

Defining Ecologically-Based Significant Wildlife Areas for the City of Whitehorse:

Expanded Ecosystem Mapping Program

FINAL REPORT (ver 2.0)

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Prepared for:

City of Whitehorse Planning Department

and

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Several staff of Applied Ecosystem Management Ltd. contributed to this report:

- **Shawn Francis**, Project Manager and Senior Ecologist (Concepts - Ecosystem Mapping and Environmental Sensitivity Ratings, Wildlife Habitat Values)
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Executive Summary

The YTG Wildlife Viewing Program is dedicated to advancing wildlife viewing appreciation and education opportunities for Yukon residents and visitors, while maintaining the ecological integrity of these sites. The Program is working jointly with the City of Whitehorse Planning Department to study the potential for developing wildlife viewing opportunities within the City of Whitehorse. In order to provide such opportunities now and into the future, Significant Wildlife Areas within the City need to be identified, described, and recognized within the City of Whitehorse Official Community Plan.

The major objectives of this project were to identify important wildlife habitats within the City of Whitehorse and to provide a rating of ecological sensitivity to each. Potential private land ownership conflicts with high value wildlife habitat were also examined. A series of maps have been prepared illustrating the different Wildlife Areas and their associated wildlife values and environmental ratings.

Previous versions of this report have used the term “Terrestrial Ecosystem Mapping”, or “TEM”, to describe the mapping methods developed by Applied Ecosystem Management Ltd. for use within the City of Whitehorse. To avoid potential confusion with Terrestrial Ecosystem Mapping standards that exist in British Columbia (RIC 1998), we have now chosen to use the term “**Ecosystem Mapping**” to describe the mapping methodology. The term “TEM” is no longer used in this report.

Ecosystem Mapping has been completed for approximately 60 percent of the City of Whitehorse land base. Seventeen (17) Significant Wildlife Areas are currently recognized within the City of Whitehorse. Potential high value wildlife areas were identified within the Whitehorse Copper ADS-Mount Sima area but our current understanding of wildlife values and habitat use within this part of the City is still very limited. For these reasons, the area is not currently recognized as a Significant Wildlife Area within the City of Whitehorse. However, the Whitehorse Copper ADS does have relatively large areas of potentially high value wildlife habitats that remain in a natural state and provide landscape-level linkages to the surrounding landscape.

Areas with high wildlife values, as identified in this report, encompass 7 percent (2863 ha) of the total City of Whitehorse land base (41,600 ha) and 12 percent of the 24,102 ha mapping area. The majority of areas containing high wildlife values are comprised of open water and wetlands, therefore representing limited conflicts with both private land ownership and future development potential. Portions or entire units of some Significant Wildlife Areas are currently designated as either PE, Environmental Protection, or PR, Parks and Recreation.

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City of Whitehorse Significant Wildlife Areas: Expanded Ecosystem Mapping Program

1. Background

The YTG Wildlife Viewing Program is dedicated to advancing wildlife viewing appreciation and education opportunities for Yukon residents and visitors, while maintaining the ecological integrity of these sites. The Program is working jointly with the City of Whitehorse Planning Department to study the potential for developing wildlife viewing opportunities within the City of Whitehorse. In order to provide such opportunities now and into the future, Significant Wildlife Areas within the City need to be identified, described, and recognized within the City of Whitehorse Official Community Plan.

In the spring of 1998, the *Whitehorse Wildlife Inventory, Data Compilation and Gap Analysis* (AEM 1998) identified a number of Significant Wildlife Areas within the City of Whitehorse. Areas identified through this process were based primarily on user interviews where “watchable wildlife” formed the main criteria for the designation. For the AEM (1998) report, the YTG Wildlife Viewing Program defined “wildlife” as birds, mammals, and amphibians. This study high-lighted that many of the areas considered as “significant” for wildlife also received high levels of recreational use or were bordered by potentially incompatible land uses. In some situations, adjacent land uses or intensive recreational activities have the potential to negatively impact the wildlife and habitat values of Significant Wildlife Areas within the City.

In late 1998, field work and mapping in support of the *Yukon River Corridor Plan* (1999) was initiated (AEM 1999). This project expanded on the Significant Wildlife Areas identified in AEM (1998) and modified preliminary boundaries to incorporate new information. The Yukon River Corridor Plan improved upon the previous work by including site visits and the development of a comprehensive ecosystem map for the Yukon River Corridor planning area. Fisheries information, specifically known spawning and rearing areas along the Yukon River, were also incorporated. Based on this work, several new Significant Wildlife Areas were suggested for consideration in the Yukon River Corridor Plan (AEM 1999). The development of a detailed ecosystem map for the Yukon River Corridor within the City of Whitehorse filled a major gap in the identification of rare and sensitive wildlife habitats. From this project, it was recognized that by expanding the Ecosystem Mapping to cover additional areas of the City, ecologically-based Significant Wildlife Areas could be identified and described for a large portion of the City of Whitehorse land base.

In spring of 1999, the development of the *City of Whitehorse Trail Map* (1999) necessitated the creation of a map of titled lands for the City of Whitehorse. This map was intended as a reference for trail users to identify land ownership conflicts with recreational use. The majority of lands are titled to private ownership rather than City of Whitehorse titled public lands. The titled land map developed through the Trail project was used within the goals of this project as it allowed areas of potential conflict between high wildlife values and titled land to be identified.

This project is the next step in completing the wildlife/habitat information required for effective land use planning within the City of Whitehorse. Within the boreal zone of Whitehorse, each Significant Wildlife Area identified within AEM (1998) and the Yukon River Corridor Plan (1999) has been examined and the key habitat elements identified. An additional mapping area has also recently been completed for the Whitehorse Copper Area Development Scheme (ADS) near Mount Sima, filling an information gap that was identified in earlier drafts of this document. Through the expanded City of Whitehorse Ecosystem Mapping program, an accurate, updated land cover map has been produced which will allow sensitive and/or rare ecosystems to be identified and incorporated into the City of Whitehorse Official Community Plan (OCP). A single GIS-based map coverage has been prepared that provides Ecosystem Mapping for approximately 60 percent of the City of Whitehorse land base.

Should there be interest in development of lands defined as having high wildlife values or high environmental sensitivity, then a detailed examination of the area should be completed. This will give an exact determination of the boundaries of these areas and the effects of the development and possible mitigation measures. The City of Whitehorse land zoning designations (City of Whitehorse Land Zoning Bylaw 97-42) have not been related directly to the ecosystem units or the identified wildlife areas in the report at this time. This is another step towards the protection of these areas which best follows integration of this report into the OCP and a review of the current zoning bylaw designations.

2. Objectives

The three primary objectives of this project were as follows:

Objective 1: Identify high value wildlife habitats within the City of Whitehorse through the use of Ecosystem Mapping. These ecologically based map units would form the core wildlife values within each of the currently recognized Significant Wildlife Areas;

Objective 2: Identify all environmentally-sensitive areas within the current extent of the City of Whitehorse Ecosystem Mapping. In many cases these areas enhance and support the Significant Wildlife Areas in either a functional or aesthetic role;

Objective 3. Examine potential private land ownership conflicts with the high value wildlife habitats.

The linking of these three objectives would provide the foundation for future land use planning decisions.

3. Methods

3.1. ECOSYSTEM MAPPING

Previous versions of this report have used the term “Terrestrial Ecosystem Mapping”, or “TEM”, to describe the mapping methods developed by Applied Ecosystem Management Ltd. for use within the City of Whitehorse. To avoid potential confusion with Terrestrial Ecosystem Mapping standards that exist in British Columbia (RIC 1998), we have now chosen to use the term “**Ecosystem Mapping**” to describe the mapping methodology. The term “TEM” is no longer used in this report.

Ecosystem Mapping concepts and methods developed during the Yukon River Corridor Plan (AEM 1999) were also used for this expanded mapping project; however several new ecosystem units and modifiers were added during this study. A new “*Users Guide to City of Whitehorse Ecosystem Mapping*” has been prepared to describe the updated methods and interpretations of this mapping methodology (AEM 2000a), and is included with this report as Appendix One. Ecosystem units developed for the Yukon River Corridor planning area were found to be inadequate to describe the ecological variation encountered in some areas of Whitehorse. This expanded project required the addition of new ecosystem units and modifiers to provide adequate ecological description for the upper boreal-subalpine forests along Mount McIntyre, Haekle Hill and Mount Sima. The expanded Ecosystem Mapping program completed for this report was accompanied by several days of field work.

The Ecosystem Mapping was performed at a scale of 1:20,000, which is appropriate for City-wide land use planning and land management but inappropriate for site-specific interpretations.

3.2. WILDLIFE VALUES

In this report, a “Significant Wildlife Area” is considered to be:

“An area in a largely natural state that receives high levels of wildlife use and provides significant seasonal values to wildlife through either suitable habitat and/or providing travel corridors with adequate connectivity to the surrounding landscape”.

Significant Wildlife Areas should be considered as *core habitat units that contain high wildlife values plus their adjacent buffer areas*. It is not possible to determine a strict definition for the zone of influence that each high value wildlife habitat unit creates around it. Therefore, the approach used by this project to illustrate the potential zone of influence around high value wildlife habitats was to map a 100m buffer around all ecosystem units rated as containing high wildlife values. On the associated mapping contained in Appendix Two, these areas are illustrated as hatched red lines surrounding high wildlife value polygons. It is fully recognized by the authors of this report that in some cases the zone of influence may not encompass the full 100m and in other situations, it may be greater. However, it was felt critical by the authors and the project steering committee that this “fuzzy boundary” be included in the mapping to illustrate the

potential influence of these high value habitats on adjacent areas. It is worthy to note that the distance of 100m is greater than the current 30m set-back designated within City of Whitehorse Zoning Bylaw 97-42 for Environmental Protection (PE).

The original Whitehorse Wildlife Inventory project (AEM 1998) identified 12 Significant Wildlife Areas within the boreal zone of Whitehorse. Those original Significant Wildlife Areas were based primarily on user group interviews and on wildlife viewing opportunities. At the time of the 1998 report, limited habitat mapping existed within the City. The Yukon River Corridor Plan (AEM 1999) suggested several new areas for consideration as Significant Wildlife Areas based primarily on habitat characteristics and naturalness. The development of an Ecosystem Map for the Yukon River Corridor planning area allowed for the accurate delineation of high value habitat units within Significant Wildlife Areas of the Corridor, thus allowing the development of ecologically-based Significant Wildlife Areas. The expanded ecosystem mapping program that was completed for this project now allows for important habitat elements within all of the currently recognized Significant Wildlife Areas to be mapped.

Based on the user surveys, AEM (1998) reported documented wildlife groups in each of the Significant Wildlife Areas identified during that project. The Yukon River Corridor Plan (AEM 1999) added to this information by identifying important fish spawning and rearing areas along the Yukon River, and by suggesting several new areas. Table 1 lists the general species groups considered in the identification of Significant Wildlife Areas for the City of Whitehorse.

Table 1. Major species groups considered in the identification of ecologically-based Significant Wildlife Areas for the City of Whitehorse. AEM (1998) provides a complete description of the different wildlife species groups and contains a detailed species list.

GROUP	SPECIES GROUP	DESCRIPTION
Birds	Avian Predators	<ul style="list-style-type: none"> Hawks, Accipters, Falcons, Eagles and Owls
	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> Warblers and Passerines, Woodpeckers, Corvids, Grouse and Ptarmigan
	Water Birds	<ul style="list-style-type: none"> Marsh and Shore Birds, Waterfowl, Gulls and Terns
Mammals	Ungulates	<ul style="list-style-type: none"> Moose, Deer, Sheep, Caribou
	Large Predators	<ul style="list-style-type: none"> Bear (Black and Grizzly), Wolf, Coyote, Red Fox, Lynx, Wolverine
	Semi-Aquatic Mammals	<ul style="list-style-type: none"> Beaver, Muskrat, Mink, Otter
	Small Forest Mammals Microtine Mammals	<ul style="list-style-type: none"> Hares, Squirrels, etc. Mice, Voles, Shrews, Lemmings, Bats
Amphibians	Frogs	<ul style="list-style-type: none"> Wood Frog
Fish	Fish	<ul style="list-style-type: none"> Fresh Water Fish Species and Salmon

Upon completion of the ecosystem mapping, each ecosystem unit within and surrounding the identified Significant Wildlife Areas (AEM 1998, AEM 1999) was examined from the perspective of wildlife values. Given some knowledge about the general requirements of the different wildlife species and species groups, it became possible to link ecosystem unit attributes to general wildlife values. Such an approach is known as “Wildlife Suitability” or “Habitat Mapping”. Two examples of this methodology are provided below:

- Important habitat conditions for moose include areas with adequate winter thermal cover and abundant winter browse. A lodgepole pine-bearberry (PB) forest with an open forest canopy and limited shrub understory does not provide these habitat conditions. Therefore, a PB forest has relatively lower habitat values for moose than mature white spruce-poplar riparian (SP) forests, which provide good winter thermal cover, or white spruce-willow (SW) forests with a high abundance of winter browse.
- Important habitat conditions for migratory water birds include open water, especially waterbodies that become open in early spring, and shoreline-fringe environments. Upland forest conditions are therefore of relatively low habitat value to this wildlife group. However, the characteristics of the water body - large lake (LL), small lake (LS), shallow open water (OW), represent different types of aquatic environments with different shoreline characteristics and therefore create different habitat conditions for this species group.

The “Wildlife Suitability Mapping”, or “Habitat Mapping” approach to the identification of Significant Wildlife Areas is well suited to the description of habitat values over broad geographic areas where detailed wildlife information does not exist. This method of wildlife mapping cannot determine detailed patterns of wildlife use or the abundance of a particular species but it does provide a practical approach to wildlife management. Specific patterns of wildlife use or species abundance estimates cannot be verified without detailed, long-term, systematic wildlife surveys, something that is probably not practical within a City of Whitehorse planning context. However, anecdotal information provided by recreationalists, wildlife viewing enthusiasts, or through First Nations traditional knowledge does provide information that can be used to verify habitat mapping interpretations.

For this report, ecosystem units that contain “High Wildlife Values” are considered to be:

“Ecosystem units that provide high value wildlife habitat and are critical to the long-term, continued use of the area by significant levels of wildlife”.

These polygons form the central “nodes” or create important corridors within each Significant Wildlife Area; disruption of these habitats or corridors would potentially compromise the future use of these areas by wildlife and may affect the long-term ecological integrity of the site. They may be used by wildlife during critical life stages (e.g. shorebird nesting sites or waterfowl staging areas) or may provide important seasonal foraging opportunities (e.g. herbaceous vegetation in the spring and berries in the fall). In general, riparian habitats, shallow water bodies, mid-river islands, wetlands, shrub and grassy meadows, and mature, highly structured forests provide the highest wildlife values within the City of Whitehorse. It is important to note that these conditions are relatively rare within the City of Whitehorse land base. While these ecosystem units generally contain the highest wildlife values, it should be recognized that locally-

important sites, such as a single raptor nest or ungulate bedding site, cannot be identified without detailed systematic field observations.

As requested by the City of Whitehorse, additional Ecosystem Mapping was recently completed for the Whitehorse Copper Area Development Scheme (ADS). This mapping has been incorporated into the current City of Whitehorse Ecosystem Map (ver. 2c). Potential high value wildlife habitats were identified within the Whitehorse Copper-Mount Sima area but our current understanding of wildlife values and habitat use within this part of the City is still very limited. For this reason, Ecosystem Mapping and wildlife interpretations for the Whitehorse Copper ADS are not presented within the main body of this report but are included as a separate addendum (Addendum One). The area is not currently recognized as a Significant Wildlife Area within the City of Whitehorse. However, the Whitehorse Copper ADS does have relatively large areas of potentially high value wildlife habitats that remain in a natural state and provide landscape-level linkages to the surrounding landscape.

3.3. ENVIRONMENTAL SENSITIVITY

In this report, “High Environmental Sensitivity” is defined as:

“Areas with low tolerance to human disturbance where slight alterations would result in functional or structural changes to the ecosystem unit with potentially negative impacts on wildlife or visual aesthetics”. This definition was also used in the Yukon River Corridor Plan (1999).

Environmental sensitivity can be viewed in two ways: a) the tolerance of a site to disturbance and b) the functional role of the site to the surrounding ecosystem:

- a) **Tolerance to disturbance:** Different types of ecosystems or plant communities have different tolerances to disturbance. Some forested ecosystems, such as the lodgepole pine-bearberry (PB) unit, occur on upland sites and support a very limited understory; the soils are usually well drained and coarse-textured. Further, PB ecosystems are well-adapted to relatively frequent, high intensity wildfires and the forest regenerates well following these types of surface disturbances. PB ecosystems can therefore be considered quite resilient and can sustain a relatively high degree of human disturbance. Compared with some other types of ecosystems, PB units have a low environmental sensitivity. In contrast, a wet meadow (ME) unit usually develops on organic soils and is strongly controlled by the local hydrologic regime; any minor changes in the hydrologic inputs may result in a rapid vegetation shift to very different ecological conditions. This shift in the ecology of the site will have associated impacts on wildlife habitat values. Also, due to the organic soils, the ME unit would not be able to sustain high levels of human foot traffic; this type of ecosystem would therefore be considered to have a high environmental sensitivity.

- b) Functional role within the system:** Some areas of the landscape serve as a “support centre” for others, both in an ecological or aesthetic role. For example, a productive wetland depends on continuous groundwater discharge for water and nutrient input. If the discharge area feeding the wetland is disrupted or disturbed, there will ultimately be impacts on the wetland. Therefore, these “support” sites should also be considered environmentally sensitive due to their important influence on the long-term ecological integrity of neighboring ecosystem units or downstream areas. The “natural character” of an important wildlife habitat is also dependent on the surrounding viewshed. If a landscape unit is important to maintaining the natural character of a Significant Wildlife Area, this should also be considered a functional role of that ecosystem unit.

Each polygon within the current Ecosystem Mapping database was examined with the use of these definitions and rated in terms of environmental sensitivity by a plant ecologist and soil/terrain specialist. Three classes, “*High*”, “*Moderate*” and “*Low*”, were used. Wetlands and meadows (fens, bogs, marshes, wet shrub), steep slopes in a variety of vegetated and non-vegetated stages, shallow open water bodies, known ground water discharge areas and some types of lowland forested ecosystems generally received a rating of “*High Environmental Sensitivity*”. “*Moderate Environmental Sensitivity*” was applied to more gently-sloping conditions and some larger open water bodies. A rating of “*Low Environmental Sensitivity*” typically applies to gently-sloping upland forested ecosystems, bedrock outcrops and urban areas.

3.4. WILDLIFE VALUES AND ENVIRONMENTAL SENSITIVITY

Two main objectives of this project were to identify ecologically-based areas of high wildlife value and to rate each unit in terms of environmental sensitivity. Based on the identified wildlife values and environmental sensitivity ratings developed during this project, three important land classes with direct relevance to land use planning within the City of Whitehorse can be determined:

1) High Wildlife Values, High Environmental Sensitivity

Ecosystem units considered critical to the continued long-term use of the area by significant levels of wildlife and that have a high level of environmental sensitivity. Many high value wildlife habitats within the City of Whitehorse, due to their ecological attributes, also have a high environmental sensitivity – a similar situation that is found throughout much of the boreal forest in northwest Canada. In some cases, large waterbodies, such as Schwatka Lake or widenings of the Yukon River, have been subdivided to highlight the location of the highest wildlife values and correspondingly sensitive areas. Disturbance, both in the form of development or high levels of human use, could potentially disrupt the short-term wildlife use of these areas or impact their long-term ecological integrity. These areas are typically used during important life stages such as spring/fall waterfowl staging areas, as forest bird nesting and foraging areas, or travel corridors for larger mammals.

2) High Wildlife Values, Moderate Environmental Sensitivity

Ecosystem units considered important to the continued long-term use of the area by significant levels of wildlife and that have a moderate level of environmental sensitivity. These areas should not be considered “less important” than the areas with a rating of “High Wildlife Values, High Environmental Sensitivity”; due to the ecosystem unit attributes of which they are composed, they have a higher tolerance to disturbance.

3) High Environmental Sensitivity

Ecosystem units with a high level of environmental sensitivity defined by either a low tolerance to disturbance or by the importance of that unit in the long-term functioning of adjacent areas. In some cases, these units may not be adjacent to identified high wildlife values and consist of steep erodable slopes such as the clay cliffs behind Downtown Whitehorse. However, in other situations these environmentally-sensitive units serve as a “support system” for the long-term ecological functioning of high value wildlife areas. In some situations these units may also serve to enhance existing corridors through developed areas. Due to the functional aspect of this definition used in the rating of “*High Environmental Sensitivity*”, there is a considerable difference between the terrain mapping which has been completed for the City of Whitehorse by Mougeot et al. (1998) and this project.

The classification used in this report is “wildlife-centric”. Regardless of the environmental sensitivity of the site or potential constraint to development, units with high wildlife values that have received a rating of high environmental sensitivity are considered the most important areas identified by this project. This has been indicated through the choice of colors used on the Significant Wildlife Area maps (Appendix Two) to depict the different classification schemes.

3.5. PRIVATE LAND OWNERSHIP

Within each Significant Wildlife Area, the titled map layer that was developed for the City of Whitehorse Trail Map (1999) was used to examine areas of titled land within and adjacent to areas of high wildlife value. This allowed for the identification of potential land use conflicts within and surrounding the high value wildlife units for each Significant Wildlife Area. The review of the Official Community Plan will address concerns surrounding private land ownership and future development areas. First Nations Land Claim areas are not shown on these maps.

4. City of Whitehorse Significant Wildlife Areas

Seventeen (17) Significant Wildlife Areas have been identified and mapped within the City of Whitehorse. Table 2 lists the 17 Significant Wildlife Areas. Ecosystem mapping has also been completed for the Whitehorse Copper ADS; wildlife interpretations have been completed for this part of the City but at this time the Whitehorse Copper ADS is not considered to be a Significant Wildlife Area, mainly due to a lack of verified wildlife information.

Figure 1 provides an overview map for the location of high wildlife values within the 17 general Significant Wildlife Areas and the Whitehorse Copper ADS expanded mapping area. Environmentally-sensitive areas are also shown on Figure 1. A detailed map of each Significant Wildlife Area is included in Appendix Two at the back of this report. Whitehorse Copper ADS Ecosystem Mapping and wildlife interpretations are presented as a separate addendum (Addendum One). The Significant Wildlife Areas have been numbered for ease of presentation and discussion; this numbering does not imply importance. For the purposes of this report, three general planning areas are recognized within the City of Whitehorse: 1) Yukon River Corridor, 2) Whitehorse South and 3) Whitehorse West. The following sections provide a detailed description of each identified Significant Wildlife Area within the City of Whitehorse.

Areas with high wildlife values, as identified in this report, encompass 7 percent (2863 ha) of the total City of Whitehorse land base (41,600 ha) and 12 percent of the 24,102 ha mapping area. The majority of areas containing high wildlife values are comprised of open water and wetlands, therefore representing limited conflicts with both private land ownership and future development potential. Portions or entire units of some Significant Wildlife Areas are currently designated as either PE, Environmental Protection, or PR, Parks and Recreation.

Table 2. Overview: City of Whitehorse Significant Wildlife Areas.

WHITEHORSE SIGNIFICANT WILDLIFE AREAS
YUKON RIVER CORRIDOR
Area 1: Wolf Creek/Cowley Creek – Yukon River
Area 2: Chadburn Lake
Area 3: Chadden Lake
Area 4: Schwatka Lake and Area (including Hidden and Ear Lakes)
Area 5: Riverdale – Yukon River Flats
Area 6: Quartz Road – Yukon River
Area 7: Long Lake
Area 8: Old Village (Marwell) Wetlands
Area 9: Lower McIntyre Creek – Yukon River
Area 10: Croucher Creek
Area 11: Porter Creek – Yukon River Confluence
Area 12: Little Takhini Creek
WHITEHORSE SOUTH
Area 13: Mary Lake – Wolf Creek
WHITEHORSE WEST
Area 14: McLean Lake
Area 15: Logan – Arkell Wetlands
Area 16: McIntyre Creek Corridor
Area 16A: Upper McIntyre Creek
Area 16B: Middle McIntyre Creek
Area 17: Crestview Ponds

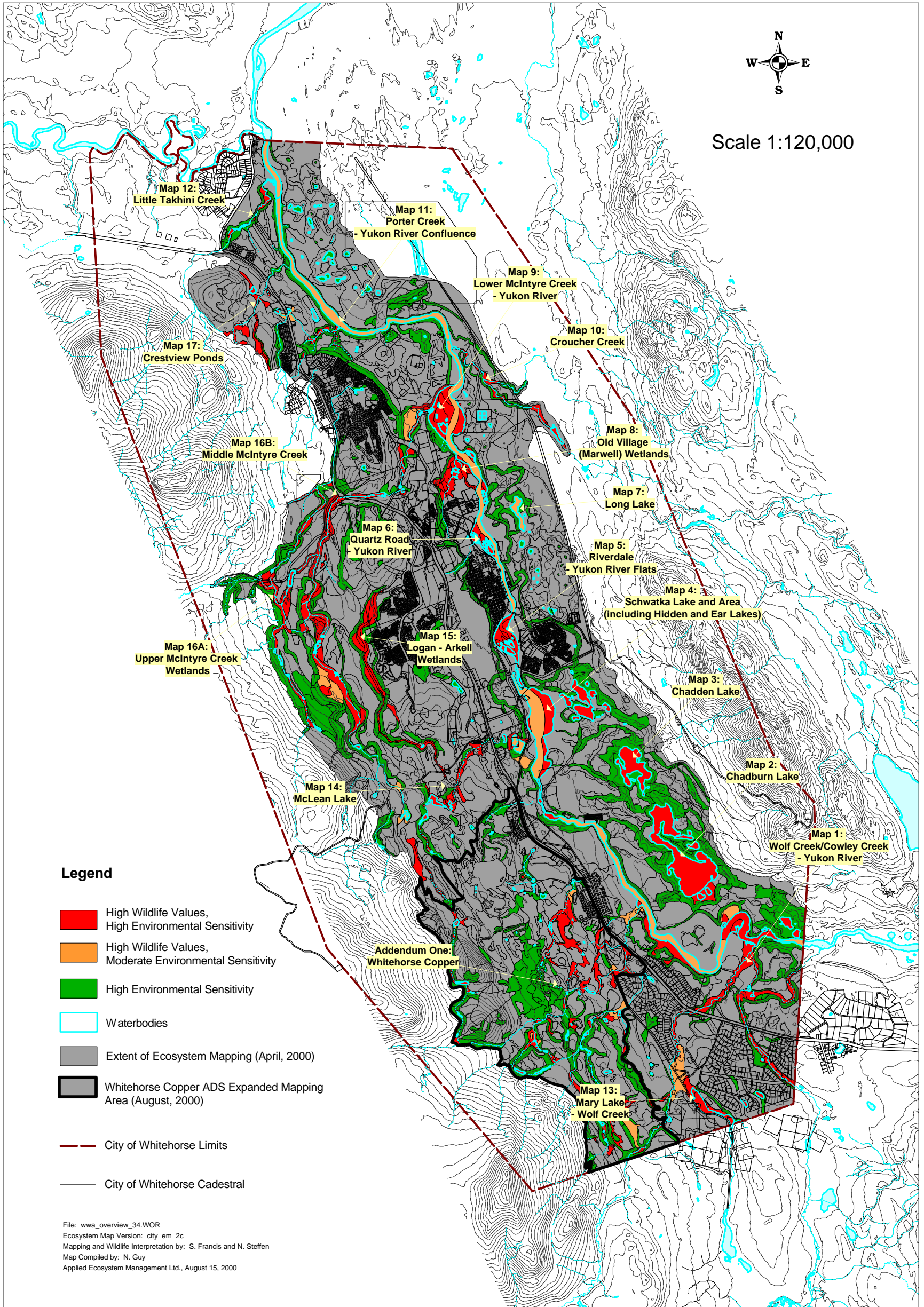


Figure 1. Overview Map: Significant Wildlife Areas and Environmentally Sensitive Areas within the current extent of City of Whitehorse Ecosystem Mapping. Detailed Ecosystem Mapping and wildlife interpretations for the Whitehorse Copper ADS Expanded Mapping Area are presented in Addendum One.

Area 1: Wolf Creek/Cowley Creek - Yukon River

Ecological Setting

The Wolf Creek/Cowley Creek – Yukon River wildlife area is centered around the mature spruce forests and wetlands of the Wolf and Cowley Creek corridors, the large marsh in the Cowley Creek basin and the open water and shoreline environments of the Yukon River (Map 1). The confluence of Wolf Creek and the Yukon River creates a mosaic of shoreline habitats along this shallow water interface. Along with McIntyre and Croucher Creeks, the Wolf Creek area represents the largest lowland riparian spruce ecosystem in Whitehorse. Mature riparian forests along Wolf and Cowley Creeks are primarily white spruce-feathermoss (SF), spruce-willow (SW) and riparian spruce-poplar (SP). Willow, alder, shrub birch (WA, WB) and sedge communities (MR) are found at the confluence of Wolf Creek and Yukon River. A low point of land was flooded when the Yukon River level was raised 0.5 – 1.0 m above historic levels with the building of the Whitehorse Rapids Dam, creating a large swamp with many standing dead snags. A meadow (ME) in the Cowley Creek basin has experienced a major shift in its hydrologic regime; over the past five years the former fen has nearly drained as a result of beaver activity. The remaining meadow is now dry and grassy. Surrounding upland benches are primarily lodgepole pine-bearberry (PB), aspen-bearberry (AB) and pine-grass (PG). A forest fire burned most of the upland benches in the late 1930s-early 1940s. The mature riparian forest is therefore a fire residual patch and one of the best examples of a mature forest environment within the City of Whitehorse.

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Wolf Creek/Cowley Creek – Yukon River Wildlife Area (AEM 1998, AEM 1999). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed.

GROUP	SPECIES GROUP	WILDLIFE VALUES
Birds	Avian Predators	<ul style="list-style-type: none"> • Mature lowland and riparian forests (SF, SW, SP) • Open marshes, meadows and fens (MR, ME, FE) • Standing snags along flooded shoreline • Steep ES bluffs on east bank of Yukon River
	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> • Mature, lowland and riparian forests (SF, SW, SP)
	Water Birds	<ul style="list-style-type: none"> • Open water at Wolf Creek – Yukon River confluence (RI)
Mammals	Semi-Aquatic Mammals	<ul style="list-style-type: none"> • River (RI) and shallow open water (OW) • Marshes and meadows (FE, ME) • Aspen groves (AB) along steep bluffs
	Ungulates*	<ul style="list-style-type: none"> • Dense spruce forests (SP, SF, SW)
Amphibians	Amphibians	<ul style="list-style-type: none"> • Mature lowland and riparian forests (SF, SW, SP) • Open marshes, meadows and fens (MR, ME, FE) • River (RI) and shallow open water (OW)
Fish	Fish	<ul style="list-style-type: none"> • Portions of the Yukon River (RI) and Wolf Creek (RI)

* Ungulates, especially moose, have been observed in Cowley Creek basin. Ungulates were not documented in the 1998 Wildlife Inventory (AEM 1998).

Wildlife Values and Environmental Sensitivity

Map 1 displays the identified wildlife values and land classifications for the Wolf Creek-Cowley Creek – Yukon River Wildlife Area. Two different land classes were identified:

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> • Riparian and lowland forests (SF, SW and SP), marsh (MR), meadow (ME), fen (FE) and shrub communities (WA, WB) within the Wolf Creek, Cowley Creek and Yukon River corridors • Open water habitat of the Yukon River (RI) should be considered a sensitive environment due to the adjacent shoreline plant communities and its importance as a waterfowl staging area • Wolf Creek is a rehabilitating salmon stream, adjacent and upstream water quality impacts should be minimized
High Environmental Sensitivity	<ul style="list-style-type: none"> • Sparsely vegetated, steep GS and active ES slopes • Steep forested slopes directly adjacent to High Wildlife Value.

Private Land Ownership

The Wolf Creek Territorial Campground is located within the Wildlife Area and is accessed off of the Alaska Highway. Beyond this small development, the identified wildlife area remains largely in a natural state. Currently, no direct private land ownership conflicts exist for the high wildlife value areas east of the Alaska Highway. However, one parcel is in very close proximity to Cowley Creek east of the Alaska Highway, and one parcel occurs within an environmentally-sensitive area of Cowley Creek, just west of the highway (Map 1). The western perimeter of the Cowley Creek country residential subdivision is directly adjacent to the environmentally sensitive corridor of Cowley Creek. A new country residential subdivision, Spruce Hill, is being constructed on the plateau between Wolf and Cowley Creeks. The subdivision footprint is contained to the bluffs, away from the riparian corridors and lowlands, therefore creating limited impacts on high wildlife value habitats within the Wildlife Area. The Spruce Hill Subdivision is not shown on this version of the private land mask, as it was last updated in spring of 1999.

Area 2: Chadburn Lake

Ecological Setting

The Chadburn Lake Wildlife Area is situated on the east side of the Yukon River within the Chadburn Lake Reserve (Map 2). The area is comprised of a series of kettle lakes nestled within a complex landscape of ice stagnant (glaciofluvial) terrain. Surrounding the lakes, numerous eskers and ridges create a diversity of slope and aspect conditions, which gives underlying pattern to distinct boreal vegetation communities. On flat to gently sloping terrain, forest communities are generally lodgepole pine-bearberry (PB), lodgepole pine-grass (PG) or white spruce-feathermoss (SF). Pine-lichen is also present in some areas. These forests are generally warm and dry and have an open forest canopy. Grass-sage (GS) ecosystems are limited to steep south- and west-facing slopes. They are limited in areal extent but create great visual and ecological contrast with the surrounding forests. Aspen-bearberry (AB) is usually associated with the margins of the dry GS ecosystems. Mixed lodgepole pine - white spruce forests (PB, SF, SW) occur on north and east-facing slopes. Upland forested ecosystems in the ice stagnant terrain have experienced a complex history of fire. Most of the forests in the area are in seral stage 2 and 3 (40-120 years) with small remnant patches of older stands and individual trees scattered throughout. Forests along the margins of Chadburn and Chadden Lake were flooded when Yukon Energy completed the Whitehorse Dam in 1958 creating numerous standing and downed snags. While most areas are relatively undisturbed, high recreational use in some areas have caused localized erosion and soil compaction. Dry south- and west-facing GS slopes are especially susceptible to these disturbances.

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Chadburn Lake Wildlife Area (AEM 1998). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed. Chadburn Lake was identified as a Significant Wildlife Area primarily for its shallow, open water habitats for waterbirds.

GROUP	SPECIES GROUP	WILDLIFE VALUES
Birds*	Water Birds	<ul style="list-style-type: none"> Interior, open water habitat of Chadburn Lake (LS) Shallow, sheltered bays of Chadburn Lake and surrounding small lakes (OW) Flooded shoreline habitat (standing and downed snags, emergent vegetation)
	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> Mature, lowland and riparian forests (SF, SW, SP)
Mammals	Semi-Aquatic Mammals	<ul style="list-style-type: none"> Interior, open water habitat of Chadburn Lake (LS) Shallow, sheltered bays of Chadburn Lake and surrounding small lakes (OW) Aspen groves (AB) along shorelines
	Microtine Mammals	<ul style="list-style-type: none"> Abandoned cabins and structures Mature forest and open spaces (foraging areas)

* Avian predators are likely prominent in the area.

Wildlife Values and Environmental Sensitivity

Map 2 displays the identified high wildlife values and land classifications for the Chadburn Lake Wildlife Area. Two land classes are recognized:

LAND CLASS*	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> Interior, open water habitat of Chadburn Lake (LS) Shallow, sheltered bays of Chadburn Lake and surrounding small lakes (OW) Flooded shoreline habitat (standing and downed snags, emergent vegetation) Lowland spruce forest and shallow waterbodies at north end of Chadburn Lake
High Environmental Sensitivity	<ul style="list-style-type: none"> Sparsely vegetated, steep GS and active ES slopes.

Private Land Ownership

Chadburn Lake and surrounding area, including Chadden, Schwatka, Ear and Hidden Lakes, are currently designated as the Chadburn Lake Reserve, a Parks and Recreation Area. A management plan exists for the Reserve but has never been formally adopted by the City of Whitehorse (City of Whitehorse Parks and Recreation Master Plan, David

Nairne and Associates et al. 1994). No private lands occur within the Chadburn Lake Reserve. The Chadburn Lake Wildlife Area can be accessed by many routes and therefore receives high levels of recreational use. The Chadburn Lake road provides year round vehicle access directly to Chadburn Lake. A large day-use area is situated at the northwest corner of Chadburn Lake and a day-camp cabin and facility are located along the west shore. The Chadburn Lake ski trails provide the main recreation trail network in the area, however numerous other trails provide a range of options for hikers, bikers and skiers in all seasons.

Area 3: Chadden Lake

Ecological Setting

The Chadden Lake Wildlife Area is situated north of Chadburn Lake within the Chadburn Lake Reserve (Map 3). The area has very similar ecological characteristics as the Chadburn Lake Wildlife Area; please consult the Chadburn Lake description for Chadden Lake.

Wildlife Values and Species Groups Represented

The Chadden Lake Wildlife Area was suggested for consideration in the Yukon River Corridor Plan (AEM 1999) and was not identified in the 1998 Whitehorse Wildlife Inventory (AEM 1998). The area was suggested for its similar ecological characteristics as Chadburn Lake (shallow, open water habitats for waterbirds) and its relatively natural character. Wildlife species groups have therefore not been documented in this Wildlife Area but similar wildlife groups as documented for Chadburn Lake would be expected.

Environmental Sensitivity and Land Zoning Designation

Map 3 displays the identified wildlife values and land classifications for the Chadden Lake Wildlife Area. Two land classes are recognized:

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> Interior, open water habitat of Chadden Lake (LS) Shallow, sheltered bays of Chadden Lake and surrounding small waterbodies (OW) Flooded shoreline habitat (standing and downed snags, emergent vegetation)
High Environmental Sensitivity	<ul style="list-style-type: none"> Sparsely vegetated, steep GS and active ES slopes Steep slopes directly adjacent to the lake shore

Private Land Ownership

Chadden Lake is currently designated within the Chadburn Lake Reserve, a Parks and Recreation Area. No private lands occur within the Chadburn Lake Reserve. Chadden Lake cannot be accessed directly off of the Chadburn Lake Road by vehicle and therefore receives a lower level of recreational use than nearby Chadburn Lake. An extensive trail network runs throughout the area, however.

Area 4: Schwatka Lake and Area (including Hidden and Ear Lakes)

Ecological Setting

The Schwatka Lake wildlife area includes some of the most visited portions of Whitehorse including Schwatka Lake, Hidden Lakes, Ear Lake and the Whitehorse Dam and Fish Ladder (Map 4). Miles Canyon and Canyon City are located upstream of Schwatka Lake along the Yukon River. Schwatka Lake is a reservoir that was created by the Whitehorse Dam. This wildlife area is part of the Chadburn Lake Reserve as described in the City of Whitehorse Parks and Recreation Master Plan (David Nairne and Associates et al. 1994). A number of local interest groups already use the Chadburn Lake Reserve for natural history and historical tours, including the Yukon Conservation Society. Areas identified as being significant for wildlife are all centered on the various water bodies and shoreline habitats within this area.

The complex landscape of Schwatka Lake and area includes many kettle lakes, eskers, kames and associated glaciofluvial features. The area is composed of a number of old alluvial terraces interspersed with kettle lakes and moderate-steep south-facing slopes. This complex landscape contains vegetation communities which are related strongly to slope and aspect conditions. Lodgepole pine-bearberry (PB), lodgepole pine-lichen (PL) and lodgepole pine-grass (PG) occur on level to gentle south-facing slopes. White spruce trees are interspersed throughout the pine forests but are more prevalent on north-facing ridges, creating white spruce-feathermoss forests (SF). Forest conditions within the area are generally warm and dry. Most of the forests surrounding Schwatka Lake are quite young (Seral Stage 2, 40-80 years) as a result of recent fire history, and are in an even-aged condition. Scattered residual forest patches and individual trees are generally associated with the complex terrain around Hidden Lakes. Steep south-facing ridges are extremely dry and provide conditions suitable for grass-sage (GS) ecosystems. These sparsely vegetated, grassy slopes provide a striking visual and ecological contrast to the surrounding forests and are favorite locations for hikes and interpretive viewing. The Chadburn Lake Reserve contains the majority of GS ecosystem units within the City.

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Chadburn Lake Wildlife Area (AEM 1998). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed. Schwatka Lake and the surrounding small waterbodies (Ear Lake and Hidden Lakes) were identified as a Significant Wildlife Area primarily for their shallow, open water habitats for waterbirds.

GROUP	SPECIES GROUP	WILDLIFE VALUES
Birds	Water Birds	<ul style="list-style-type: none"> Interior, open water habitats of Schwatka and Hidden Lakes (LS) Shallow, sheltered bays of Schwatka, Ear and Hidden Lakes and surrounding small lakes (OW) Flooded shoreline habitat (standing and downed snags, emergent vegetation)
	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> Mature, lowland and riparian forests (SF, SW, SP)
Mammals	Semi-Aquatic Mammals	<ul style="list-style-type: none"> Interior, open water habitat of Schwatka and all small lakes (LS) Shallow, sheltered bays of Schwatka Lake and all surrounding small lakes (OW) Aspen groves (AB) near shorelines
	Microtine Mammals*	<ul style="list-style-type: none"> Steep, exposed bluffs Mature forest and open spaces (foraging areas)

* A small colony of Little Brown Bats has been documented along the steep bluffs below Whitehorse Airport. This area has not been identified on the Map 4 as a High Wildlife Value area. It is recommended that all steep, exposed bluffs (ES) within Whitehorse should be considered Environmentally Sensitive.

Wildlife Values and Environmental Sensitivity

Map 4 displays the identified wildlife values and land classifications for the Schwatka Lake Wildlife Area. Three land classes are recognized:

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> Shallow open water habitats of Ear, Hidden and surrounding small lakes (LS, OW). Water levels in Ear Lake have dropped dramatically over the past years, potentially making this waterbody ineffective as waterfowl habitat. Flooded shoreline habitats along shallow lakes (standing and downed snags, emergent vegetation)
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> Interior, open water habitat of Schwatka Lake (LL). Schwatka Lake is a significant wildlife area for waterfowl but does not possess sensitive shoreline habitat.
High Environmental Sensitivity	<ul style="list-style-type: none"> Sparsely vegetated, steep GS and active ES slopes and very steep forested slopes.

Private Land Ownership

The majority of Schwatka Lake Wildlife Area does not contain privately owned lands. The Yukon Energy Corporation Whitehorse Rapids Dam and Generating facility are located at the north end of Schwatka Lake. An active float plane base and the M.V. Schwatka dock is situated on the northwest corner of Schwatka Lake. Float plane activity during summer months is perhaps the greatest disturbance to the area. A day use area has been developed along the east shore of Schwatka Lake and a major boat launch been constructed at the southeast corner of the Lake, near the inflow of the Yukon River. Both of these facilities are accessed from the Chadburn Lake Road off of Nisutlin Drive in Riverdale subdivision. Schwatka Lake receives high levels of summer motorboat use and with the proximity of the Whitehorse Rapids Fish Ladder, is frequented by many Whitehorse visitors. Numerous biking and hiking trails run throughout the area and these receive high levels of multi-season use by Whitehorse citizens. Yukon Energy has recently prepared an interpretive pamphlet for the area.

Area 5: Riverdale – Yukon River Flats

Ecological Setting

The Riverdale - Yukon River Flats wildlife area is centered around a shallow widening of the Yukon River and represents one of the largest mid-river island complexes within City limits (Map 5). Similar to Schwatka Lake, this area was the result of the Whitehorse Dam, situated just upstream from this wildlife area. Several permanent forested islands along the west bank of Yukon River contain willow-alder (WA) and spruce-willow/spruce-feathermoss (SW/SF) communities. Mid-river islands become exposed in the low water periods of spring and fall, with gravel bars (GB) and willow-alder (WA) being present. Lodgepole pine-bearberry (PB) and white spruce-feathermoss (SF) forests line the east bank along the Riverdale subdivision and along the west bank of Robert Service Campground. Reconstruction of Robert Service Way along the west bank of the Wildlife Area required the construction of two salmon enhancement channels in the Wildlife Area. Being visible from downtown Whitehorse and only minutes from the Riverdale subdivision, this area receives a high level of recreational use. Plans are currently being made by the City of Whitehorse Parks and Recreation Department for the Millenium Trail project, which will link the east and west banks of the Yukon River with a foot bridge downstream of the power dam.

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Riverdale – Yukon River Flats Wildlife Area (AEM 1998, AEM 1999). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed. The Riverdale – Yukon River Flats Wildlife Area was identified for its open water and island/shoreline habitats in the 1998 Wildlife Inventory (AEM 1998). Additional fisheries information documented in the Yukon River Corridor Plan (AEM 1999) added to the Significance of this area within the context of the City of Whitehorse.

GROUP	SPECIES GROUP	WILDLIFE VALUES
Birds*	Water Birds	<ul style="list-style-type: none"> Mid-river channels of the Yukon River (RI) Shallow, sheltered side channels of the Yukon River (RI) Mid-river islands and shorelines (WA, GB, SF, SW). The use of gravel bars and small islands is influenced largely by the discharge of the Yukon River (during peak flow in July and August, most small islands are submerged).
	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> Mature spruce forests (SF, SW) Mid-river islands and shorelines (WA, SF, SW)
Mammals	Semi-Aquatic Mammals	<ul style="list-style-type: none"> Shallow, sheltered side channels of the Yukon River (RI) Aspen groves (AB) near shorelines. An active beaver lodge is situated within site of the Lewes Boulevard bridge.
Fish	Fish	<ul style="list-style-type: none"> This area contains spawning and rearing habitat in the shallow side channels and along Robert Service Way. Two salmon enhancement channels have been constructed; one adjacent to the Robert Service Campground, the other along the shallow gravel bar on the west bank of the Yukon River.

* Use of the area by some Avian Predators is likely.

Wildlife Values and Environmental Sensitivity

Map 5 displays the area of highest wildlife value and land classification for the Riverdale – Yukon River Flats Wildlife Area. A single land class is recognized:

LAND CLASS*	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> Shallow, sheltered side channels of the Yukon River (RI) Mid-river islands, gravel bars and shorelines (WA, GB, SF, SW).

*While not directly associated with the Wildlife Area, the steep ES bluffs below the Whitehorse Airport should be considered to have a High Environmental Sensitivity.

Private Land Ownership

The Riverdale – Yukon River Flats Wildlife Area is within easy walking distance of downtown, Rotary Park and the S.S. Klondike Historic Site. This area is perhaps viewed by more people than any other Significant Wildlife Area in the City of Whitehorse. No privately owned lands are known to occur within the highest wildlife values of this Significant Wildlife Area (Map 5). Robert Service Campground is titled to the City of Whitehorse. Bert Law Park is situated on a permanent, forested island along the west bank of the Yukon River. The island is accessible by a foot bridge connected to the Robert Service Campground. Bert Law Park and the adjacent islands contain some of the highest wildlife values within the Significant Wildlife Area. A major recreation trail runs along the east bank of the Yukon River from Riverdale to the Lewes Boulevard Bridge. The Millenium Trail project is anticipated to link the east and west banks of the river through the construction of a footbridge below the power dam.

Area 6: Quartz Road – Yukon River

Ecological Setting

The Quartz Road - Yukon River Wildlife Area is situated adjacent to the old British Yukon Railway tracks and Quartz Road, between downtown Whitehorse and the Marwell Industrial Area (Map 6). This wildlife area is centered on the shallow water (RI) and island habitats (WA, MR) along the west bank of the Yukon River at Kishwoot Island. The small islands and sheltered side channels of the Yukon River create excellent bird habitat; this area is one of the most accessible places to view waterbirds, neotropical migrants and other passerines in the Whitehorse area. The state of the small islands is tied closely to water levels in the Yukon River, both seasonal discharge and daily water level fluctuations created by the Whitehorse Dam. A wetland and lowland spruce forest that occurred across Quartz Road from this site has recently been lost to development.

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Quartz Road – Yukon River Wildlife Area (AEM 1998, AEM 1999). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed. The Quartz Road – Yukon River Flats Wildlife Area was identified for its shallow water and island/shoreline habitats in the 1998 Wildlife Inventory (AEM 1998). Additional fisheries information documented in the Yukon River Corridor Plan (AEM 1999) added to the Significance of this area within the context of the City of Whitehorse.

GROUP	SPECIES GROUP	WILDLIFE VALUES
Birds	Avian Predators	<ul style="list-style-type: none"> Open water channels of the Yukon River (RI) are used for hunting Shoreline forests are used for roosting
	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> Lowland spruce forests and wetlands across Quartz Road have recently been cleared for development, removing much of the Forest Bird/Neotropical Migrant Bird habitat. A portion of Kishwoot Island is forested with spruce-willow (SW) and probably important
	Water Birds	<ul style="list-style-type: none"> Shallow, sheltered side channels along the west bank of the Yukon River (RI) Mid-river islands and shorelines (GB, MR, WA). The use of gravel bars and small islands as nesting habitat is influenced largely by water levels in the Yukon River. During low water periods, most islands are exposed and nesting birds become vulnerable to predation by terrestrial mammals.
Mammals	Semi-Aquatic Mammals	<ul style="list-style-type: none"> Shallow, sheltered side channels and the mainstem of the Yukon River (RI)
Fish	Fish	<ul style="list-style-type: none"> Areas surrounding Kishwoot Island were identified as containing salmon and other fish rearing habitat.

Wildlife Values and Environmental Sensitivity

Map 6 displays the major wildlife values and land classifications for the Quartz Road – Yukon River Wildlife Area. Two land classes are recognized:

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> Shallow, sheltered side channels of the Yukon River (RI) along Kishwoot Island (Quartz Road Wetlands) Mid-river islands, gravel bars and shorelines (GB, MR, WA). The sensitivity of these ecosystem units decreases greatly in the winter upon freeze up. Thin band of shoreline spruce-poplar riparian forest (SP)*
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> Main channel of the Yukon River (RI)

*The thin band of SP forest along the Yukon River edge cannot be mapped at the resolution used for this project, 1:20,000. However, this band of forest is encompassed by the 100m wildlife area buffer shown on Map 6. The maintenance of this forested area provides an important visual buffer between the industrial lands near Quartz Road and the Yukon River. This small forested area also adds greatly to the natural character of the area. For further discussion, please see AEM (2000b).

Private Land Ownership

Situated between downtown Whitehorse and the Marwell Industrial Area, the Quartz Road - Yukon River Wildlife Area is one of the most accessible Significant Wildlife Areas in Whitehorse. With the exception of the Yukon River Corridor, the area is essentially surrounded by private lands. Map 6 shows the Kishwoot Island complex as being public lands, but recent research has determined that a portion of the island is actually under private title. Land ownership status within the area was not well understood at the time of report preparation. Kishwoot Island Park is accessible by a foot bridge from Second Avenue.

Area 7: Long Lake

Ecological Setting

The Long Lake Wildlife Area is located on the east side of the Yukon River across from the Marwell Industrial Area (Map 7). Similar to the Chadburn Lake Reserve, Long Lake lies in an area of ice stagnant (glaciofluvial) terrain. This complex landscape is composed of numerous deep kettles and steep bluffs, creating heterogeneous ecological conditions. Grass-sage (GS) ecosystems occur on steep, warm aspect slopes. Gently-sloping and warm aspect forests are generally lodgepole pine-bearberry (PB) and lodgepole pine-lichen (PL). Cool aspect forested slopes contain mainly white spruce-feathermoss (SF) forests. Most of the forests surrounding Long Lake are in a seral stage 3 or 4; unlike most surrounding areas, they have not experienced a fire in at least 100 years. One of the best local examples of a mature upland spruce forest occurs along the north-facing slope above Long Lake. The highest wildlife habitat values within

the area are currently considered to be the open water habitats of Long Lake and the surrounding small lakes.

Wildlife Values and Species Groups Represented

Long Lake was suggested for consideration as a Significant Wildlife Area in the Yukon River Corridor Plan (AEM 1999) based on its habitat characteristics and relatively natural character. The lake is currently connected to the extensive upland forested ecosystems along the east side of the Yukon River. Wildlife groups have not been documented for this area but species groups similar to those found on Chadburn, Chadden and Hidden Lakes would be expected (waterbirds, semi-aquatic mammals and possibly avian predators). However, this lake receives a substantial level of small motor boat traffic during the summer months, possibly decreasing its wildlife values in relation to Chadburn Lake.

Wildlife Values and Environmental Sensitivity

Map 7 displays the high wildlife values habitat units and the different land classifications within the Long Lake Wildlife Area. Two land classes are recognized:

LAND CLASS	DESCRIPTION
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> Interior open water habitat of Long Lake (LS) Shoreline habitats of Long Lake. Shoreline communities do not contain the flooded forests that occur along Chadburn Lake and are therefore considered as moderately sensitive.
High Environmental Sensitivity	<ul style="list-style-type: none"> Steep, sparsely vegetated, warm aspect GS and AB slopes. Some areas around Long Lake have been impacted heavily by off-road vehicle use. Steep, forested slopes above Long Lake (SF, AB)

Private Land Ownership

No privately owned lands are known to occur around Long Lake. Long Lake can be accessed by vehicle on the Long Lake Road (also known as Livingstone Trail or Swan Lake Road) during all seasons. Vehicle traffic to the area has increased markedly since the construction of the Livingstone Trail Environmental Control Facility, further to the north of the Lake. Long Lake is a well known summer recreation area with local residents.

Area 8: Old Village (Marwell) Wetlands

Ecological Setting

The Old Village (Marwell) Wetlands are bounded by the Marwell Industrial Area, the Takhini Trailer Park bluffs and the Yukon River (Map 8). The wetlands occur within a low-lying abandoned floodplain of the Yukon River and are comprised of fen (FE), marsh (MR), willow-alder/willow-shrub birch shrub (WA/WB), spruce-willow (SW) and spruce-feathermoss (SF) ecosystems. Surrounding upland forests contain lodgepole pine-bearberry (PB), and spruce-feathermoss/willow (SF/SW) in seral stage 3 (80-120 years old). Lowland spruce forests associated with the wetlands are highly structured and are underlain by permafrost, creating “drunken forest” conditions. The wetland is somewhat unique within Whitehorse in that it experiences a large water fluctuation based on seasonal discharge patterns of the Yukon River. This hydric wetland environment provides suitable conditions for a number of rare plants. The wetlands also appear to receive a substantial input of water from a small creek draining the area to the west of Copper Road. A freshwater spring is also thought to enter into the wetland from the base of the Takhini Trailer Court bluffs.

Two other small, unnamed areas with high wildlife values occur along the east bank of the Yukon River; due to their close proximity, they have been grouped within the Old Village (Marwell) Wetlands Wildlife Area. These areas were suggested for consideration during the preparation of the Yukon River Corridor Plan (AEM 1999). The areas are comprised of small island complexes along side-channels of the Yukon River. These areas contain willow-alder (WA), marsh (MR), shallow water river and gravel bar environments (RI and GB) and a small component of spruce-willow (SW) forest. The combination of the three areas along a single stretch of the Yukon River adds to the importance of the Old Village site as a Significant Wildlife Area. Downstream of the Marwell Industrial Area, the entire Yukon River has a very natural character.

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Old Village (Marwell) Wetlands Wildlife Area (AEM 1998, AEM 1999). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed. The Old Village (Marwell) Wetlands were identified for their wetland characteristics and structured forest conditions in the 1998 Wildlife Inventory (AEM 1998). Field observations during the development of the Yukon River Corridor Plan lead to the addition of the two small areas along the east bank of the Yukon River. Additional fisheries information documented in the Yukon River Corridor Plan (AEM 1999) added to the Significance of this area within the context of the City of Whitehorse.

GROUP	SPECIES GROUP	WILDLIFE VALUES
Birds	Avian Predators	<ul style="list-style-type: none"> Open water channels of the Yukon River (RI) are used for hunting Shoreline forests are used for roosting and possibly nesting (one raptor nest is known to occur along the east bank of the Yukon River) Surrounding bluffs may be used for roosting
	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> Lowland spruce forests, shrub meadows and sedge flats create excellent Forest Bird/Neotropical Migrant habitat (SW, FE, MR, WA, WB)
	Water Birds	<ul style="list-style-type: none"> Shallow, sheltered side channels along the east bank of the Yukon River (RI) Islands along the east bank of the Yukon River (GB, MR, WA) Yukon River shoreline (GB, MR, WA) and interior wetland fringes
Mammals	Semi-Aquatic Mammals	<ul style="list-style-type: none"> Shallow, sheltered side channels and the mainstem of the Yukon River (RI) Interior open water within the main Old Village wetland complex
Fish	Fish	<ul style="list-style-type: none"> Areas surrounding the small groups of islands along the east bank of Yukon River were identified as containing salmon and fresh water fish rearing habitat. During periods of high water, the wetlands themselves may provide rearing habitat

Wildlife Values and Environmental Sensitivity

Map 8 displays the areas with the highest wildlife values and different land classifications for the Old Village (Marwell) Wetlands Wildlife Area. Three land classes are recognized:

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> The entire Old Village wetland complex contains saturated and/or organic soils with permafrost (SW, FE, MR, WA, WB). These units also provide the highest wildlife values. The sensitivity of these ecosystems decreases greatly in the winter upon freeze up. Several open channels (MR) dissect the upland forests surrounding the wetland Small islands, gravel bars and shorelines (GB, MR, WA) along the east bank of the Yukon River. The sensitivity of these ecosystems decreases greatly in the winter upon freeze up.
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> Mainstem of the Yukon River (RI)
High Environmental Sensitivity	<ul style="list-style-type: none"> All surrounding steep, sparsely vegetated slopes (GS, AB) Very steep, forested slopes directly adjacent to the High Wildlife Value units

Private Land Ownership

No major private land ownership conflicts exist within the areas of highest wildlife values (Map 8). One parcel encroaches upon a small portion of high value wildlife habitat along the back of Marwell industrial properties. It should also be recognized that First Nations Land Claims are not reflected on the private land ownership layer displayed on Map 8. A network of well-used trails runs through the forest behind the Marwell Industrial Area with horse back riding appearing to be the primary use. Since the development of the private land map, much of the forested area on the Takhini bluffs has been developed or serviced for future subdivision development. An important trail runs along the Takhini bluffs above the Old Village wetlands.

Area 9: Lower McIntyre Creek – Yukon River

Ecological Setting

The Lower McIntyre Creek - Yukon River Wildlife Area is comprised of the lower-most reach of McIntyre Creek, from Mountain View Drive to its confluence with the Yukon River, and the large widening of the Yukon River. With its headwaters along the toe slopes of Mount McIntyre, this important confluence is the outlet of the McIntyre Creek watershed. The McIntyre Creek-Yukon River confluence consists of a wetland complex with willow-shrub birch (WB), spruce willow (SW), open shallow water (OW) and marsh (MR). Surrounding upland forests contain lodgepole pine-bearberry (PB) and spruce-feathermoss (SF). Most forests on the surrounding plateaus are even-aged and less than 80 years old due to a recent fire event.

The broad, shallow channel of the Yukon River at this point forms the largest island and gravel bar complex in the City of Whitehorse Limits. This island complex consists of marsh (MR), gravel bars (GB), and willow-alder (WA). The amount of land exposed within the island complex depends primarily on seasonal water fluctuations. Most of the islands are flooded at peak flow while in spring and fall much of the area is exposed. A portion of the islands are permanent and are forested by spruce-willow (SW). Both the south and north banks of the Yukon River at this point are formed by steep erodible slopes (ES) and grass-sage (GS) ecosystems.

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Lower McIntyre Creek - Yukon River Wildlife Area (AEM 1998, AEM 1999). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed. Lower McIntyre Creek – Yukon River was identified for its aquatic habitat characteristics and connectivity to areas outside of the Yukon River Corridor in the 1998 Wildlife Inventory (AEM 1998). Field observations during the development of the Yukon River Corridor Plan lead to the expansion of the area to cover the entire Yukon River, especially the steep bluffs along the south shore. This “bay” in the Yukon River is known to many local river guides as “Eagle Bay” due to unusually high concentration of Bald Eagles that can be viewed along the bluff. Additional fisheries information documented in the Yukon River Corridor Plan (AEM 1999) added to the Significance of this area within the context of the City of Whitehorse.

GROUP	SPECIES GROUP	WILDLIFE VALUES
Birds	Avian Predators	<ul style="list-style-type: none"> Shallow river channels and gravel bars in the Yukon River (RI) are used for hunting and scavenging spawned salmon carcasses Shoreline forests are used for roosting and possibly nesting Surrounding ES bluffs are used for roosting. Of special significance are the bluffs above Eagle Bay. The steep ES bluffs below the Mountain View Golf course are well known for the large number of ravens which congregate
	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> Lowland spruce forests (SW, SF) and shrub areas (WB) in the Lower McIntyre Creek basin
	Water Birds	<ul style="list-style-type: none"> Shallow, sheltered side channels along the west bank of the Yukon River (RI) and at the McIntyre Creek confluence (open shallow water – OW) Islands, gravel bars, marshes and shorelines of the Yukon River (GB, MR, WA)
Mammals*	Microtine Mammals	<ul style="list-style-type: none"> Surrounding steep, ES bluffs
	Ungulates	<ul style="list-style-type: none"> Moose have been observed sporadically in the area, especially on the east bank of the river. The landscape-level connectivity of this site is probably most responsible for the occasional presence of ungulates.
Fish	Fish	<ul style="list-style-type: none"> Areas surrounding the small groups of islands within the Yukon River were identified as containing salmon and other fish spawning/rearing habitat. Spawned out salmon carcasses provide an important food source for many species during fall

* Semi-Aquatic Mammals (beavers and muskrats) probably also use this area. Bears may also use the east bank of the Yukon River.

Wildlife Values and Environmental Sensitivity

Map 9 displays the high wildlife values and different land classifications for the Lower McIntyre Creek - Yukon River Wildlife Area. Three land classes are recognized:

LAND CLASSES	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> The entire Yukon River island complex (GB, MR, WA, SW). Sensitivity of these ecosystems decreases greatly in the winter upon freeze up. The open shallow water area of the Yukon River known as "Eagle Bay" (RI, OW) The important roosting bluffs above Eagle Bay along the south shore of the Yukon River, and the bluffs below Mountain View Golf Course (ES) McIntyre Creek and the shallow waterbody at its confluence with the Yukon River (OW, MR) Spruce-willow (SW) riparian forests along Lower McIntyre Creek
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> Fast-flowing mainstem of the Yukon River (RI)
High Environmental Sensitivity	<ul style="list-style-type: none"> All surrounding steep, sparsely vegetated slopes (ES, GS) Very steep, forested slopes directly adjacent to the High Wildlife Values

Private Land Ownership

No private land ownership conflicts exist within the areas of highest wildlife values (Map 9). The Mountain View Golf Course overlooks the wildlife area from the Lower Porter Creek Bench. It should be recognized that First Nations Land Claims are not reflected on the private land ownership layer displayed on Map 9. Human disturbance of this area has been extensive at some locations, with the southern bank of Lower McIntyre Creek once being used for a landfill. This landfill is now abandoned and rehabilitation efforts are ongoing. The eastern side of the river and the mid-river islands remain largely unaltered by human activities.

Area 10: Croucher Creek

Ecological Setting

The Croucher Creek Wildlife Area is centered on the prominent Croucher Creek riparian corridor and its confluence with the Yukon River (Map 10). Croucher Creek drains the broad valley to the east of Grey Mountain and enters the Yukon River opposite the Mountain View Golf Course. The confluence area consists of shallow open water (OW), marsh (MR) and willow-shrub birch (WB). Mature, lowland riparian spruce forests (SF, SW) occur along the creek corridor. A large marsh occurs at the western-most edge of the mapping area, well removed from the Yukon River. Croucher Creek contains some of the best examples of mature, lowland riparian spruce forests in the City. The entire

corridor is in a relatively natural state with the upgraded road and buried pipeline leading to the Livingstone Trail Environmental Control Facility creating the only major disturbance along its length. Areas around the creek mouth were logged in the 1920s and 1930s but limited evidence of these activities is visible today. A major feature of this Wildlife Area is the effective corridor it provides between surrounding forested uplands and the Yukon River Corridor. Much of the surrounding upland forested areas contain large tracts of young, even-aged lodgepole pine-bearberry (PB) forests. A large forest fire burned over most of the upland areas approximately 50 years ago.

Wildlife Values and Species Groups Represented

The Croucher Creek Wildlife Area was suggested for consideration in the Yukon River Corridor Plan (AEM 1999) and was not identified in the 1998 Whitehorse Wildlife Inventory (AEM 1998). The area was suggested for its intact riparian forest habitats and its importance as a wildlife corridor between the Yukon River Corridor and the surrounding uplands. Wildlife species groups have therefore not been documented in this Wildlife Area but similar wildlife groups as documented for Wolf and Cowley Creek corridors would be expected. The area of open, shallow water at the Croucher Creek-Yukon River confluence was observed to have high levels of ungulate and waterfowl use.

Wildlife Values and Environmental Sensitivity

Map 10 displays the high wildlife values and different land classifications recognized for the Croucher Creek Wildlife Area. Three land classes are recognized:

LAND CLASSES	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> Riparian and lowland forests (SF, SW and SP), marsh (MR), and shrub communities (WA, WB) within the Croucher Creek corridor Open water (OW, MR) habitat at the confluence of Croucher Creek and Yukon River
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> Yukon River mainstem (RI)
High Environmental Sensitivity	<ul style="list-style-type: none"> Sparsely vegetated, steep GS and active ES slopes Steep forested slopes directly adjacent to High Wildlife Values

Private Land Ownership

No private land ownership conflicts are known to exist within the areas of highest wildlife value (Map 10). A small First Nations camp (Atsua Ku) is located at the Croucher Creek-Yukon River confluence. Land ownership surrounding this camp is not currently documented. Several abandoned cabins are also located in this area. It should be recognized that potential First Nations Land Claims are not reflected on the private land ownership layer displayed on Map 10.

Area 11: Porter Creek – Yukon River Confluence

Ecological Setting

The Porter Creek – Yukon River Confluence Wildlife Area is centered on a prominent gully system to the north of the Taylor Industrial Area (Map 11). Porter Creek may not be the proper name for this drainage system as the Porter Creek that many people refer to flows through the Porter Creek subdivision and then goes subsurface through Hidden Lake. It is possible that the eastern branch of this drainage is connected to Porter Creek. The western branch of the gully system also appears to be connected by subsurface hydrologic flow to areas by Crestview, across the Alaska Highway. The gully system contains areas of willow-shrub birch (WB) and patches of mature spruce-willow (SW) and spruce-feathermoss (SF) forest. Steep slopes surrounding the drainage contain grass-sage (GS), active, erodable slopes (ES) and mixed pine and spruce forests (PB, SW and SF). Much of the surrounding upland forest has originated from a forest fire that occurred in the 1940s. The confluence of this drainage system with the Yukon River forms an area of open shallow water (OW) and marsh (MR). This drainage forms a potential linkage between the Yukon River Corridor and the surrounding uplands.

Wildlife Values and Species Groups Represented

The Porter Creek – Yukon River Confluence Wildlife Area was suggested for consideration in the Yukon River Corridor Plan (AEM 1999) and was not identified in the 1998 Whitehorse Wildlife Inventory (AEM 1998). The area was suggested for its lowland shrub habitats, remnant forest patches, marsh area at the confluence, and its potential importance as a wildlife corridor between the Yukon River Corridor and surrounding uplands. Wildlife species groups have therefore not been documented in this Wildlife Area.

Wildlife Values and Environmental Sensitivity

Map 11 displays the wildlife values and land classifications for the Porter Creek – Yukon River Confluence Wildlife Area. Three land classes are recognized:

LAND CLASSES	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> • Lowland, remnant forest patches (SF, SW and SP), marsh (MR), and shrub communities (WA, WB) within the steep gully system • Open water (OW) and marsh (MR) habitat at the confluence of Porter Creek and the Yukon River
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> • Yukon River mainstem (RI)
High Environmental Sensitivity	<ul style="list-style-type: none"> • Sparsely vegetated, steep GS and active ES slopes • Steep forested slopes directly adjacent to High Wildlife Values. A recent site assessment of the Taylor Industrial Area indicated that some very steep forested slopes surrounding this drainage are unstable.

Private Land Ownership

One privately owned lot occurs within the high wildlife value areas in the bottom lands of the drainage (Map 11). The lot owner runs a spring water business and obtains the water from this site; water quality impacts are obviously important to this lot owner. Most of the development on this property is located within the top northwest corner of the lot. Properties in the Taylor Industrial Area are adjacent to the gully system which eventually drains into the Yukon River.

Area 12: Little Takhini Creek

Ecological Setting

The Little Takhini Creek Wildlife Area is located at the north end of the Yukon River Corridor planning area, between the North Klondike Highway and Cousins Airfield (Map 12). Little Takhini Creek flows east and enters into the Yukon River near the Takhini River Bridge. A small marsh (MR) occurs at the confluence. The Wildlife Area is centered on a prominent drainage that contains the creek and series of relatively undisturbed wetlands. The wetlands contain a complex of marsh (MR), willow-shrub birch (WB), highly structured lowland spruce-willow (SW) and some shallow, open water (OW). The drainage is incised well below the surrounding forested uplands by steep slopes that contain elements of grass-sage (GS), active erodible slopes (ES) and young, even-aged pine, spruce and aspen forests (PB, SF, AB). Most forests surrounding the Little Takhini Creek drainage are the result of a 1940s forest fire. Similar to other tributaries of the Yukon River, Little Takhini Creek provides a potential link between the Yukon River and surrounding upland environments to the west of the Alaska Highway.

Wildlife Values and Species Groups Represented

The Little Takhini Creek Wildlife Area was suggested for consideration in the Yukon River Corridor Plan (AEM 1999). This area was not identified in the 1998 Whitehorse Wildlife Inventory (AEM 1998). Little Takhini Creek was suggested for its intact lowland wetland and shrub habitats, remnant forest patches, and its potential importance as a wildlife corridor between the Yukon River Corridor and surrounding uplands. Wildlife species groups have therefore not been documented in this Wildlife Area.

Wildlife Values and Environmental Sensitivity

Map 12 displays the major areas containing high wildlife values and the different land classifications. Three land classes are recognized:

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> Lowland wetlands (MR, OW), remnant forest patches (SW) and SP) and shrub communities (WB) within the steep gully system Open water (OW) and marsh habitat at the confluence of Little Takhini Creek and the Yukon River
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> Yukon River mainstem (RI)
High Environmental Sensitivity	<ul style="list-style-type: none"> Sparsely vegetated, steep GS, AB and active ES slopes Steep forested slopes directly adjacent to High Wildlife Values Moderate forested slopes at the upper reaches of the gully system, adjacent to the Alaska Highway and Klondike Highways.

Private Land Ownership

Limited conflicts appear to exist between the high wildlife values within Little Takhini Creek and privately owned lands (Map 12). A privately titled lot partially overlaps with the upper end of the drainage, and an agricultural lease is adjacent to the steep forested slope above the main wetlands. Potential First Nations Land Claims are not shown on Map 12.

Area 13: Mary Lake – Wolf Creek

Ecological Setting

The Mary Lake – Wolf Creek Wildlife Area is situated on the southern City limits near the Mary Lake Subdivision (Map 13). One of the most important aspects of this Wildlife Area is the important corridor it provides between lands outside of the City of Whitehorse in south Whitehorse and the Wolf Creek – Yukon River confluence. The maintenance of this linkage is probably critical to the long-term viability of the Wolf Creek/Cowley Creek –Yukon River Wildlife Area.

Documented wildlife values in the Mary Lake – Wolf Creek Wildlife Area are centered on the open water and shoreline habitat of Mary Lake. However, a diversity of conditions around the lake creates suitable conditions for many different wildlife species groups. Mary Lake drains into Wolf Creek and is therefore part of the much larger Wolf Creek drainage basin to the west of Golden Horn Mountain. Mary Lake lies in a well defined basin, separated from the surrounding, flat-to-rolling boreal benches by an approximate 30 m depression. Upland benches surrounding the lake are predominantly mixed mature pine-spruce (PB, SF, PG) with an open forest canopy. On the open water fringe, especially at the north end of Mary Lake, partially flooded forest conditions are present, creating a large wetland with willow-shrub birch (WB) and spruce-willow (SW). An open

grassy meadow (ME) with scattered spruce and shrubs is also present north of Mary Lake. Adjacent to Wolf Creek on DND land, a large, mature stand of highly structured spruce-feathermoss (SF) forest is found. The Wolf Creek riparian corridor in this area is composed of open canopy mature spruce with shrub (SW) and feathermoss (SF) associations. This corridor, due to its orientation and well defined basin below the surrounding upland forests and country residential subdivisions, is thought to be an important travel corridor for large ungulates (moose). One of the few examples of a large rock cliff (CL) in the boreal zone of Whitehorse occurs along the Wolf Creek corridor near the abandoned open pit mine.

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Mary Lake Wildlife Area (AEM 1998). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed.

GROUP	SPECIES GROUP	WILDLIFE VALUES
Birds	Avian Predators	<ul style="list-style-type: none"> • Mature lowland and riparian forests (SF, SW) • Open marshes, meadows and fens (MR, ME, FE) • Standing snags along flooded shorelines
	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> • Mature, lowland and riparian forests (SF, SW) • Shrub meadows (WB) and grassy meadows (ME)
	Water Birds	<ul style="list-style-type: none"> • Open water on Mary Lake (LS) • Shoreline habitats of Mary Lake (WB, SW)
Mammals	Microtine Mammals	<ul style="list-style-type: none"> • Little Brown Bats forage along the shore of Mary Lake and in the adjacent wetlands • Roosts may occur in the adjacent rock cliff (CL)
	Semi-Aquatic Mammals	<ul style="list-style-type: none"> • Open water (LS, OW) • Shoreline habitats and meadows (WB, SW, ME) • Aspen groves (AB) along steep bluffs
	Ungulates*	<ul style="list-style-type: none"> • Dense spruce forests
Amphibians	Amphibians	<ul style="list-style-type: none"> • Mature lowland and riparian forests (SF, SW, SP) • Shorelines (LS, OW), meadows (ME) and wet shrub areas (WB)

* Woodland caribou were once common in the Mary Lake area. Some glaciofluvial sites around the Mary Lake subdivision, especially along the Cowley Creek corridor, contain a very high abundance of terrestrial lichen, the primary winter forage of northern woodland caribou. Most of these areas have been developed by country residential subdivisions and/or are no longer used due to the high levels of human activity.

Wildlife Values and Environmental Sensitivity

Map 13 displays high wildlife value areas and different land classifications for the Mary Lake Wildlife Area. Three land classes are recognized:

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> Riparian and lowland forests (SF, SW), marsh (MR), meadow (ME), and shrub communities (WA, WB) within the Wolf Creek corridor and surrounding Mary Lake Open water habitat of Mary Lake (LS) Wolf Creek is a rehabilitating salmon stream; therefore any water impacts in this area will have effects downstream
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> Highly structured, mature upland spruce-feathermoss (SF) Open grassy meadow (ME) at north end of Mary Lake
High Environmental Sensitivity	<ul style="list-style-type: none"> Sparsely vegetated, steep slopes (GS, AB) Rock cliff (CL) unit

Private Land Ownership

Two private parcels present potential conflicts with the High Wildlife Values of the Mary Lake site (Map 13). One parcel is located adjacent to Wolf Creek to the west of Mary Lake. The second lot is situated in the lowland forest adjacent to Mary Lake. The Department of National Defence operates a large cadet camp facility near Wolf Creek (the extent of DND lands is not displayed on Map 13). The status of land designation on Department of National Defence lands is currently unclear, but the existence of the DND holdings is probably a benefit to the long-term maintenance of the area, as further development on these lands will be minimal. The White Pass and Yukon Route railroad tracks also run along the west side of Mary Lake, through the middle of the Wildlife Area.

Area 14: McLean Lake

Ecological Setting

The McLean Lake Wildlife Area is located north of the abandoned Whitehorse Copper mine (Map 14). Hydrologically, the area is very complex. The Wildlife Area is centered on a series of discontinuous meadows, small lakes and wetlands that ultimately provide drainage to Ear Lake in the Yukon River Corridor. The McLean Lake Wildlife Area also appears to be one of the source regions for the Logan-Arkell wetlands, which flow to the north from this area. Important habitat elements in this Wildlife Area include small open water bodies (OW, LS), fens (FE), shrub meadows (WB), and lowland spruce forests (SW, ST). Grass-sage (GS) and aspen-bearberry (AB) ecosystems are also important on warm aspect slopes. Similar to most forested areas in Whitehorse West, adjacent upland forests are the result of a forest fire that occurred in the early 1920s. Based on stand age mapping, it appears that this single event burned at least 25 percent (10,000 ha) of the Whitehorse land base. Most upland forests in the immediate area are now composed of even-aged lodgepole pine-bearberry (PB(2s)) ecosystems.

Wildlife Values and Species Groups Represented

The McLean Lake Wildlife Area was not recognized in the 1998 Whitehorse Wildlife Inventory (AEM 1998). This area was also outside of the Yukon River Corridor planning area. The YTG Wildlife Viewing Program and the City of Whitehorse Planning Department therefore requested that McLean Lake receive ecosystem mapping as part of this project. As no previous wildlife information has been documented, it is currently not possible to report wildlife species groups that occur within the area. Further user surveys or field observations will be required to fill this data gap.

Wildlife Values and Environmental Sensitivity

Map 14 displays the high wildlife value units and land classifications within the McLean Lake Wildlife Area. Three land classes are recognized:

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> Lowland wetlands (FE, ME, OW), Open water (OW, LS), remnant forest patches (SW, ST) and wet shrub communities (WB) create the highest wildlife values in the area.
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> Moderately disturbed shrub meadows (WB)
High Environmental Sensitivity	<ul style="list-style-type: none"> Sparsely vegetated, GS and AB units on warm aspect, steep slopes Steep forested slopes directly adjacent to High Wildlife Value ecosystem units

Private Land Ownership

Norcope Gravel operates a large gravel pit to the immediate west of some high wildlife value areas (Map 14). The area disturbed by this gravel operation is currently much greater than indicated on the orthophoto backdrop. The majority of the area outlined in yellow has been deforested with active gravel removal. A number of small private lots are scattered about the entire area; several lie partially or entirely within identified High Wildlife Value habitats. The lack of private lot planning in the area is a serious impediment to effective land use planning within and surrounding the McLean Lake Wildlife Area.

Area 15: Logan – Arkell Wetlands

Ecological Setting

The Logan - Arkell Wildlife Area is centered on a large, diverse wetland complex to the immediate west of the Logan, Arkell and Copper Ridge subdivisions (Map 15). These wetlands occur in an abandoned, deep glacial meltwater channel; they are isolated from the surrounding upland morainal forests by very steep slopes with a vertical drop of approximately 50 m. The wetland is a complex of willow-shrub birch (WB), dry meadow (ME), spruce bog (SB) and shallow open water (OW). Pockets of mature spruce-willow are located around the perimeters of the area. The most interesting wetland component is the existence of a calcareous marl fen (FE ca), wetland that is relatively uncommon within the Yukon Southern Lakes region. This marl fen has very different hydrologic and vegetative characteristics than adjacent wetland complexes, and orchids and other rare plants are known to occur in the carbonate-rich soils. Steep, warm aspect slopes surrounding the wetlands contain elements of grass-sage (GS), aspen-bearberry (AB) and lodgepole pine-bearberry (PB); cool aspect slopes are forested primarily with spruce-feathermoss (SF) ecosystems. Forest conditions on the flat morainal hummocks surrounding the wetland are even-aged mixed pine and spruce stands (PB, SF). The entire west side of Whitehorse was burned by a fire event in the early 1920s, creating extensive tracts of even-aged, similar forest conditions (2s).

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Logan-Arkell Wetlands Wildlife Area (AEM 1998). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed.

GROUP*	SPECIES GROUP	WILDLIFE VALUES
Mammals	Semi-Aquatic Mammals	<ul style="list-style-type: none"> Shallow open water (OW) Aspen groves (AB) at the base of steep bluffs
Amphibians	Frogs	<ul style="list-style-type: none"> Mature lowland forests (SW) Shallow open water (OW) Wet meadows (ME) and shrub areas (WB)

* This list should be considered preliminary and incomplete as habitat characteristics suggest the area should also be important for ungulates and a variety of birds.

Wildlife Values and Environmental Sensitivity

Map 15 illustrates the areas of highest wildlife value and the different land classifications for the Logan-Arkell Wildlife Area. Two land classes are recognized:

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> Wetlands at the base of the glacial melt water channel (Fe ca, WB, SB, ME, OW). The calcareous marl fens are especially sensitive to human disturbance Lowland forests adjacent to the Logan-Arkell wetlands (SF, SW) The sensitivity of these sites decreases greatly upon winter freeze up.
High Environmental Sensitivity	<ul style="list-style-type: none"> Sparsely vegetated, steep slopes (GS, AB) Forested, very steep slopes directly adjacent to high value wildlife habitat units.

Private Land Ownership

No private lands are known to occur within the high value wildlife habitats of the Logan-Arkell Wildlife Area. Adjacent subdivisions are situated on the level plateaus to the east of, and well above, the core wetland habitats. Two large power transformer stations and associated overhead cables are located on upland benches within the drainage basin. Beyond the adjacent developments, the wetlands are largely undisturbed. Mineral claim status was not investigated during the preparation of this report.

Area 16: McIntyre Creek Corridor

The McIntyre Creek Corridor represents the largest contiguous Significant Wildlife Area within the City of Whitehorse. McIntyre Creek runs from the toe slopes of Mount McIntyre down to the Yukon River. The McIntyre Creek – Yukon River confluence has been discussed as Area 9 and is considered to be a part of the Yukon River Corridor. McIntyre Creek, above Mountain View Drive, has been subdivided into two sections, an Upper (Area 16A) and Middle (Area 16B) are, due to the size and complexity of the areas. Upper and Middle McIntyre Creek are discussed below.

Area 16A: Upper McIntyre Creek

Ecological Setting

Upper McIntyre Creek is the uppermost reach of McIntyre Creek watershed which runs through the length of west-central Whitehorse (Map 16A). The headwaters for McIntyre Creek begin along the subalpine and upper boreal slopes of Mount McIntyre, near the old Copper Haul Road. The Upper McIntyre Creek Wildlife Area is a very complex. Two relatively distinct areas form the high wildlife value habitats of the Wildlife Area. The largest portion of the Wildlife Area is comprised of a large wetland complex in a well-defined basin of an old glacial melt water channel. The second important area is a

wetland complex situated at the junction of the Fish Lake and old Copper Haul Roads. Many people consider this second area to be the McIntyre Creek wetlands. A water diversion project to create hydroelectric power is somewhat responsible for the creation of the wetlands and flooded forest habitat at the junction of the Fish Lake and old Copper Haul Roads. The west-side of the Yukon River valley supports very different forest communities than the Grey Mountain area; much of the forest along the upper, cool aspect slopes of Mount McIntyre appears to be underlain by permafrost. The hydrology of both wetlands appears to be controlled by numerous seepage areas along Mount McIntyre.

Located in the large glacial melt water channel, the first wetland complex is comprised of fen (FE), dry, grassy meadows (ME), willow-shrub birch (WB) and shallow open water (OW). Spruce-willow (SW) forest is scattered about the wetland but is prevalent along the base of the steep slopes. Steep bluffs rising more than 50 m to the plateaus above are composed of variable lodgepole pine-bearberry (PB), grass-sage (GS), aspen-bearberry (AB) and erodable slope (ES) units along warm aspects. Cool aspects contain mainly spruce-feathermoss (SF) and spruce-willow (SW) units; cool aspect slopes may also contain permafrost. A major wildfire burned across a forested bench adjacent to this wetland in 1998; this unit is currently designated as recent burn (RB).

The upper wetland adjacent to the Fish Lake and old Copper Haul Roads contains a flooded forest as a result of the road construction and water diversion. The area contains a diversity of wetland conditions including willow-shrub birch (WB), fen (FE), and shallow open water (OW). Forest ecosystems include old, highly structured spruce-willow (SW) and spruce-labrador tea (ST). A small lake, created by the hydro diversion project, is also present (LS). Water flow from the two wetlands eventually joins together in a very narrow, steep-walled canyon, to continue its path towards the Yukon River. Forest conditions surrounding the wetlands on level, morainal benches are primarily even-aged, lodgepole pine-bearberry (PB) ecosystems in seral stage 2. Some forested areas along the Fish Lake Road are controlled strongly by depth of bedrock or surface colluvial materials. These forests exist in the lithic phase. The early 1920s fire also affected much of this area.

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Upper McIntyre Creek Wildlife Area (AEM 1998). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed. Most documented wildlife information refers to the wetlands at the junction of the Fish Lake and old Copper Haul Roads. There is a near absence of documented wildlife information for the larger wetlands in the old melt water channel.

GROUP*	SPECIES GROUP	WILDLIFE VALUES
Birds	Avian Predators	<ul style="list-style-type: none"> • Mature lowland forests (SW, SF) • Open shrub and grassy meadows (WB, ME)
	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> • Mature, structured lowland spruce forests (SW, SF) and flooded forest conditions • Open shrub and grassy meadows (WB, ME) and Fens (FE)
	Water Birds	<ul style="list-style-type: none"> • Shallow open water and the small lake (OW, LS) • Shoreline habitats and marsh (MR)
Mammals	Semi-Aquatic Mammals	<ul style="list-style-type: none"> • Shallow open water and the small lake (OW, LS)

* This list should be considered preliminary and incomplete as habitat characteristics suggest the area should also be important for amphibians, ungulates and perhaps mammalian predators.

Wildlife Values and Environmental Sensitivity

Map 16A displays areas of high wildlife value and the different land classifications within the Upper McIntyre Creek Wildlife Area. Three land classes are recognized:

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> • Wetlands at the base of the glacial melt water channel (FE, WB, ME, OW) • Mature, structured lowland forests adjacent to the McIntyre Creek wetlands (SF, SW) • The sensitivity of these sites decreases greatly upon winter freeze up. Snowmobiling or cross country skiing would have limited direct physical impacts on these sites during winter.
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> • Within the glacial melt water channel, a lower bench of forest adjacent to the main wetland contains high wildlife values but is not as sensitive to human disturbance as the wetland. Several Mount McIntyre ski trails traverse this lower forested bench.
High Environmental Sensitivity	<ul style="list-style-type: none"> • Sparsely vegetated and active, steep slopes (GS, AB, ES) • Forested, very steep slopes directly adjacent to core habitat units. Forests on north and east-facing aspects can be expected to have permafrost.

Private Land Ownership

No private land ownership is identified within the major wildlife values of the Upper McIntyre Creek (Map 16A). However, many mineral claims may still exist in this area of the Whitehorse Copper Belt. Mineral claims were not investigated during the preparation of this report. Consideration should be given to this situation prior to any land use planning in the Upper McIntyre Creek Wildlife Area. Primary access to Upper McIntyre Creek is provided by the old Copper Haul Road. This route is accessible by vehicle, bike or foot. Numerous local trails which connect to the Mount McIntyre Ski Area and Logan-Arkell also run through the forested uplands to the east of McIntyre Creek. These trails receive high levels of winter and moderate summer use.

Area 16B: Middle McIntyre Creek

Ecological Setting

The Middle McIntyre Creek Wildlife Area is the middle reach of three wildlife areas identified along the McIntyre Creek corridor. This Wildlife Area is considered to be the entire McIntyre Creek corridor from the wetlands adjacent to Fish Lake Road, east to Mountain View Drive (Map 16B). The majority of this wildlife area occurs on Yukon College Endowment Lands. This area was identified for its mature riparian forest and wetland habitat characteristics. The most important forested area along this riparian corridor occurs behind Yukon College and is comprised of mature, highly structured spruce-feathermoss (SF) and spruce-willow (SW) ecosystems. Portions of this drainage contain residual forest patches that escaped the early 1920s fire event that affected most of Whitehorse West. Along with Wolf, Cowley and Croucher Creeks, these lowland forests provide some the best examples of mature riparian spruce ecosystems in Whitehorse. These riparian forests exhibit a large degree of vertical structure and contain a wide range of tree sizes; this diverse stand structure creates a number of different habitats for forest birds.

Several significant wetlands occur within this Wildlife Area. Adjacent to the Fish Lake Road, a marsh (MR) with scattered live and dead mature spruce (SW) provides important bird habitat. A section of McIntyre Creek just east of the Alaska Highway was straightened as part of a hydroelectric diversion project, creating an area of shrub and marsh. The main wetland in this area occurs behind Yukon College. It is comprised of a marsh and shallow open water (OW). Beaver activity has maintained high water levels in this wetland. A grass-sage (GS) overlooks the Yukon College wetland.

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Upper McIntyre Creek Wildlife Area (AEM 1998). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed. This area receives a very high level of recreational use and in some areas has been impacted heavily by rutting and erosion.

GROUP*	SPECIES GROUP	WILDLIFE VALUES
Birds	Avian Predators	<ul style="list-style-type: none"> • Mature riparian forests (SW, SF) • Open shrub and grassy meadows (WB, ME), and open water and marsh (OW, MR)
	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> • Mature, structured lowland spruce forests (SW, SF) and flooded forest conditions • Open shrub and grassy meadows (WB, ME) and Fens (FE)
	Water Birds	<ul style="list-style-type: none"> • Shallow open water (OW) • Shoreline habitats and marsh (MR)
Mammals	Semi-Aquatic Mammals	<ul style="list-style-type: none"> • Shallow open water (OW) • Aspen groves (AB) along warm aspect slopes
Amphibians	Frogs	<ul style="list-style-type: none"> • Shallow open water (OW) • Shoreline habitats and marsh (MR) • Mature riparian forests (SW, SF)

* The use of this area by ungulates (moose) and mammalian predators (coyotes) has not been documented but is probable.

Wildlife Values and Environmental Sensitivity

Map 16B displays the areas of highest wildlife value and the different land classifications within the Middle McIntyre Creek Wildlife Area. Two land classes are recognized:

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> • Mature riparian forests (SW, SF) • Open shrub and grassy meadows (WB, ME) • Open water and marsh (OW, MR)
High Environmental Sensitivity	<ul style="list-style-type: none"> • Steep grass-sage (GS) and aspen (AB) slopes • Steep forested slopes directly above High Wildlife Value, PE areas

Private Land Ownership

Much of the Middle McIntyre Creek Wildlife area occurs on Yukon College Endowment Lands. This land would be considered YTG lands. Yukon Energy Corporation operates a small hydroelectric station on the Yukon College wetland. This is the only private land holding currently identified within the Wildlife Area. Numerous trails run through the forests behind Yukon College. These trails receive very high levels of both summer and winter use; off-road vehicles are common in the area.

Area 17: Crestview Ponds

Ecological Setting

The Crestview Ponds Wildlife Area is centered around a group of small, shallow lakes and wetlands near the Crestview subdivision in the northwest corner of Whitehorse (Map 17). This area was originally recognized for its open water and forest bird habitat. However, a much larger area has been identified through the Ecosystem Mapping for this project than was originally identified in the 1998 Wildlife Inventory (AEM 1998). The area is connected by a complex network of lowland spruce forests and wetlands, that when examined from a landscape perspective, provide another potentially important linkage with the Yukon River Corridor. The drainage system identified in the Ecosystem Mapping appears to carry on to the Yukon River. Open shallow water (OW), marsh (MR), meadows (ME) and a spruce bog (SB) are connected through a series of mature spruce-feathermoss (SF) and spruce-willow (SW) corridors. Surrounding upland forests are composed of relatively uniform mid-seral, mixed spruce and pine ecosystems. Aspen is prominent on warm aspect slopes with a strong surface expression of bedrock. Some grass-sage (GS) ecosystems are present on warm aspect bluffs.

Wildlife Values and Species Groups Represented

The following wildlife species groups have been documented within the Crestview Ponds Wildlife Area (AEM 1998). Key habitat elements associated with each species group and considered critical to the long-term integrity of the Significant Wildlife Area are also listed. This general area receives a high level of off-road vehicle use and in some areas has been impacted heavily by rutting and erosion.

GROUP*	SPECIES GROUP	WILDLIFE VALUES
Birds	Forest Birds/Neotropical Migrants	<ul style="list-style-type: none"> • Mature, structured lowland spruce forests (SW, SF) • Open shrub and grassy meadows (WB, ME) • Black spruce bog (SB)
	Water Birds	<ul style="list-style-type: none"> • Shallow open water (OW) • Shoreline habitats and marsh (MR)
Mammals**	Semi-Aquatic Mammals	<ul style="list-style-type: none"> • Shallow open water (OW) • Aspen groves (AB) along warm aspect slopes

* The use of this area by avian predators, ungulates (moose) and mammalian predators (coyotes) has not been documented but is probable, especially in light of the expanded area of interest.

** Beaver activity was observed on a pond near the gravel pit/truck yard during field work for this project.

Wildlife Values and Environmental Sensitivity

Map 17 displays the high value wildlife habitats of the Crestview Ponds Wildlife Area. Three land classes have been recognized. An emphasis has been placed on maintaining the major linkages between the aquatic and lowland environments.

LAND CLASS	DESCRIPTION
High Wildlife Values, High Environmental Sensitivity	<ul style="list-style-type: none"> • Mature lowland forests (SW, SF) • Open shrub and grassy meadows (WB, ME) • Open water and marsh (OW, MR) • Many of these areas have been impacted to varying degrees by off-road vehicle use. Site sensitivity will decrease substantially in winter upon freeze up.
High Wildlife Values, Moderate Environmental Sensitivity	<ul style="list-style-type: none"> • Shrub meadows (WB) and mixed-wood forest surrounding the shallow, open water bodies
High Environmental Sensitivity	<ul style="list-style-type: none"> • Steep grass-sage (GS) and aspen (AB) slopes • Forested areas (SF) occurring on moist soils

Private Land Ownership

The Lomak truck yard and gravel pit is adjacent to an important pond within the Wildlife Area. No other private land ownership conflicts are known to exist in the Crestview Ponds Wildlife Area. Many local trails are present and used by residents of Crestview on a regular basis. The Canadian Wildlife Service has used the small pond to the immediate east of the Alaska Highway for waterfowl counts in the past.

5. Interpretation and Limitations

5.1. ECOSYSTEM MAPPING

The development of an Ecosystem Map for the City of Whitehorse was instrumental in the identification of high wildlife values throughout the City land base. The development of this mapping filled a major information gap in the City of Whitehorse land management information. While the Ecosystem Mapping is an important tool that will assist ecologically-based land use planning, it should be recognized that Ecosystem Mapping methods and the identification of ecosystem units is an ongoing process for the City of Whitehorse (Appendix One). The City of Whitehorse Ecosystem Map is currently unique within Yukon, but similar products are being considered for use within the surrounding Yukon Southern Lakes Ecoregion. While great effort went into the development of the map, some misclassification errors can be expected, especially for upland forest communities. The ecosystem mapping has received a relatively low intensity of ground checks; approximately five per cent of all polygons have been field verified.

5.2. WILDLIFE VALUES

The ranking of wildlife values is a somewhat subjective process but is based upon the known habitat requirements of specific species or general species groups. A number of local biologists gave input into the report and reviewed earlier drafts. Wildlife habitat interpretations are only relevant at the mapping scale, 1:20,000. Important point source wildlife values occur throughout the City of Whitehorse land base but cannot be captured at a mapping scale of 1:20,000. This mapping identifies wildlife values of landscape-level significance, and that are probably critical to the maintenance and long-term integrity of the locally-important values (eg. a single nest tree, or a known ungulate bedding site). Areas not ranked as having high wildlife values should not be interpreted as having no wildlife values. Areas ranked as having high wildlife values represent relatively higher values than adjacent ecosystem units. Also, many small areas or isolated areas may exist that have high wildlife values or are considered locally-important community recreation resources. However, they are not considered Significant Wildlife Areas from the landscape perspective of this project.

The ranking of wildlife values within the City of Whitehorse, as presented in this report, currently has two important limitations:

- Seasonally important habitats cannot be identified using the existing information database. Some wildlife habitats are seasonally important for specific wildlife groups while other areas can be important through all seasons. In this report, all ecosystem units that were considered to represent significant wildlife values at any time during the year have been identified.
- The approach taken with this project was to identify important areas or “nodes” of wildlife values and then provide a description for each area. “Wildlife Suitability Mapping” or “Habitat Mapping” is generally performed for a specific species or species group. The methods used in this report have considered all species groups, ranging from ungulates to birds to fish, in the rating and identification of wildlife values throughout the City. It is therefore not currently possible to examine habitat values for a specific species or species group, using only the information contained within the database. This accounts for the identification of a large range of ecosystem conditions that have high wildlife values.

5.3. ENVIRONMENTAL SENSITIVITY

Environmental sensitivity ratings are subjective but based on expert opinion of soil/terrain specialists and ecologists. The identification of environmentally sensitive areas, based on the definitions used in this report, should provide a strong foundation for the development of future land use zoning and activity planning.

5.4. PRIVATE LAND HOLDINGS

The private land ownership (titled lands) layer used in this project has not identified all privately owned lands within the City of Whitehorse. This land ownership layer was developed specifically from the point of view of a recreationalist in support of the City of Whitehorse Trail Map (1999). Also, this information has not been updated since March, 1999. Some new developments have occurred since this time (e.g. Spruce Hill). However, due to the nature of the Significant Wildlife Area habitats (lowland environments, open water, meadows, wetlands, etc.), they generally represent few direct conflicts with residential and commercial development sites.

5.5. DATA GAPS

City of Whitehorse Ecosystem Mapping currently covers the majority of the boreal zone. The expansion of the mapping program to the Whitehorse Copper ADS, as presented in Addendum One, filled an important information gap within the City of Whitehorse. However, wildlife data within that area is still insufficient to receive designation as a Significant Wildlife Area. It is expected that ecosystem mapping will continue to be developed for the City as required by specific planning projects. Ecosystem mapping has not yet occurred within the Subalpine and Alpine zones of Whitehorse, and ecosystem units would require development within these new environments. The database developed for the Ecosystem Mapping (ver. 2c) does not currently include terrain attributes, which would further enhance our ability to make ecological interpretations from the existing mapping.

5.6. LAND CLASSIFICATIONS

Three different land classifications have been used throughout this report: 1) *High Wildlife Values, High Environmental Sensitivity*, 2) *High Wildlife Values, Moderate Environmental Sensitivity*, and 3) *High Environmental Sensitivity*. These three classes were created to give direction to future land use planning activities, specifically the updating of the City of Whitehorse Official Community Plan. The main purpose of this report was to identify and map the most important wildlife habitats within the City. Incorporating these wildlife values into a City of Whitehorse landscape design will now be possible. Potential land zoning options and activity limitations within each land classification have not been addressed in this report.

6. Summary and Recommendations

This project identified and mapped high wildlife values within the City of Whitehorse through the use of Ecosystem Mapping. Seventeen (17) Significant Wildlife Areas have been identified throughout Whitehorse. Ecosystem Mapping and wildlife interpretations have also been completed for the Whitehorse Copper ADS but this area is not currently recognized as a Significant Wildlife Area. High value wildlife units, as identified in this report, encompass approximately 7 percent of the total City of Whitehorse land base, and 12 percent of the mapping area. An Ecosystem Map has been created for approximately 60 percent of the City, primarily in the boreal zone. Most high value wildlife habitats are comprised of open shallow water, meadows, wetlands, and mature, highly structured lowland forests. There are very few direct conflicts with the high value wildlife ecosystem units identified in this report and existing private land holdings (titled lands). During the completion of this report, several recommendations became apparent:

- While this report did not address land zoning options or activity limitations within the different wildlife areas and environmentally sensitive areas, some consideration was given to the existing City of Whitehorse Bylaws and Land Zoning. Based on the results of this project, it is recommended that the definitions of PE, Environmental Protection, and PR, Parks and Recreation be re-visited and possibly revised. Different classes of PE should be created to reflect different levels of environmental sensitivity (e.g. habitat protection area and environmentally-sensitive area). Also, great thought should be put into the activity limitations within PR, Parks and Recreation, zones. Different levels of PR should be recognized within the Official Community Plan, again in relation to the site characteristics and the overall landscape-level objectives for the area.
- In future land use planning initiatives, the protection of linkages between important core areas should be viewed as a priority. To accomplish this, a long-term, strategic landscape level plan will need to be developed. Such an activity would integrate well with the ongoing Official Community Plan updates and City Greenways initiative. In many ways, these linkages and corridors should form the framework for landscape level planning in the Official Community Plan.

- Given the size of Whitehorse and the number of special areas within the City, a City-wide wildlife species inventory should not be performed. Key areas should be chosen if more detailed information is required beyond the general species groups presented in this report. Protecting major ecologically-based habitat elements and maintaining corridors, as identified by this report, will probably yield greater results at much less cost.
- Ecosystem mapping should be completed for the remainder of the City as required for specific planning projects. The project team feels that most important areas within the boreal zone of Whitehorse have been identified but that some areas, specifically Livingstone Trail and Haekle Hill, contain significant wildlife values.

7. References

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Appendix One:

**A Users Guide to City of Whitehorse
Ecosystem Mapping**

Ver. 2c

August 15, 2000

File

MAPINFO: city_em_2c.TAB

A Users Guide to City of Whitehorse Ecosystem Mapping (ver. 2c)

August 15, 2000

MAPINFO: *city_em_2c.TAB*

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City of Whitehorse Ecosystem Mapping (ver. 2c): User's Guide Notes

Previous versions of this report have used the term “Terrestrial Ecosystem Mapping”, or “TEM”, to describe the mapping methods developed by Applied Ecosystem Management Ltd. for use within the City of Whitehorse. To avoid potential confusion with Terrestrial Ecosystem Mapping standards that exist in British Columbia (RIC 1998), we have now chosen to use the term “**Ecosystem Mapping**” to describe the mapping methodology; the term “TEM” is no longer used.

Changes since ver. 2b (May 7, 2000)

- Update of ecosystem unit descriptions and formatting of User's Guide
- Expanded mapping area now includes Whitehorse Copper Area Development Scheme
- Addition of new forested ecosystem unit in Whitehorse Copper ADS expanded mapping area – Lodgepole Pine-Canoe Birch (PC) - near Mount Sima. To our knowledge, this forested ecosystem unit has not been described in previous vegetation mapping/ecosystem mapping programs and appears to be relatively rare within the Yukon Southern Lakes Ecoregion.

Applied Ecosystem Management Ltd.
August 15, 2000

A Users Guide to City of Whitehorse Ecosystem Mapping (ver. 2c)

August 15, 2000

1. ECOSYSTEM MAPPING CONCEPTS

1.1. Ecosystem Mapping Versus Forest Cover and Vegetation Mapping

One of the underlying philosophies behind plant and landscape ecology is that abiotic factors (terrain conditions, soil conditions, elevation gradients, etc.) create environmental gradients which influence the growth and distribution of vegetation. In the boreal forest of northwest Canada, vegetation responds to terrain conditions and topographic gradients in relatively predictable ways, producing the concept of vegetation associations/communities and **ecosystem units**. These communities and land units occur in generally predictable patterns along topographic, soil energy, nutrient and moisture gradients. The mapping philosophy behind **Ecosystem Mapping** relies on the identification of these distinct landscape (or ecosystem) units and their associated attributes. This procedure results in the development of a “terrain-based” mapping system, which allows a better understanding of the relationships between terrain, soil, landscape position and vegetation communities than traditional vegetation or forest cover mapping. This methodology, when structured in an orderly fashion within a GIS environment, is very well suited to spatial analysis and cartographic display as a single map product can be used for many different applications.

Traditional forest cover or vegetation maps only contain information about just that, forest cover or vegetation. It is nearly impossible to distinguish between a white spruce-feathermoss forest on a steep, north-facing slope and a white spruce-feathermoss forest growing on level, productive alluvial soils without the use of a digital elevation model and some serious assumptions. The two cover types have completely different rates of turnover, growth characteristics and disturbance patterns, yet are commonly lumped into the same cover type due to their similar dominant tree species composition. This is not an ecologically-based classification and creates serious limitations for the principles of ecosystem-based forest management. Ecosystem mapping, and the GIS database that can result, allows these relationships to be queried directly from the database, creating a more accurate representation of the landscape.

1.2. Ecosystem Mapping Developed for the City of Whitehorse (Yukon Southern Lakes Ecoregion) Versus Terrestrial Ecosystem Mapping (TEM) in British Columbia

Well defined standards exist for Terrestrial Ecosystem Mapping, or “TEM”, in British Columbia (RIC 1998b). A similar, Broad Ecosystem Habitat, or “BEI” mapping methodology is also well defined for the province (RIC 1998a). Applied Ecosystem Management Ltd. (AEM) has worked extensively with these two products in northwest British Columbia, and have attempted to directly apply Broad Ecosystem Habitat mapping methods to the Liard Basin Ecoregion (ESWG 1995) of southeast Yukon (AEM 1999c). Based on our experiences with these products, the two British Columbia mapping systems were modified to reflect Yukon environmental conditions, ecosystems and data sources.

The *Biogeoclimatic Ecosystem Classification*, or “BEC” (Pojar et al. 1987), and TEM (RIC 1998b) approaches used in British Columbia are based on the concept of “*climatic vegetation potential*”. Areas that have similar climatic controls are expected to contain similar “*potential climax vegetation*”. For example, in a mature, undisturbed state, the potential for a certain area to produce a certain type of vegetation community, or plant association, is the primary criteria for naming and classification.

The BEC system has a strong coastal bias as stand initiating disturbances such as fire are relatively rare, therefore allowing a “*potential climax vegetation community*” to be reached. However, in the boreal forests of Yukon, northern British Columbia and Alaska, fire is a relatively frequent stand initiating, large-scale occurrence on most upland landscape positions. Much of the landscape is therefore maintained in an “*early seral condition*” that can be considered in a constant state of “*recovery*” from the last major fire disturbance. Within this disturbance regime, the “*potential climax vegetation community*” is rarely if ever reached, as the length of time between fire return intervals is generally too short. This then brings into question whether the “*climax vegetation community*” concepts developed in British Columbia are completely relevant within boreal regions.

The preliminary ecosystem mapping methods developed by AEM for Yukon ecosystems are not based on the concept of “climax vegetation potential”. We recognize that general ecological zones exist (i.e. boreal, subalpine and alpine) within distinct climatic and physiographic regions of Yukon, but that the effects of disturbance are highly variable and regeneration cannot always be predicted. The effects of disturbance and the variable vegetation regeneration that can result have been incorporated into the mapping framework through the use of terrain units and observable vegetation communities. City of Whitehorse Ecosystem Mapping therefore reflects what is currently on the landscape, not what will be on the landscape in the absence of disturbance.

In the boreal fire regime of Yukon, fire is a landscape-level disturbance agent that must be incorporated into any Ecosystem Mapping efforts. It is hoped that Ecosystem Mapping developed for the City of Whitehorse will serve as a pilot project for further mapping and classification efforts throughout the Yukon Southern Lakes Ecoregion and adjacent areas of Yukon. AEM has recently prepared a discussion paper about potential ecosystem mapping issues and systems for Yukon (AEM 2000b).

1.3. Development of Ecosystem Mapping Methods

Ecosystem Mapping in the City of Whitehorse presented several challenges:

- a) A “standardized”, mappable, ecological land classification for the Yukon Southern Lakes Ecoregion did not exist in 1998 when the concept of “Ecosystem Mapping” for the City of Whitehorse was first developed by AEM. As of August, 2000, such a system is still not in place. Therefore, a first approximation of ecologically-meaningful ecosystem and terrain units had to be created, based on local knowledge and existing vegetation descriptions (Boyd et al. 1982, Davies et al. 1983, Oswald and Brown 1986) and soil/terrain mapping (Mougeot et al. 1998) within the area. The City of Whitehorse land base provided an ideal situation to develop a first approximation of Ecosystem Mapping methodology for the Yukon-Southern Lakes region due to the existence of these previous studies and excellent 1:20 000 scale digital base mapping. Previous work in the Yukon Southern Lakes area (AEM 1999a) also assisted in the development of mapping concepts and ecosystem units.
- b) Based on mapping experience in southeast Yukon using boreal ecosystem units described for British Columbia (RIC 1998a, RIC 1998b), it was found that the British Columbia units did not allow sufficient variation to describe Yukon ecosystems (AEM 1999c). Therefore, while the mapping concepts remained extremely useful, new ecosystem units had to be created and expanded for the City of Whitehorse. Many of the ecosystem units were adapted during development of the Yukon River Corridor Plan (1999) (see AEM 1999b).
- c) Seral and structural stage modifiers for forest communities had to be developed to reflect Yukon Southern Lakes disturbance regimes and data sources (i.e. fire return intervals and non-stand initiating fire behaviour)
- d) The 1:100,000 scale Southern Lakes Vegetation Inventory (Boyd et al. 1982) and 1:100,000 scale vegetation mapping produced during the initial *Whitehorse Wildlife Inventory, Data Compilation and Gap Analysis* (AEM 1998) were found to be of limited use for the purposes of Ecosystem Mapping due to their reliance on tree species composition. Also, the vegetation classifications used in these former projects were also not well suited to GIS analysis. Due to community classification problems, georeferencing issues and the small-scale nature of the mapping, it was determined that an entirely new approach was warranted. This was the major impetus behind the development of Ecosystem Mapping for the City of Whitehorse.

2. ECOSYSTEM MAPPING METHODS

2.1. Terrain Mapping

Terrain mapping forms the underlying basis of Ecosystem Mapping. Table 1 lists the terrain classes used to form *bioterrain* units for the City of Whitehorse Ecosystem Map. The terrain mapping concept envisioned by the project team was not the development of a “strict” terrain map. For these reasons, the terrain classification of Mougeot et al. (1998) was modified to better reflect *terrain conditions that influence plant community distribution*. New terrain mapping using the definitions outlined in Table 1 was created by AEM as a basis for the Ecosystem Mapping. Therefore, the terrain units created through this program do not fit the original terrain mapping of Mougeot et al. (1998), but in most cases are similar. ***At this time, the terrain codes have not been entered into the Ecosystem Mapping data base due to time and budget constraints but all ecosystem map polygons are based on the terrain classes.***

Table 1. Preliminary terrain classes and modifiers developed for the City of Whitehorse Ecosystem Mapping program. Terrain attributes were modified from a variety of data sources, including Mougeot et al. (1998).

TERRAIN CODES	CODE	DESCRIPTION	VALUE
LANDFORM	C	crest	
	D	depressional	
	L	level	
	S	sloping	
	V	variable	
SLOPE	1	level - gently sloping	0-10 deg
	2	moderate slope	10 - 20
	3	steep slope	20 - 30
	4	very steep	30 - 40
	5	extreme slope	40+
	6	variable slope (hummocky)	
ASPECT	c	cool aspect	N and E
	w	warm aspect	S and W
	v	variable aspect (hummocky)	variable aspects
GENESIS	F	fluvial	
	GF	glaciofluvial	
	L	lacustrine	
	M	morainal	
	O	organic	
DRAINAGE		Drainage categories require development	

2.2. Ecosystem Units

Ecosystem units represent the observable “surface cover” of the landscape. Ecosystem units can be both **vegetated** and **non-vegetated** and an equal emphasis is given to both types of ecosystems. This is a major benefit of Ecosystem Mapping versus traditional forest cover or vegetation mapping – the entire land base receives description. Based on initial field reconnaissance (AEM 1999b), information collected during previous studies (Boyd et al. 1982, Davies et al. 1983, Oswald and Brown 1986, Mougeot et al. 1998) and personal experience within the study area, a preliminary ecosystem classification was developed for the boreal zone* of the City of Whitehorse. Much of the development of this mapping system occurred during studies related to the Yukon River Corridor Plan (1999) (see AEM 1999b). This classification is considered to represent meaningful vegetation-terrain associations as observed within the boreal zone of the City of Whitehorse. Representing the full range of variability found within distinct vegetation communities is possible at the site level through the use of structural stage (even-aged or complex) and seral modifiers (time-since-fire) and by knowledge of terrain-vegetation relationships. However, accurately mapping this variability is often not possible at a scale of 1:20,000 or smaller. Due to the preliminary nature of this project and the ongoing development of mapping methodology, only seral stage modifiers (time-since-fire) were used to describe community variation. Seral stages were developed from general stand age analysis collected during the field studies. In the future, it may be possible to use structural stage modifiers to represent different stages of vegetation community structure and composition given time-since-disturbance and site conditions. It is intended that these preliminary ecosystem units be compatible with future ecosystem classification work within the entire Yukon Southern Lakes Ecoregion.

The lack of a consistent, comprehensive, mappable ecological land classification system for the area is a major impediment to ecosystem-based land management in the Southern Lakes region. The ecosystem units developed for the City of Whitehorse Ecosystem mapping program should currently be viewed as preliminary as they were developed specifically for this project. Ecosystem unit descriptions developed for the boreal zone of the City of Whitehorse are contained in Sections 2.2.1 – 2.2.5. AEM has produced several discussions on the topic of ecosystem units and ecosystem mapping during the past two years (AEM 1999a, AEM 1999b, AEM 1999c, AEM 2000a, AEM 2000b).

* **Boreal**, **Subalpine** and **Alpine** ecological zones within the City of Whitehorse have not yet been mapped. However, our current working definition of “Boreal” is lower elevation areas that are continuously forested and that do not contain a significant component of subalpine fir (*Abies lasiocarpa*). Along the western City Limits, the approximate transition between “Boreal” and “Subalpine” forests occurs along the Copper Haul Road and lower slopes of Mount McIntyre.

2.2.1. URBAN AND AGRICULTURAL ECOSYSTEMS

<i>UNIT</i>	<i>NAME</i>	<i>DESCRIPTION</i>
AN	Anthropogenic Disturbance	Gravel pits, mine tailings, etc.
CF	Cultivated Field	Active agriculture
UR	Urban	Developed areas

2.2.2. BOREAL UPLAND FORESTED ECOSYSTEMS

<i>UNIT</i>	<i>NAME</i>	<i>DESCRIPTION</i>
AB	Trembling Aspen - Bearberry	Generally occur on south-facing slopes and ridges, but can be found in a variety of positions. Lichen and moss cover are low with a near carpet of bearberry (<i>Arctostaphylos uva-ursi</i>) forming ground cover. Sporadic soapberry (<i>Shepherdia canadensis</i>) is common. Steep slopes are often associated with GS (grass-sage). Aspen (<i>Populus tremuloides</i>) groves may also be locally- prominent on a range of conditions and are often considered “early successional” forest types.
PB	Pine/Bearberry	Lodgepole pine-dominated stands on morainal or transitional upland sites with limited shrub understory development. Bearberry (<i>Arctostaphylos uva-ursi</i>) forms the dominant groundcover. Soapberry (<i>Shepherdia canadensis</i>) and willow cover sporadic, aspen and spruce may be intermixed in canopy and moss cover is generally low. Terrestrial lichens may be locally abundant. Labrador tea (<i>Ledum groenlandicum</i>)/dwarf birch shrubs (<i>Betula glandulosa</i>) and mossberry (<i>Empetrum nigrum</i>) may be important on moist sites and in the lower subalpine. This community generally occurs on dry, poor sites, however.
PC	Lodgepole Pine – Canoe (Paper) Birch	Open canopy lodgepole pine stands occurring on gently-sloping, shallow soil ecosystems with rock outcrops. Rock outcrops may contain a high cover of terrestrial lichens. Moist depressions contain thick blankets of feathermoss with Paper Birch (<i>Betula paperifera</i>), alder (<i>Alnus crispa</i>) and Labrador Tea (<i>Ledum groenlandicum</i>). This community has only been described on one site within the City of Whitehorse, near Mount Sima. To the knowledge of the mapping team, this ecosystem unit has not been described elsewhere within the Southern Lakes Region.
PG	Lodgepole Pine - Grass	Open, mesic stands with low shrub cover, abundant grass cover and a variable moss layer. Soapberry and Mooseberry (<i>Viburnum edule</i>) is often present in moderate amounts with large, sporadic willows growing in canopy openings. This unit has received limited description and field sampling.

2.2.2. BOREAL UPLAND FORESTED ECOSYSTEMS (cont.)

<i>UNIT</i>	<i>NAME</i>	<i>DESCRIPTION</i>
PL	Pine/Lichen	Dry, open canopy lodgepole pine (<i>Pinus contorta</i>) forests with abundant terrestrial lichen cover (<i>Cladina</i> and <i>Cladonia</i> spp.) growing on coarse textured soils. Flat benches and complex terrain are the dominant terrain features. Rapidly drained, poor sites. Usually associated with glaciofluvial parent materials (glaciofluvial sites generally have the highest abundance of terrestrial lichens). Complex fire history is common. PL is commonly associated with PB ecosystems.
RB	Recent Burn	Recent burn (<10 years old) with limited vegetation recovery. A recent burn in a previously-forested area would receive the designation of Forested, Recent Burn. This would be differentiated from Non-forested areas by the presence of standing and downed snags, indicating forested conditions.
SF	White Spruce - Feathermoss	A closed canopy, white spruce (<i>Picea glauca</i>) dominated forest community occurring on both level conditions and cool aspects. The shrub understory is usually sparse and ground cover is dominated by a thick layer of feathermoss. Pine may be interspersed throughout the canopy. Old stands may contain juniper; moist sites may contain mossberry and Labrador tea.
SL	White Spruce - Lichen - Grass	Open canopy white spruce stands growing on level medium-textured soils with rapid drainage. Mixed spruce and pine canopy with predominantly lichen, grass and dwarf shrub groundcover. Lichen is not as dominant as the PL ecosystem unit. Willow or shrub birch may be interspersed throughout.
ST	White/Black Spruce – Labrador Tea	Acidic, cool (possibly permafrost), moist to wet soils for portions of the year. Tree cover can be white or black (<i>Picea mariana</i>) spruce. Forest canopy is usually sparse and a thick layer of moss and Labrador tea in the understory. Limited shrub cover. Poor sites often in association with depressions and seepage areas. ST usually forms on mineral soils with peaty surface horizons.
SW	White Spruce - Willow	Open canopy white spruce forests growing on a variety of sites but tending towards mesic, with moderate-high moss cover and a prominent shrub layer. Both willow and shrub birch may be present. Moss cover is variable. Depressions may contain Labrador Tea and mossberry.

2.2.3. BOREAL LOWLAND FORESTED ECOSYSTEMS

UNIT	NAME	DESCRIPTION
RB	Recent Burn	Recent burn (<10 years old) with limited vegetation recovery. A recent burn in a previously-forested area would receive the designation of Forested, Recent Burn. This would be differentiated from Non-forested areas by the presence of standing and downed snags, indicating forested conditions.
SB	Spruce Bog	Acidic, partially saturated soils for portions of year. Partially forested with variable cover of willow and shrub birch. Bogs are rare in southern Yukon due to the dry climate.
SF	White Spruce - Feathermoss	Spruce-feathermoss forests that occur in riparian zones and on alluvial terraces can have variable but usually limited development of shrub understory. Moist sites may have extensive horsetail (<i>Equisetum</i> spp.) cover on rich, organic soils. They are generally not influenced by active flooding and deposition. These sites contain some of the most productive forests in southern Yukon.
SP	White Spruce - Balsam Poplar Riparian	Generally limited to lowland riparian areas with rich organic soils. Are periodically influenced by flooding and similar low intensity disturbances. They tend to be structurally complex and are affected by fire to a lesser degree than upland stands.
ST	White/Black Spruce – Labrador Tea	Acidic, cool (possibly permafrost), moist to wet soils for portions of the year. Tree cover can be white or black (<i>Picea mariana</i>) spruce. Forest canopy is usually sparse and a thick layer of moss and Labrador tea in the understory. Limited shrub cover. Poor sites often in association with depressions and seepage areas. ST usually forms on mineral soils with peaty surface horizons.
SW	White Spruce - Willow	Wettest of the spruce-willow communities. Well developed herbaceous and graminoid cover is common.

2.2.4. BOREAL VEGETATED, NON-FORESTED ECOSYSTEMS

<i>UNIT</i>	<i>NAME</i>	<i>DESCRIPTION</i>
BG	Sphagnum Bog	Acidic, sphagnum moss dominated wetlands where scattered spruce, willows and shrub birch may be present. They are not connected to local watertables.
FE	Sedge Fen	Productive, sedge dominated wetlands occurring in alkaline conditions where standing water is common. Thick growth of sedge (<i>Carex</i> spp.) is common. Fens are connected to local hydrologic flows.
ME	Meadow	Herbaceous growth (sedge, grass) with fluctuating water table. Many meadows remain dry for large periods of the year.
MR	Marsh	Non-forested, saturated mineral soils. Open, shallow water is usually present with emergent sedge and grass cover.
RB	Recent Burn	Recent burn (<10 years old) with limited vegetation recovery. A recent burn in a shrub (disclimax) area would receive the designation of Non-Forested, Recent Burn.
WA	Willow - Alder	Non-forested shrub communities (willow and alder) generally limited to riparian areas. Often in association with SP, SW and SF units.
WB	Willow - Shrub Birch	Non-forested willow and shrub birch meadows occur throughout the boreal and subalpine areas of the Southern Lakes ecoregion. A variable cover of grass, sedge, or lichen may be present, depending on site moisture regimes.

2.2.5. BOREAL NON-VEGETATED/SPARSELY-VEGETATED ECOSYSTEMS

<i>UNIT</i>	<i>NAME</i>	<i>DESCRIPTION</i>
CL	Cliff, rock	Steep rock cliffs
ES	Erodable Slope, steep	Steep, non-vegetated or sparsely vegetated erodable slopes.
GS	Grass - Sage	Grass and sage communities limited to dry, steep warm aspect slopes. Often associated with the AB ecosystem unit.
GB	Gravel/Sand Bar	Gravel and sand bars in river or edgewater environments
LL	Lake, Large	Deep lake, no emergent vegetation, >60 ha
LS	Lake, Small	Shallow lake with limited emergent vegetation, <60 ha
OW	Open Shallow Water	Shallow water body with possible seasonal depth fluctuations and variable emergent vegetation.
RI	River	Large, flowing water feature
RO	Rock Outcrop	Rock outcrop

2.2.6. ECOSYSTEM UNIT MODIFIERS*

<i>SERAL STAGE</i>	<i>CODE</i>	<i>DESCRIPTION</i>
None	0	Non-Forested Ecosystems
Young Forest	1	(0-40 yrs)
Mid-Seral Forest	2	(40-80 yrs)
Mature Forest	3	(80-120 yrs)
Old Forest	4	(120-160 yrs)
Very Old Forest	5	(160-250 yrs)
Relict Forest	6	(>250 yrs)
DISTURBANCE HISTORY/ STRUCTURAL ATTRIBUTES**	s	Single cohort. Even-aged forest stands with very little variation in tree size and age.
	m	Multiple cohort. Complex disturbance history (logging, variable intensity fire behaviour, stand-level disturbances) have produced forest stands with large variation in age and size classes.
SPECIAL SOIL CONDITIONS	ca	Calcareous soil conditions, used primarily for marl fen description
	l	Lithic Phase, bedrock close to surface or vegetation developed on boulders and colluvium
	cp	Cool aspect and permafrost, generally limited to forests occurring in the upper boreal zone on steep, north and east-facing slopes

***Note:** Ecosystem Unit Modifiers apply only to vegetated (both forested and non-forested) ecosystems.

****A more detailed description of structural attributes** should be developed to characterize different stages of forested and non-forested development (eg. low or tall shrub communities, forest stands in understory initiation stages, etc.) Many definitions could be adapted from RIC (1998a) and RIC (1999b).

2.2.7. POLYGON LABELS

Map labeling conventions for Ecosystem Mapping are complex but standardized. Each polygon can receive two ecosystem units, a primary and a secondary unit, in various deciles adding up to 10 (100%). Each unit can have two seral stages or modifiers, creating a range of potential polygon labels as described in Table 2 below.

Table 2. City of Whitehorse Ecosystem Map labeling conventions.

<i>Condition</i>	<i>Example Label</i>	<i>Definition</i>
single ecosystem unit with single seral stage	PL(4s)	Lodgepole Pine-Lichen (Seral Stage 4, single cohort). If no decile is present, it is assumed to be 100%.
two ecosystem units with single seral stages	6PL(4s)-4GS(0)	60% Lodgepole Pine-Bearberry (Seral Stage 4, single cohort), 40% Grass-Sage (Seral Stage 0 – non-forested)
single ecosystem unit with special soil modifier	SFI(3s)	White Spruce-Feathermoss, Lithic Phase-Shallow Soil (Seral Stage 3, single cohort)
single ecosystem unit with multiple seral stages	PL 6(2s)4(5m)	Lodgepole Pine-Lichen 60% (Seral Stage 2, single cohort) 40% (Seral Stage 5, multiple-cohort)
two ecosystem units with two seral stages	7PL 6(2s)4(5m) – 3PB 8(2s)2(5m)	70% Lodgepole pine-Lichen 60%(Seral Stage 2, single cohort) 40% (Seral Stage 5, multiple-cohort) – 30% Lodgepole Pine-Bearberry 80%(Seral Stage 2, single cohort) 20% (Seral Stage 5, multiple-cohort)

2.3. Projection Parameters

The City of Whitehorse Ecosystem Map has been created to fit the current City of Whitehorse planimetric and cadastral data set. The native file projection is UTM Zone 8, NAD83.

2.4. Database Structure

The City of Whitehorse Ecosystem Map database structure is outlined in Table 3. The coverage currently resides as a MapInfo table but can be exported to most GIS formats due to the “one to one” database structure; each polygon is unique with a series of data fields attached.

Table 3. Database structure of the City of Whitehorse Ecosystem Map. Database structure adapted from RIC (1998a and 1998b) and Yukon Forest Resources (1997).

<i>Database Field</i>	<i>Description</i>
POLY_ID	Unique polygon ID
AREA	Area of polygon (meters)
NTS_MAP	NTS mapsheet (1:250 000)
ECOREG	3 letter Ecoregion code (i.e. “YSL” - Yukon Southern Lakes)
LANDPOS	“ALP” - Alpine, “BOR” - Boreal, “SUB” - Subalpine
TYPE1	General ecosystem type of primary ecosystem unit (“VF” - vegetated forested, “VN” - vegetated non-forested, “NW” - non-vegetated water, “NA” - non-vegetated anthropogenic, “NE” - non-vegetated exposed)
ECO1_CO	Proportion of polygon covered by primary ecosystem unit (ECO1)
ECO1	Primary ecosystem unit
ECO1_MOD	Primary ecosystem unit modifier
SER1A_CO	Proportion of polygon covered by SER1
SER1A	Primary seral stage of ECO1
STR1A	Structural stage modifier of SER1A
SER1B_CO	Proportion of polygon covered by SER1B
SER1B	Secondary seral stage descriptor of ECO1
STR1B	Structural stage modifier of SER1B
ECO1_LAB	Primary polygon label for ECO1 and attributes
TYPE2	General ecosystem type of secondary ecosystem unit (“VF” - vegetated forested, “VN” - vegetated non-forested, “NW” - non-vegetated water, “NA” - non-vegetated anthropogenic, “NE” - non-vegetated exposed)
ECO2_CO	Proportion of polygon covered by secondary ecosystem unit (ECO2)
ECO2	Secondary ecosystem unit
ECO2_MOD	Secondary ecosystem unit modifier
SER2A_CO	Proportion of polygon covered by SER2A
SER2A	Primary seral stage of ECO2
STR2A	Structural stage modifier of SER2A
SER2B_CO	Proportion of polygon covered by SER2B
SER2B	Secondary seral stage descriptor of ECO2
STR2B	Structural stage modifier of SER2B
ECO2_LAB	Secondary polygon label for ECO2 and attributes
REF_YEAR	date of information used to determine classification (photo date, sample year).
COMMENT	general info and comments, sample site information, etc.
WLD_RATE	Units ranked as containing high wildlife values “H”
ECO_RATE	Environmental sensitivity of unit to disturbance “H”, “M”, “L”
LAND_CLS	Land classification derived from WLD_RATE and ECO_RATE. Three categories are possible: “High Wildlife Values, High Environmental Sensitivity - HWHS”, “High Wildlife Values, Moderate Environmental Sensitivity - HWMS”, and “High Environmental Sensitivity - HS”.

3. INTERPRETATION AND LIMITATIONS

Many different types of information can be obtained from the Ecosystem Map including wildlife habitat values, sensitivity to human disturbance, and constraints to development. Interpreting Ecosystem Mapping requires knowledge of the different ecosystem units. Due to their characteristics, some ecosystem units have a high susceptibility to human disturbance while others are more resilient. Some ecosystems are very rare on the Whitehorse landscape, while others are common. Wildlife values can be interpreted by examining specific ecosystem units, their structural characteristics and their relative position/location on the landscape (i.e. is it connected to other areas in a relatively natural state – see AEM 2000a). The distribution (abundance) of each ecosystem type and seral stage can be queried from the database and histograms generated. An important component of ecosystem-based planning is maintaining a range of conditions across the land base. The spatial location of each ecosystem unit can be displayed through the GIS. Depending on the desired queries, it is often easier to export the database outside of the GIS to a spreadsheet such as MS-Excel or MS-Access and manipulate the information there. This is a common approach for many types of GIS analyses.

For the purposes of land use planning, ecosystem conditions within a planning area can be examined and each unit ranked according to site sensitivity, development constraints, etc. This allows a general overview of the planning area in a short period of time, and highlights different values and possible constraints early in the planning process. Field checks will always be required for detailed, subdivision-level plans but the amount of time required will be greatly reduced.

The Ecosystem Mapping should only be interpreted at a scale of 1:20,000. More detailed mapping can be completed for specific locations but should always be nested within the 1:20,000 mapping, to maintain the hierarchical concepts of ecological land classification (AEM 2000b). It should be recognized by the City of Whitehorse that this product is currently unique within Yukon, but similar concepts are being considered for surrounding areas within the Yukon Southern Lakes Ecoregion. Currently, only Boreal Ecosystems have been described; the description of subalpine and alpine ecosystems requires development.

4. REFERENCES

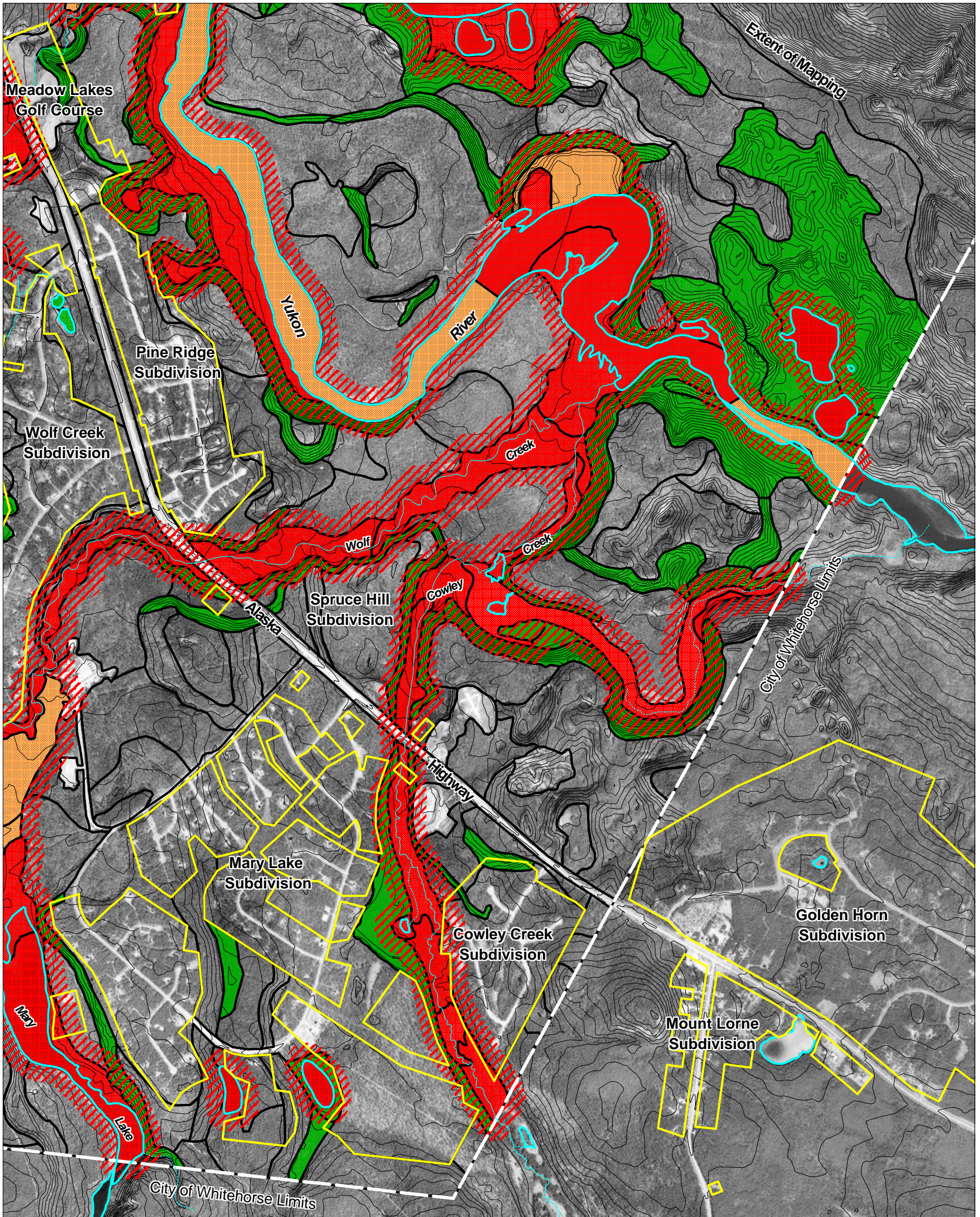
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Appendix Two:
City of Whitehorse
Significant Wildlife Area Mapping

August 15, 2000

Map 1: Wolf Creek/Cowley Creek - Yukon River Wildlife Area



- High Wildlife Values,
High Environmental Sensitivity
- High Wildlife Values,
Moderate Environmental Sensitivity
- High Environmental Sensitivity

Zone of awareness for Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.

Ecosystem Unit Boundaries

Titled Lands (updated March, 1999)

Waterbodies

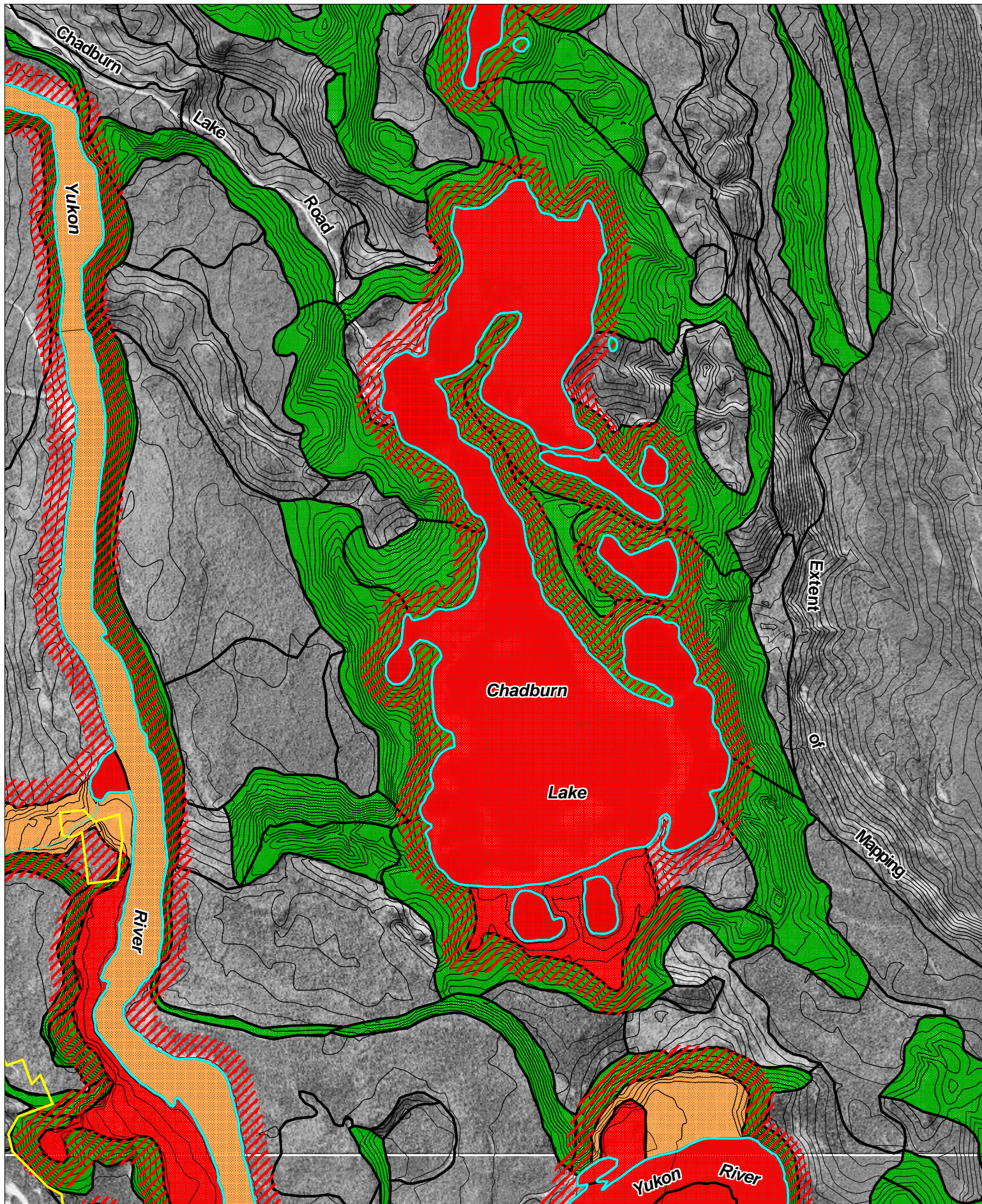
Streams (from the City of Whitehorse planimetric base mapping)



Scale 1:25,000

File: wwa_wolfcreek_34.WOR
Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
Applied Ecosystem Management Ltd., August 15, 2000

Map 2: Chadburn Lake Wildlife Area



- High Wildlife Values,
High Environmental Sensitivity
- High Wildlife Values,
Moderate Environmental Sensitivity
- High Environmental Sensitivity

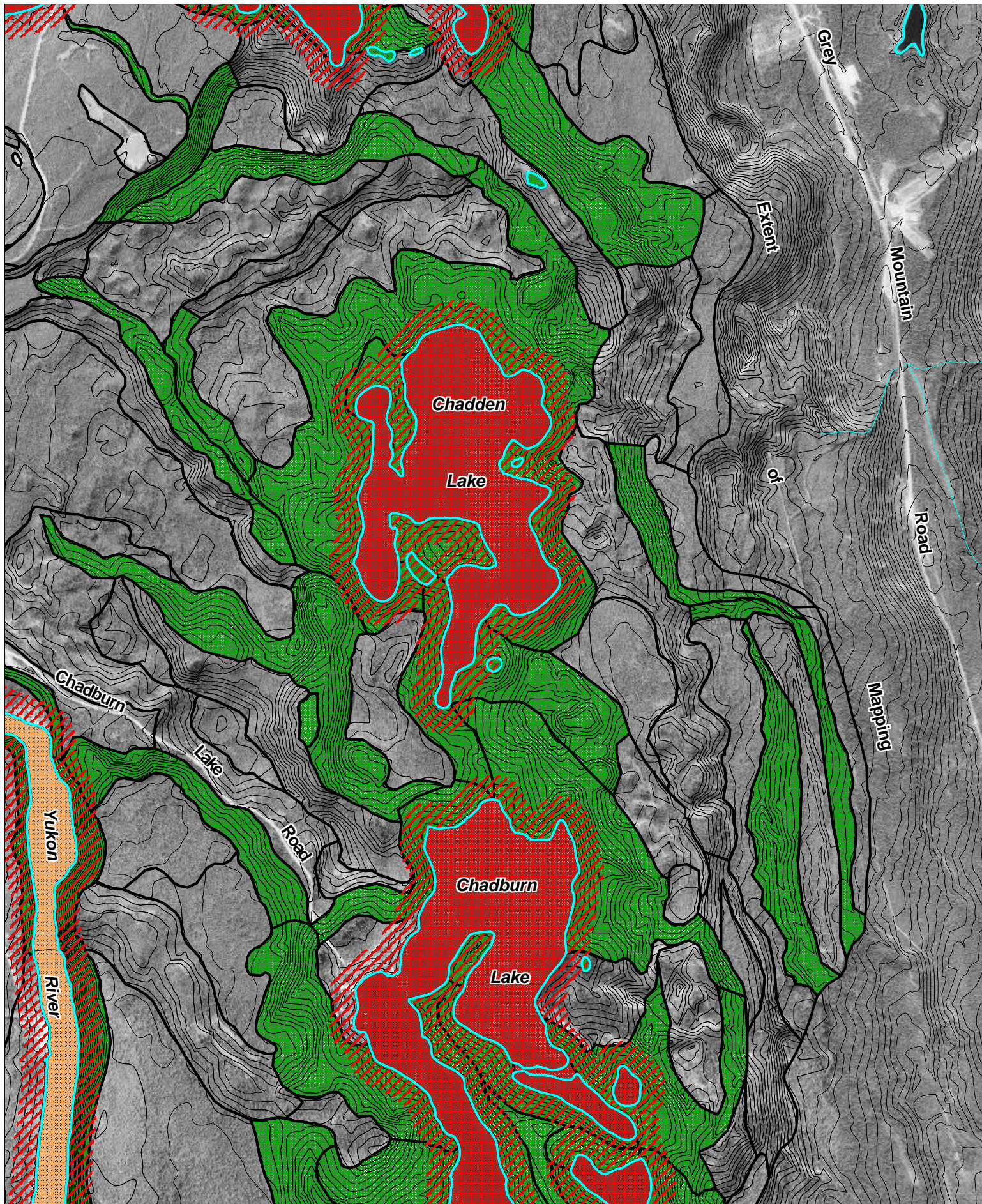
- Zone of awareness for Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.
- Ecosystem Unit Boundaries
- Titled Lands (updated March, 1999)
- Waterbodies
- Streams (from City of Whitehorse planimetric base mapping)








File: wwa_chadburn_34.WOR
Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
Applied Ecosystem Management Ltd., August 15, 2000

Scale 1:20,000

Map 3: Chadden Lake Wildlife Area



-  High Wildlife Values, High Environmental Sensitivity
-  High Wildlife Values, Moderate Environmental Sensitivity
-  High Environmental Sensitivity

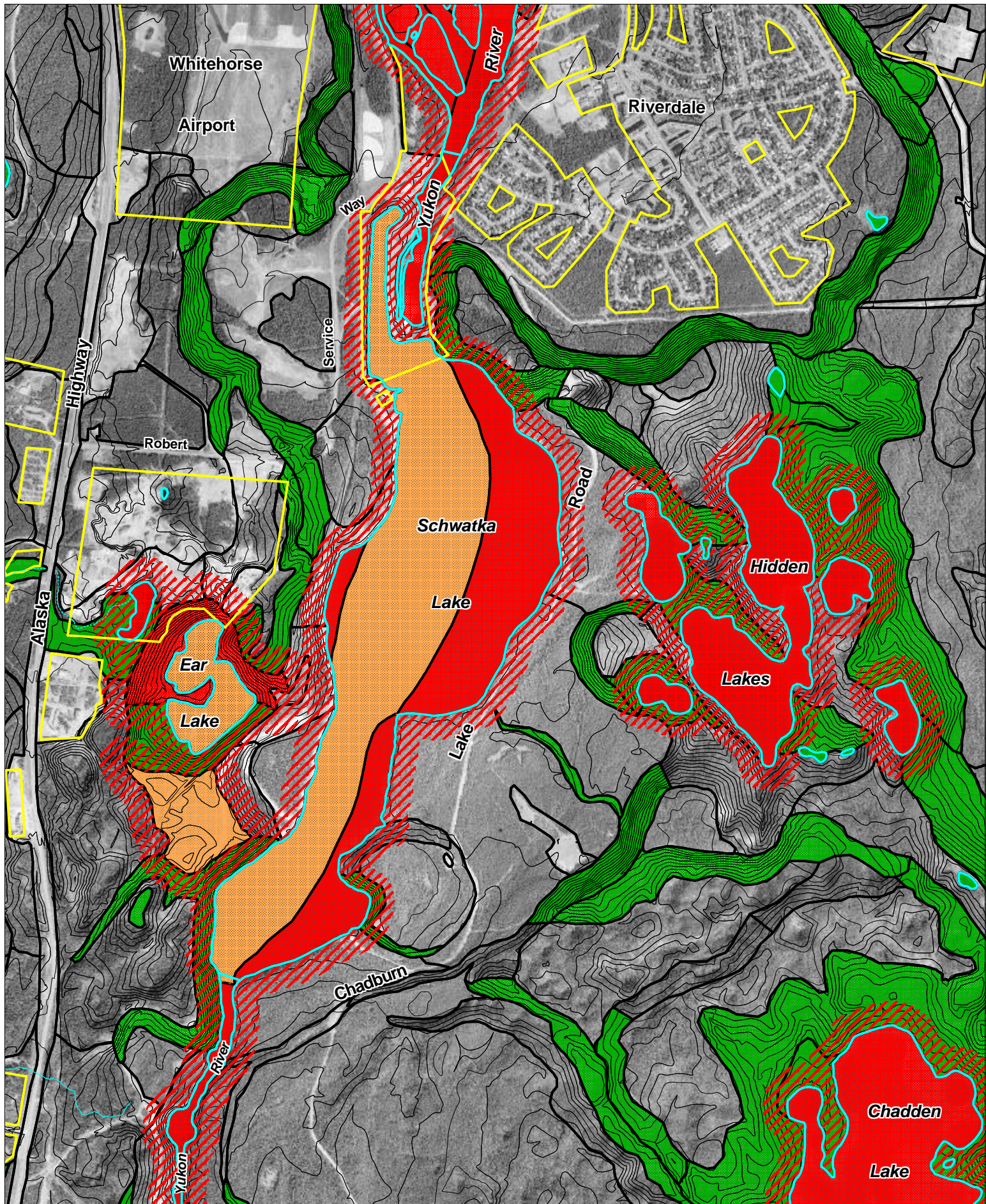
-  Zone of awareness for Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.
-  Ecosystem Unit Boundaries
-  Titled Lands (updated March, 1999)
-  Waterbodies
-  Streams (from the Whitehorse planametric base)



File: wwa_chadden_34.WOR
 Ecosystem Map Version: city_em_2c
 Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
 Map Compiled by: N. Guy
 Applied Ecosystem Management Ltd., August 15, 2000

Scale 1:20,000

Map 4: Schwatka Lake and Area (including Hidden and Ear Lakes) Wildlife Area



- High Wildlife Values, High Environmental Sensitivity
- High Wildlife Values, Moderate Environmental Sensitivity
- High Environmental Sensitivity

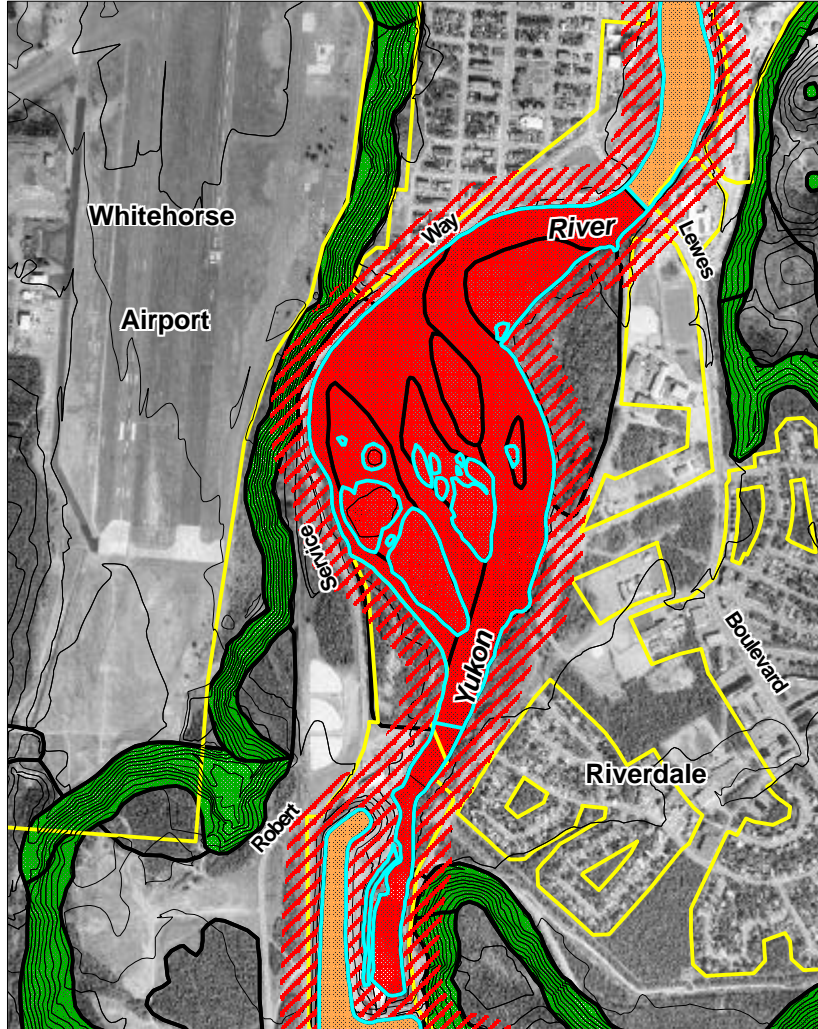
- Zone of awareness for Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.
- Ecosystem Unit Boundaries
- Titled Lands (updated March, 1999)
- Waterbodies
- Streams (from the City of Whitehorse planimetric base mapping)




File: wwa_schwatka_34.WOR
Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
Applied Ecosystem Management Ltd., August 15, 2000

Scale 1:20,000

Map 5: Riverdale - Yukon River Flats Wildlife Area



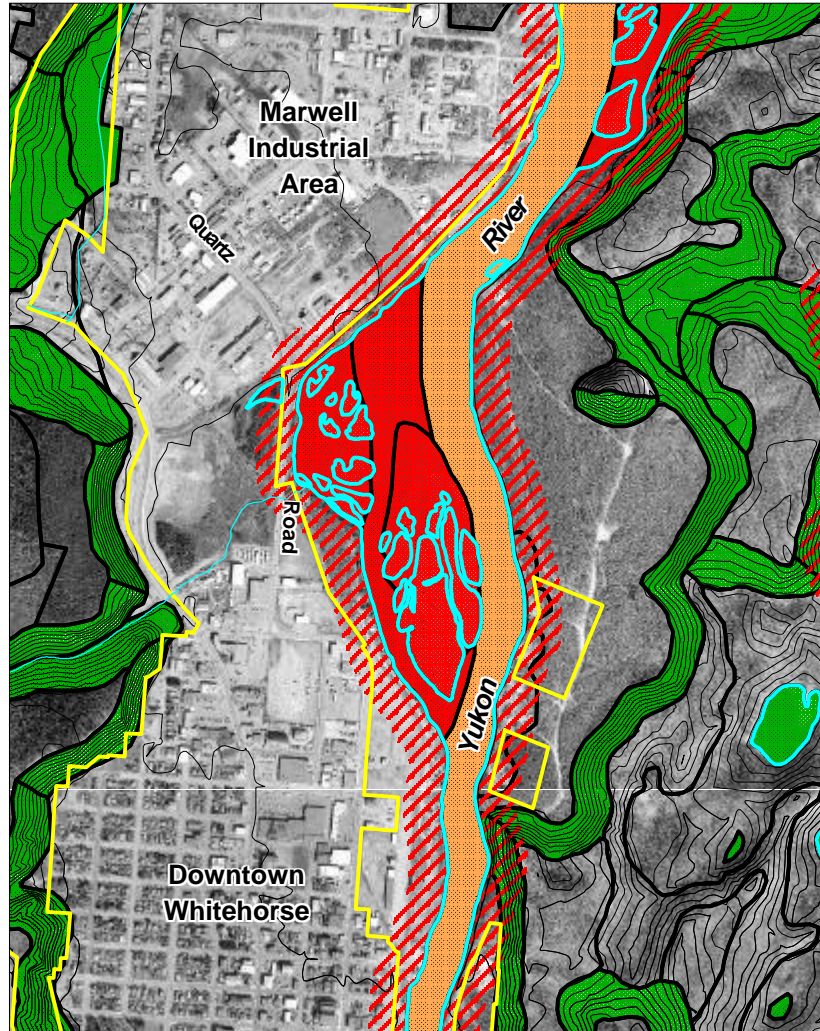
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|---|---|---|---|
|  | High Wildlife Values,
High Environmental Sensitivity |  | Zone of awareness for Significant Wildlife
Areas. Actual buffer width to be determined
on a site-by-site basis. |
|  | High Wildlife Values,
Moderate Environmental Sensitivity |  | Ecosystem Unit Boundaries |
|  | High Environmental Sensitivity |  | Titled Lands (updated March, 1999) |
| | |  | Waterbodies |
| | |  | Streams (from City of Whitehorse
planimetric base mapping) |









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 Ecosystem Map Version: city_em_2c
 Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
 Map Compiled by: N. Guy
 Applied Ecosystem Management Ltd., August 15, 2000



Scale 1:20,000

Map 6: Quartz Road - Yukon River Wildlife Area



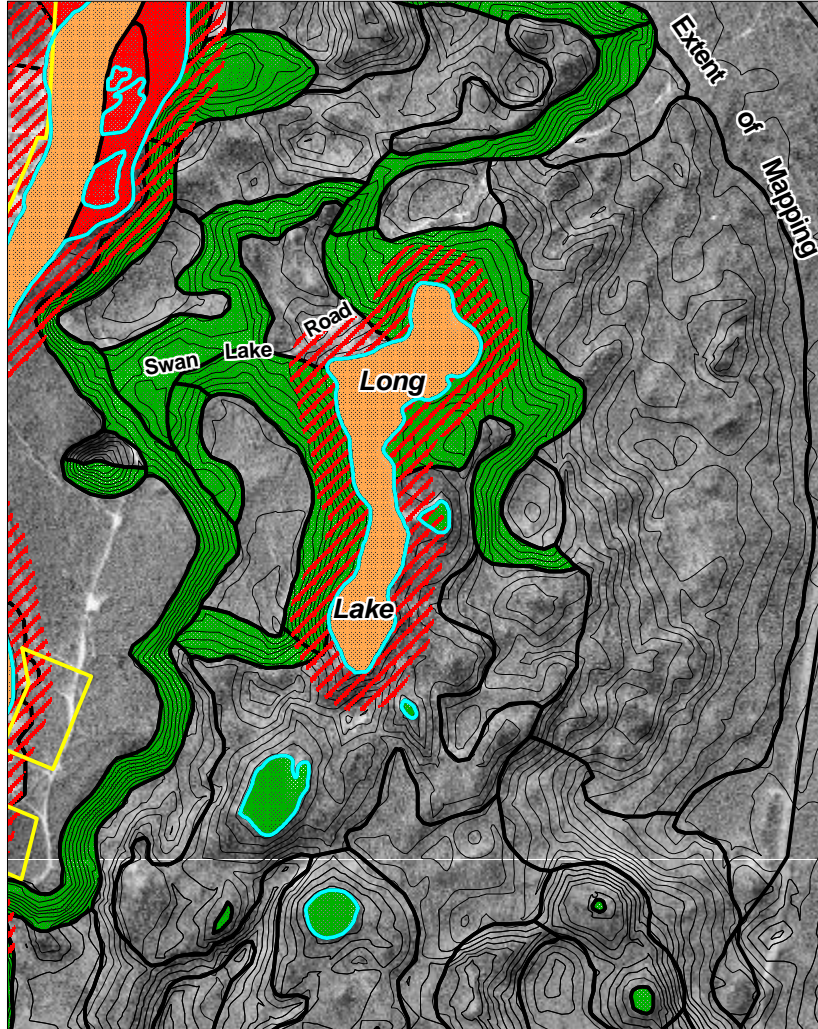
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|---|---|---|---|
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Areas. Actual buffer width to be determined
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|  | High Wildlife Values,
Moderate Environmental Sensitivity |  | Ecosystem Unit Boundaries |
|  | High Environmental Sensitivity |  | Titled Lands (updated March, 1999) |
| | |  | Waterbodies |
| | |  | Streams (from City of Whitehorse
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



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Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
Applied Ecosystem Management Ltd., August 15, 2000



Scale 1:20,000

Map 7: Long Lake Wildlife Area



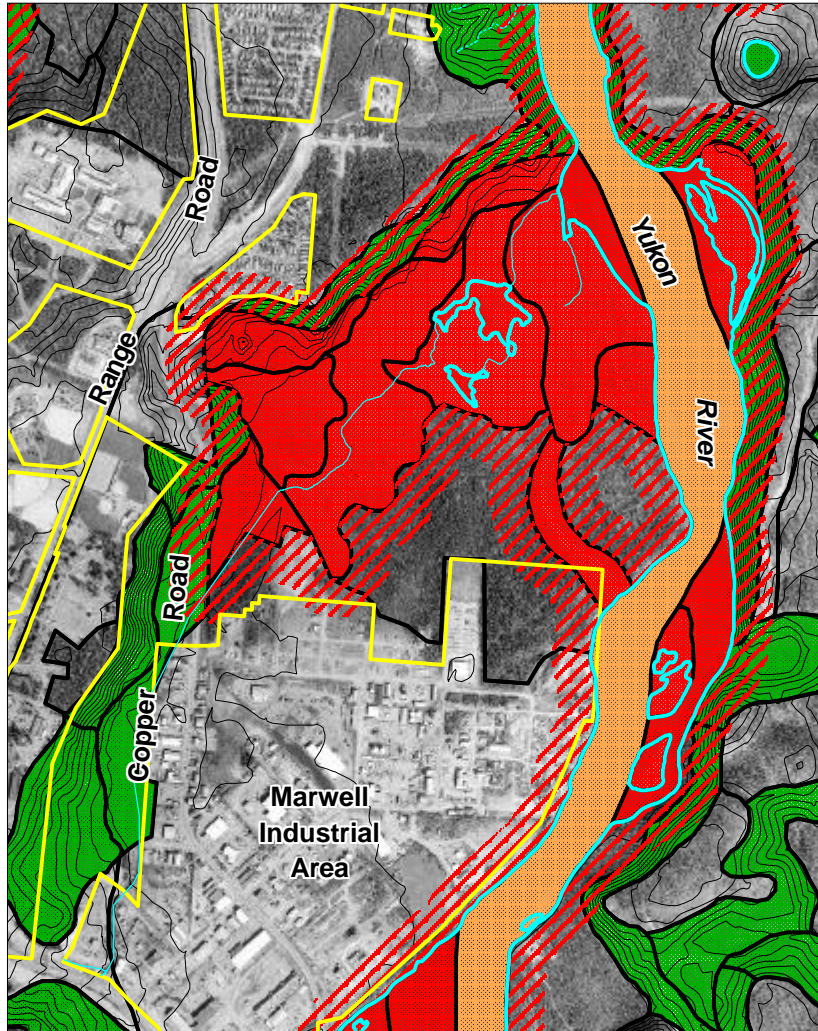
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|  | High Wildlife Values,
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Areas. Actual buffer width to be determined
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|  | High Wildlife Values,
Moderate Environmental Sensitivity |  | Ecosystem Unit Boundaries |
|  | High Environmental Sensitivity |  | Titled Lands (updated March, 1999) |
| | |  | Waterbodies |
| | |  | Streams (from City of Whitehorse
planametric base mapping) |









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 Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
 Map Compiled by: N. Guy
 Applied Ecosystem Management Ltd., August 15, 2000



Scale 1:20,000

Map 8: Old Village (Marwell) Wetlands Wildlife Area



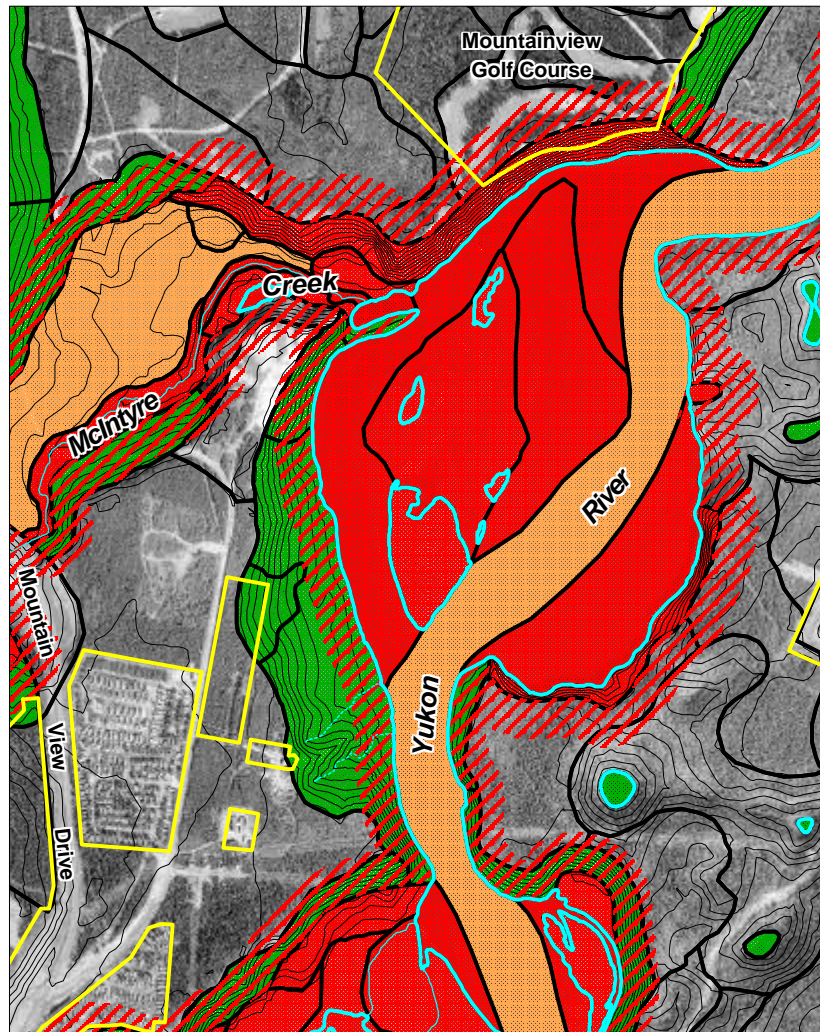
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|  | High Wildlife Values,
High Environmental Sensitivity |  | Zone of awareness of Significant Wildlife
Areas. Actual buffer width to be determined
on a site-by-site basis. |
|  | High Wildlife Values,
Moderate Environmental Sensitivity |  | Ecosystem Unit Boundaries |
|  | High Environmental Sensitivity |  | Titled Lands (updated March, 1999) |
| | |  | Waterbodies |
| | |  | Streams (from City of Whitehorse
planimetric base mapping) |









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Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
Applied Ecosystem Management Ltd., August 15, 2000



Scale 1:20,000

Map 9: Lower McIntyre Creek - Yukon River Wildlife Area



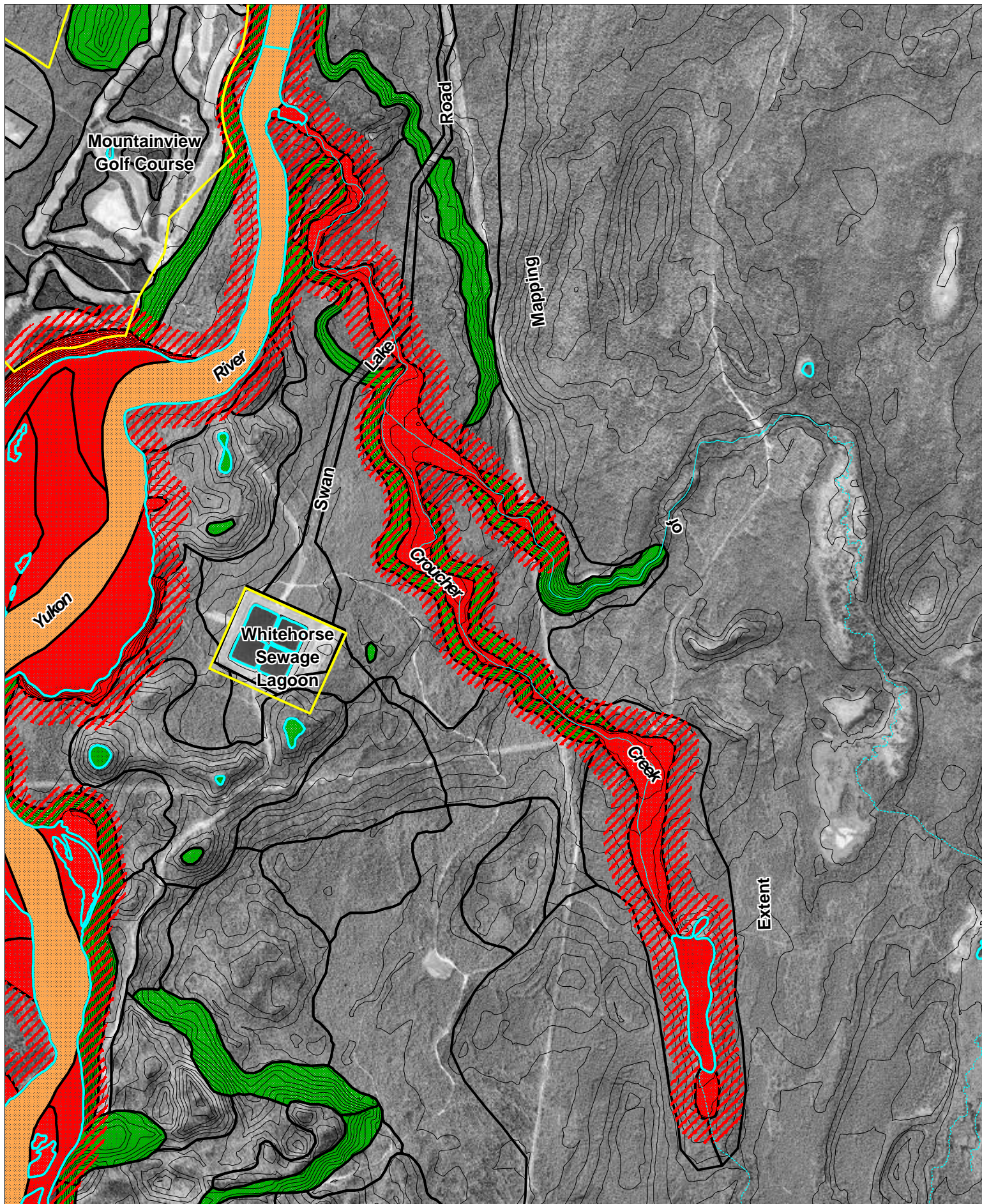
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|---|---|---|--|
|  | High Wildlife Values,
High Environmental Sensitivity |  | Zone of awareness of Significant Wildlife
Areas. Actual buffer width to be determined
on a site-by-site basis. |
|  | High Wildlife Values,
Moderate Environmental Sensitivity |  | Ecosystem Unit Boundaries |
|  | High Environmental Sensitivity |  | Titled Lands (updated March, 1999) |
| | |  | Waterbodies |
| | |  | Streams (from City of Whitehorse
planametric base mapping) |

File: wwa_lowermcintyreck_34.WOR
Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
Applied Ecosystem Management Ltd., August 15, 2000



Scale 1:20,000

Map 10: Croucher Creek Wildlife Area



- High Wildlife Values, High Environmental Sensitivity
- High Wildlife Values, Moderate Environmental Sensitivity
- High Environmental Sensitivity

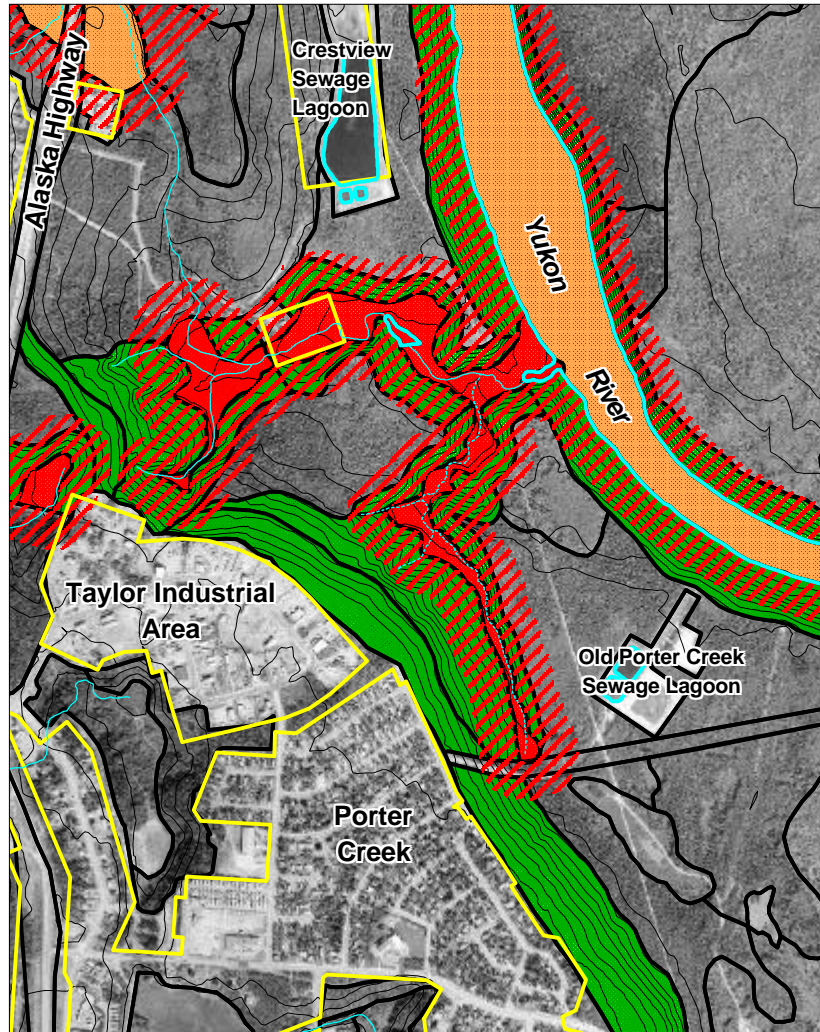
- Zone of awareness for Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.
- Ecosystem Unit Boundaries
- Titled Lands (updated March, 1999)
- Waterbodies
- Streams (from City of Whitehorse planametric base mapping)











File: wwa_croucher_34.WOR
 Ecosystem Map Version: city_em_2c
 Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
 Map Compiled by: N. Guy
 Applied Ecosystem Management Ltd., August 15, 2000

Scale 1:20,000

Map 11: Porter Creek - Yukon River Confluence Wildlife Area



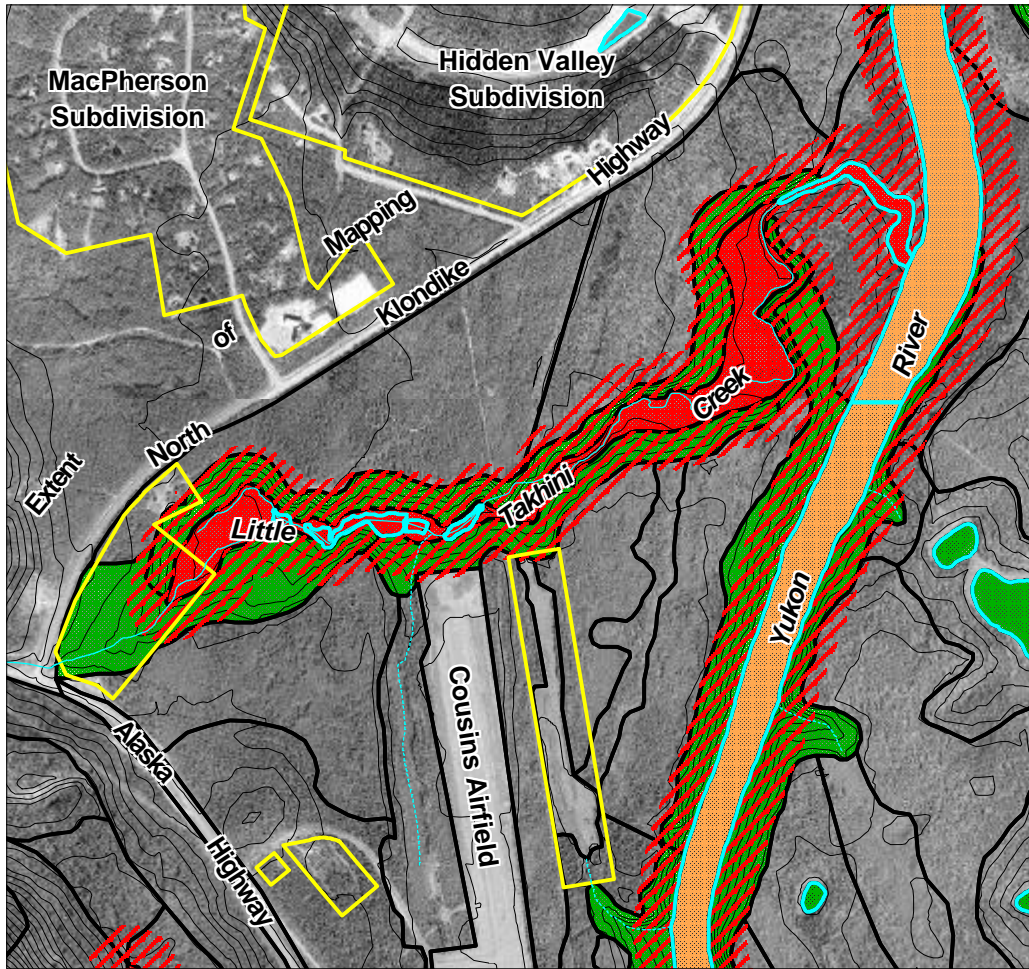
- | | | | |
|---|---|---|--|
|  | High Wildlife Values,
High Environmental Sensitivity |  | Zone of awareness of Significant Wildlife
Areas. Actual buffer width to be determined
on a site-by-site basis. |
|  | High Wildlife Values,
Moderate Environmental Sensitivity |  | Ecosystem Unit Boundaries |
|  | High Environmental Sensitivity |  | Titled Lands (updated March, 1999) |
| | |  | Waterbodies |
| | |  | Streams (from City of Whitehorse
planametric base mapping) |

File: wwa_portercreek_34.WOR
Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
Applied Ecosystem Management Ltd., August 15, 2000



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Map 12: Little Takhini Creek Wildlife Area



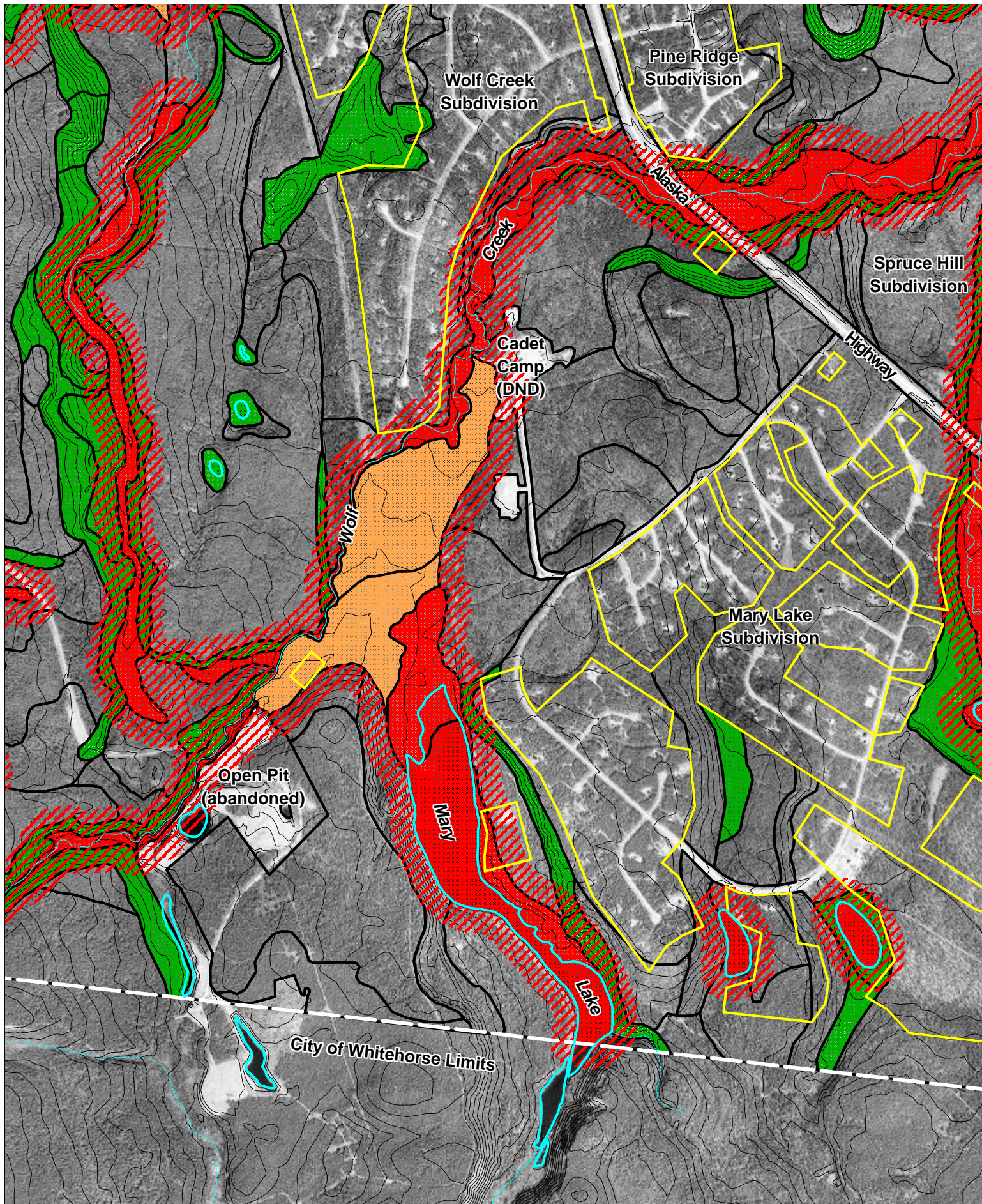
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|---|---|---|---|
|  | High Wildlife Values,
High Environmental Sensitivity |  | Zone of awareness for Significant Wildlife
Areas. Actual buffer width to be determined
on a site-by-site basis. |
|  | High Wildlife Values,
Moderate Environmental Sensitivity |  | Ecosystem Unit Boundaries |
|  | High Environmental Sensitivity |  | Titled Lands (updated March, 1999) |
| | |  | Waterbodies |
| | |  | Streams (from City of Whitehorse
planametric base mapping) |

File: wwa_littletakhini_34.WOR
Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
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Scale 1:20,000

Map 13: Mary Lake - Wolf Creek Wildlife Area



- High Wildlife Values, High Environmental Sensitivity
- High Wildlife Values, Moderate Environmental Sensitivity
- High Environmental Sensitivity

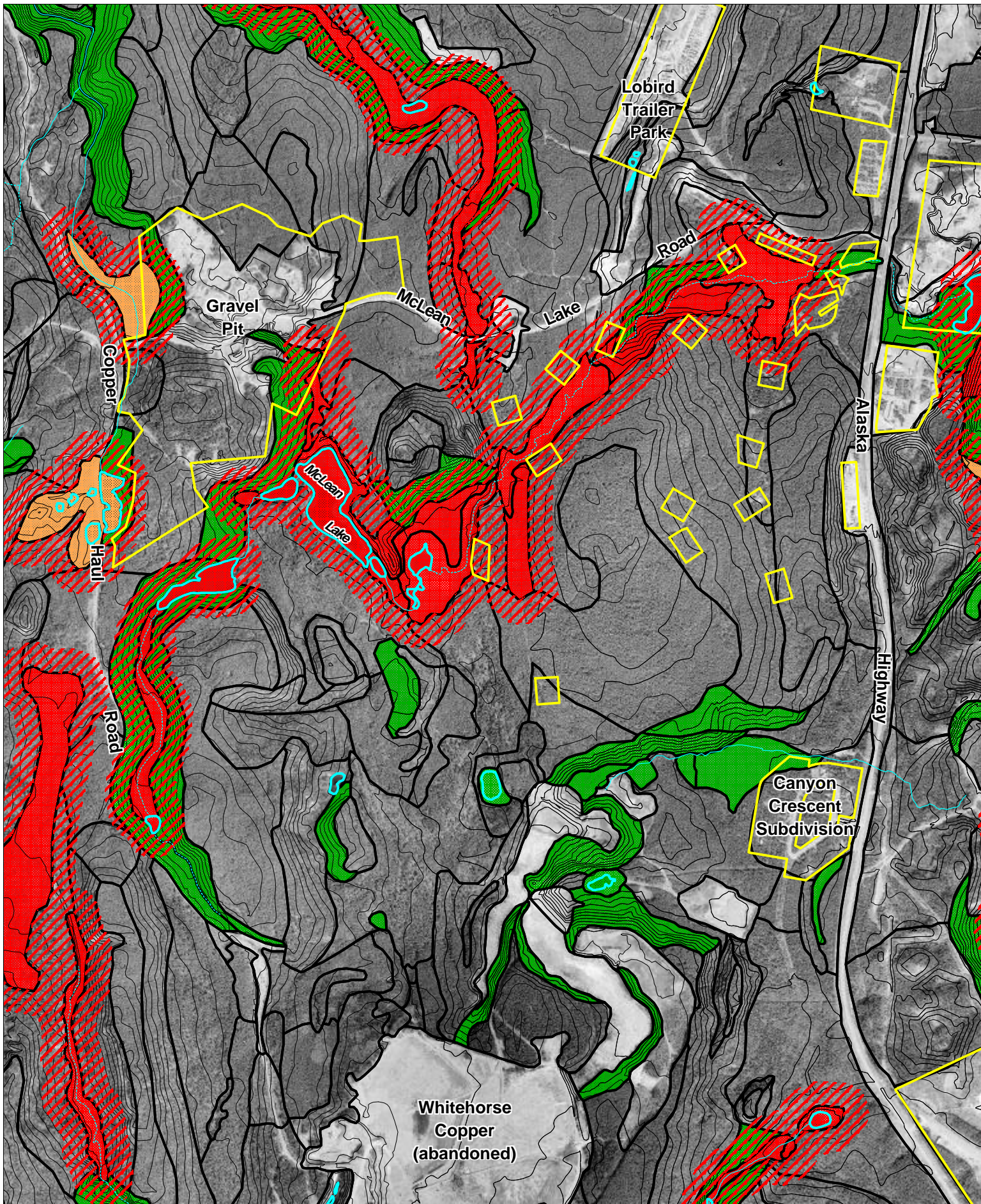
- Zone of awareness of Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.
- Ecosystem Unit Boundaries
- Titled Lands (updated March, 1999)
- Waterbodies
- Streams (from City of Whitehorse planametric base mapping)




File: wwa_marylake_34.WOR
Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
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Scale 1:20,000


Map 14: McLean Lake Wildlife Area




-  High Wildlife Values, High Environmental Sensitivity
-  High Wildlife Values, Moderate Environmental Sensitivity
-  High Environmental Sensitivity

 Zone of awareness of Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.

 Ecosystem Unit Boundaries

 Titled Lands (updated March, 1999)

 Waterbodies

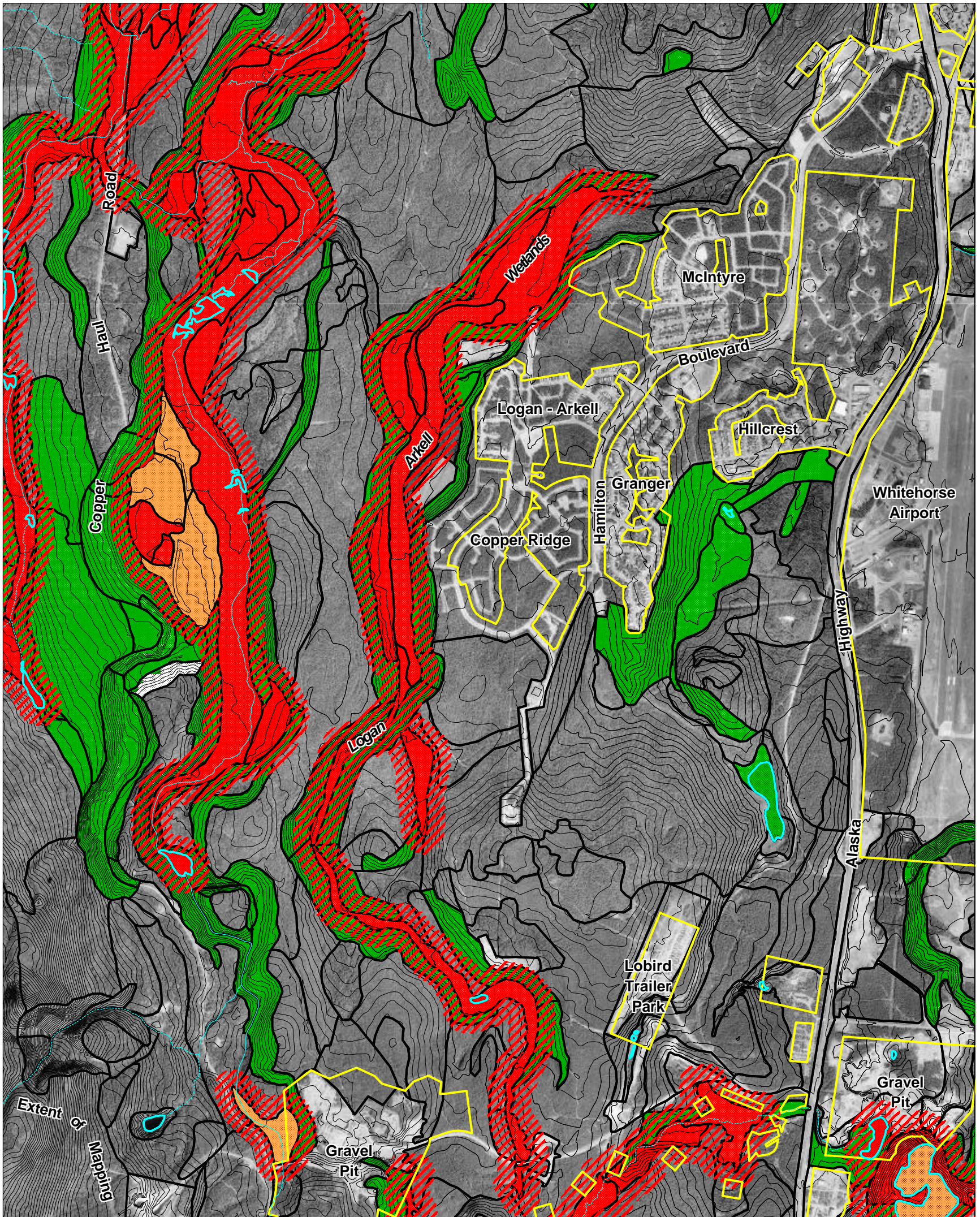
 Streams (from City of Whitehorse planimetric base mapping)



File: wwa_mcleanlake_34.WOR
Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
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Scale 1:20,000

Map 15: Logan - Arkell Wetlands Wildlife Area



- High Wildlife Values, High Environmental Sensitivity
- High Wildlife Values, Moderate Environmental Sensitivity
- High Environmental Sensitivity

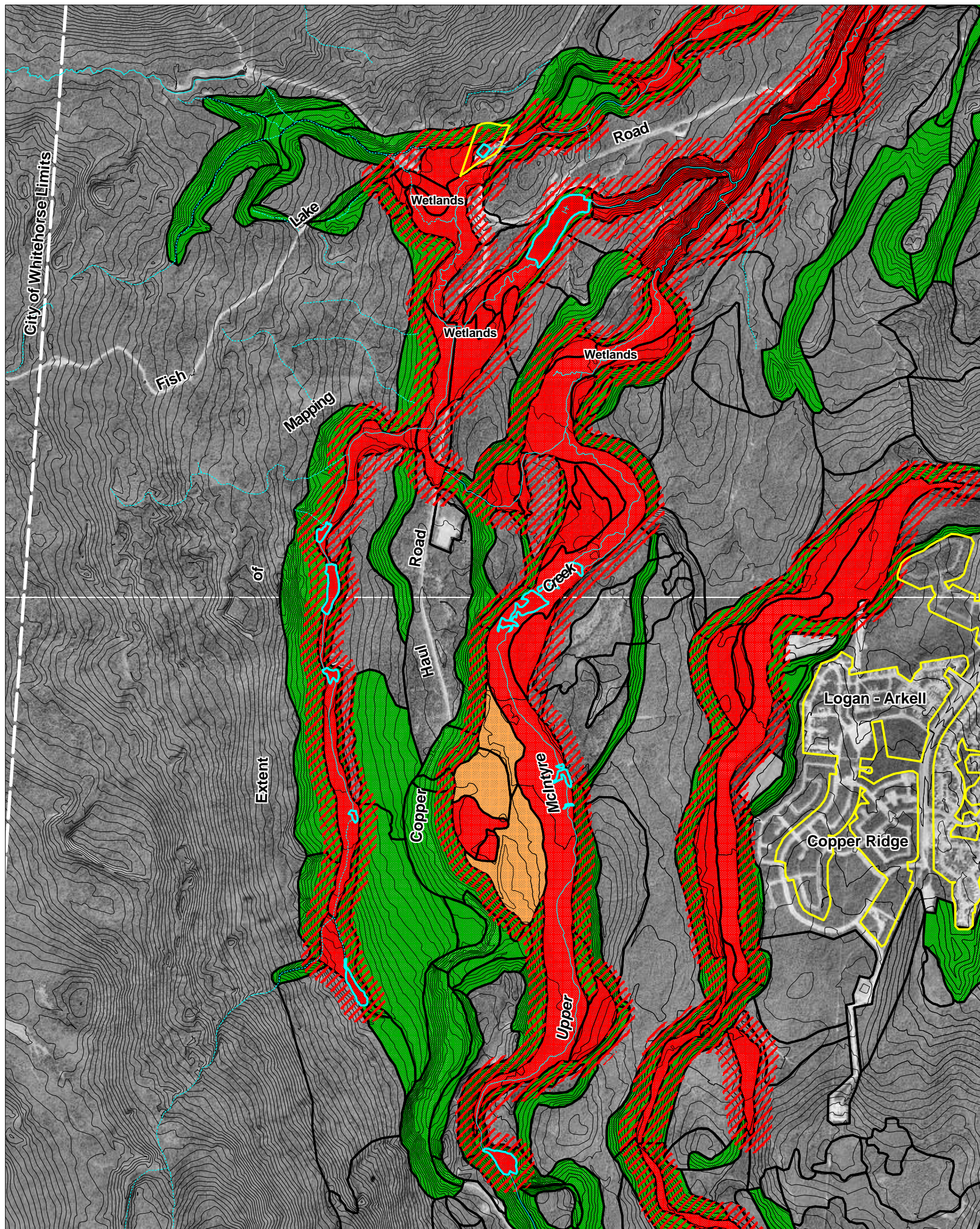
- Zone of awareness for Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.
- Ecosystem Unit Boundaries
- Titled Lands (updated March, 1999)
- Waterbodies
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File: wwa_loganarkell_34.WOR
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Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
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Map 16A: Upper McIntyre Creek Wetlands Wildlife Area



- High Wildlife Values, High Environmental Sensitivity
- High Wildlife Values, Moderate Environmental Sensitivity
- High Environmental Sensitivity

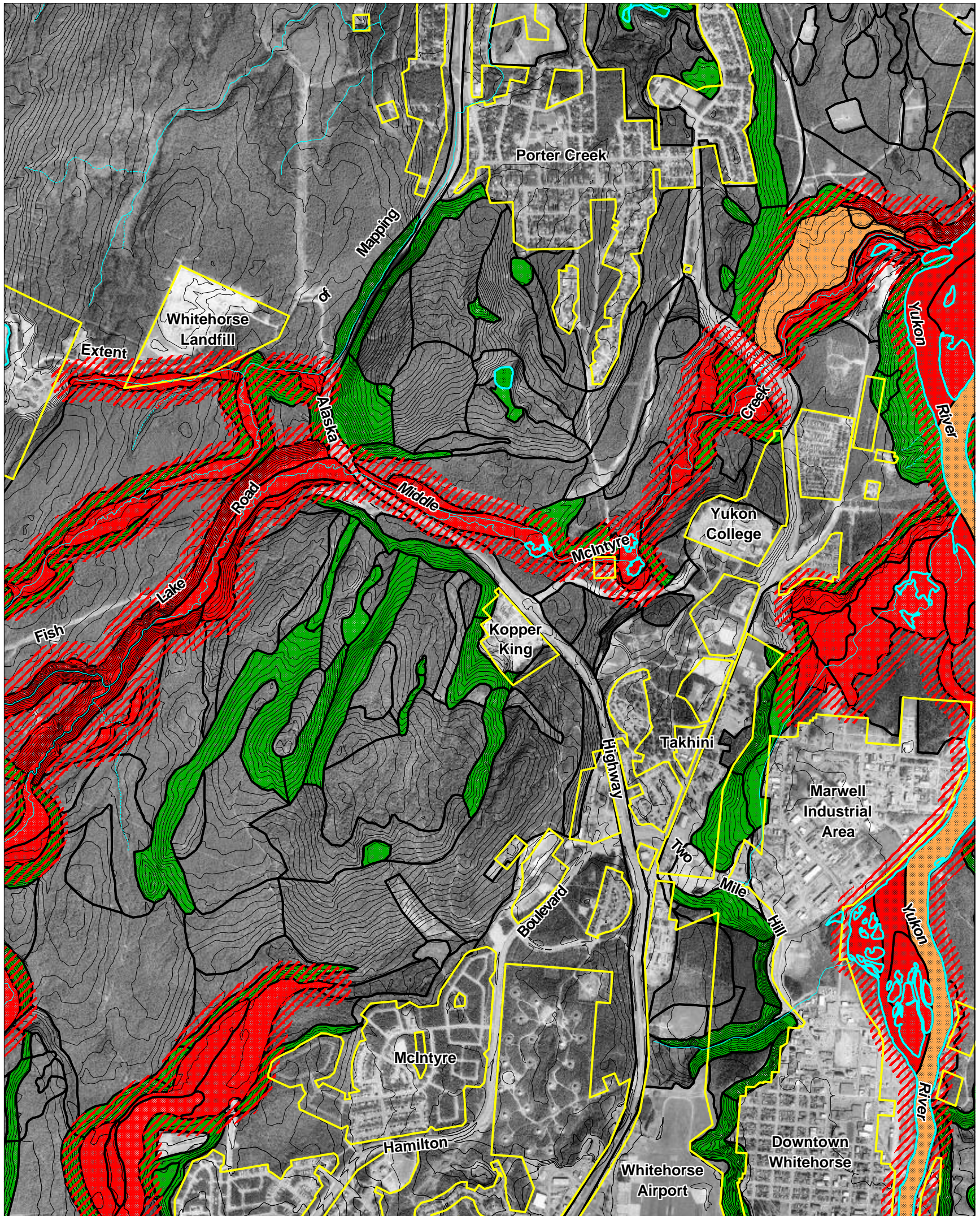
- Zone of awareness for Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.
- Ecosystem Unit Boundaries
- Titled Lands (updated March, 1999)
- Waterbodies
- Streams (from the City of Whitehorse planimetric base mapping)



Scale 1:25,000

File: wwa_uppermcintyre_34.WOR
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Map Compiled by: N. Guy
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Map 16B: Middle McIntyre Creek Wildlife Area



- High Wildlife Values, High Environmental Sensitivity
- High Wildlife Values, Moderate Environmental Sensitivity
- High Environmental Sensitivity

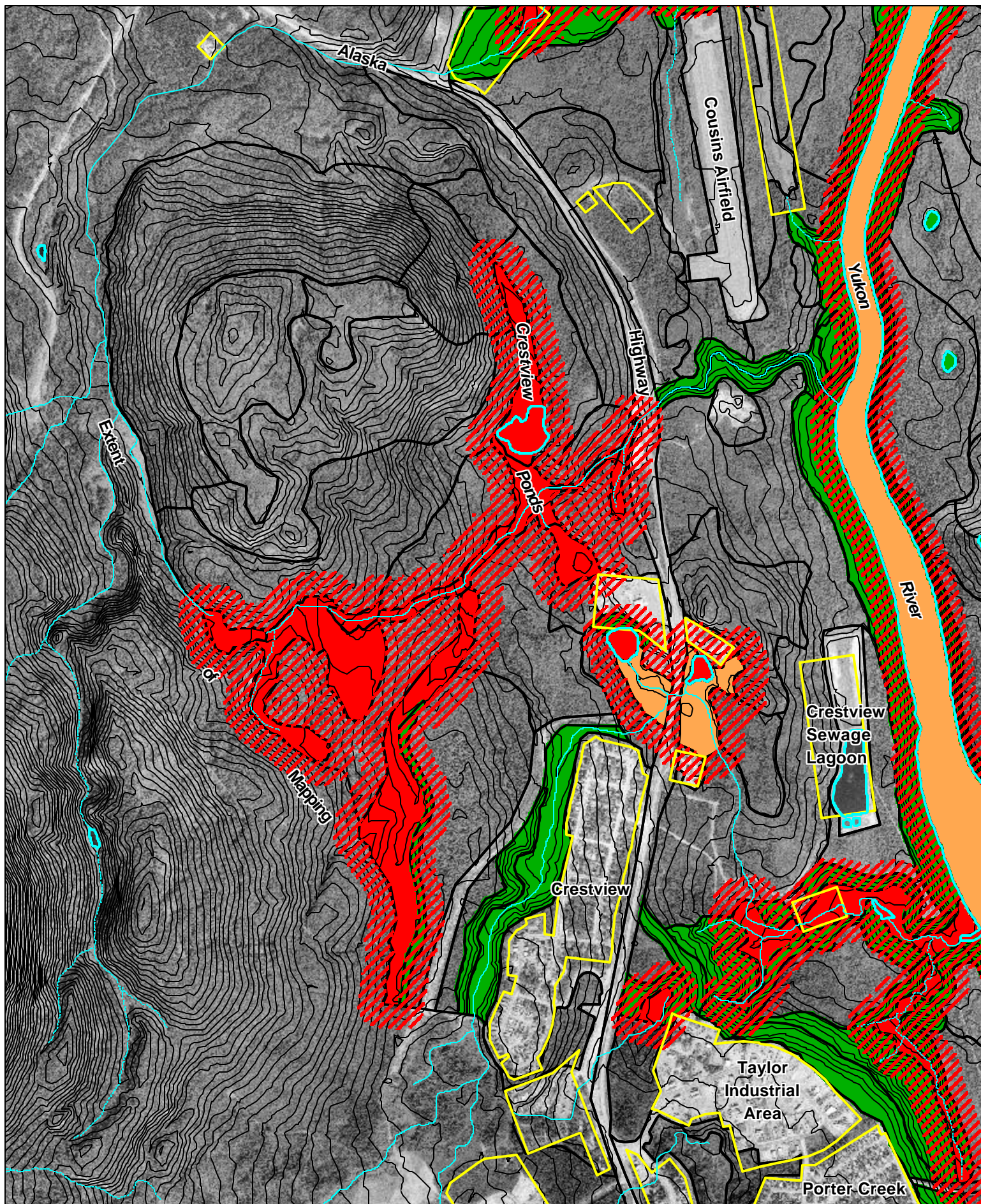
- Zone of awareness of Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.
- Ecosystem Unit Boundaries
- Titled Lands (updated March, 1999)
- Waterbodies
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Scale 1:25,000

File: wwa_middlemcintyre_34.WOR
Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
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Map 17: Crestview Ponds Wildlife Area



- High Wildlife Values, High Environmental Sensitivity
- High Wildlife Values, Moderate Environmental Sensitivity
- High Environmental Sensitivity

- Zone of awareness for Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.
- Ecosystem Unit Boundaries
- Titled Lands (updated March, 1999)
- Waterbodies
- Streams (from City of Whitehorse planametric base mapping)



File: wwa_crestview_34.WOR
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Map Compiled by: N. Guy
Applied Ecosystem Management Ltd., August 15, 2000

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Addendum One:

**Whitehorse Copper
Area Development Scheme (ADS)
Expanded Mapping Area**

August 15, 2000

Addendum One:

Whitehorse Copper Area Development Scheme (ADS) Expanded Mapping Area

Ecosystem Mapping and Wildlife Interpretations

August 15, 2000

Addendum to:

“Applied Ecosystem Management Ltd. 2000. Defining Ecologically-Based Significant Wildlife Areas for the City of Whitehorse: Expanded Ecosystem Mapping Program. Unpublished report prepared for City of Whitehorse Planning Department and YTG Wildlife Viewing Program, Whitehorse, Yukon. August 15, 2000.”

Prepared by

Applied Ecosystem Management Ltd.

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Whitehorse, Yukon Y1A 1X3

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Email aem@yknet.yk.ca

WHITEHORSE COPPER ADS

Expanded Mapping Area

Ecological Setting

The Whitehorse Copper ADS Expanded Mapping Area is situated in the southwest corner of Whitehorse, between the Alaska Highway and the toe slopes of Mount McIntyre and Mount Sima. The mapping area contains some of the most disturbed and most natural areas in Whitehorse. The abandoned Whitehorse Copper Mine pit and tailings, the old Copper Haul Road, many abandoned mineral exploration areas and several smaller mine pits occur within the ADS. Whitehorse Copper ADS also contains large tracts of relatively natural upland and lowland depressional forested areas, and a significant portion of the lowland forested environments within the City of Whitehorse are also found here.

Unlike most other areas of Whitehorse, bedrock outcrops are common along the Copper Haul Road and toe slopes of Mount McIntyre. The rock outcrops exert a strong control on the surface vegetation and the spatial distribution of ecosystem units. The hydrology of the area is very complex and accounts for the number of large forested wetlands. Several moderately-sized streams run through the ADS that create or maintain important wildlife value habitats in the Yukon River Corridor. Many seepage areas were found to occur and they are often in association with shallow soil units. Very few open water bodies are contained within the Whitehorse Copper ADS.

In addition to the complex hydrology, a second complicating factor to the ecosystem mapping was the transition from Boreal to Subalpine forest environments. Our current ecosystem units (see User's Guide) were developed specifically for the Boreal Zone of Whitehorse. The Copper Haul Road along the base of Mount Sima appears to represent the approximate location of the Boreal-Subalpine boundary. Forests above the Copper Haul Road and along the slopes of Mount McIntyre/Golden Horn Mountain contain a significant component of subalpine fir (*Abies lasiocarpa*). In this area, mossberry (*Empetrum nigrum*) also begins to replace bearberry (*Arctostaphylos uva-ursi*) as the dominant dwarf shrub. These forest conditions are generally indicative of the lower Subalpine. Therefore, ecosystem mapping to the west of the Copper Haul Road should be viewed as "preliminary" in the absence of recognised ecosystem units within this high elevation forest environment.

Spruce-dominated forest ecosystems are prevalent in the area due to a dominant northeasterly aspect and shaded conditions created by Mount Sima, Mount McIntyre and Golden Horn Mountain. The area contains large units of spruce-Labrador tea (ST) forests, associated with seepage areas and lowland depressions. Fire history within the western portion of the ADS is very complex. Most forests are in Seral Stage 2-3 (40-120 years old) but residual patches and veteran trees are scattered throughout the area. The complex mosaic of forested lowland and upland environments complicates the interpretation of forest seral stages and the sampling intensity of the field program was not detailed enough to determine exact fire margins. For this reason, seral stages should be considered approximate.

A new upland forested ecosystem unit was described in the vicinity of the Copper Haul Road and Mount Sima Ski Area. The lodgepole pine – canoe (paper) birch unit (PC) occurs in gently sloping terrain with shallow soils. Prominent rock outcrops are the defining characteristic of the soil. Vegetation conditions are dominated by widely-spaced lodgepole pine trees growing on and among the bedrock. Rock outcrops may contain a high cover of terrestrial lichens. Moist depressions in the bedrock contain thick blankets of feathermoss with paper birch (*Betula papyrifera*), alder (*Alnus crispa*) and Labrador tea (*Ledum groenlandicum*). Lodgepole pine trees sampled in the unit were over 200 years old. Similar forests have been observed by the mapping team along the Skagway Road in the vicinity of Log Cabin but to our knowledge, have not been described in the Southern Lakes Region. Pine and birch, growing only meters apart, is a very rare plant association.

Wildlife Values

Potential high value wildlife areas were identified within the Whitehorse Copper ADS-Mount Sima area but our current understanding of wildlife values and habitat use within this part of the City is still very limited. For these reasons, the area is not currently recognized as a Significant Wildlife Area within the City of Whitehorse. However, the Whitehorse Copper ADS does have relatively large areas of potentially high value wildlife habitats that remain in a natural state and provide landscape-level linkages to the surrounding landscape. The maintenance of those linkages should be viewed as a planning priority. Based on a preliminary review of the current ADS (April 1999), it appears that most potentially important corridors and high value habitats have been respected by the landscape design. A more detailed analysis would be required to identify potential lot boundary conflicts for specific subdivisions/land uses at a later date.

Based on the general habitat characteristics of the Whitehorse Copper ADS expanded mapping area, it is probable that the area is important for ungulates (moose) and large carnivores (black bears). A number of forest birds and neo-tropical migrants probably use the forested, shrub and graminoid wetlands (WB, SW, ST, FE), and avian predators would certainly be found in the area. Ice Lake, at the base of Mount Sima, was mentioned as potentially having high habitat values for waterbirds and other species groups during initial data gathering efforts for the original Whitehorse Wildlife Area report (AEM 1998), but no further information was collected during the development of the ecosystem mapping.

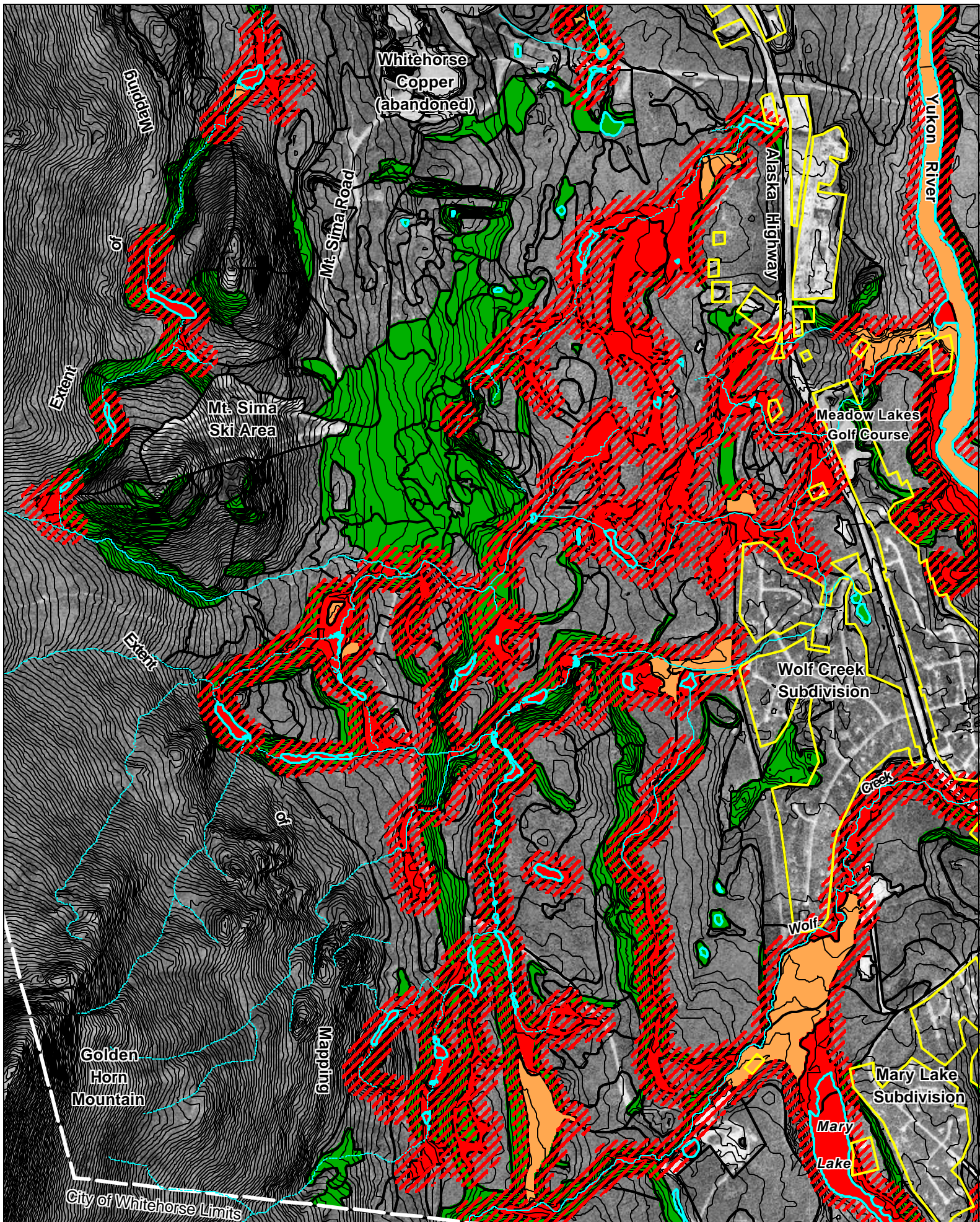
Unlike the currently recognised Significant Wildlife Areas of Whitehorse, the Whitehorse Copper ADS does not contain a single “corridor” or “node” of high wildlife value habitat. The high value habitat units are scattered throughout the planning area with several potentially important lowland corridors running through the ADS. One of the most important aspects of the Whitehorse Copper ADS may be the landscape-level linkages the area provides between Mount Granger/McIntyre and the Yukon River Corridor.

Environmental Sensitivity

Lowland and shallow soil ecosystems are the most ecologically-sensitive units in the planning area. The toe slopes of Mount Sima, to the east of the Copper Haul Road, contain large areas of these units. This has been reflected in the Ecosystem Mapping as the large area of green, denoting “High Environmental Sensitivity”, to the east of the Copper Haul Road. The current Whitehorse Copper ADS (April 1999) also recognised this sensitive area through the designation of “Environmental Reserve”. Major slopes along potentially high value wildlife habitat units are also considered to be Environmentally Sensitive due to the maintenance role they play in the long-term integrity of those habitats.

end

Addendum One: Whitehorse Copper ADS Expanded Mapping Area



- High Wildlife Values, High Environmental Sensitivity
- High Wildlife Values, Moderate Environmental Sensitivity
- High Environmental Sensitivity

Zone of awareness for Significant Wildlife Areas. Actual buffer width to be determined on a site-by-site basis.

- Ecosystem Unit Boundaries
- Titled Lands (updated March, 1999)
- Waterbodies
- Streams (from the City of Whitehorse planimetric base mapping)



Scale 1:35,000

File: wwa_copper_34.WOR
Ecosystem Map Version: city_em_2c
Mapping and Wildlife Interpretation by: S. Francis and N. Steffen
Map Compiled by: N. Guy
Applied Ecosystem Management Ltd., August 15, 2000