

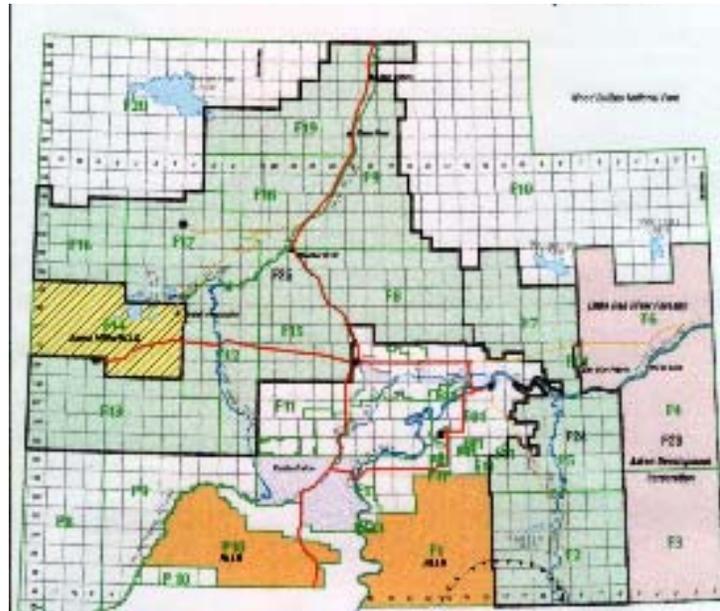
APPENDIX D

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**Biophysical Description of Wildlife (Wildlife
Inventory) and Insects within the FMA of
Tolko Industries Ltd. (High Level)**



**Prepared as a draft copy for Tolko Industries Ltd
development of the Integrated Detailed Forest
Management Plan**

**Prepared by Eco-West Environmental Services Ltd
September, 2001**

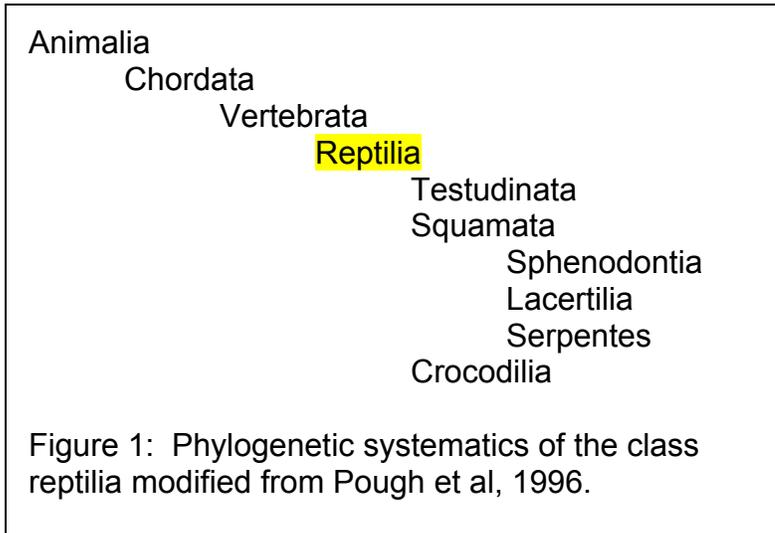
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Amphibians and Reptiles

Currently there are eight species of reptiles and ten species of amphibians in Alberta (General Status, 2000). Although there exists ample habitat for these two classes, climate is a major limiting factor to their development in northern Alberta (Russel A.P. and A.M. Bauer, 2000). Distribution of these classes is poor in Northwestern Alberta, with only one species of reptile and four species of amphibian present (Russel, A.P. and A.M. Bauer, 2000, TARAS). Although distribution maps show area inhabited by species, these can not always be accurate; therefore, if habitat conditions are met, species should be considered present.

The only known reptile to inhabit Tolko Industries Ltd FMA area, is the Common Garter Snake (*Thamnophis sirtalis*). This species is considered sensitive under Alberta's Wildlife Act

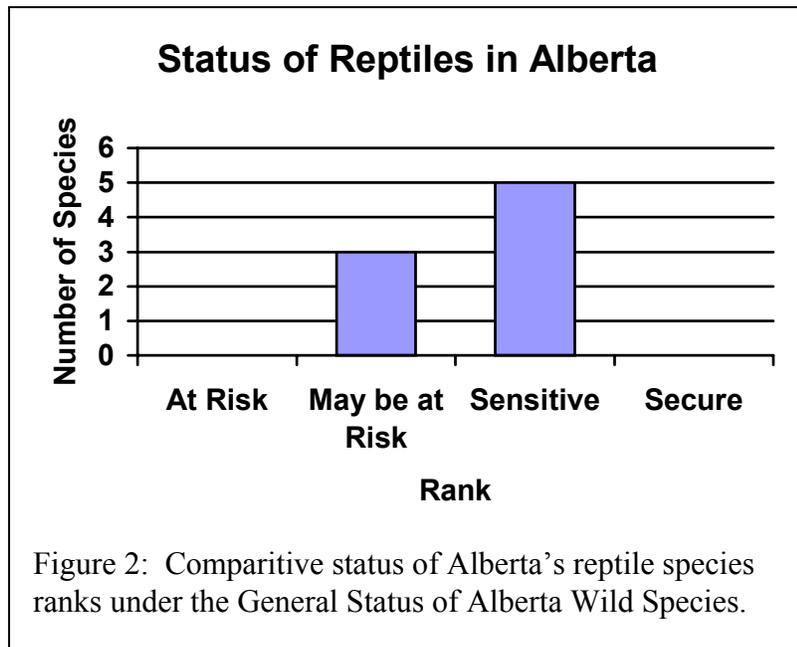


(General Status, 2000). Currently it is located along the Peace River lowlands, where suitable habitat and food sources exist. The Common Garter Snake (*Thamnophis sirtalis* exists here due to the microclimate created by the river, and is not abundant elsewhere within Tolko Industries Ltd FMA area. Of the seven other reptile species in Alberta, none are considered to exist in northern Alberta,

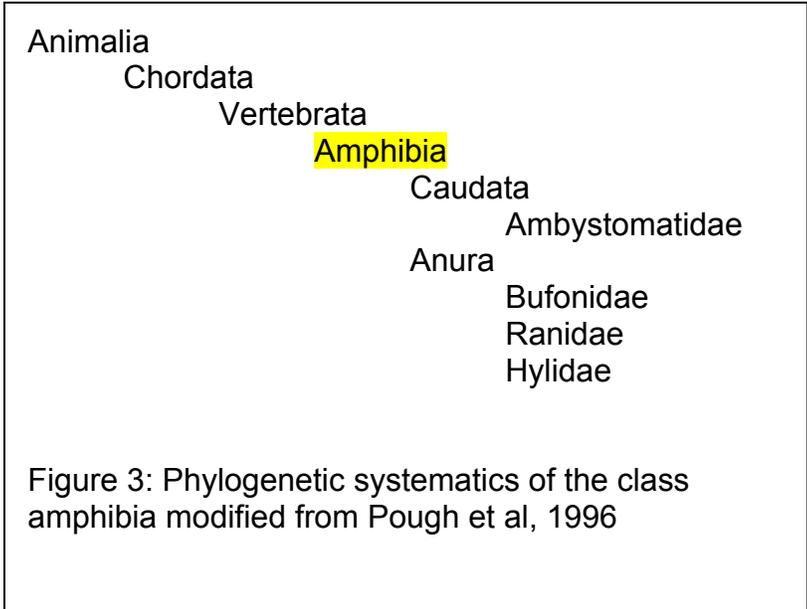
due to climatic extremes. These species are generally restricted to the scrub-plains of southeastern Alberta, where hot and dry conditions prevail.

Table 1: Reptile species in Alberta (highlighted species may likely reside within FMA area) modified from The General Species of Alberta Wild Species, 2000.

<u>Name</u>	<u>Scientific Name</u>	<u>Status</u>
Painted Turtle	<i>Chrysemys picta</i>	Sensitive
Short-horned Lizard	<i>Phrynosoma hernandesi</i>	May be at risk
Western Hognose Snake	<i>Heterodon nasicus</i>	May be at risk
Bullsnake	<i>Pituophis catenifer</i>	Sensitive
Western Terrestrial Garter Snake	<i>Thamnophis elegans</i>	Sensitive
Plains Garter Snake	<i>Thamnophis radix</i>	Sensitive
Common Garter Snake	<i>Thamnophis sirtalis</i>	Sensitive
Western rattlesnake	<i>Crotalus viridis</i>	May be at risk



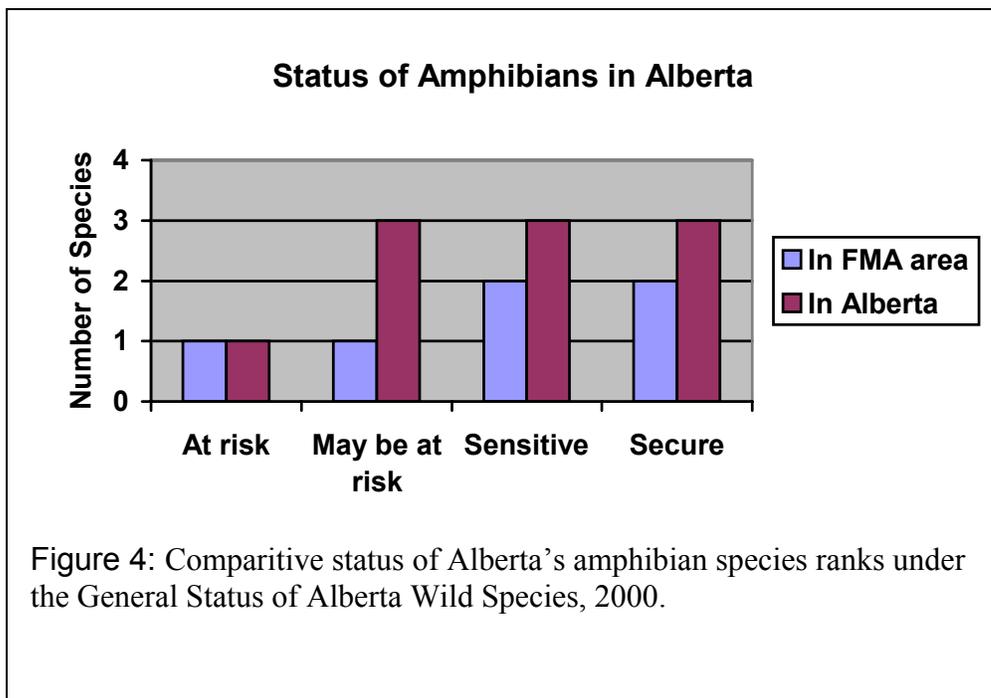
The distributions of amphibians of the area are variable, due to a general lack of knowledge of habitat requirements (Hamilton et al, 1998). Due to this knowledge gap in distribution, we should consider all species as being within the area. Ten species of amphibians reside in Alberta; two salamanders (caudata) and eight frogs (anura) (General Status, 2000). Distribution maps show four species in the area; however,



inferences from known habitat preferences provide several species a greater likelihood of presence within the area. These individuals are the Long toed Salamander (*Ambystoma macrodactylum*), Western Toad (*Bufo boreas*), the Canadian Toad (*Bufo hemiphrys*), the Boreal Chorus Frog (*Pseudacris maculata*), the Northern Leopard Frog (*Rana Pipiens*), and the Wood Frog (*Rana sylvatica*) (Russel, A.P. and A.M. Bower, 2000, TARAS).

Table 2: Amphibian species in Alberta (highlighted species may likely reside within FMA area) modified from The General Species of Alberta Wild Species, 2000.

<u>Name</u>	<u>Scientific Name</u>	<u>Status</u>
Long toed Salamander	<i>Ambystoma macrodactylum</i>	Sensitive
Tiger Salamander	<i>Ambystoma tigrinum</i>	Secure
Western Toad	<i>Bufo boreas</i>	Sensitive
Great Plains Toad	<i>Bufo cognatus</i>	May be at risk
Canadian Toad	<i>Bufo hemiophrys</i>	May be at risk
Plains Spadefoot	<i>Spea bombifrons</i>	May be at risk
Boreal Chorus Frog	<i>Pseudacris maculata</i>	Secure
Northern Leopard Frog	<i>Rana pipiens</i>	At Risk
Wood Frog	<i>Rana sylvatica</i>	Secure
Columbia Spotted Frog	<i>Rana luteiventris</i>	Sensitive



Over the years, decreases in amphibian populations have been blamed on negative human impact; however, since 1988, herpetologists from across the globe reported declines in amphibian populations from all habitats, including those untouched by human activity. This observation led to the theory of negative global factors affecting amphibians. These factors include climatic changes, atmospheric changes (elevated UV-B radiation), and pollution (<http://www.open.ac.uk/daptf/>). Currently, Alberta's Amphibian species are also in a state of decline. As can be seen in figure 4, only 3/10 (30%) of Alberta's amphibians are designated secure.

Species of Concern

Although all amphibians in Alberta should be of special concern, only the Northern Leopard Frog (*Rana pipiens*) is considered "At Risk", by the General Status of Alberta Wild Species. On a national scale, COSEWIC (Committee on the Status of Endangered Wildlife in Canada) considers the Northern Boreal Frog (*Rana pipiens*) a species of special concern (the equivalent of the Alberta ranking structure sensitive) (COSEWIC, 2001). [The following information is modified, unless indicated, from Wagner, 1997] The Northern Leopard Frog (*Rana pipiens*) requires a variety of habitats throughout their life cycles. Separate sites are typically used for breeding and hibernating; however, some individuals may not disperse to too much of an extreme. Breeding and summer habitat tends to be wetland areas of stable water level with relatively clear water. Winter habitat,

on the other hand, tends to be in deeper water or those areas with well-ventilated springs. This frog, unlike other amphibians, hibernates in water causing this need for movement between alternate habitats (Russell, A.P. and A.M. Bauer, 2000). In an area of increased human activity this may cause problems both in the summer and winter months. Limiting factors include, but are not limited to:

1. Climate (changes in wetland habitat availability)
2. Livestock operations (limited within FMA area)
3. Harvest (now illegal so negligible effects)
4. Road Kill (limited, due to low occurrence of roads)
5. Water management (little water management within FMA area)
6. Introduction of game fish (possible effect into stocked lakes such as Bistcho Lake, Footner Pond, High Level dugouts, Hutch Lake, Machesis Lake, Rainbow Lake Pond, Wadlin Lake, and Zama Lake Pond)
7. Contamination and wetland acidification
8. Disease (many fish diseases contractible by amphibians)
9. **Habitat loss and fragmentation**

The main limiting factor for which Tolko Industries Ltd should be aware is habitat loss and/or fragmentation. As mentioned previously, populations of the Northern Leopard Frog (*Rana pipiens*) exist as metapopulations (Blaustein et al, 1994). Metapopulation dynamics are based on series of colonizations and extinctions whereby individuals migrate about from 'island' to 'island.' Individual populations (within the metapopulation) may encounter stochastic mechanisms resulting in fluctuations in size. These individual changes are 'smoothed out' throughout the

entire metapopulation, keeping it stable. With loss and/or degradation, some populations may be separated and possibly effect the entire system. The related problem here is that to avoid the Northern Leopard Frog (*Rana pipiens*) habitat, not only must wetland area be monitored effectively, but also associated upland habitats, where migrating individuals could exist. With habitat loss and/or fragmentation, additional stressors may be placed on the already fragile status of this species

Fish

As with amphibians and reptiles, declines have occurred in the distribution of fish within Alberta. Presently, Alberta’s freshwater systems contain 63 species

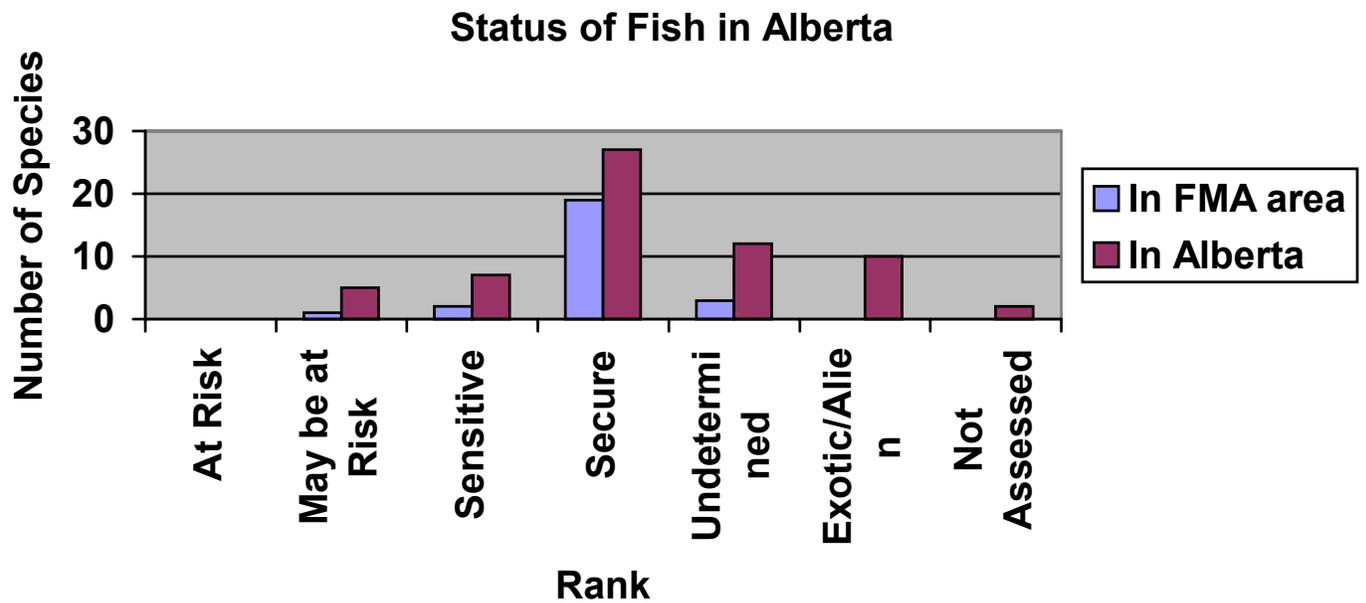
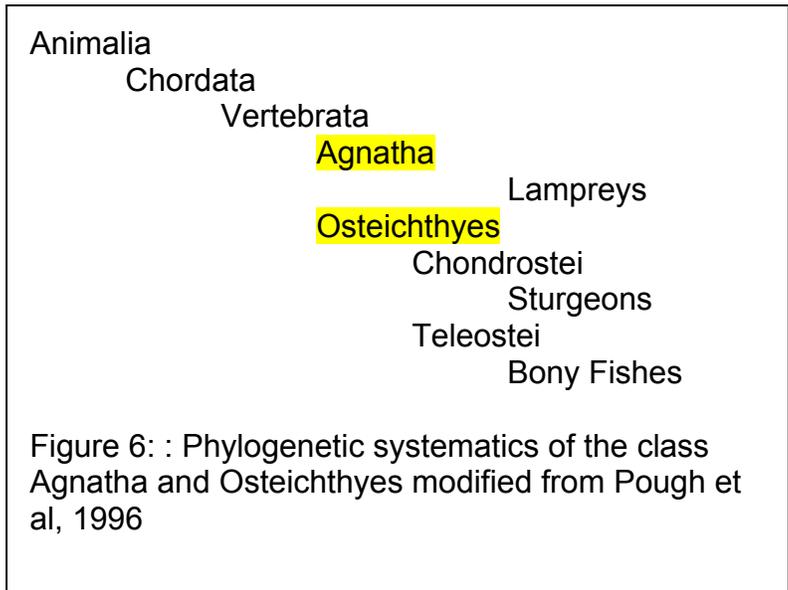


Figure 5: Comparative status of Alberta’s fish species ranks under the General Status of Alberta Wild Species.

of fish (General Status, 2000). According to distribution maps, 28 species reside in Northwest Alberta (Nelson, J.S. and J. Paetz, 1992), but these can once again be misleading. For example, an Alberta



Environment distribution map of the Bull Trout *salvelinus confluentus* shows that the species exists on the Peace River as far down stream as Fort Vermillion (http://www3.gov.ab.ca/srd/fw/threatsp/bt_hab.html).

The preferred habitat of this fish is the cool, clear, swift waters of the eastern slopes of the Rocky Mountains, which are unlike that of the Peace River. Once again we can infer about many of the species based on habitat requirements; therefore, as with amphibians and reptiles, fish that could possibly exist within the FMA area should be considered possible inhabitants. Possible exceptions could be exotic/alien species, which are strictly restricted to certain areas. A perfect example is the Mosquito Fish *Gambusia affinis* and the Sailfin Molly *Poecilia latipinna*, both of which are alien species from tropical regions. Both exist in Alberta, but only in the Cave and Basin area (near Banff, Alberta), where increased temperatures, from geothermal activity, provide suitable habitat conditions.

Table 3: Distribution of Alberta's fish families

Common Family	Scientific Family	Species in FMA¹	Species in Alberta
Lampreys	<i>Peteromyzontiformes</i>	0	1
Sculpins	<i>Scorpaeniformes</i>	2	6
Sturgeons	<i>Acipenseriformes</i>	0	1
Mooneyes	<i>Osteoglossiformes</i>	1	2
Pike and Trout-like Fishes	<i>Salmoniformes</i>	8	17
Suckers and Minnows	<i>Cypriniformes</i>	8	21
Catfish	<i>Siluriformes</i>	0	1
Trout-Perches	<i>Percopsiformes</i>	1	1
Cod	<i>Gadiformes</i>	1	1
Livebearers	<i>Cyprinodontiformes</i>	0	2
Sticklebacks	<i>Gasterosteiformes</i>	2	3

¹ According to Nelson, J.S. and Paetz, M.J., 1992.

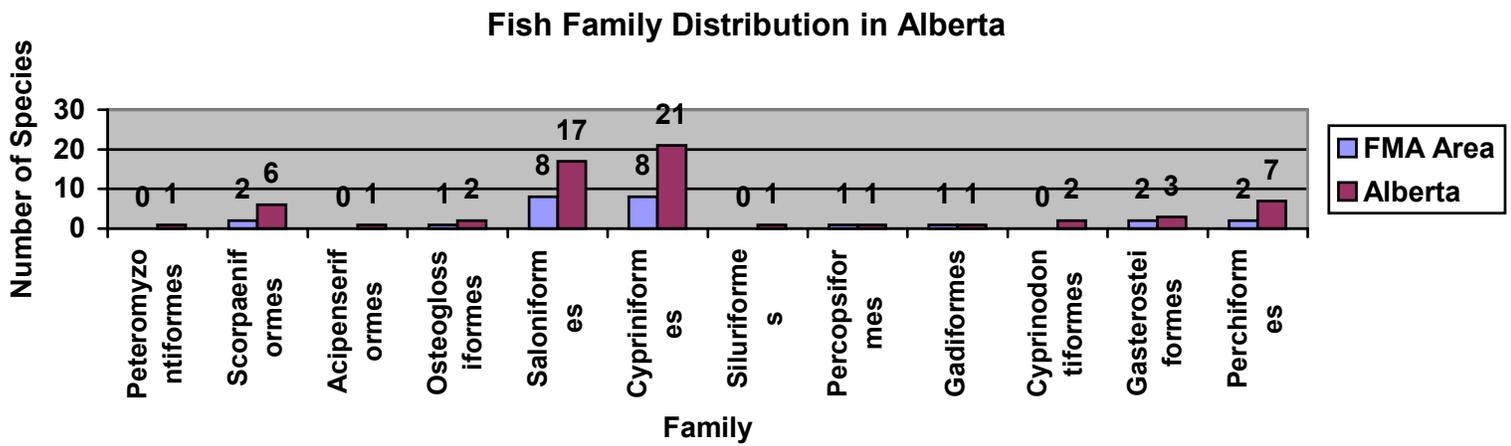


Figure 7: Distribution of Alberta's Fish Families.

Table 4: Fish species in Alberta (highlighted species reside within FMA area) modified from The General Species of Alberta Wild Species, 2000 and Nelson, J.S. and J. Paetz, 1992.

Common Name	Scientific Name	Status
Arctic Lamprey	<i>Lampetra japonica</i>	Secure
Prickly Sculpin	<i>Cottus asper</i>	Not Assessed
Mottled Sculpin	<i>Cottus bairdi</i>	Not Assessed
Slimy Sculpin	<i>Cottus cognatus</i>	Secure
Shorthead Sculpin	<i>Cottus confusus</i>	May be at risk
Spoonhead Sculpin	<i>Cottus ricei</i>	May be at risk
Deepwater Sculpin	<i>Myoxocephalus thompsoni</i>	Undetermined
Lake Sturgeon	<i>Acipenser fulvescens</i>	Undetermined
Goldeye	<i>Hiodon alosoides</i>	Secure
Mooneye	<i>Hiodon tergisus</i>	Secure
Cisco	<i>Coregonus artedii</i>	Secure
Lake Whitefish	<i>Coregonus clupeaformis</i>	Secure

Shortjaw Cisco	<i>Coregonus zenithicus</i>	May be at risk
Golden Trout	<i>Oncorhynchus aguabonita</i>	Exotic/alien
Cutthroat Trout	<i>Oncorhynchus clarki</i>	Secure
Rainbow Trout	<i>Oncorhynchus mykiss</i>	Secure
Sockeye Salmon	<i>Oncorhynchus nerka</i>	exotic/alien
Pygmy Whitefish	<i>Prosopium coulteri</i>	May be at risk
Round Whitefish	<i>Prosopium cylindraceum</i>	Undetermined
Mountain Whitefish	<i>Prosopium williamsoni</i>	Secure
Brown Trout	<i>Salmo trutta</i>	Exotic/alien
Bull Trout	<i>Salvelinus confluentus</i>	Sensitive
Brook Trout	<i>Salvelinus fontinalis</i>	Exotic/alien
Dolly Varden	<i>Salvelinus malma</i>	Exotic/alien
Lake Trout	<i>Salvelinus namaycush</i>	Sensitive
Arctic Grayling	<i>Thymallus arcticus</i>	Sensitive
Northern Pike	<i>Esox lucius</i>	Secure
Lake Chub	<i>Couesius plumbeus</i>	Secure
Western Silvery Minnow	<i>Hybognathus argyritis</i>	May be at risk
Brassy Minnow	<i>Hybognathus hankinsoni</i>	Undetermined
Emerald Shiner	<i>Notropis atherinoides</i>	Secure
River Shiner	<i>Notropis blennius</i>	Undetermined
Spottail Shiner	<i>Notropis hudsonius</i>	Secure
Northern redbelly Dace	<i>Phoxinus eos</i>	Sensitive
Finescale dace	<i>Phoxinus neogaeus</i>	Undetermined

Fathead Minnow	<i>Pimephales promelas</i>	Secure
Northern Pikeminnow	<i>Ptchocheilus oregonensis</i>	Sensitive
Longnose Dace	<i>Rhinichthys cataractae</i>	Secure
Redside Shiner	<i>Richardsonius balteatus</i>	Secure
Pearl Dace	<i>Margariscus margarita</i>	Undetermined
Flathead Chub	<i>Platygobio gracilis</i>	Secure
Quillback	<i>Carpiodes cyprinus</i>	Undetermined
Longnose Sucker	<i>Catostomus catostomus</i>	Secure
White Sucker	<i>Catostomus commersoni</i>	Secure
Largescale Sucker	<i>Catostomus macrocheilus</i>	Sensitive
Mountain Sucker	<i>Catostomus platyrhynchus</i>	Secure
Silver Redhorse	<i>Moxostoma anisurum</i>	Undetermined
Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>	Secure
Stonecat	<i>Noturus flavus</i>	Undetermined
Trout-perch	<i>Percopsis omiscomaycus</i>	Secure
Burbot	<i>Lota lota</i>	Secure
Mosquitofish	<i>Gambusia affins</i>	Exotic/alien
Sailfin Molly	<i>Poecilia latipinna</i>	Exotic/alien
Brook Stickleback	<i>Culaea inconstans</i>	Secure
Threespine Stickleback	<i>Gasterosteus aculeatus</i>	Exotic/alien
Ninespine Stickleback	<i>Pungitius pungitius</i>	Undetermined
Smallmouth Bass	<i>Micropterus dolomieu</i>	Exotic/alien
Iowa Darter	<i>Etheostoma exile</i>	Secure

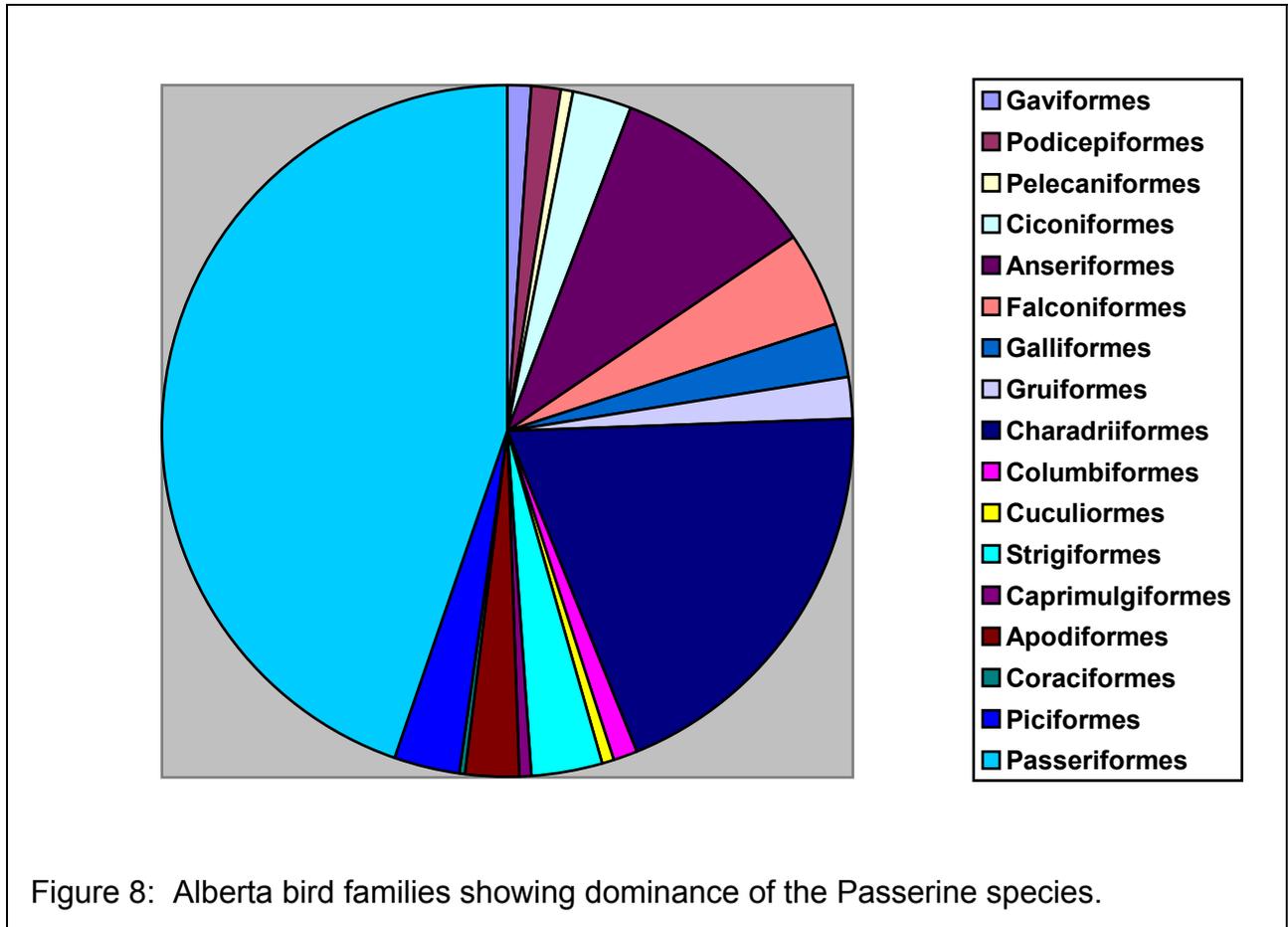
Logperch	<i>Percina caprodes</i>	Undetermined
Yellow Perch	<i>Perca flavescens</i>	Secure
Sauger	<i>Stizostedion canadense</i>	Sensitive
Walleye	<i>Stizostedion vitreum</i>	Secure
African Jewelfish	<i>Hemichromis bimaculatus</i>	Exotic/alien

Currently, no species of fish are considered 'At Risk' by Alberta or Endangered by COSEWIC; however, that should not rule out adaptive management. Five species in Alberta are rated as 'May be at Risk' and seven species are considered Sensitive. Positive management practices must prevail to prevent any species degrading to an 'At Risk.' designation.

Several species of game fish are prevalent in the area. These include lake whitefish (*Coregonus clupeaformis*), Northern Pike (*Esox lucius*), and Walleye (*Stizostedion vitreum*). Sportfishing in the area has a negligible impact, due to the low human density in the region. Several fishing lodges are located within, or close to Tolko Industries Ltd FMA area, with Margaret Lake being classified as a trophy Lake. Commercial fishery operations also exist. Bistcho Lake is large enough to support this activity, with a total size of approximately 41,000 hectares. Although populations of trout exist in North-western Alberta, they are small and usually the result of a stocking program

Birds

The class Aves is by far the most diverse class of the sub-phylum Vertebrata. Alberta is presently known to exhibit 402 species of birds from 17 families (General Status, 2000).



According to Alberta Sustainable Development, there are currently 7 species 'At Risk' in Alberta. These include the Trumpeter Swan *Cygnus buccinator*, the Ferruginous Hawk *Buteo regalis*, the Peregrine Falcon *Falco peregrinus*, the Greater Sage Grouse *Centrocercus urophasianus*, the Whooping Crane, *Grus americana*, the Piping Plover *Charadrius melodus*, and the

Burrowing Owl *Athenen cunicularia*. The species which are not in Tolko Industries Ltd FMA are the Greater Sage grouse (Peterson, 1990. Fisher and Acorn, 1998. Salt and Wilk, 1966. and Semechuk, 1992) and the Burrowing Owl (Peterson, 1990. Fisher and Acorn, 1998. Salt and Wilk, 1966. Semechuk, 1992 and Wellicome, 1997). As was mentioned in earlier sections, distributions maps can be misleading, however, these two species are restricted to the scrub plains of the extreme south-east of Alberta, and can be assumed with great certainty to not live within Tolko Industries Ltd. FMA area. Ideal Ferruginous Hawk habitat is also the south-west of the province, however, with populations increasing in size, suitable nesting sites are becoming sparse, causing dispersal of this species. It is unlikely that this hawk has moved this far north, but it is possible (Peterson, 1990. Fisher and Acorn, 1998. Salt and Wilk, 1966. and Semechuk, 1992). The Piping Plover is another example of a bird that may arise in north-western Alberta. Breeding does not take place in the FMA area (Prescott, 1997); however, that does not exclude the species from using the northern habitat occasionally. Distribution maps do, however, exclude the species from the area (Peterson, 1990. Fisher and Acorn, 1998. Salt and Wilk, 1966. and Semechuk, 1992). The last three species (Trumpeter Swan, Whooping Crane, and Peregrine Falcon) have quite a high probability of utilizing habitat within Tolko Industries Ltd FMA area (Peterson, 1990. Fisher and Acorn, 1998. Salt and Wilk, 1966. James, 1997. Rowell and Stepnisky, 1997. White, 1997 and Semechuk, 1992). These three species will be discussed in detail later.

Of the 402 bird species within Alberta, only two species are designated 'May be at Risk.' These are the Long Billed Curlew *Numenius phaeopus* and the Short-eared Owl *Asio flammeus*. The Curlew is not known to reside in the FMA area, and due to its reliance on Prairie habitat, it is unlikely that it strays far enough north (Peterson, 1990. Fisher and Acorn, 1998. Salt and Wilk, 1966. and Semechuk, 1992). The Short-eared Owl, on the other hand, tends to use the boreal region of Alberta for Breeding. Limited incidences of observation have been documented on the Peace River and at the base of the Caribou Mountains (Semenchuk, 1992 and Clayton, 1997). A section on the Short-eared Owl will follow due to its recent decline in population.

The remaining categories include; 48 Sensitive species, 231 Secure species, 15 Undetermined Species, 90 Accidental/Vagrant species, and 6 exotic/Alien species (General Status, 2000).

Ranking of Alberta Birds

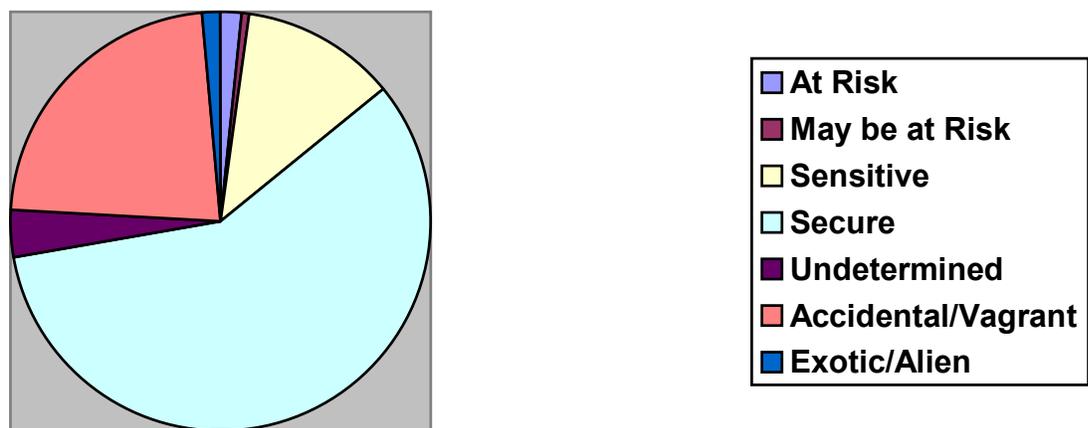


Figure 9: Status comparison of Alberta's bird species

COSEWIC has several other species, which it also considers

- 'At Risk' (endangered)
 1. Eskimo Curlew *Numenius borealis* rated extirpated/extinct by General Status Report., 2000.
 2. Mountain Plover *Charadrius montanus* rated sensitive by General Status Report, 2000
 3. Sage Thrasher *Oreoscoptes montanus* rated Undetermined by General Status Report, 2000.
- 'May be at Risk' (threatened).
 1. Sprague's Pipit *Anthus spragueii* rated Sensitive by General Status Report, 2000.
 2. Loggerhead Shrike *Lanius ludovicianus excubitorides* rated Sensitive by General Status Report, 2000.

*The above was modified from COSEWIC, 2001.

At this point, a break down of species within the FMA area would be appropriate. This will not be done however, due to distribution map error. With the number of species over 400, the frequency of error would make the data negligible. The only attempt at an area specific analysis will be made in the following tables.

Highlighted species are once again those species which are distributed within the FMA area. Distribution maps were interpreted from Peterson, 1990. Fisher and Acorn, 1998. Salt and Wilk, 1966. and Semechuk, 1992.

Table 5: Gaviformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Red Throated Loon	<i>Gavia stellata</i>	Secure
Common Loon	<i>Gavia immer</i>	Secure
Yellow-billed Loon	<i>Gavia adamsii</i>	Accidental
Pacific Loon	<i>Gavia pacifica</i>	Secure

Table 6: Podicipiformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Pied-billed Grebe	<i>Podilymbus podiceps</i>	Sensitive
Horned Grebe	<i>Podiceps auritus</i>	Sensitive
Red-necked Grebe	<i>Podiceps grisegena</i>	Secure
Eared Grebe	<i>Podiceps nigricollis</i>	Secure
Western Grebe	<i>Aechmophorus occidentalis</i>	Sensitive
Clark's Grebe	<i>Aechmophorus clarkii</i>	Sensitive

Table 7: Pelecaniformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
American White Pelican	<i>Pelecanus erythrorhynchos</i>	Sensitive
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Secure

Table 8: Ciconiformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
American Bittern	<i>Botaurus lentiginosus</i>	Sensitive
Great Blue Heron	<i>Ardea herodias</i>	Sensitive
Great Egret	<i>Ardea alba</i>	Accidental
Snowy Egret	<i>Egretta thula</i>	Accidental
Little Blue Heron	<i>Egretta caerulea</i>	Accidental
Tricolored Heron	<i>Egretta tricolor</i>	Accidental
Cattle Egret	<i>Bubulcus ibis</i>	Accidental
Green Heron	<i>Butorides virescens</i>	Accidental
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>	Accidental
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Sensitive
White-faced Ibis	<i>Plegadis Chihi</i>	Sensitive

Table 9: Anseriformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Tundra Swan	<i>Cygnus columbianus</i>	Secure
Trumpeter Swan	<i>Cygnus buccinator</i>	At Risk
Greater White-fronted Goose	<i>Anser albifrons</i>	Secure
Snow Goose	<i>Chen caerulescens</i>	Secure
Ross's Goose	<i>Chen rossii</i>	Secure
Brant	<i>Branta bernicla</i>	Accidental
Canada Goose	<i>Branta canadensis</i>	Secure

Wood Duck	<i>Aix sponsa</i>	Secure
Green-winged Teal	<i>Anas crecca</i>	Secure
American Black Duck	<i>Anas rubripes</i>	Secure
Mallard	<i>Anus platyrhynchos</i>	Secure
Northern Pintail	<i>Anus acuta</i>	Secure
Garganey	<i>Anas querquedula</i>	Accidental
Blue-winged Teal	<i>Anas discors</i>	Secure
Cinnamon Teal	<i>Anas cyanoptera</i>	Secure
Northern Shoveler	<i>Anas clypeata</i>	Secure
Gadwall	<i>Anas strepera</i>	Secure
Eurasian Wigeon	<i>Anas penelope</i>	Accidental
American Wigeon	<i>Anas americana</i>	Secure
Canvasback	<i>Aythya valisineria</i>	Secure
Redhead	<i>Aythya americana</i>	Secure
Ring-necked Duck	<i>Aythya collaris</i>	Secure
Tufted Duck	<i>Aythya fuligula</i>	Accidental
Greater Scaup	<i>Aythya marila</i>	Secure
Lesser Scaup	<i>Aythya affinis</i>	Secure
King Eider	<i>Somateria spectabilis</i>	Accidental
Common Eider	<i>Somateria mollissima</i>	Accidental
Harlequin Duck	<i>Histrionicus histrionicus</i>	Sensitive
Long-tailed Duck	<i>Clangula hyemalis</i>	Secure
Black Scoter	<i>Melanitta nigra</i>	Accidental

Surf Scoter	<i>Melanitta perspicillata</i>	Secure
White-winged Scoter	<i>Melanitta fusca</i>	Sensitive
Common Goldeneye	<i>Bucephala clangula</i>	Secure
Barrow's Goldeneye	<i>Bucephala islandica</i>	Secure
Bufflehead	<i>Bucephala albeola</i>	Secure
Hooded Merganser	<i>Lophodytes cucullatus</i>	Secure
Common Merganser	<i>Mergus merganser</i>	Secure
Red-breasted Merganser	<i>Mergus serrator</i>	Secure
Ruddy Duck	<i>Oxyura jamaicensis</i>	Secure

Table 10: Falconiformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Turkey Vulture	<i>Cathartes aura</i>	Secure
Osprey	<i>Pandion haliaetus</i>	Sensitive
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Sensitive
Northern Harrier	<i>Circus cyaneus</i>	Secure
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Secure
Cooper's Hawk	<i>Accipiter cooperii</i>	Secure
Northern Goshawk	<i>Accipiter gentilis</i>	Sensitive
Broad-winged Hawk	<i>Buteo playpterus</i>	Sensitive
Swainson's Hawk	<i>Buteo swainsoni</i>	Sensitive
Red-tailed Hawk	<i>Buteo jamaicensis</i>	Secure
Ferruginous Hawk	<i>Buteo regalis</i>	At Risk

Rough Legged Hawk	<i>Buteo lagopus</i>	Secure
Golden Eagle	<i>Aquila chrysaetos</i>	Sensitive
American Kestrel	<i>Falco sparverius</i>	Secure
Peregrine Falcon	<i>Falco peregrinus</i>	At Risk
Merlin	<i>Falco columbarius</i>	Secure
Gyrfalcon	<i>Falco rusticolus</i>	Secure
Prairie Falcon	<i>Falco mexicanus</i>	Sensitive

Table 11: Galliformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Gray Partridge	<i>Perdix perdix</i>	Exotic/alien
Ring-necked Pheasant	<i>Phasianus colchicus</i>	Exotic/alien
Spruce Grouse	<i>Falcapennis canadensis</i>	Secure
Blue Gouse	<i>Dendragapus obscurus</i>	Secure
Willow Ptarmigan	<i>Lagopus lagopus</i>	Secure
White-tailed Ptarmigan	<i>Lagopus leucurus</i>	Secure
Ruffed Grouse	<i>Bonasa umbrellus</i>	Secure
Greater Sage Grouse	<i>Centrocercus urophasianus</i>	At Risk
Greater Prairie Chicken	<i>Tympanuchus cupido</i>	Extirpated
Sharp-tail Grouse	<i>Typanuchus phasianellus</i>	Sensitive
Wild Turkey	<i>Meleagris gallopavo</i>	Exotic.alien

Table 12: Gruiformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific name	Status
Yellow Rail	<i>Coturnicops noveboracensis</i>	Undetermined
Virginia Rail	<i>Rallus limicola</i>	Undetermined
Sora	<i>Porzana carolina</i>	Secure
American Coot	<i>Fulica americana</i>	Secure
Sandhill Crane	<i>Grus canadensis</i>	Sensitive
Common Crane	<i>Grus grus</i>	Accidental
Whooping Crane	<i>Grus americana</i>	At Risk

Table 13: Charadriiformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Pacific Golden Plover	<i>Pluvialis fulva</i>	Accidental
Black-bellied Plover	<i>Pluvialis squatarola</i>	Secure
American Golden Plover	<i>Pluvialis dominica</i>	Secure
Mongolian Plover	<i>Charadrius mongolus</i>	Accidental
Snowy Plover	<i>Charadrius alexandrinus</i>	Accidental
Spotted Redshank	<i>tringa erythropus</i>	Accidental
Semipalmated Plover	<i>Charadrius semipalmatus</i>	Secure
Piping Plover	<i>Charadrius melodus</i>	At Risk
Killdeer	<i>Charadrius vociferus</i>	Secure
Mountain Plover	<i>Charadrius montanus</i>	Sensitive
Black-necked Stilt	<i>Himantopus mexicanus</i>	Sensitive

American Avocet	<i>Recurirostra americana</i>	Secure
Greater Yellowlegs	<i>Tringa melanoleuca</i>	Secure
Lesser Yellowlegs	<i>Tringa flavipes</i>	Secure
Solitary Sandpiper	<i>Tringa solitaria</i>	Secure
Willet	<i>Catoptrophorus semipalmatus</i>	Secure
Wandering Tattler	<i>Heteroscelus incanus</i>	Accidental
Spotted Sandpiper	<i>Actitis macularia</i>	Secure
Upland Sandpiper	<i>Bartramia longicauda</i>	Sensitive
Eskimo Curlew	<i>Numenius borealis</i>	Extirpated
Black Turnstone	<i>Arenaria melanocephala</i>	Accidental
American Whimbrel	<i>Numenius phaeopus</i>	Secure
Long-billed Curlew	<i>Numenius americanus</i>	May be at Risk
Hudsonian Godwit	<i>Limosa haemastica</i>	Secure
Marbled Godwit	<i>Limosa fedoa</i>	Secure
Ruddy Turnstone	<i>Arenaria interpres</i>	Secure
Surfbird	<i>Aphriza virgata</i>	Accidental
Red-necked Stint	<i>Calidris ruficollis</i>	Accidental
Little Stint	<i>Calidris minuta</i>	Accidental
Red Knot	<i>Calidris canutus</i>	Secure
Sanderling	<i>Calidris alba</i>	Secure
Semipalmated sandpiper	<i>Calidris pusilla</i>	Secure
Western Sandpiper	<i>Calidris mauri</i>	Secure
Least Sandpiper	<i>Calidris minutilla</i>	Secure

White-rumped Sandpiper	<i>Calidris fuscicollis</i>	Secure
Baird's Sandpiper	<i>Calidris bairdii</i>	Secure
Pectoral Sandpiper	<i>Calidris melanotos</i>	Secure
Sharp-tailed sandpiper	<i>Calidris acuminata</i>	Accidental
Dunlin	<i>Calidris alpina</i>	Secure
Curlew Sandpiper	<i>Calidris ferruginea</i>	Accidental
Stilt Sandpiper	<i>Calidris himantopus</i>	Secure
Spoonbill Sandpiper	<i>Eurynorhynchus pygmeus</i>	Accidental
Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>	Secure
Ruff	<i>Philomachus pugnax</i>	Accidental
Short-billed Dowitcher	<i>Limnodromus griseus</i>	Undetermined
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>	Secure
Common Snipe	<i>Gallinago gallinago</i>	Secure
Wilson's Phalarope	<i>Phalaropus tricolor</i>	Secure
Red-necked Phalarope	<i>Phalaropus lobatus</i>	Secure
Red Phalarope	<i>Phalaropus fulicaria</i>	Accidental
Pomarine Jaeger	<i>Stercorarius pomarinus</i>	Accidental
Parasitic Jaeger	<i>Stercorarius parasiticus</i>	Accidental
Long-tailed Jaeger	<i>Stercorarius longicaudus</i>	Accidental
Franklin's Gull	<i>Larus pipixcan</i>	Secure
Little Gull	<i>Larus minutus</i>	Accidental
Bonaparte's Gull	<i>Larus philadelphia</i>	Secure
Mew Gull	<i>Larus canus</i>	Secure

Ring-billed Gull	<i>Larus delawarensis</i>	Secure
California Gull	<i>Larus californicus</i>	Secure
Herring Gull	<i>Larus argentatus</i>	Secure
Thayer's Gull	<i>Larus thayeri</i>	Secure
Iceland Gull	<i>Larus glaucoides</i>	Accidental
Lesser Black-winged Gull	<i>Larus fuscus</i>	Accidental
Glaucous-winged Gull	<i>Larus glaucescens</i>	Accidental
Slaty-backed Gull	<i>Larus schistisagus</i>	Accidental
Glaucous Gull	<i>Larus hyperboreus</i>	Secure
Great Black-backed Gull	<i>Larus marinus</i>	Accidental
Black-legged Kittiwake	<i>Rissa tridactyla</i>	Accidental
Ivory Gull	<i>Pagophila eburnea</i>	Accidental
Sabine's Gull	<i>Xema sabini</i>	Secure
Caspian Tern	<i>Sterna caspia</i>	Sensitive
Common Tern	<i>Sterna hirundo</i>	Secure
Arctic Tern	<i>Sterna paradisaea</i>	Secure
Forster's Tern	<i>Sterna forsteri</i>	Sensitive
Black tern	<i>Chlidonias niger</i>	Sensitive
Black Guillemot	<i>Cepphus grylle</i>	Accidental
Long-billed Murrelet	<i>Brachyramphus perdix</i>	Accidental
Ancient Murrelet	<i>Synthliboramphus antiquus</i>	Accidental

Table 14: Columbiformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Rock Dove	<i>Columba livia</i>	Exotic/alien
Band-tailed pigeon	<i>Columba fasciata</i>	Accidental
White-winged Dove	<i>Zenaida asiatica</i>	Accidental
Mourning Dove	<i>Zenaida macroura</i>	Secure
Passenger Pigeon	<i>Ectopistes migratorius</i>	Extirpated

Table 15: Cuculiformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Undetermined
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Accidental

Table 16: Strigiformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Barn Owl	<i>Tyto alba</i>	Accidental
Eastern Screech-Owl	<i>Otus asio</i>	Accidental
Western Screech-Owl	<i>Otus kennicottii</i>	Accidental
Great Horned Owl	<i>Bubo virginianus</i>	Secure
Snowy Owl	<i>Nyctea scandiaca</i>	Secure
Northern Hawk Owl	<i>Surnia ulula</i>	Secure
Northern Pygmy Owl	<i>Glaucidium gnoma</i>	Sensitive
Burrowing Owl	<i>Athene cunicularia</i>	At Risk

Barred Owl	<i>Strix varia</i>	Sensitive
Great Gray Owl	<i>Strix nebulosa</i>	Sensitive
Long-eared Owl	<i>Asio otus</i>	Secure
Short-eared Owl	<i>Asio flammeus</i>	May be at Risk
Boreal Owl	<i>Aegolius funereus</i>	Secure
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	Secure

Table 17: Caprimulgiformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Common Nighthawk	<i>Chordeiles minor</i>	Sensitive
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	Undetermined

Table 18: Apodiformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Black Swift	<i>Cypseloides niger</i>	Undetermined
Vaux's Swift	<i>Chaeture vauxi</i>	Accidental
White-throated Swift	<i>Aeornates saxatalis</i>	Accidental
Green Violet-ear	<i>Colibri thalassinus</i>	Accidental
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	Secure
Black-chinned Hummingbird	<i>Archilochus alexandri</i>	Accidental
Anna's Hummingbird	<i>Calypte anna</i>	Accidental
Costa's Hummingbird	<i>Calypte costae</i>	Accidental
Calliope Hummingbird	<i>Stellulat calliope</i>	Secure

Rufous Hummingbird	<i>Selasphorus rufus</i>	Secure
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Table 19: Coraciformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Belted Kingfisher	<i>Ceryle alcyon</i>	Secure

Table 20: Piciformes of Alberta(modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Lewis's Woodpecker	<i>Melanerpes lewis</i>	Secure
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Accidental
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	Secure
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	Accidental
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	Accidental
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>	Undetermined
Downy Woodpecker	<i>Picoides pubescens</i>	Secure
Hairy Woodpecker	<i>Picoides villosus</i>	Secure
Three-toed Woodpecker	<i>Picoides tridactylus</i>	Secure
Black-backed	<i>Picoides articus</i>	Sensitive
Northern Flicker	<i>Colaptes auratus</i>	Secure
Pileated Woodpecker	<i>Dryocopus pileatus</i>	Sensitive

Table 21: Passeriformes of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Secure
Western Wood-Pewee	<i>Contopus sordidulus</i>	Secure
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>	Undetermined
Alder Flycatcher	<i>Empidonax alnorum</i>	Secure
Willow Flycatcher	<i>Empidonax trailii</i>	Secure
Least Flycatcher	<i>Empidonax minimus</i>	Secure
Hammond's Flycatcher	<i>Empidonax hammondii</i>	Secure
Dusky Flycatcher	<i>Empidonax oberholseri</i>	Secure
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	Undetermined
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	Undetermined
Eastern Phoebe	<i>Sayornis phoebe</i>	Secure
Say's Phoebe	<i>Sayornis saya</i>	Secure
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	Sensitive
Western Kingbird	<i>Tyrannus forficatus</i>	Accidental
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Secure
Gray Flycatcher	<i>Empidonax wrightii</i>	Accidental
Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	Accidental
Horned Lark	<i>Eremophila alpestris</i>	Secure
Purple Martin	<i>Progne subis</i>	Sensitive
Tree Swallow	<i>Tachycineta bicolor</i>	Secure
Violet-Green Swallow	<i>Tachycineta thalassina</i>	Secure

Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	Secure
Bank Swallow	<i>Riparia riparia</i>	Secure
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	Secure
Barn Swallow	<i>Hirundo rustica</i>	Secure
Gray Jay	<i>Perisoreus canadensis</i>	Secure
Steller's Jay	<i>Cyanocitta stelleri</i>	Secure
Blue Jay	<i>Cyanocitta cristata</i>	Secure
Clark's Nutcracker	<i>Nucifraga columbiana</i>	Secure
Black-billed Magpie	<i>Pica hudsonia</i>	Secure
American Crow	<i>Corvus brachyrhynchos</i>	Secure
Common Raven	<i>Corvus corax</i>	Secure
Black-capped Chickadee	<i>Poecile atricapilla</i>	Secure
Mountain Chickadee	<i>Poecile gambeli</i>	Secure
Boreal Chickadee	<i>Poecile hudsonica</i>	Secure
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	Accidental
Red-breasted Nuthatch	<i>Sitta canadensis</i>	Secure
White-breasted Nuthatch	<i>Sitta carolinensis</i>	Secure
Pygmy Nuthatch	<i>Sitta pygmaea</i>	Accidental
Brown Creeper	<i>Certhia americana</i>	Undetermined
Rock Wren	<i>Salpinctes obsoletus</i>	Secure
Carolina Wren	<i>Thryothorus ludovicianus</i>	Accidental
House Wren	<i>Troglodytes aedon</i>	Secure
Winter Wren	<i>Troglodytes troglodytes</i>	Secure

Sedge Wren	<i>Cistothorus platensis</i>	Sensitive
Marsh Wren	<i>Cistothorus palustris</i>	Secure
American Dipper	<i>Cinclus mexicanus</i>	Secure
Golden-crowned Kinglet	<i>Regulus satrapa</i>	Secure
Ruby-crowned Kinglet	<i>Regulus calendula</i>	Secure
Blue-gray Gnatcatcher	<i>Poloptila caerulea</i>	Accidental
Northern Wheatear	<i>Oenanthe oenanthe</i>	Accidental
Eastern Bluebird	<i>Sialia sialis</i>	Secure
Western Bluebird	<i>Sialia mexicana</i>	Secure
Mountain Bluebird	<i>Sialia currucoides</i>	Secure
Townsend's Solitaire	<i>Myadestes townsendi</i>	Secure
Veery	<i>Catharus fuscescens</i>	Secure
Gray-cheeked Thrush	<i>Catharus minimus</i>	Undetermined
Swainson's Thrush	<i>Catharus ustulatus</i>	Secure
Hermit Thrush	<i>Catharus guttatus</i>	Secure
Wood Thrush	<i>Hylocichla mustelina</i>	Accidental
Bendire's Thrasher	<i>Toxostoma bendirei</i>	Accidental
Curve-billed Thrasher	<i>Toxostoma curvirostre</i>	Accidental
American Robin	<i>Turdus migratorius</i>	Secure
Varied Thrush	<i>Ixoreus naevius</i>	Secure
Gray Catbird	<i>Dumetella carolinensis</i>	Secure
Northern Mockingbird	<i>Mimus polyglottos</i>	Secure
Sage Thrasher	<i>Oreoscoptes montanus</i>	Undetermined

Brown Thrasher	<i>Toxostoma rufum</i>	Secure
American Pipit	<i>Anthus rubescens</i>	Secure
Sprague's Pipit	<i>Anthus spragueii</i>	Sensitive
Bohemian Waxwing	<i>Bombycilla garrulus</i>	Secure
Cedar Waxwing	<i>Bombycilla cedrorum</i>	Secure
Northern Shrike	<i>Lanius excubitor</i>	Secure
Loggerhead Shrike	<i>Lanius ludovicianus</i>	Sensitive
European Starling	<i>Sturnus vulgaris</i>	Exotic/alien
Blue-headed Vireo	<i>Vireo solitarius</i>	Secure
Warbling Vireo	<i>Vireo gilvus</i>	Secure
Philadelphia Vireo	<i>Vireo philadelphicus</i>	Secure
Red-eyed Vireo	<i>Vireo olivaceus</i>	Secure
Cassin's Vireo	<i>Vireo cassinii</i>	Undetermined
Tennessee Warbler	<i>Vermivora peregrina</i>	Secure
Orange-crowned Warbler	<i>Vermivora celata</i>	Secure
Nashville Warbler	<i>Vermivora ruficapilla</i>	Secure
Northern Parula	<i>Parula americana</i>	Accidental
Yellow Warbler	<i>Dendroica petechia</i>	Secure
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	Secure
Magnolia Warbler	<i>Dendroica magnolia</i>	Secure
Cape May Warbler	<i>Dendroica tigrinia</i>	Sensitive
Blue-winged Warbler	<i>Vermivora pinus</i>	Accidental
Golden-winged warbler	<i>Vermivora chrysoptera</i>	Accidental

Black-throated Blue Warbler	<i>Dendroica caerulescens</i>	Accidental
Yellow-rumped Warbler	<i>Dendroica coronata</i>	Secure
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	Accidental
Townsend's Warbler	<i>Dendroica townsendi</i>	Secure
Black-throated Green Warbler	<i>Dendroica virens</i>	Sensitive
Blackburian Warbler	<i>Dendroica fusca</i>	Sensitive
Pine Warbler	<i>Dendroica pinus</i>	Accidental
Palm Warbler	<i>Dendroica palmarum</i>	Secure
Bay-breasted Warbler	<i>Dendroica castanea</i>	Sensitive
Blackpoll Warbler	<i>Dendroica striata</i>	Secure
Black and White Warbler	<i>Mniotilta varia</i>	Secure
American Redstart	<i>Setophaga ruticilla</i>	Secure
Ovenbird	<i>Seiurus aurocapillus</i>	Secure
Northern Waterthrush	<i>Seiurus noveboracensis</i>	Secure
Kentucky Warbler	<i>Oporornis formosus</i>	Accidental
Connecticut Warbler	<i>Oporornis agilis</i>	Secure
Mourning Warbler	<i>Oporornis philadelphia</i>	Secure
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	Secure
Common Yellowthroat	<i>Geothlypis trichas</i>	Secure
Hooded Warbler	<i>Wilsonia citrina</i>	Accidental
Wilson's Warbler	<i>Wilsonia pusilla</i>	Secure
Canada Warbler	<i>Wilsonia canadensis</i>	Sensitive
Yellow-breasted Chat	<i>Icteria virens</i>	Secure

Summer Tanager	<i>Piranga rubra</i>	Accidental
Scarlet Tanager	<i>Piranga olivacea</i>	Accidental
Western Tanager	<i>Piranga ludovicana</i>	Sensitive
Green-tailed Towhee	<i>Pipilo Chlorurus</i>	Accidental
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	Accidental
Northern Cardinal	<i>Cardinalis cardinalis</i>	Accidental
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	Secure
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	Secure
Lazuli Bunting	<i>Passerina amoena</i>	Secure
Indigo Bunting	<i>Passerina cyanea</i>	Accidental
Painted Bunting	<i>Passerina ciris</i>	Accidental
Dickcissel	<i>Spiza americana</i>	Accidental
Spotted Towhee	<i>Pipilo maculatus</i>	Secure
Cassin's Sparrow	<i>Aimophila cassinii</i>	Accidental
Field Sparrow	<i>Spizella pusilla</i>	Accidental
American Tree Sparrow	<i>Spizella arborea</i>	Secure
Chipping Sparrow	<i>Spizzella passerina</i>	Secure
Clay-colored Sparrow	<i>Spizella pallida</i>	Secure
Brewer's Sparrow	<i>Spizella breweri</i>	Sensitive
Vesper Sparrow	<i>Pooecetes grammacus</i>	Secure
Lark Sparrow	<i>Chondestes grammacus</i>	Secure
Black-throated Sparrow	<i>Amphispiza bilineata</i>	Accidental
Lark Bunting	<i>Calamospiza melanocorys</i>	Sensitive

Savannah Sparrow	<i>Passerculus sandwichensis</i>	Secure
Baird's Sparrow	<i>Ammodramus bairdii</i>	Sensitive
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Sensitive
Le Conte's Sparrow	<i>Ammodramus leconteii</i>	Secure
Nelson's Sharp-tailed Sparrow	<i>Ammodramus nelsoni</i>	Secure
Fox Sparrow	<i>Passerella iliaca</i>	Secure
Song Sparrow	<i>Melospiza melodia</i>	Secure
Lincoln's Sparrow	<i>Melospiza licolnii</i>	Secure
Swamp Sparrow	<i>Melospiza geogiana</i>	Secure
White-throated Sparrow	<i>Zonotrichia albicollis</i>	Secure
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	Secure
White-crowned Sparrow	<i>Zonotrichia leucoprys</i>	Secure
Harris's Sparrow	<i>Zonotrichia querula</i>	Secure
Dark-eyed Junco	<i>Junco hyemalis</i>	Secure
McCown's Longspur	<i>Calcarius mccownii</i>	Secure
Lapland Longspur	<i>Calcarius lapponicus</i>	Secure
Smith's Longspur	<i>Calcarius pictus</i>	Secure
Chestnut-collared Longspur	<i>Calcarius ornatus</i>	Secure
Snow Bunting	<i>Plectrophenax nivalis</i>	Secure
Bobolink	<i>Dolichonyx oryzivorus</i>	Sensitive
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Secure
Eastern Meadowlark	<i>Sturnella magna</i>	Accidental
Western Meadowlark	<i>Sturnella neglecta</i>	Secure

Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	Secure
Rusty Blackbird	<i>Euphagus carolinus</i>	Secure
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	Secure
Common Grackle	<i>Quiscalus quiscula</i>	Secure
Brown-headed Cowbird	<i>Molothrus ater</i>	Secure
Baltimore Oriole	<i>Icterus galbula</i>	Secure
Bullock's Oriole	<i>Icterus bullockii</i>	Undetermined
Brambling	<i>Fringilla montifringilla</i>	Accidental
Gray-crowned Rosy-Finch	<i>Leucosticte tephrocotis</i>	Secure
Pine Grosbeak	<i>Pinicola enucleator</i>	Secure
Purple Finch	<i>Carpodacus purpureus</i>	Secure
Cassin's Finch	<i>Carpodacus cassinii</i>	Secure
House Finch	<i>Carpodacus mexicanus</i>	Secure
Red Crossbill	<i>Loxia curvirostra</i>	Secure
White-winged Crossbill	<i>Loxia leucoptera</i>	Secure
Common Redpoll	<i>Carduelis hornmanni</i>	Secure
Hoary Redpoll	<i>Carduelis hornemanni</i>	Secure
Pine Siskin	<i>Carduelis pinus</i>	Secure
American Goldfinch	<i>Carduelis tristis</i>	secure
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Secure
House Sparrow	<i>Passer domesticus</i>	Exotc/alien

Species of Concern

Of the 402 species within Alberta, four are of utmost concern, although many species are in need of special management. Recall that 48 species of birds are ranked as 'Sensitive'. The four species discussed next are the Trumpeter Swan *Cygnus buccinator*, the Whooping Crane *Grus americana*, the Peregrine Falcon *Falco peregrinus*, and the Short-eared Owl *Asio flammeus*.

The Trumpeter Swan *Cygnus buccinator* is currently considered 'At Risk' by the General Status of Wildlife Report 2000. COSEWIC and the Federal Wildlife Act also designate the Trumpeter Swan with 'endangered' status. Although this species experienced a dramatic population decline, numbers have been gradually increasing since 1944 (James, 1997). These birds breed in Alberta, but tend to be localized near Grande Prairie; however, breeding locations occur throughout the province. Where breeding does occur, special management around the habitated lakes is required. Currently there are two nesting lakes in Tolko Industries Ltd FMA area (located in T105 R5 W6) and one just outside of the area in T122 R4 W6 (Interpreted from Wildlife referral Map, 1997). Fish and Wildlife Division of Alberta Sustainable Resource Development recommends

- no activity April 01 to September 30 within 800m of identified lakes high-water mark
- no direct flights over identified waterbodies at an altitude causing disturbance

- no long-term development within 500m of identified lakes high-water mark
- no timber harvesting within 200m of identified lakes high-water mark
- special management required between 200m and 500m of identified lakes high watermark

Although breeding lakes are currently identified, habitat requirements change as population increases breeding pairs flee nesting sites when disturbed. These birds have at least five requirements for suitable nesting lakes (James, 1997):

- stable lake water levels
- quiet wave action
- Shallow water
- isolation from human disturbance
- emergent vegetation
- adequate take-off lane
- nest-building structure

Limiting factors of the Trumpeter Swan *Cygnus buccinator* include but are not limited to:

1. Shortage of winter habitat (Not within Tolko Industries Ltd FMA area)
2. Shortage of breeding habitat (May not be a limiting factor, but rather disturbance while breeding. See below)
3. Hunting (Responsible for initial loss, but modern losses to this cause are limited.)

4. Collisions with powerlines (Due to their large size, agility is compromised, and deaths do occur due to collisions. Special attention should be given to this problem (Fannes, 1987).
5. Disturbance in Breeding Habitat (Most likely cause of concern within Tolko Industries Ltd FMA area.

Although Trumpeter Swans may become accustomed to limited human disturbance within the breeding lakes, they are very sensitive to loud traffic such as airplanes, flying within 60m, and large equipment (Hansen and Grant, 1991). The problem arises in that cygnet loss is almost unavoidable after disturbance. These birds only produce one clutch per year, therefore, after loss of the first nest, no new nest is built that year. Although much of this disturbance is documented near Grande Prairie, it is imperative to manage the few breeding lakes accordingly. If new lakes are discovered, they would need to become a priority as well.

All information taken from James 1997, unless otherwise stated.

The Whooping Crane *Grus americana* has been a widely studied species within the latter half of the twentieth century. During the nineteenth century, population size decreased to as low as 15 individuals, due to overhunting, habitat loss, and habitat degradation (White, 1997). Currently, there are approximately 180 individuals. Although the birds are not known to breed within Tolko Industries Ltd FMA area, their location is quite close, in Wood Buffalo National

Park. Birds could eventually breed within the area, as suitable habitat exists and population numbers increase. Limiting factors include, but are not limited to:

1. Habitat loss and degradation (Limited in breeding grounds as they are currently entirely within Wood Buffalo National Park)
2. Human disturbance in breeding areas (Limited because of protected areas)
3. Low reproductive potential
4. Inbreeding depression due to historical bottleneck
5. Powerline collisions (Fannes, 1987)
6. Sensitive to repeated Human Disturbance (Studies show that the Whooping Crane is not overly wary of people, but rather human disturbance, such as large operations producing noise pollution (Howe, 1989)

Due to the low population size, the Whooping Crane must be managed.

Although management can not affect genetic factors associated with the historical low population, human disturbance can be minimized to avoid future negative pressure.

All information taken from White 1997, unless otherwise stated.

The Peregrine Falcon *Falco peregrinus* is another species that requires special management. Like the Whooping Crane, this species faced extirpation years ago due to human impact. In this case, the pesticide diphenyl-trichloroethane (DDT) is responsible, rather than hunting, for the species' current

status. Habitat requirements of the Peregrine Falcon include riparian/marsh and cliff nesting sites. Little research has been done, however, on habitat requirements in the province (Rowell and Stepnisky, 1997). No accounts are recorded within Tolko Industries Ltd, FMA area, however, some individuals have been seen in the Hay-Zama complex, with one injured bird being captured in T113 R5 W6 (personal observation, 2000). With the possibility of existence within the FMA area, management should occur for this species. Limiting Factors for the Peregrine Falcon *Falco peregrinus* include but are not limited to:

1. Contaminant Levels (Still may cause some concern, but generally, levels are low enough in birds and prey species that reproduction interference is very limited)
2. Habitat Degradation/loss (This is not a concern as of yet due to the plethora of suitable habitat, however, as populations increase, and more habitat is disturbed, management implications will be changed)
3. Human disturbance (Birds nesting in urban areas are more likely to be disturbed by human intrusion than those birds in natural habitat)

To continue the Peregrine Falcon recovery, care should be taken to avoid future habitat degradation/loss and human disturbance, especially near nesting sites. All information taken from Rowell and Stepnisky 1997, unless otherwise stated.

The Short-eared Owl *Asio flammeus* is the last species, which is of special concern, residing within the FMA area of Tolko Industries Ltd. It is currently designated 'May be at Risk', but recent information shows this species has

declined drastically over the last thirty years (Perhaps over 10%) (Semenchuk, 1992). This species has been reported in a variety of areas (Clayton, 1997), but is most often associated with grassland and Aspen Parkland (Semenchuk, 1992). Ideal habitat is not within the FMA area; however, individuals do exist here. Although few studies exist, forage habitat and cyclical availability of prey species displace this owl from year to year. As mentioned earlier, two sites have confirmed year round observation. One is in the Peace River valley and the other is on the southern aspect of the Caribou Mountain Escarpment. Limiting Factors include, but are not limited to:

1. Habitat loss/degradation (Nests are built on the ground in marshland habitat. Birds may use wooded edges for hunting)
2. Food abundance (As stated earlier, the cyclical availability of food sources is important to choice of habitat)
3. Pesticides (Some concern, but mild effects)

All information taken from Clayton 1997, unless otherwise stated.

Migratory Waterfowl

Due to the abundance of wetlands, Northern Alberta is a major component of the Central migratory flyway. In particular, the Hay-Zama Complex (T111-114 R5-9 W6) is an area of major importance to waterfowl (Land Capability for Wildlife, 1974). This area is internationally recognized for its importance as a staging area. Annual counts equal hundreds of thousands of birds each year (personal conversation with NRS). A comparison to show the number of birds

potentially using the area is from a Botulism cleanup on West Hay Lake in fall of 2000. On this one lake, approximately one quarter of the complex, over 100,000 dead birds were recovered in a period of approximately one month. (Personal experience, 2000)

Hunting by both native and non-native hunters is common throughout the region. Commonly harvested species includes the Mallard, the Gadwall, and the Canada Goose.

Mammals

Mammals are by far the most recognized class of vertebrates today. Size, utilization by man and ecosystem impact are all possible reasons for this recognition. Currently there are 95 species within Alberta, the second highest provincial concentration in Canada (General Status, 2000). Seven families are present in Alberta, and all families are represented within Tolko Industries Ltd FMA area.

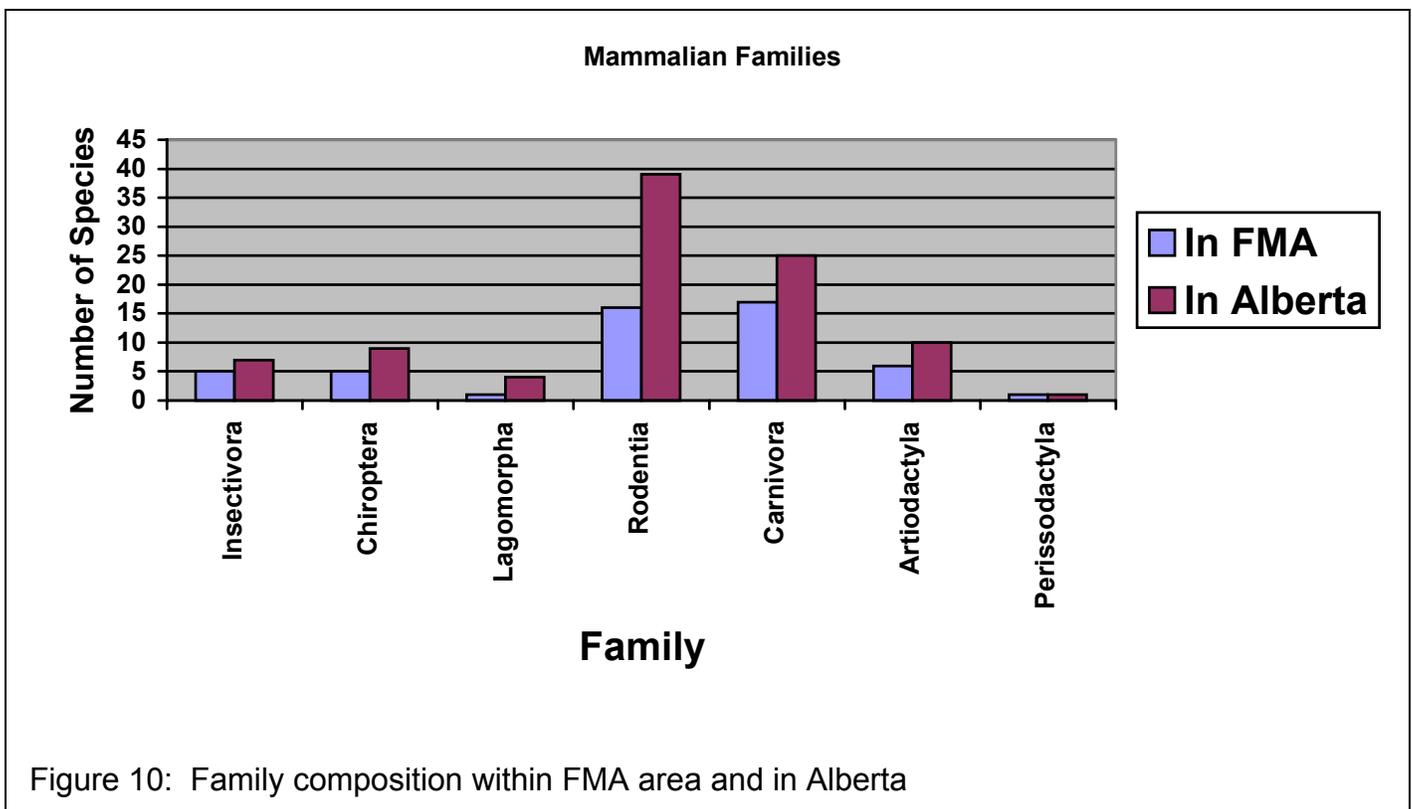


Figure 10: Family composition within FMA area and in Alberta

Alberta Mammalian Species Ranks

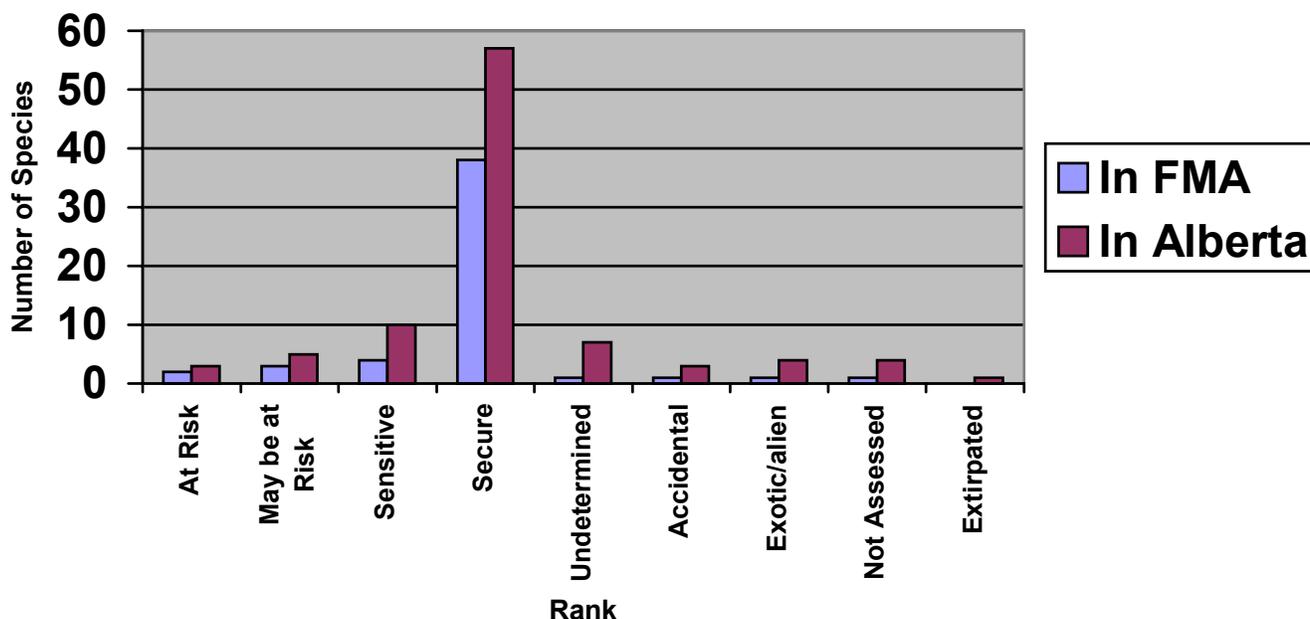


Figure 11: Comparison of Mammalian Species Ranks

The total number of species which are present with Tolko Industries Ltd FMA area is 51; however, as previously mentioned, distribution maps may be inaccurate. Dispersion is not as varied as with birds, so some inference can be made on ranges of possible inhabitant species. Information on distribution was interpreted from Pattie and Fischer, 1999. and Forsyth, 1985. Species within or possibly within Tolko Industries Ltd FMA area are highlighted in table 22 -28.

Table 22 Insectivora of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Masked Shrew	<i>Sorex cinereus</i>	Secure
Vagrant Shrew	<i>Sorex vagrans</i>	May be at Risk
Dusky Shrew	<i>Sorex monticolus</i>	Secure

Water Shrew	<i>Sorex palustris</i>	Secure
Arctic Shrew	<i>Sorex arcticus</i>	Secure
Pygmy Shrew	<i>Sorex hoyi</i>	Secure
Hayden's Shrew	<i>Sorex haydeni</i>	Secure

Table 23: Chiroptera of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Little Brown Myotis	<i>Myotis lucifugus</i>	Secure
Long-eared Myotis	<i>Myotis evotis</i>	Secure
Long-legged Myotis	<i>Myotis volans</i>	Undetermined
Western Small-footed Myotis	<i>Myotis ciliolabrum</i>	Sensitive
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	Secure
Big Brown Bat	<i>Eptesicus fuscus</i>	Secure
Eastern Red Bat	<i>Lasiurus borealis</i>	Accidental
Hoary Bat	<i>Lasiurus cinereus</i>	Secure
Northern Myotis	<i>Myotis septentrionalis</i>	May be at Risk

Figure 24 Lagomorpha of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
American Pika	<i>Ochotona princeps</i>	Secure
Mountain Cottontail	<i>Sylvilagus nuttallii</i>	Secure
Showshoe Hare	<i>Lepus americanus</i>	Secure
White-tailed Jack Rabbit	<i>Lepus townsendii</i>	Secure

Figure 25: Rodentia of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Least Chipmunk	<i>Tamias minimus</i>	Secure
Yellow-pine Chipmunk	<i>Tamias amoenus</i>	Secure
Red-tailed Chipmunk	<i>Tamias ruficaudus</i>	Sensitive
Woodchuck	<i>Marmota monax</i>	Secure
Yellow-bellied Marmot	<i>Marmota flaviventris</i>	Secure
Hoary Marmot	<i>Marmota caligata</i>	Secure
Richardson's Ground Squirrel	<i>Spermophilus richardsonii</i>	Secure
Columbian Ground Squirrel	<i>Spermophilus columbianus</i>	Secure
Thirteen-lined Ground Squirrel	<i>Spermophilus tridecemlineatus</i>	Undetermined
Franklin's Ground Squirrel	<i>Spermophilus franklinii</i>	Undetermined
Golden-mantled Ground Squirrel	<i>Spermophilus lateralis</i>	Secure
Eastern Grey Squirrel	<i>Sciurus carolinensis</i>	Exotic/alien
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	Secure
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	Secure
Northern Pocket Gopher	<i>Thomomys talpoides</i>	Secure
Olive-backed Pocket Mouse	<i>Perognathus fasciatus</i>	Sensitive
Ord's Kangaroo Rat	<i>Dipodomys ordii</i>	May be at Risk
American Beaver	<i>Castor canadensis</i>	Secure
Western Harvest Mouse	<i>Reithrodontomys megalotis</i>	Undetermined
Deer Mouse	<i>Peromyscus maniculatus</i>	Secure
Northern Grasshopper Mouse	<i>Onychomys leucogaster</i>	Secure

Bushy-tailed Woodrat	<i>Neotoma cinerea</i>	Secure
Southern Red-backed Vole	<i>Clethrionomys gapperi</i>	Secure
Heather Vole	<i>Phenacomys intermedius</i>	Secure
Meadow Vole	<i>Microtus pennsylvanicus</i>	Secure
Long-tailed Vole	<i>Microtus longicaudus</i>	Secure
Taiga Vole	<i>Microtus xanthognathus</i>	Undetermined
Prairie Vole	<i>Microtus ochrogaster</i>	Undetermined
Water Vole	<i>Microtus richardsoni</i>	Sensitive
Sagebrush Vole	<i>Lemmus sibiricus</i>	Secure
Muskrat	<i>Ondatra zibethicus</i>	Secure
Brown Lemming	<i>Lemmus sibiricus</i>	Undetermined
Northern Bog Lemming	<i>Synaptomys borealis</i>	Secure
Black Rat	<i>Rattus rattus</i>	Exotic/alien
Norway Rat	<i>Rattus norvegicus</i>	Exotic/alien
House Mouse	<i>Mus musculus</i>	Exotic/alien
Meadow Jumping Mouse	<i>Zapus hudsonius</i>	Secure
Western Jumping mouse	<i>Zapus princeps</i>	Secure
Common Porcupine	<i>Erethizon dorsatum</i>	Secure

Figure 26: Carnivora of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Coyote	<i>Canis latrans</i>	Secure
Gray Wolf	<i>Canis lupus</i>	Secure
Arctic Fox	<i>Alopex lagopus</i>	Accidental
Red Fox	<i>Vulpes vulpes</i>	Secure
Swift Fox	<i>Vulpes velox</i>	At Risk
Common Gray Fox	<i>Urocyon cinereoargenteus</i>	Accidental
Black Bear	<i>Ursus americanus</i>	Secure
Grizzly Bear	<i>Ursus Arctos</i>	May be at Risk
Common Raccoon	<i>Procyon lotor</i>	Secure
American Marten	<i>Martes americana</i>	Secure
Fisher	<i>Martes pennanti</i>	Sensitive
Ermine	<i>Mustela erminea</i>	Secure
Least Weasel	<i>Mustela nivalis</i>	Secure
Long-tailed Weasel	<i>Mustela frenata</i>	May be at Risk
Black-footed Ferret	<i>Mustela nigripes</i>	Extirpated
Mink	<i>Mustela vison</i>	Secure
Wolverine	<i>Gulo gulo</i>	May be at Risk
American Badger	<i>Taxidea taxus</i>	Sensitive
Striped Skunk	<i>Mephitis mephitis</i>	Secure
Northern River Otter	<i>Lutra canadensis</i>	Secure
Cougar	<i>Felis concolor</i>	Sensitive

Canada Lynx	<i>Lynx canadensis</i>	Sensitive
Bobcat	<i>Lynx rufus</i>	Sensitive
Feral Dog	<i>Canis familiaris</i>	Not Assessed
Feral Cat	<i>Felis catus</i>	Not Assessed

Figure 27: Artiodactyla of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Wapiti/Elk	<i>Cervus elaphus</i>	Secure
Mule Deer	<i>Odocoileus hemionus</i>	Secure
White-tailed Deer	<i>Odocoileus virginianus</i>	Secure
Moose	<i>Alces alces</i>	Secure
Caribou	<i>Rangifer tarandus</i>	At Risk
Pronghorn	<i>Antilocapra americana</i>	Sensitive
American Bison	<i>Bos bison</i>	At Risk
Mountain Goat	<i>Oreamnos americanus</i>	Secure
Mountain Sheep	<i>Ovis canadensis</i>	Secure
Wild Boar	<i>Sus scrofa</i>	Not Assessed

Figure 28: Perissodactyla of Alberta (modified from The General Species of Alberta Wild Species, 2000.)

Name	Scientific Name	Status
Feral Horse	<i>Equus caballus</i>	Not Assessed

Species of Concern

As previously mentioned, mammals are the most observed class of animals. Of the 95 species within Alberta, 51 are in Tolko Industries Ltd FMA area (Pattie and Fischer, 1999. and Forsyth, 1985). There are three species 'At Risk', in Alberta (General Status, 2000). Of these three, two are prevalent within the area; Caribou *Rangifer tarandus* and the Bison *Bos bison*. Other species which should be assessed are those which 'May be at Risk' and reside in Tolko Industries Ltd FMA area. (There are currently six species 'May be at Risk' in Alberta, and three in Tolko Industries Ltd FMA area.) These additional species include the Northern Myotis *Myotis septentrionalis*, Grizzly Bear *Ursus arctos*, and the Wolverine *Gulo gulo* (Pattie and Fischer, 1999. and Forsyth, 1985 and General Status, 2000).

The Woodland Caribou *Rangifer tarandus caribou* has been studied extensively in Northern Alberta. These large ungulates range across the northwest corner of Alberta; however, the bulk of the population resides in the Caribou Mountains, where ideal habitat is located. Caribou require large tracts of mature old forest with ample lichen supplies. For most part, these are found in peatlands. Caribou seldom utilize upland habitat, with associated Aspen, White Spruce, Paper Birch, and Balsam Fir (Bradshaw et al, 1995). There is no accurate estimate of population size because of low density, clumped distribution, cryptic color, etc. Limiting Factors include, but are not limited to:

1. Predation (Alterations of ecosystems have implications on the dynamics of Caribou and their main predator, the wolf *Canis lupus*)
2. Habitat loss and degradation (Any disturbance effects Lichens, the main food source of the Caribou. Also, cleared land proceeding through sucessional stages draws other ungulates, including Moose *Alces alces*, thereby increasing the concentration of predators as well. (see limiting factor 1))
3. Linear corridors (Linear corridors have dramatic effects on predator prey dynamics. James and Smith, 2000. illustrate a great increase in Wolf and Caribou activity along linear corridors. They also showed that mortality of Caribou in these areas is much increased.)

It seems that any involvement of humans within Caribou habitat has a negative effect. One study, however, showed that where the herd spends the winter, calving location, weather, and insect harassment, rather than the vicinity of a [human intrusion] road largely influence distribution (Yost and Wright, 2001). It would seem then that Caribou are not affected by human presence, but rather human-caused habitat degradation. This fact has led the provincial government to impose regulations involving Caribou and development. Caribou Protection Areas are situated in the Northern third of Tolko Industries Ltd FMA (roughly north of Twp 119 and the Steen River watershed as far south as Twp 116), as well in the east towards to Caribou Mountains (Twp 110-118 between ranges 7-17)(Wildlife Referral map, 1997), approximately 100 townships.

All information taken from Dzus 1997, unless otherwise stated.

Another of Alberta's mammals that is At Risk is the Bison *Bos bison*. This free ranging animal exists only in the Hay-Zama complex area of Tolko Industries Ltd FMA area. Most of the complex is situated within Zama Mills operational area, but the Bison have been observed far downstream along the Hay River flood plain, as well as an unconfirmed report of a small herd south of Rainbow Lake. The species was introduced into the area as an enclosed reintroduction program. Population size remained stable for many years, approximately 60 individuals. Once the Bison were released, the population exploded to an estimated present population size of several hundred animals. The habitat required by this species is exhibited by the Hay-Zama Complex and associated flood plain. Wide spread fields with intermixed scrub trees, such as willow abound. Although the herds usually stay relatively close to the grassy meadows of the complex, herds will enter the associated adjacent forested area throughout the year. Limiting factors include, but are not limited to:

1. Habitat loss/degradation (Disturbance or removal of stands near the flood plains of the Hay River may remove Bison from that area. Since these trees provide protection from predators and weather, as well as calving areas, they should be managed as important habitat.)
2. Disease (Anthrax and Tuberculosis are extreme problems of the Bison of Northern Alberta. Anthrax, caused by *bacillus anthraxus*, is a highly infectious, fatal disease. Although flies and other wildlife can spread the disease, they usually do not contract it. The cause of the initial outbreak is not well known, however it is believed to be fluctuating

water levels over dormant *Bacillus anthraxus* spores. Taken from Pybus, 2000).

3. Genetic invariability

Bison seem to be at risk mostly due to small population size and disease. The total population within the FMA area was derived from just a couple dozen individuals, creating genetic similarity within the population. Numbers seem to be rising and may reach a stable level, however, with this sameness, impacts affecting common gene loci could affect the entire herd. One last note of interest is the bison's apparent lack of fear of humans. People have ventured within 30 feet of the large animals (author included).

Information from Pattie and Fisher, 1999; Pybus, 2000

The Northern Myotis *Myotis septentrionalis* is currently designated 'May be at Risk' (General Status, 2000). Populations of this species are quite small and distribution is clumped. Little is known about the habits and habitats of the Northern Myotis, however, much research is being conducted on the species at the present time. Habitat requirements include roosting and foraging sites in summer and hibernacula sites in winter (distribution maps don't place the Northern Myotis in Northern Alberta in winter). Roosting sites have been shown to be most likely located in old-growth aspen mixedwood stands (Lee et al, 1997). These old stands provide plenty of edges and gaps making foraging possible over small bogs, puddles, and small clearings. Also due to reduced clutter, communication and navigation are better achieved (Barclay, 1991).

Individual roost trees are postulated to be an outcome of old growth forests. This is formulated, based on height, diameter, and degree of rot in the tree (Crampton and Barclay, 1998). In fact, Grindal, 1998, shows that roosts average 4.2 metres in trees averaging 8.7 metres in height. Grindal, 1998 also showed that roost trees average 55% remaining bark, average 10.6 metres to forage clearings and were relatively close to water. Limiting Factors include, but are not limited to:

1. Climate (Diversity and abundance of bats decreases with latitude)
2. Hibernacula (Suitable hibernacula are limited. As well, any disturbance during hibernation would probably result in that population's extinction. This can be hypothesized, based on the amount of energy needed to exit torpor. Once out of this state the individuals would need to eat. Since this species consumes insects, it would starve from lack of a food source in winter.)
3. Summer Roosts (As mentioned earlier, summer roosts are important for bat nesting and as a forage base.)

Due to a lack of understanding of this fragile species, forest managers should attempt to maintain current amounts of old growth, preferably in patch sizes large enough to meet forage requirements and to maintain bat populations (Crampton and Barclay, 1998 and Lee et al, 1997).

All information taken from Caceres and Pybus, 1997, unless otherwise noted.

The Grizzly *Bear Ursus arctos* has been extirpated from much of its habitat since colonization of the prairie provinces. Now confined to the

mountains and Northern Boreal region, the Grizzly is considered At Risk (General Status, 2000) and a special concern on a federal level (COSEWIC, 2001). Many studies are being conducted at the present time, including the Eastern Slopes Grizzly Project and the Northern Boreal Grizzly Project. Habitat of bears, in the northern reaches of Alberta, is quite varied, as the home ranges of Grizzlies can be large. Home range is typically dependent on the availability of food sources. Individuals near rich salmon streams in British Columbia have ranges as low as 27 km². Bears in the interior of Alaska, on the other hand, have recorded home ranges of up to 1350km². It is interesting to note that Grizzly range is actually not entirely utilized. Instead, a range is typically a group of foraging areas connected by travel corridors. Bears are solitary creatures occupying different areas, except for a brief period during the mating season (May to July). Currently, the population of the province is below 1000 individuals. This can create problems, as this great dispersal can lead to decreased reproductive potential. This leads into limiting factors of the Grizzly Bear. Although, a status report for *Ursus Arctos* was not available, limiting factors can be devised from other sources.

1. Human caused mortality (Some hunting of Grizzly Bears is permitted by the Alberta government, however it is heavily regulated. Another note is the extermination of nuisance bears)
2. Habitat loss/fragmentation/degradation (As mentioned previously, bear ranges can be large, but patchy. Any clearing of forests would contribute to loss/fragmentation/degradation of bear habitat)

3. Low population numbers/low density (As with the Bison *Bos bison*, low numbers may contribute to genetic similarity problems.

Several noteworthy projects are currently underway, such as the Eastern Slopes Grizzly Bear Project and the Northern Boreal Grizzly Bear Project. Many other individual studies are being conducted on the Grizzly bear, financed by diverse organizations, due to its status and its public image of a correlation with pristine wilderness.

Information in this section was obtained and interpreted in part from the following unless otherwise stated.

<http://www.nature-net.com/bears/>

<http://www.canadianrockies.net/Grizzly>

<http://www3.gov.ab.ca/srd/fw/bears/index.html>

The last species, which may be of concern, is the Wolverine *Gulo gulo*. Little is known about this species, and there are considerable gaps in the understanding of Wolverine ecology (Banci, 1994). Although Alberta Environment estimates less than 1000 breeding individuals exist in the entire province, no actual population study has been carried out. This estimate is based on extrapolation from trapping records. Within North-western Alberta is Fur Management Zone 2, which has produced the highest yield of Wolverine pelts for many years. Individuals occupy large ranges and are extremely mobile, but it is known that individuals tend to remain close to their natal site (Wilson et al., 2000). Denning and natal sites may be at different sites, however their

structure is usually quite the same, consisting of intricate tunnels around rock and vegetative structure in large amounts of snow accumulation (Lee and Niptanatiak, 1996 and Magoun, 1998). These two sites are of significant importance for they have been used to estimate range size. Denning sites typically consist of 4%-7% of the home range (Lee and Niptanatiuk, 1996). Magoun 1998 showed that food was carried up to 22km to reproductive/natal dens. As ranges are large, but individuals tend to stay close to their natal site, genetically similar populations have arisen. Individuals of each population have been calculated as being an average of 350km apart (Wilson et al, 2000). Management within Tolko Industries Ltd FMA area must obviously take place, but to what extent is unclear. More information about the Wolverine is desperately needed, but as for now, the following limiting factors are known.

1. Trapping/hunting (Due to the great area of home ranges, the possibility that individuals might encounter traps is increased. Impacts are greater when fur prices are high(as more traps are set), but individuals are likely taken in traps meant for other species. Without an accurate estimate, however, the effects of trapping on the species is hard to assess.)
2. Habitat fragmentation/degradation (The edge of their range is slowly eroding as human involvement encroaches. This is not a local trend, but rather a global occurrence. The Wolverine tends to shy away from human development whenever possible. With development in natural areas in Alberta, habitat is seemingly shrinking. At some instances,

the Wolverine used human induced changes to their advantage. Some evidence shows hunting of Snowshoe Hares *Lepus americana* increased in clearcuts. As well, when linear corridors were encountered, they were used 100% of the time for distances of 3-3000 meters (Ernst, 2000). Areas with permanent structure are definitely a concern, as the Wolverine did not use these areas, as they did with no structure present. Another implication with changes in habitat is the changes in ungulate populations. The extent to which this may contribute negatively is unknown, however it does affect the dynamics of the system.

3. Low reproductive potential, low population, and low concentration (These three factors combined make a stable population size a hard objective to achieve.)

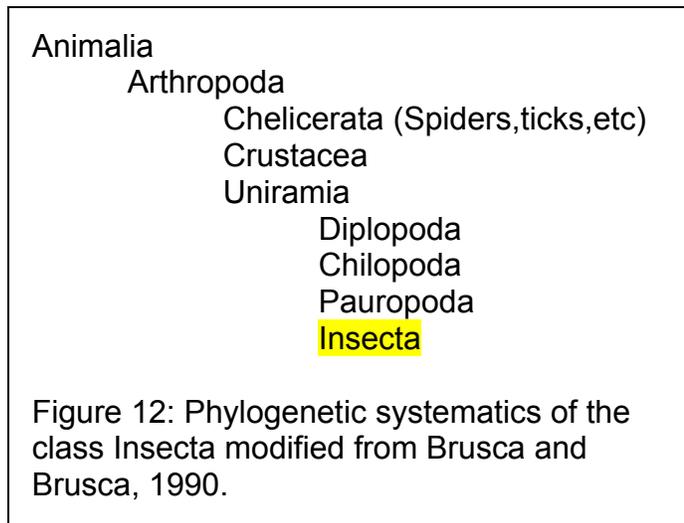
The Wolverine species requires an immense amount of habitat. Their 'fear' of humans also is harmful to populations across Northern Alberta. Their absolute success may not be achievable without setting aside large tracts of habitat as is proposed in several wilderness projects like the Y2Y (Yellowstone to Yukon) project. The Wolverine will likely persist in Tolko Industries Ltd FMA area. However, considering individual requirements, it is conceivable that all individuals will be influenced by human/industrial activity. With Wolverine studies being relatively few at the present time, it would be hard to estimate the extent of the impact from activities in this area; however, more research should eventually fill the information gaps leading to positive management of the Wolverine.

All information taken from Peterson, 1997, unless otherwise noted.

Furbearing animals are of great importance to native and non-natives alike. This long-standing traditional activity can bring great financial gains. In fur management zone 2, of North-western Alberta, fur-bearing animals abound, and are taken in highest numbers within the province. The animals included are the Badger *Taxidea taxus* (Not likely in Tolko Industries Ltd FMA area (Pattie and Fischer, 1999. and Forsyth, 1985).), beaver *Castor canadensis*, bobcat *Lynx rufus*, coyote *Canis latrans*, fisher *Martes pennanti*, red fox *Vulpes vulpes*, lynx *Lynx canadensis*, marten *Martes americana*, mink *Mustela vison*, muskrat *Ondatra zibethicus*, otter *Lutra canadensis*, red squirrel, *Tamiasciurus hudsonicus*, weasel *Mustela nivalis*, wolf *Canis Lupis*, and the Wolverine *Gulo gulo*. As activity continues within Tolko Industries Ltd FMA area, the natural movement of furbearers may be hindered/altered. Care should be given to these species, as the prime trapping times overlap that of Forestry peak times (between November and April). (Alberta Guide to Trapping Regulations, 2000). Little work has been done on furbearers in the area, however some private industry studies have been performed. The ground-based, snow-tracking method has been shown to effectively review the status of these mammals.

Insects

Insects are really an interesting group of animals that are quite understudied in Northern Alberta. In fact, little money is contributed to their study, unless they have a related effect on some form of industry such as agriculture or forestry. It



would be interesting to analyze Alberta's invertebrate riches, but as will be shown with insect diversity, this would be a tremendous undertaking. As shown in figure 12, the class insecta is quite specific. Most of the invertebrate clades are this complex, and there are many different phyla. To put this into perspective, there are currently 30,000 species of insects known in Canada, but that only represents an estimated 55% of the total number of species (Danks, 1993). This estimate may even be conservative, as some studies claim the number to be less than 50% (Behan-Pelletier, 1993). The most specific species assessment that was found used an area as large as the western boreal forest. This is sufficient, as species diversity is relatively consistent across the region. The number of species estimated for this region is obviously lower than the whole of Canada, (based on the more northern climate) but it is still a staggering 12,000 described species (Danks, 1993). Of these, the most prevalent species come from four different orders: Coleoptera (Beetles), Diptera (True Flies), Lepidoptera

(Butterflies and moths), and Hymenoptera (Ants, bees, and wasps) (Brusca and Brusca, 1990). It is easy to see that these are important groups, in terms of numbers, for many familiar insects fall into these orders. These insect species mark the basis for most food chains, and thus show the importance of vast numbers of individuals in each species. Listed in the General Status of Alberta Wild Species Report 2000 was only members of the order Lepidoptera (butterflies and moths). There were 162 species listed, with none being designated 'At Risk', and only one species designated 'May be at Risk' (General Status, 2000). This species is Weidemeyer's Admiral *Limentis weidemeyerii*, which was considered a special concern to COSEWIC along with the Monarch Butterfly *Danaus plexippus*. No other species of invertebrates were considered in either of these assessments.

Table 29: Forestry Pests of Northern Alberta (modified from http://www.NRCan.gc.ca/cfs/proj/sci-tech/arena/pest_e.html, 2001)

Name	Scientific Name	Host Species	Effect
Bruce Spanworm	<i>Operophtera bruceata</i>	Hardwoods	Defoliation caused by a single generation each year.
Western Black-headed budworm	<i>Acleris gloverana</i>	Conifers	Larvae feed on needles leading to successive defoliation. Ability to kill
Eastern Larch Beetle	<i>Dendroctonus simplex</i>	Larch	Common, but little damage leads to pest status.

Spruce Budworm	<i>Choristoneura fumiferana</i>	Conifers (prefers Balsam Fir and White Spruce)	Attacks consist of defoliation, which often completely removes the current years foliage = mortality.
Forest Tent Caterpillar	<i>Malacosoma disstria</i>	Trembling Aspen	Complete defoliation, but mortality usually does not result.
Hemlock Looper	<i>Lambdina fiscellaria</i>	Hemlock, but also other conifers	Defoliation damages all species, but only will kill Balsam Fir
Jack Pine Budworm	<i>Choristoneura pinus</i>	Pine species	Defoliation of usually the crown. If attack occurs throughout tree, mortality usually occurs.
Large Aspen Tortrix	<i>Choristoneura conflictana</i>	Aspen	Larvae completely devour buds, rarely resulting in mortality.
Satin Moth	<i>Leucoma salicis</i>	Deciduous	Larval defoliation, rarely leading to mortality.
Spruce Beetle	<i>Dendroctonus rufipennis</i>	Spruce Species	Beetles bore into bark at base of tree retarding sap flow. Blue-stain fungi may infest bore holes as well. Both may lead to mortality.
White Pine Weevil	<i>Pissodes strobi</i>	Spruce and Pine	Larvae and adults bore holes to feed on inner bark. Usually does not kill tree, but fungal pathogens can enter system, likely leading to mortality.

Literature Cited

- Bahan-Pelletier, V.N. 1993. Diversity of Soil Arthropods in Canada: Systematic and Ecological Problems. Mem. Ent. Soc. Can. 165:11-50.
- Banci, V.P. 1994. Wolverine.pp99-127 in the Scientific Basis for Conserving Forest Carnivores; Marten, Fisher, Lynx, and Wolverine in the Western US. USDA Forest Service, General Technical Report. 254.
- Barclay, R.M.R. 1991. Population Structure of Temperate Zone Insectivorous Bats in Relation to Foraging Behavior and Energy Demand. J. of Anim. Ecol. 60:165-178.
- Blaustein, A.R., D.B. Wake, and W.P. Sousa. 1994. Amphibian Declines: Judging Stability, Persistence, and Susceptibility of Populations to Local and Global Extinction. Con. Biol. 8:60-71.
- Bradshaw, C.J.A, D.M. HerbertA.B. Rippen, and S. Boutin. 1995. Winter Peatland Habitat Selection by Woodland Caribou in Northeastern Alberta. Can. J. of Zool. 73:1567-1574.
- Brusca, R.C. and G.J. Brusca. Invertebrates. Sinauer Associates, Inc. Sunderland, Mass.1990.
- Caceres, M.C. and M.J. Pybus. 1997. Status of the Northern Long-Eared Bat (*Myotis septentrionalis*) in Alberta. Alberta Environment, Wildlife Management Division. Wildlife Status Report No. 3, Edmonton, AB. 19pp.
- Clayton, K.M. 2000 Status of the Short-eared Owl (*Asio flammeus*) in Alberta. Alberta Environment, Fisheries and Wildlife Management Division, and Alberta Conservation Association, Wildlife Status Report No. 28, Edmonton, AB. 15 pp.
- COSEWIC, 2001. Canadian Species at Risk, May 2001. Committee on the Status of Endangered Wildlife in Canada. 31pp.
- Crampton, L.H. and R.M.R. Barclay. 1998. Selection of Roosting and Foraging Habitat by Bats in Different Aged Aspen Mixedwood Stands. Cons. Biol. 12(6) 1347-1358.
- Danks, H.V. 1993. Patterns of Biodiversity in the Canadian Insect Fauna. Mem. Ent. Soc. Can. 165:51-74.
- Danks, H.V. and R.G. Footitt. 1989. Insects of the Boreal Zone of Canada. The Can Ent. 121:625-690.
- Dzus, E. 2001. Status of the Woodland Caribou (*Rangifer tarandus caribou*) in Alberta. Alberta Environment. Fisheries and Wildlife Management Division and the Alberta Conservation Association, Wildlife Status Report No 30, Edmonton AB, 47pp.
- Ernst, J. 2000. Pioneer Natural Resources Canada Inc. Wildlife Studies. Prepared by Ernst Environmental Services.
- Fannes, C.A. 1987. Bird Behavior and Mortality in Relation to Powerlines in Prairie Habitat. US Department of the Interior, Fish and Wildlife Service. Fish and Wildlife Technical Report 7. Washington DC.
- Fisher, C. and J. Acorn. Birds of Alberta. Lone Pine Publishing. Edmonton. 1998.

- Forsyth, A. Mammals of the Canadian Wild. Canada House Publishers Ltd. Canada, 1985.
- Grindal, S.D. 1998. Habitat Use by Bats, *Myotis* spp in Western Newfoundland. *Can. Field. Nat.* 113(2) 258-263.
- Guide to Trapping Regulations. 2000. Alberta Environment.
- Hamilton, I.M., J.L. Skilnick, H.Troughton, A.P. Russel, and G.L. Powell. 1997. Status of the Canadian Toad (*Bufo hemiphrys*) in Alberta. Alberta Environmental Protection, Wildlife Management Division, Wildlife Status Report No. 12, Edmonton, AB. 30pp.
- Hansen, P. and T.A. Grant. 1991. The Effects of Human Disturbance on Trumpeter Swan Breeding Behavior. *Wild. Soc. Bull.* 19:248-257.
- Howe, M.A. 1989. Migration of Radio-Marked Whooping Cranes from the Aransas-Wood Buffalo Population: Patterns of Habitat Use, Behavior and Survival. US Department of the Interior, Fish and Wildlife Service. Fish and Wildlife Technical Report 21. Washington DC.
- http://www.NRCan.gc.ca/cfs/proj/sci-tech/arena/pest_e.html, 2001
- <http://www.kingsnake.com/TARAS/>
- <http://www.open.ac.uk/daptf/>
- http://www3.gov.ab.ca/srd/fw/threatsp/bt_hab.html
- <http://www.nature-net.com/bears/>
- <http://www.canadianrockies.net/Grizzly>
- <http://www3.gov.ab.ca/srd/fw/bears/index.html>
- James, A.R.C. and A.K. Smith. 2000. Distribution of Caribou and Wolves in Relation to Linear Corridors. *J. of Wild. Man.* 64:154-159.
- James, M.L. 2000. Status of the Trumpeter Swan (*Cygnus buccinator*) in Alberta. Alberta Environment, Fisheries and Wildlife Management Division, and Alberta Conservation Association, Wildlife Status Report No. 26, Edmonton, AB. 21 pp.
- Land Capability for Wildlife/Waterfowl. Soil Research Institute Branch, Agriculture Canada. Ottawa, 1974.
- Lee, J. and A. Niptanatiuk. 1996. Observations of Repeated Use of a Wolverine (*Gulo gulo*) den on the Tundra of the NWT. *Can. Field Nat.* 110(2):349-350.
- Lee, P.C. S. Crites M. Niefeld H. Van Nguyen and J.B. Stelfox. 1997. Characteristics and Origins of Deadwood Material in Aspen-Dominated Boreal Forests. *Ecological Applications* 7:691-701.
- Magoun, A.J. and J.P. Copeland. 1998. Characteristics of Wolverine Reproductive Den Sites. *J. of Wild. Man.* 62(4) 1313-1320.
- Nelson, J.S. and M.J. Paetz. The Fishes of Alberta. University of Calgary Press. Calgary. 1992.
- Pattie, D. and C. Fisher. Mammals of Alberta. Lone Pine Publishing. Edmonton, 1999.
- Peterson, R.T. Western Birds. Houghton Mifflin Company. USA. 1990.

- Peterson, S. 1997. Status of the Wolverine (*Gulo gulo*) in Alberta. Alberta Environmental Protection, wildlife Management Division. Wildlife Status Report No 2, Edmonton, AB. 17pp.
- Pough, F.H., J.B. Heiser, and W.N. McFarland. Vertebrate Life. Prentice Hall. Upper Saddle River, NJ. 1996.
- Prescott, D.R.C. 1997. Status of the Piping Plover (*Charadrius melodus*) in Alberta. Alberta Environmental Protection, Wildlife Management Division, Wildlife Status Report No. 1, Edmonton, AB. 19pp.
- Pybus, M.J. Anthrax in Alberta: Wildlife Implications. Alberta Environment Publication I/861. 09 Aug 2000.
- Rowell, P. and D.P. Stepnisky. 1997. The Status of the Peregrine Falcon (*Falco peregrinus*) in Alberta. Alberta Environmental Protection, Wildlife Management Division, Wildlife Status Report No. 8, Edmonton, AB. 23 pp.
- Russel, A.P. and A.M. Bauer. The Amphibians and Reptiles of Alberta. University of Calgary Press. Calgary. 2000.
- Salt, W.R. and A.L. Wilk. Birds of Alberta. Queens Printer. Edmonton. 1966.
- Sauer, J.R. J.E. Hines and J. Fallen. The North American Breeding Bird Survey, Results and Analysis 1966-2000. Version 2001.2. USGS Patuxent Wildlife Research Center. Laurel, MD.
- Semenchuk, G.P. Atlas of the Breeding Birds of Alberta. Friesen Printers. Canada. 1992.
- The General Status of Alberta Wild Species 2000. Information Centre – Publications. Alberta Environment. Alberta Sustainable Development. 2000.
- Wagner, G. 1997. Status of the Northern Leopard Frog (*Rana pipiens*) in Alberta. Alberta Environmental Protection. Wildlife Management Division, Wildlife Status Report No. 9, Edmonton, AB. 46pp.
- Wellicome, T.I. 1997. Status of the Burrowing Owl (*Speotyto cunicularia hypugaea*) in Alberta. Alberta Environmental Protection, Wildlife Management Division, Wildlife Status Report No. 11, Edmonton, AB. 21 pp.
- White, J.L. 2001. Status of the Whooping Crane (*Grus americana*) in Alberta. Alberta Environment, Fisheries and Wildlife Management Division, and Alberta Conservation Association, Wildlife Status Report No. 34, Edmonton, AB. 21 pp.
- Wildlife Referral Map. Alberta Environment. 1997. 1:6000,000.
- Wilson, G.M., R.A. Van Den Bussche, R.A. Kennedy, P.K. Gunn, and A.K. Poole. 2000. Genetic Variability of Wolverines (*Gulo gulo*) from the NWT, Canada. J. of Mamm. 81(1) 186-196.
- Yost, A.C. and R.G. Wright. 2001. Moose, Caribou and Grizzly Bear Distribution in Relation to Road Traffic in Denali National Park, Alaska. Arctic. 54(1) 41-48.