMA for higher impact recreational use
- Manage for downstream boat use primarily
- Limit commercial tourism use to specific portions of the wetlands.
- Limit the number of commercial operators on each section of the river.
- Limit snowmobile use to specific areas.
- Impose no regulations on snowmobile use

Do you have any other ideas on this issue?

Fiscal strategy

Do you have any ideas for financing the maintenance and management of the WMA?

Please leave this sheet at the door, or send to:

Bob Jamieson
BioQuest International Consulting Ltd.
Box 73,
Ta Ta Creek, B.C.
VOB 2HO

250-422-3322
bjamieson@kootenay.awinc.com

Appendix II. Data On Red and Blue Listed Species In The Columbia Wetlands WMA.

Below is a description of the species listed for the Invermere and Golden Forest Districts that may occur in the WMA.

Two species are ranked as S1 or critically imperiled in B.C. (BC Conservation Data Centre 1998).

Leopard Frog: The leopard frog is the amphibian of primary concern in this area. It was known to occur in the mid- 1970's in the Columbia Marshes (I. Jack, L. Halverson, pers. comm.). A National Museum of Canada research team documented their occurrence at Edgewater and Moberley (Scheuler et al. 1980). Shortly after this time, a range-wide decline led to the extinction of this species throughout much of its western range in North America (Bishop and Pettit 1991). Surveys of the Columbia Marshes in 1995 and 1996 revealed no northern leopard frogs, and at present they are known to occur only in the Creston Valley. (Ohanjanian 1997) and near Eureka, Montana.

Management of the WMA should take into consideration options for re-introducing and maintaining this species in the wetlands, especially as their numbers appear to be recovering in other areas of their range.

White Sturgeon: The Columbia River population of this species is listed for the Golden Forest District. A few individuals may survive in the Columbia River and Kinbasket Reservoir, however there is no evidence of their presence in recent years.

Two species are ranked as imperiled (S2) for the two Forest Districts , but there is not evidence that they nest in the WMA.

Prairie Falcon: Sightings in the Rocky Mountain Trench indicate that the birds could nest in the East Kootenay, however, no nest has been verified.

Short-eared Owl: This species is a fall migrant through the wetlands but there is no evidence of nesting, although it is suspected that it does nest in the wetlands (R. Ferguson, pers. comm.). It was observed in the spring of 1997 at Moberly Marsh (E. Zimmerman, pers. comm.). At Creston this species used grassland areas adjacent to the wetlands in the CVWMA for nesting but has disappeared in recent years (B. Shushnoff, pers. comm.).

This species should be of management concern in the Columbia wetlands.

There are several species that are listed as vulnerable (S3) in the Invermere and Golden Forest Districts. Of these species, only one (bull trout), is considered vulnerable (G3) globally. Those species which are known to occur in the WMA are listed below.

LARGE MAMMALS

Grizzly bear: Grizzly bears are seen only occasionally in the wetlands although tracks were seen by T. Munson in Sept. 97 and by D. Hendron in Oct. 97 in the wetlands near Brisco. It is very likely that bears were much more common in the wetlands in earlier times when there were salmon spawning in the river. Corridors across the wetlands and the Trench are a concern.

Badger: The Yellow Badger has been identified as being of concern in the East Kootenay Trench. A study is presently underway, looking at their status in the region (N. Newhouse, pers. comm.). This is a grassland dependent species and occurs in the bench land portions of the WMA.

Rocky Mountain Bighorn Sheep: Bighorn sheep utilize the upland bench areas included in the WMA in the Radium Hot Springs area. Part of the role of WMA status for that area is to maintain habitat for this species.

BIRDS

Great Blue Heron: Great Blue Herons are relatively common in the East Kootenay Trench and in the Columbia wetlands. There are several known rookies in the wetlands.

Sandhill Crane: Sandhill cranes are seen irregularly during migration in the wetlands but do not appear to nest in the wetlands. One pair of Sandhill Cranes (probably Greater Sandhill) has nested for several years on Bummer's Flats (Cooper 1996). Consideration might be given to establishing sandhill crane nesting areas in the wetlands. Sandhill cranes nest on floating platforms made of vegetative material and would probably require areas with stable water levels for nesting.

Bittern: The Bittern uses wetland areas with dense emergent vegetation or tall grasses (Campbell et al. 1990) and they are victims of the continuing loss of wetlands. They are declining throughout the continent and are on the U.S. Blue List (Tate 1986). They are uncommon but have been observed in the wetlands in several areas (L. Halverson, pers. comm.). likely breeders

Turkey Vulture: Turkey Vultures occur in the E.K. Trench although this is close to the northern extent of their range. Turkey vultures have been observed in all seasons except during the winter months (Campbell et al. 1990). Breeding habitat is usually in crevices on precipitous cliffs. Populations appear to be declining in western North America (Tate and Tate 1982); vultures are susceptible to eggshell thinning and loss of nesting habitat (Anon. 1991). In B.C., populations appear to be stable, however, this is uncertain as data on their numbers is limited. Vultures are seen irregularly during the summer.

Flammulated Owl: Flammulated owls are known only from Premier Ridge (observed by Rick Howie), the east side of Columbia Lake and Stoddart Creek (Leung and Simpson 1994) and at Newgate (S. Canning, June 1996). This species uses older age Douglas-fir vets in relatively open habitats where it can hunt invertebrates, primarily grasshoppers and moths (Hayward and Verner 1994). Habitat for this species (older age Douglas-fir stands) may occur in some areas adjacent to the wetlands.

Swainson's Hawk: This species migrates through the wetlands but does not appear to nest in this area. It is seen occasionally in the wetlands, from May to September (Ferguson and Halverson 1997). One bird was seen May 11, 1997 by L. Halverson.

Bobolink: This species is listed as uncommon by Ferguson and Halverson 1997. This species was seen at Moberly Marsh and at Parson in June, 1996 (E. Zimmerman, pers. comm.). It uses meadows and adjacent fields.

Bald Eagle: Several pairs nest in the wetlands and adjacent areas. One eagle was observed at Edgewater in the summer of 1997 that was carrying a satellite backpack and beacon that had been captured on the Skagit River in Washington (T. Kinley, pers. comm.). Surveys in B.C. and elsewhere indicate that numbers are trending upward and the status of this species is under review (T. Antifeau, pers. comm.). It is currently listed as S4.

Tundra Swan: Swans occur in large numbers as migrants. This species is currently listed as S3N.

REPTILES

Painted Turtle: The Painted turtle has been blue-listed and is a species of significant concern in the E.K. Trench. One relatively large population (700 animals) is located in Kikomun Creek Provincial Park (Macartney and Gregory 1985). They are limited to a relatively low number of pothole lakes and wetlands and are at risk since they nest at some distance from water and often cross roads in the process. This species occurs in the wetlands, but in relatively low numbers compared to some other wetlands further south in the Trench. They are common at Wilmer and at Dorothy Lake in Invermere, but are uncommon further north. A laying female was observed by Susan Stewart at Spillimacheen in the early 1990's.

Rubber Boa: The Rubber Boa is very uncommon. It appears to prefer hot springs, riparian habitat and rocky areas in the East Kootenay Trench. This species is uncommon in most of the East Kootenay Trench, but has been observed in rocky areas adjacent to the Columbia River at Thompson's Landing north of Brisco (I. Jack, pers. comm.). It is often seen at the hot springs at Radium Hot Springs (L. Halverson, pers. comm.).

FISH

Below is a description of the fish species listed for the Invermere and Golden Forest Districts that may occur in the WMA.

Bull trout: Bull trout occur through most of the Columbia River system. There is little data at present on this species in the wetlands. This species is doing well in Kinbasket Reservoir, but it is not known if this population spawn in the Upper Columbia or its tributaries. This is the only species listed provincially that is also considered vulnerable throughout its range (G3) (Anon 1997a).

Chiselmouth: Little data is available on this species. Griffith 1994 sampled fish populations in the wetlands and did not record this species. It has been recorded in Windermere Lake (T. Antifeau, pers. comm.).

Salmon: As many as five species of salmon spawned in the Upper Columbia prior to the construction of the Grand Coulee dam in 1936. Although these runs of salmon are not presently listed, it should be noted that these salmon species have been extirpated for the region and the specific races that used the Upper Columbia as extinct.

The following information on the historic presence of salmon was provided by Larry Halverson and Rod Heitzmann of Parks Canada.

Marius Barbeau (Indian Days on the Western Prairie 1965) did ethnographic work with the Kootenay and Stoney in the 1920s. He wrote "...the Lake Kootenays, Arcs-a-Plat or Flatbow-- ... seldom crossed the mountains. Like most northwestern tribes, they congregated along the canyons in the summer at a time when the five varieties of salmon ran, in turn, up to the spawning bottoms at the headwaters of the Columbia River, about 1400 miles from the sea coast. Here the greatest activity in the year prevailed: the men watched on their platforms, gaffed or speared the fish or caught them in weirs; and the women split, dried, and smoked them on green willow racks for preservation. Salmon were so plentiful, gathering in such incredible numbers at the spawning grounds near the headwaters, that it was an easy task, particularly for the Upper Kootenays, to replenish their stores. The vertebra of the fish rotted every year in layers so thick as to form "ridges" that even yet have not entirely disappeared at the place named "Salmon Beds", now Athalmer townsite, though for a long time now the annual run of the salmon has dwindled to nothing."

(Page 40)

In 1807, David Thompson crossed the Rocky Mountains by way of the Howse Pass and Blaeberry River. He then turned south and established a trading post called Kootenae House near the outlet of Windermere Lake. Thompson and his crew were short on food, but the Kootenay occasionally brought them deer, elk and bear meat. On August 13, the Kootenays advised Thompson to build a fish weir. During the third week in August, the summer run of salmon arrived...Finan McDonald went out at night with a flambeau [torch] and speared salmon weighing up to twenty-six pounds ("tolerable good, but having come so far had lost all their fatness") (Nisbet 1994:97).

By October 26, Thompson's men were working on stockades. "The salmon run was over now, and the shores were littered with dead fish." (Nisbet 1994:105).

Just north of Canal Flats, is the Columbia Lake Site, EbPw 1. It has been test excavated by Mohs in 1980, (Mohs 1981) and by Yip in 1981 (Yip 1982). Mohs did a cursory faunal analysis that classified bone as land mammal, fish, bird or shell. Yip had a more specific analysis undertaken by Helen Lemon who identified some bone as salmon, sucker and peamouth. Fish remains formed 65.6% of the total number recovered (n=7062). It should be pointed out that Yip refers to anadromous fish when talking about salmon, although these might also be trout depending upon size.

PLANT COMMUNITIES

Fifteen plant communities are listed on the Rare Plant Communities Tracking List for the Invermere and Golden Forest Districts (BC Conservation Data Centre 1998). Four of these are communities that are well represented in the wetlands while four others are represented in the dryland portions of the WMA. A list of these communities is attached. A survey of these rare plant communities is proposed as part of this plan.

RARE AND ENDANGERED PLANTS

Forty one species of rare vascular plants are listed for the Invermere District and thirty five for the Golden Forest District (BC Conservation Data Centre 1998). A list of these communities is attached. Many of these species occur in the wetlands and in the dryland portions of the WMA. Information on the distribution of these species and the risks they face is limited (G. Douglas, pers. comm). A survey of rare plants is proposed as part of this plan.

The species listed as S2, S3 or S4 for the Golden and Invermere Forest Districts but that are unlikely to occur in the WMA are listed below.

MAMMALS

Wolverine: Wolverine is generally found at higher elevations. It has not been seen by L. Halverson in the wetlands.

Fisher: Fisher are generally found at higher elevations. An attempt is being made to re-introduce this species in other parts of the region (I. Teske, pers. comm.).

Woodland Caribou: Woodland Caribou occur at higher elevations in the region but not in the wetland area.

The Least Chipmunk (*selkirki* subspecies): This species is red-listed for the Invermere Forest District. Habitat is at timberline, and it has been observed at the Paradise mine.

Northern Long-eared Myotis: Northern Long-eared Myotis is found in Interior cedar hemlock forests in Revelstoke National Park. It is unlikely to occur in the wetlands.

BIRDS

Columbian Sharp-tailed grouse: This species has been extirpated from the region. It occupied large grassland areas in the south portion of the Trench as far north as Invermere (Ohanjanian 1990) until recently.

Long-billed curlew: This species occurs in small numbers in large grassland areas in the south portion of the Trench (Ohanjanian 1992) and near Windermere (T. Kinley, pers. comm.). This species was observed at Moberly Marsh in May of 1996 (E. Zimmerman, pers. comm.).

Lewis woodpecker: This woodpecker uses open grassland areas and has been observed in a burn area just south of Invermere (Cooper 1996a). It has been observed in nearby areas (Ferguson and Halverson 1997) and in the Columbia National Wildlife Area at Wilmer (T. Kinley, pers. comm.), but the area provides little potential habitat for this species.

White-troated swifts: This blue-listed species occurs at the Dutch Creek hoodoos but is not known to use the clay cliffs adjacent to the wetlands.

There are several species that are of local concern in the area, but are not red or blue listed provincially. Information on these species is provided below. (Western Grebe and American White Pelican are included in this list although it is red listed provincially. These species are not included in the list for the Golden and Inveremere Forest Districts, which would appear to be an error in the listing process for these districts).

MAMMALS

River Otter: River Otters are seen occasionally in the wetlands. Seven otter were observed at Athalmer Slough on Oct. 20, 1997 and five were seen Nov. 1, 1997 at Wilmer Slough (L. Halverson, pers. comm.). A family group appears to have wintered near Athalmer for the last three years (T. Kinley, pers. comm.). They have also been seen at Spillimacheen in 1993 and at Moberly Marsh in 1996 (E. Zimmerman, pers. comm.). The coarse fish populations in the wetlands probably provide a good food source for this species. This species is relatively common at the Creston Valley Wildlife Management Area (B. Stussnoff, pers. comm.), on Kootenay Lake (B. Herbison, pers. comm.) and is seen and trapped occasionally on the Kootenay River (P. Bradshaw, pers. comm.).

Wolf: Wolves are seen occasionally in the wetlands. They have re-colonized this area over the last two decades.

Bats: Several bat species occur in the East Kootenay Trench. A survey of the area is presently underway (Mitchell Ferman, pers. comm.). Large trees and snags in the wetlands and in adjacent forests would provide roosting sites for bats. The wetlands would provide good foraging areas. Little brown bats are common in wetlands (L. Halverson, pers. comm.).

Muskrat: Muskrats are common across their range but are important to consider since they are a major ecological factor in wetland ecology. Major fluctuations in muskrat populations occur in the wetlands (M. Yaternuck pers. comm.). In previous decades she has trapped as many as 2500 muskrats per season.

BIRDS

Wetland Habitats

American White Pelican: White Pelicans are seen during migration only and do not nest in the wetlands.

Western Grebe: Western grebe is also seen occasionally during migration. The nearest colonies are at Leach Lake and Duck Lake at Creston, with another group at Salmon Arm. It may be possible to establish a new colony in the wetlands, if there is a good fishery to support them and their young. They need stable water levels for nesting.

Eared Grebe: This grebe occurs at Trescher slough and nests on Reflection Lake (E. Zimmerman, pers. comm.).

Red-necked Grebe: Red-necked grebes are common at several locations in the wetlands. They nest at Trescher slough at Brisco, at Wilmer and in the slough just north of Athalmer. In the latter, the birds face problems with motor boats disturbing their floating nests.

Black Tern: Black tern occurs at Trescher Slough, Moberly Marsh and at Parson (E. Zimmerman, pers. comm.). There is also a colony at Elizabeth Lake near Cranbrook, at Bummer's Flats (M. White, pers. comm.) and at the CVWMA.

Canvasback and Redheaded Ducks: These species are seen during migration, but the fluctuating water levels in the wetlands make this area a poor nesting area for these species. Red heads are common nesters at the CVWMA, canvasback are less common.

Yellow-headed Blackbird: This species is common in the wetlands.

Black-chinned Hummingbird: The Black-chinned Hummingbird is rare in the wetlands.

American Avocet: This species is seen only occasionally in the wetlands.

Peregrine Falcon: Peregrine Falcon are rare visitors to the area. No nesting sites were found in a quick survey of the Trench in 1996, although two nesting sites were checked that had nesting birds in the 1980's (B. Warkentin, pers. comm.). Peregrines have been seen during the summer in nearby mountainous areas (P. Christensen, pers. comm.).

Northern Goshawk: Northern Goshawk is also of concern. There is evidence from the Pacific North-west that this species requires mid-canopy nesting sites in larger trees in mature and old forests and an overall foraging area of 2000+ ha with a variety of vegetation types. This species may occasionally use wetlands for foraging but are unlikely to nest there.

Osprey: This species is common in the wetlands with many known nest sites.

Long-eared Owl: This species is fairly common throughout its range in B.C. It occurs primarily in deciduous thickets close to grassland and pasture although it also occurs in coniferous forests (Canning 1995c). It is keyed to feeding on voles. This species has been seen at Parson and at Moberly Marsh in 1997 bird counts. R. Ferguson has size records between June and October (R. Ferguson, pers. comm.).

Great Horned Owl: This species has been observed nesting near Athalmer (L. Halverson, pers. comm.) and between Nicholson and Golden (E. Zimmerman, pes. Comm.).

Pileated woodpecker: The Pileated woodpecker is the primary forest bird of concern in this area (Ohanjanian 1991). This species requires large ponderosa pine, black cottonwood, aspen and western larch trees and snags as nesting habitat. The large diameter cottonwoods that occur in the wetlands are very important nesting habitat for this species since ponderosa pine does not occur in adjacent areas. Cottonwood and western larch are the only species used for nesting that occur in the area. This is a very important species since it is a primary cavity excavator.

Le Conte's Sparrow: The status and range of Le Conte's Sparrow in B.C. is not well known. They occur in the Peace River country and have been recorded near Revelstoke and on the deltas of Horsethief and Dutch Creeks (L. Halverson, pers. comm.). One was seen in spring of 1997 by L. Cambell near Invermere. Their nesting habitat, which consists of seasonally wet meadows with high willows, and the drier areas in creek deltas, is vulnerable to conversion to hayland.

Willow Flycatcher: This flycatcher is common in the wetlands (E. Zimmerman, pers. comm.). This species is used as an indicator species for riparian habitat in the Malheur National Wildlife Refuge in Oregon (Anon. 1990 and 1995).

Gray Catbird: This species is uncommon but does nest in the area.

Veery: This species has been observed on the Horsethief Creek fan, at the south end of Columbia Lake and at Moberly Marsh.

Other bird species that are of concern, but are probably incidental in occurrence in this area include:

Canyon Wren (Canning 1995)*
Grasshopper Sparrow (Canning 1995b)*
Gray Flycatcher (Canning 1995a)*
Yellow-breasted Chat (Canning 1995d)
Brewer's sparrow (Enns and Siddle 1996)
Western Screech Owl*
Upland Sandpiper*
Horned lark
Cape May Warbler*
Green Heron (Fraser and Ramsey 1996).*
Burrowing Owl
Rocky Mountain (Natalie's) Williamson's sapsucker (not recorded in this area (Cooper 1995).

* There are no records to date for these species in the Upper Columbia (R. Ferguson, pers. comm.).

AMPHIBIANS AND REPTILES

Other species of concern in the area are:

Columbian spotted frog occur both in the wetlands and in potholes and small lakes on the surrounding benches, from the south end of Columbia Lake to Moberley (Ohanjanian and Teske 1996). Their numbers are not abundant. Wood frogs probably occur in the wetter environments at the northern end of the Columbia Marshes. Pacific chorus frogs may also occur.

The Long-toed Salamander lives in down wood and logs close to wetlands. They court and mate in wetlands, then return to live under down woody material nearby. This species is common in

the wetlands (L. Halverson, pers. comm.). I. Ohanjanian (pers. comm.) suggests that areas within 200 m of wetlands should not be included in enhancement burns so that down woody material is not consumed by the fire.

The Western Toad is not listed in B.C. but is a concern since there is evidence of its disappearance in the northern states (I. Ohanjanian, pers. comm.). This species is relatively common in the wetlands.

The Coeur d'Alene Salamander (red listed) is unlikely to occur in the Columbia Marshes. It lives in seeps and low volume streams where exposed rock and wet talus slopes provide cover. A survey of this species was carried out in 1996-97, (I. Ohanjanian, pers. comm.) in other parts of the region, but the slopes above the Columbia marshes were not surveyed.

The Tailed Frog (blue listed) lives in clear, fast moving streams with a boulder substrate. It is primarily a coastal species, but a disjunct population occurs in the Flathead drainage. This species is unlikely to occur in the Columbia Marshes.

FISH

Burbot: Burbot were once common and supported important fisheries in Columbia and Windermere Lakes. Dutch Creek and an unnamed spring at the south end of Columbia Lake are known burbot spawning areas. Burbot are also reported to spawn in Horsethief Creek and the Spillamacheen River. A study of burbot has been initiated in Columbia Lake and twenty six fish have been implanted with radio transmitters. To date they have not left Columbia Lake (B. Westover, pers. comm.).

Pygmy Whitefish: This species occurs in the Golden area, but is restricted in distribution and habitat type (fast flowing streams) and is unlikely to occur in the wetlands.

INVERTEBRATES

Butterflies and moths: The status of rare and endangered invertebrates has been identified as a provincial concern (Scudder 1994). Syd Canning (pers. comm.) has suggested the need for surveys in the E.K. Trench; three rare butterflies would be of special concern. These are:

A large Copper (*Gaeides xanthoides*) that lives at Elizabeth Lake near Cranbrook and nowhere else in the province. It is keyed to an aquatic plant that grows along the shore of the lake. The adult lays its eggs on this plant and the larva eats the leaves. The adults nectar on a variety of flowering plants around the margins of the lake. This species may occur in portions of the wetlands where this aquatic plant occurs.

Another rare subspecies (*Mitoura siva barryi*), is found in the Windermere area with a disjunct population found at Merritt. It is keyed to juniper habitats. The pupae live on juniper spp., the adults require a nearby nectar source in grassland flower species. It may occur where juniper habitats are included in the WMA, i.e. in the Radium Hot Springs corridor.

A Fritilaria subspecies (*Speyeria aphrodite whitehousei*) is found in open range areas from Brisco to Elko. This is the only place it is found in B.C., although a different subspecies has been identified at Williams Lake. This butterfly lays its eggs in the fall on the dead stocks of a species of violet that to date has not been identified. It is found in grassland habitats and there may be impacts from grazing and other human activities. It may occur where grassland habitats are included in the WMA, i.e. in the Radium Hot Springs corridor.

Mollusks: The provincial museum plans to do some work on fresh water mussels in 1998 in the Kootenays (S. Canning, pers. comm.). Mussels occur in Windermere Lake, but are unlikely to occur in the wetlands since they require a gravel substrate on the river bottom.

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Appendix III. Maps of WMA Boundary (1:100,000 Scale)

The WMA lands are indicated in green. Land managed by the Canadian Wildlife Service is indicated in pink. Nature Trust and Wildlife Program lands are orange while provincial parks are dark green.

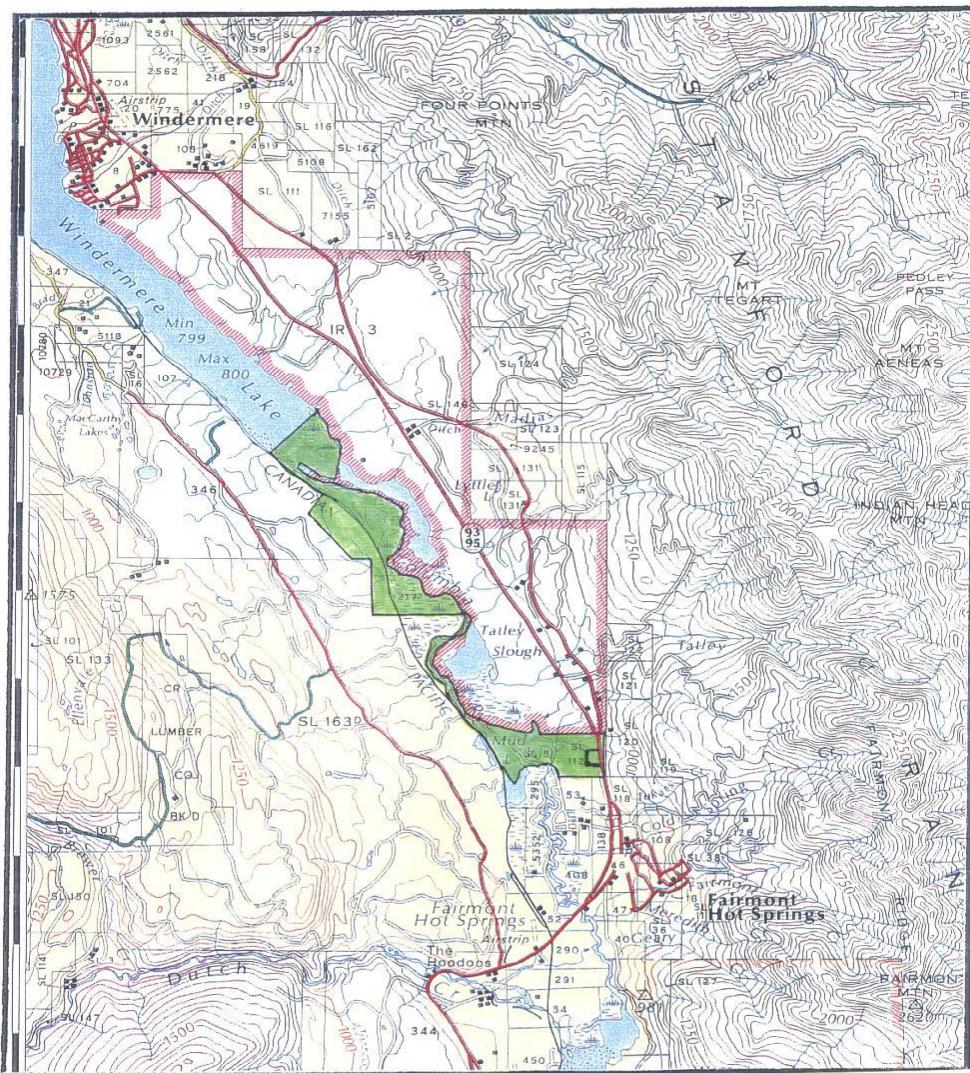


Figure 1. The Columbia Wetlands Wildlife Management Area: Fairmont Hot Springs to Windermere Lake. (1:100,000 scale)

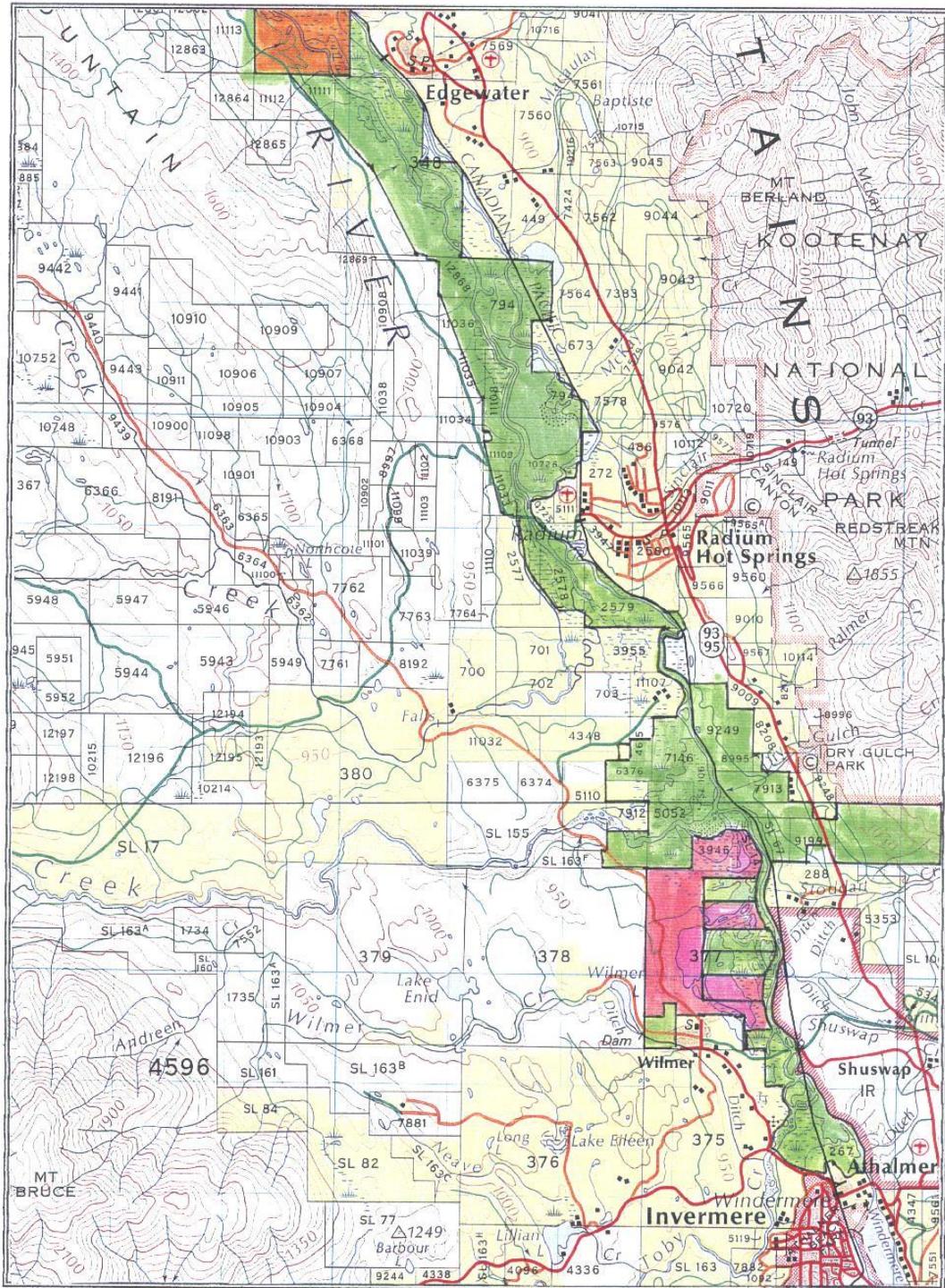


Figure 2. The Columbia Wetlands Wildlife Management Area: Invermere to Edgewater.
(1:100,000 scale)

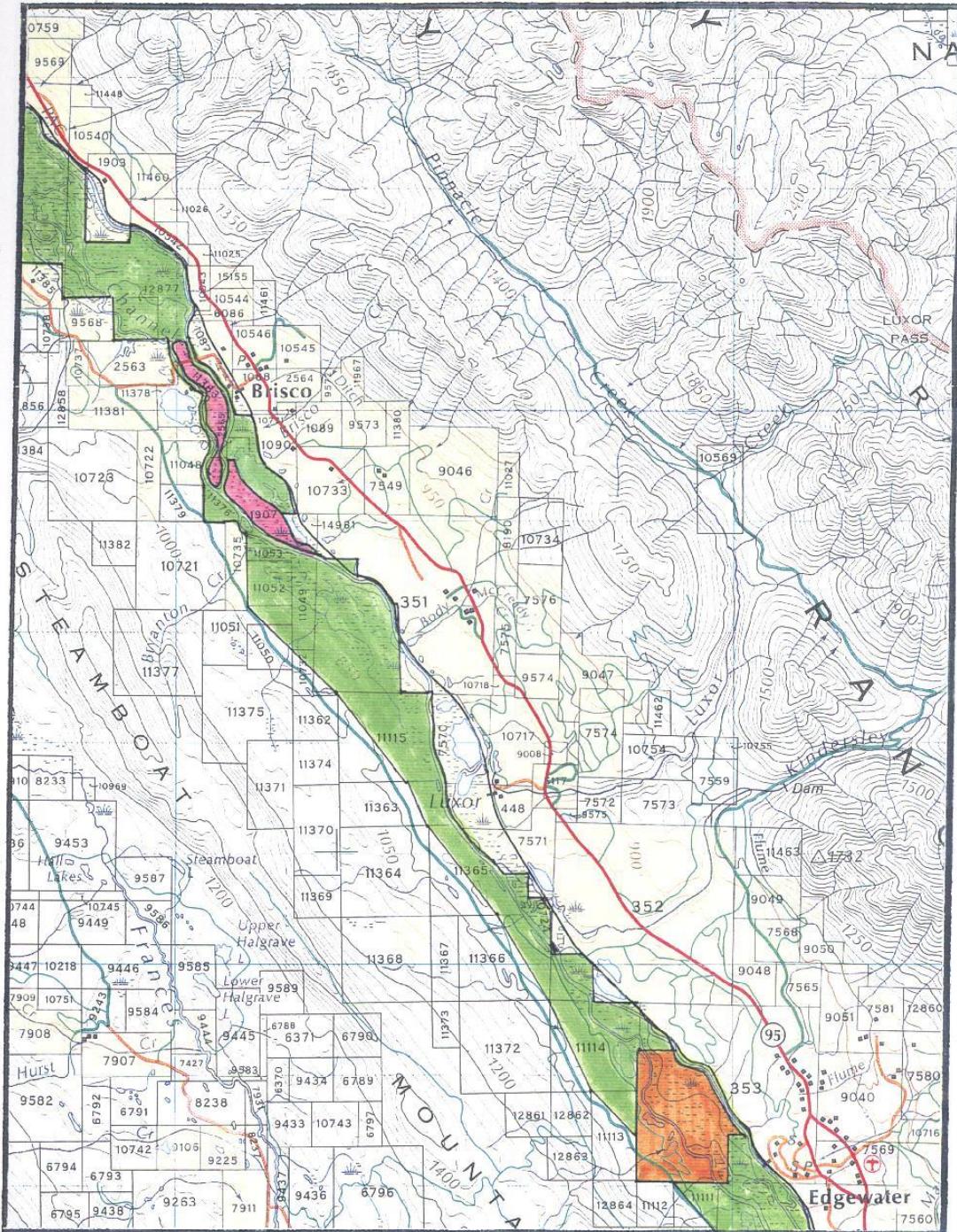


Figure 3. The Columbia Wetlands Wildlife Management Area: Edgewater to Brisco.
(1:100,000 scale)

Appendix III.

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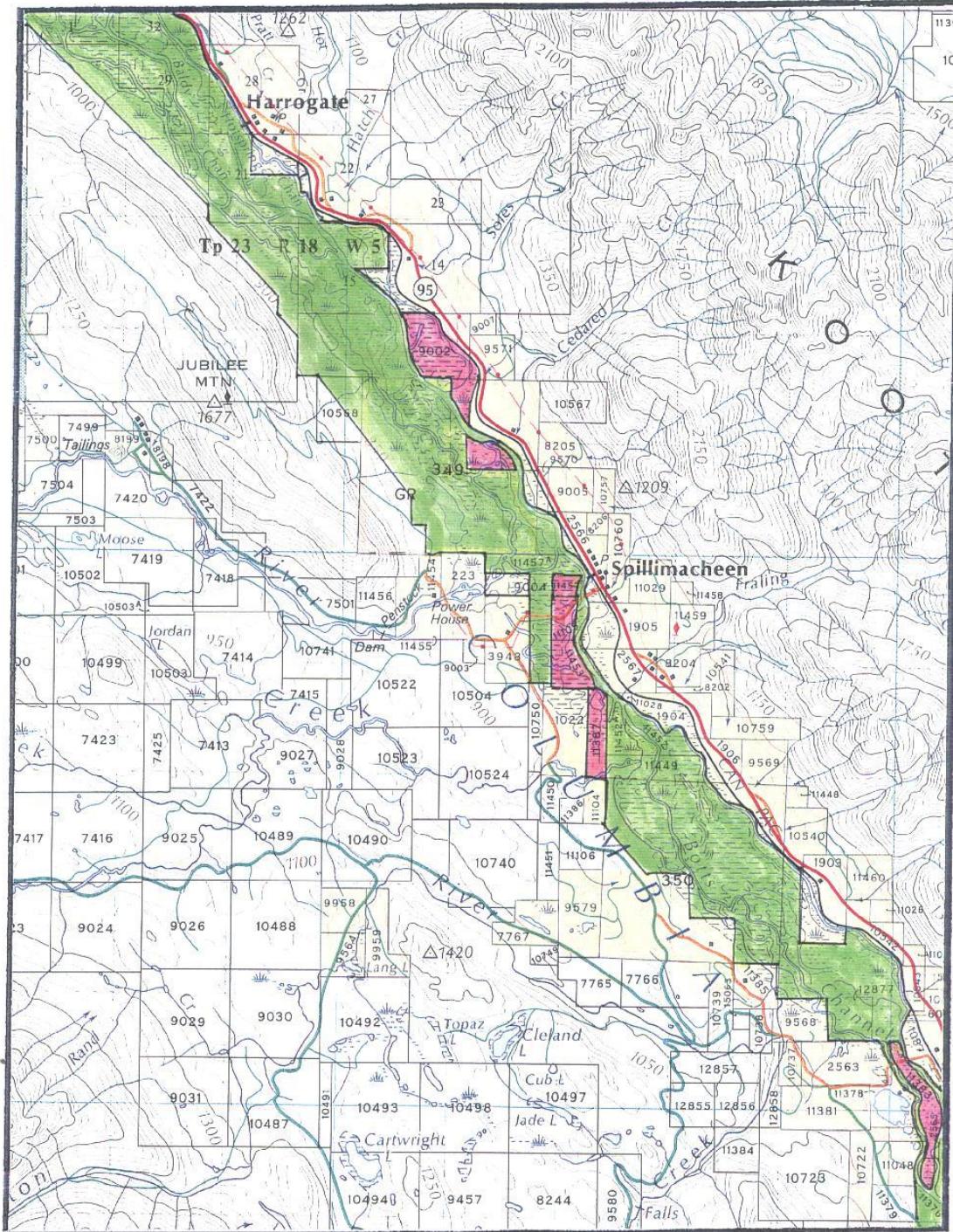


Figure 4. The Columbia Wetlands Wildlife Management Area: Brisco to Harrogate.
(1:100,000 scale)

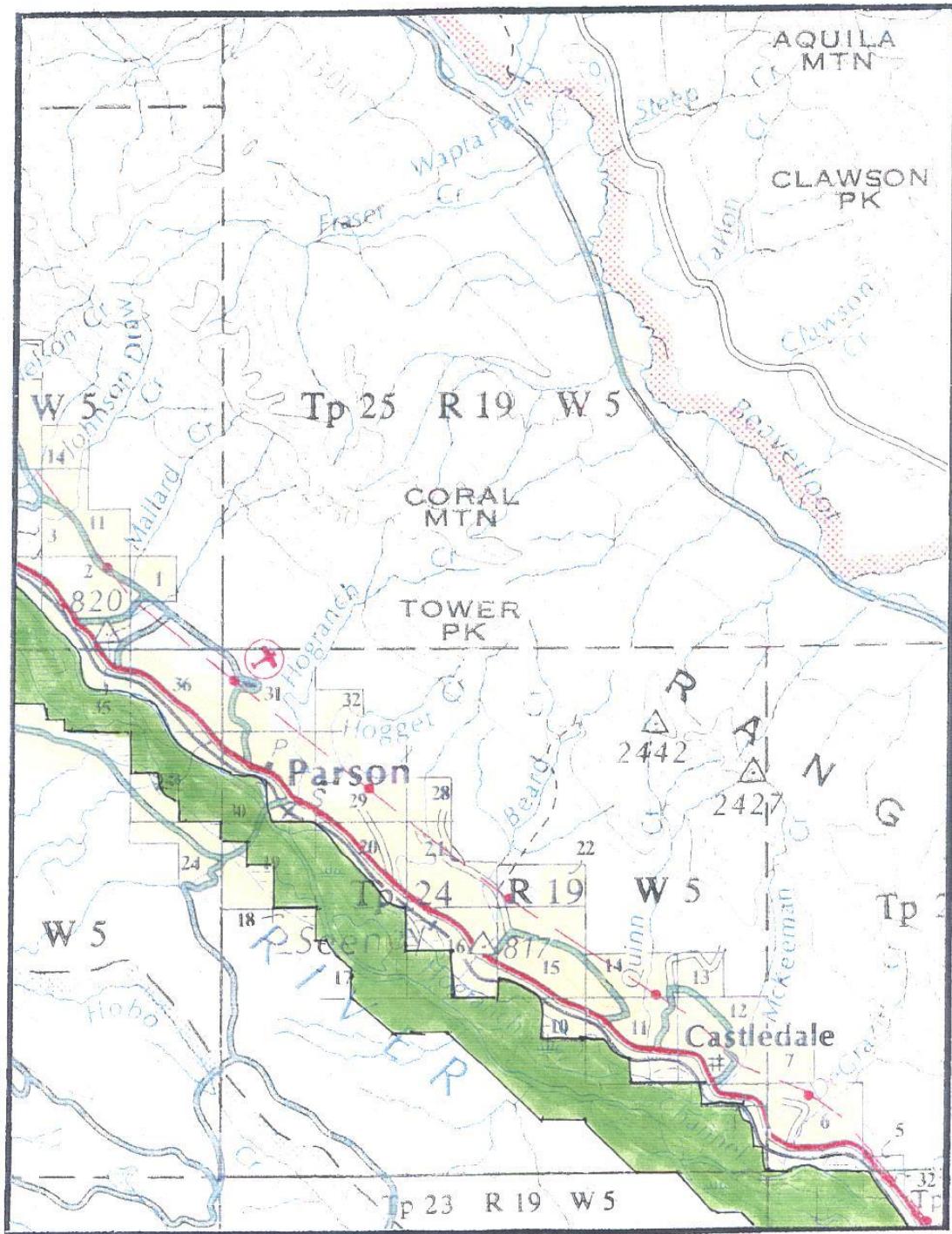


Figure 5. The Columbia Wetlands Wildlife Management Area: Harrogate to Parson.
(1:100,000 scale)

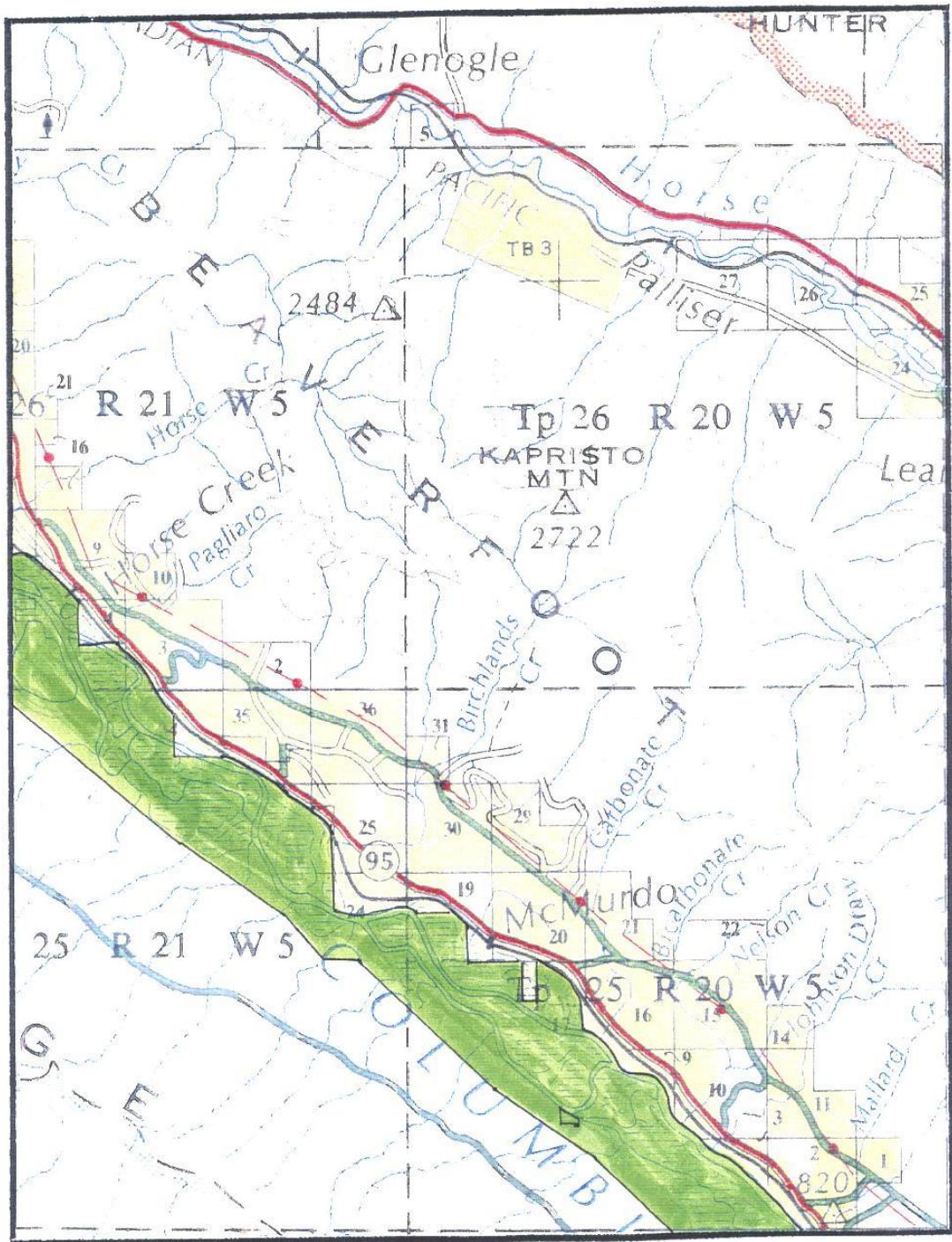


Figure 6. The Columbia Wetlands Wildlife Management Area: Parson to Horse Creek.
(1:100,000 scale)

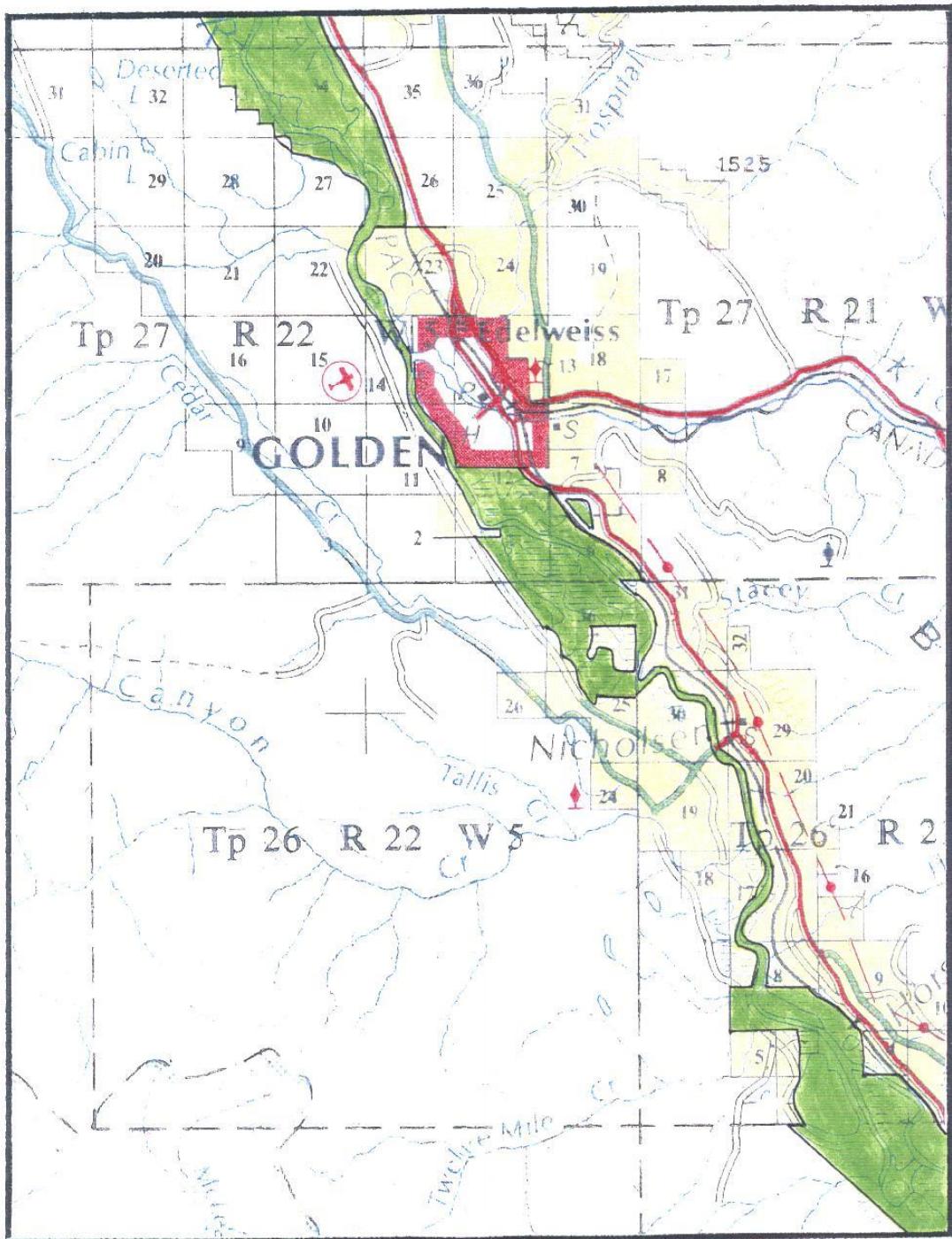


Figure 7. The Columbia Wetlands Wildlife Management Area: Horse Creek to Golden.
(1:100,000 scale)

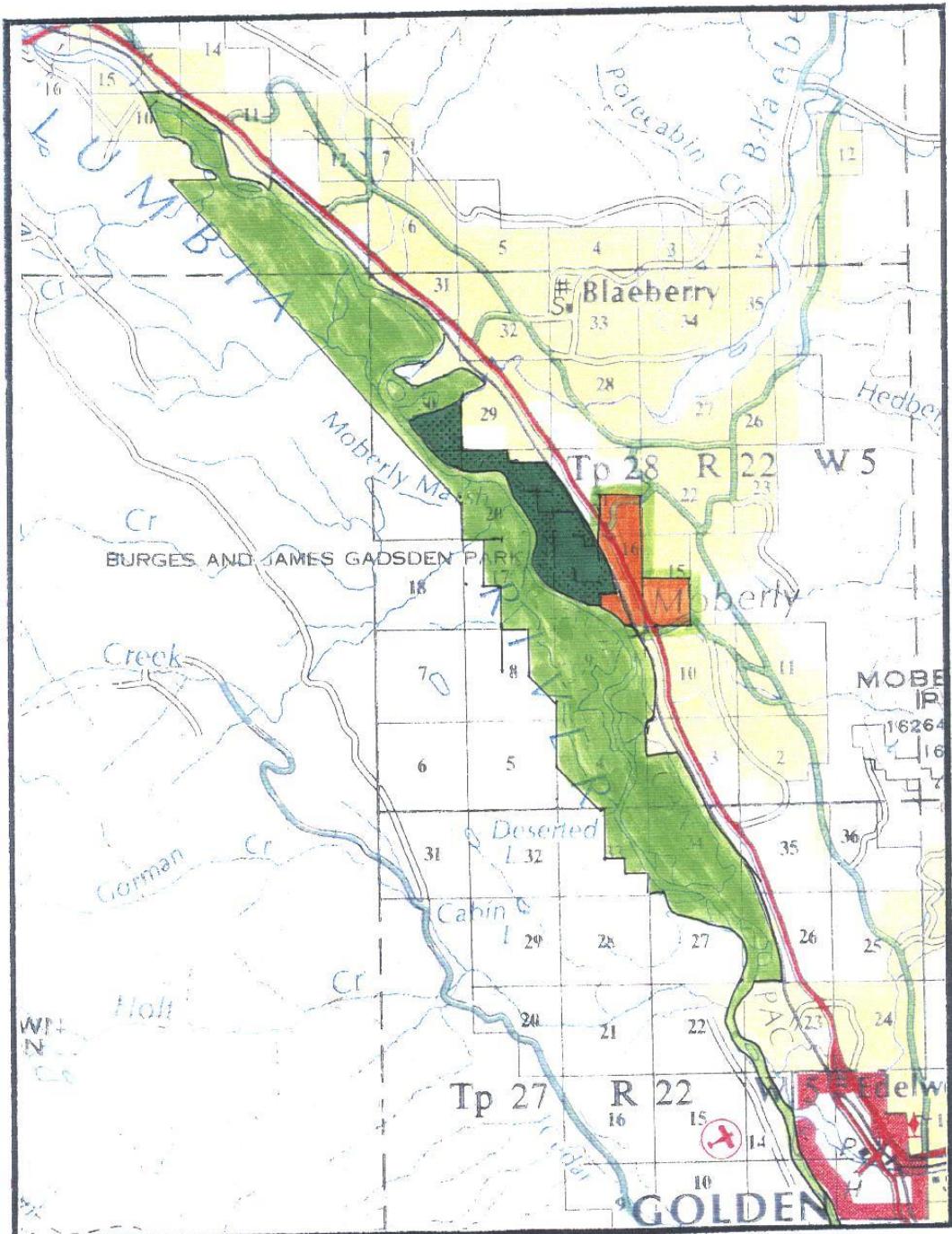


Figure 8. The Columbia Wetlands Wildlife Management Area: Golden to Donald.
(1:100,000 scale)