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SPECIES AT RISK

Wildlife Survey of the Antelope Creek

Habitat Development Area

2007

Alberta Species at Risk Report No. 118

Alberta

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Wildlife Survey of the Antelope Creek

Habitat Development Area – 2007

Jennifer Carpenter

Joel Nicholson

Alberta Species at Risk Report No. 118

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TABLE OF CONTENTS

Acknowledgements.....	iii
Executive Summary	iv
1. Introduction.....	1
2. Methods.....	2
2.1 Avian point counts	3
2.2 Amphibian call surveys.....	4
3.3 Burrowing owl playback surveys.....	5
3.4 Raptor and shrike survey	5
3.5 Incidental monitoring.....	5
3. Species Observations	5
3.1 Birds.....	5
3.2 Amphibians	8
3.3 Mammals.....	8
3.4 Other observations	9
4. Discussion and Recommendations	10
4.1 Wetland habitats.....	10
4.2 Upland habitats	11
4.3 Noise	13
4.4 Monitoring strategy.....	14
References.....	15
Appendix I.	18
Appendix II.	20
Appendix III.....	21
Appendix IV.....	22
Appendix V.....	23

TABLE OF FIGURES

Table 2.0.1. General locations and names of the fields that are discussed in this report.

Table 2.1.1. Total number of upland and wetland point count plots in each field.

Table 3.1.1. Sensitive avian species recorded during surveys of the ACHDA.

Table 3.2.1. Amphibian species recorded during surveys.

Table 3.3.1. Mammal species recorded during the survey and in previous records.

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EXECUTIVE SUMMARY

The Antelope Creek Habitat Development Area (ACHDA), located west of Brooks, Alberta, is a working ranch cooperatively managed by multiple partners. An objective of the ACHDA is to balance the needs of multiple land uses while also promoting wildlife habitat. To assess species occurrence on the ranch and collect baseline wildlife data, wildlife surveys were conducted from 15 June to 30 June 2007 and included avian point counts, amphibian call surveys, burrowing owl playback surveys, shrike and hawk searches, and incidental observation. Eighty-two wildlife species were seen or heard during the surveys, including 72 bird, seven mammal, and three amphibian species. Twenty-eight species at risk were seen or heard, including four 'may be at risk', 22 'sensitive', and two of 'undetermined' status. Many of these species are strongly associated with prairie wetlands or native mixed-grass prairie uplands. These surveys are one element in long-term monitoring to evaluate changes in the relative abundance and diversity of wildlife on the ranch.

1. INTRODUCTION

The Antelope Creek Habitat Development Area (ACHDA) is a ranch that aims through cooperation with multiple agencies to balance the needs of livestock, wildlife, and the oil and gas industry (DUC 2007). Established in 1986, the ACHDA encompasses a >22 km² area about 10 km west of Brooks, Alberta (DUC 2007). Founding partners for the ranch included the Alberta Fish and Wildlife Division, Wildlife Habitat Canada, Ducks Unlimited Canada and the Alberta Fish and Game Association. Through cooperative efforts, a multitude of other organizations and individuals have contributed to the ACHDA, including: Alberta Environment; Alberta Public Lands Division; the Eastern Irrigation District; and the Universities of Alberta, Lethbridge and Calgary (DUC 2007).

The ACHDA is composed primarily of dry mixed-grass prairie but also contains some tame pasture and several managed wetlands. These wetlands and their associated riparian areas provide a mosaic of upland and wetland habitat that supports multiple prairie-dependent wildlife species. Upland prairie habitat in this region is dominated by needle and thread (*Stipa comata*) and blue grama grass (*Bouteloua gracilis*) with patches of prickly pear (*Opuntia polyacantha*), ball cactus (*Coryphantha vivipara*) and sagebrush (*Artemisia cana*) dispersed throughout (Guyn and Clark 1999, Koper and Schmiegelow 2006b).

There are several substantial water bodies within the ACHDA, including Lake San Francisco and 36 constructed wetland basins managed by Ducks Unlimited Canada (DUC 2007). In addition, there are many smaller ephemeral water bodies, including: the canals that connect managed basins; spillover from these canal systems; spillover from managed basins; and natural depressions. The fringes of wetland basins and canals are typically dominated by common cattail (*Typha latifolia*), spike rush (*Eleocharis palustris*) and great bulrush (*Scirpus acutus*) (Koper and Schmiegelow 2006b). In some locations, wetlands are bordered by salty mudflats edged by foxtail (*Hordeum jubatum*). While there are generally few trees and shrubs in the area, willow (*Salix* spp.), silver buffaloberry (*Shepherdia argentea*), and a few stands of aspen (*Populus tremuloides*) can be found in wetter areas, mainly along canals.

The ACHDA is primarily used for livestock grazing, however, petroleum extraction is significant, particularly on the eastern portion of the ranch. This development has generated an extensive network of roads throughout the eastern portion of the ranch. Recreational use and public access of the ranch is encouraged, and there are posted maps, designated parking areas, and a public access road that loops through the ranch. Other than this designated route, public access is by foot only.

The purpose of the 2007 wildlife survey was to provide information to ACHDA managers regarding wildlife occurrence on the ranch. This information will be used to (1) to guide current management and planning efforts, particularly those beneficial to sensitive species, and (2) evaluate changes in the relative abundance and diversity of wildlife on the ranch as one element in long term monitoring.

2. METHODS

Methods for the wildlife surveys generally followed those outlined in the 2005 Sensitive Species Inventory Guidelines (SSIG), published by Alberta Sustainable Resource Development and Fish and Wildlife (2005). All surveys took place between 15 June and 30 June 2007 in weather conditions with no precipitation and wind speeds less than 20 km/h. Following the SSIG, species at risk in this report include: (1) species determined to be endangered or threatened under Alberta's *Wildlife Act*; (2) species of special concern following a provincial detailed status assessment by the Alberta Endangered Species Conservation Committee (ESCC) and (3) all species ranked by the 2005 general status assessment process as at risk, may be at risk, sensitive or undetermined. All observations of species made during surveys were submitted to the Fisheries and Wildlife Management Information System (FWMIS).

For survey purposes, the ranch was divided along pre-existing fence line divisions. Fields were labeled following Table 2.0.1. Five fields of native mixed-grass prairie are labeled field 1, field 2, field 3, field 4 and Cassil's field. A 6th smaller field with continual grazing is labeled the grazed field. Two additional areas, managed without grazing for nesting cover, are labeled the NE idle, and NW idle field. An additional small field labeled home was also surveyed. Other areas of the ranch were not

extensively surveyed and included planted and irrigated fields, labeled the pivot and CWG fields. Some surveys were also conducted on land adjacent to the ACHDA, labeled Oakland's for this report.

Table 2.0.1. General locations and names of fields discussed in this report.

Field Name	General Location
Field 1	northwest
Field 2	northeast
Field 3	south
Field 4	southwest
Cassils	east
Grazed field	southeast
Home field	central
NE idle	northeast
NW idle	northwest
Oakland's	north of the ACHDA
Pivot and CWG fields	central and southeast

2.1 Avian point counts

Birds were surveyed using circular point counts (see Appendix III for locations). Points (n=104) were placed following Koper and Schmiegelow (2006a) with 100 m radius plots centred every 300 m along transects radiating from wetlands or roads. All point count plots were accessed by foot. The number of plots in each field was determined by field size and configuration (Table 2.1.1). Count duration was five minutes and was not limited to birds, with all species within the 100 m radius recorded. In addition, evidence of breeding activity (song, display, den or nesting behaviour) was noted. Upland point counts were centred at least 100 m from a wetland edge. Wetland point counts were made at the wetland edge and included all wetland habitats within a 100 m radius. Counts began after sunrise (~05:15) and concluded by 10:00. Most counts

were repeated after a seven day interval; however counts in Oakland's were conducted only once.

Table 2.1.1. Total number of upland and wetland point count plots and times counted in each field.

Field Name	Number of Count Plots		Times Counted
	Upland	Wetland	
Field 1	10	4	2
Field 2	8	6	2
Field 3	14	6	2
Field 4	13	3	2
Cassils	7	4	2
Grazed field	3	1	2
Home field	1	1	2
NE idle	1	1	2
NW idle	2	2	2
Oakland's	14	3	1
Total	73	31	

2.2 Amphibian call surveys

Call surveys for amphibians were located (1) at randomly selected points along wetland edges, and (2) at points along roads and trails near wetlands (see appendix V for locations). Points along roads and trails were selected based on proximity of the road or trail to a wetland. Call surveys took place after dark between 22:30 and 02:00 and followed the SSIG (section 1.7.2). After a delay of two minutes, a three minute survey was conducted. If sensitive species were heard, the site was revisited during the day and egg masses and tadpoles were searched for.

3.3 Burrowing owl playback surveys

Call playback surveys and associated ground searches were conducted at sites with (1) previous observations of burrowing owl (*Athene cunicularia*) activity, and (2) sites with suspected burrowing owl breeding activity. Call playback survey methodology followed the SSIG (section 4.7.1 and 4.7.2).

3.4 Raptor and shrike survey

Observers walked along canals and searched shrubby and treed areas for loggerhead shrike (*Lanius ludovicianus*) and raptor breeding activity. Silver buffaloberry (*Shepherdia argentea*) shrubs were observed first from a distance of >200 m with a spotting scope and then again at close range on foot for evidence of loggerhead shrikes. Areas with Swainson's hawk (*Buteo swainsoni*) circling and calling were searched for nest sites.

3.5 Incidental monitoring

All incidental observations of sensitive species were recorded during the study period. This included all observations made while walking or driving between sites, and while conducting other surveys. During avian point counts, sensitive species observed beyond the 100 m radius plot were recorded separately as incidentals.

3. SPECIES OBSERVATIONS

A total of 82 wildlife species were observed (seen or heard) on the ACHDA during the 2007 surveys (see appendix I for complete species listing). These include 72 bird, seven mammal and three amphibian species. Of these, four are classified as 'may be at risk', 22 as 'sensitive' and two as of 'undetermined' status in Alberta (Alberta Sustainable Resource Development 2007).

3.1 Birds

Seventy-two bird species were observed and 26 bird sensitive species were located (table 3.1.1). Seventeen of these species are strongly associated with wetland

habitats and ten with native mixed-grass upland prairie. There was direct evidence that most of the sensitive bird species were actively breeding on the ACHDA through breeding displays or songs, observations of juveniles, nest defence behaviours or observation of active nests.

No burrowing owls were found during playback surveys. An active Swainson's hawk nest was located on the ranch in the NW idle field. A second nest was located in trees adjacent to the ranch. Both pairs of birds used the ACHDA extensively for foraging. Ferruginous hawks (*Buteo regalis*) were not observed during the survey and there are no prior records for ferruginous hawks on the ACHDA. In Alberta, ferruginous hawks are reliant on ground squirrel prey (Alberta Sustainable Resource Development and Alberta Conservation Association 2006) and the low number of ground squirrels on the ACHDA likely precludes Ferruginous hawks. A few silver buffaloberry shrubs grew along canals and also near the wetlands in the NW and NE idle fields. Loggerhead shrikes were located in both the NE idle and NW idle fields near these shrubs.

Table 3.1.1. Sensitive avian species recorded during surveys of the ACHDA. Primary habitat association is listed although many species require both upland and wetland habitats.

Species Name	Primary Habitat	Evidence of Breeding	Evidence of Foraging	Status
Baird's Sparrow	upland	✓	✓	May Be At Risk
Barn Swallow	upland		✓	Sensitive
Bobolink	upland	✓	✓	Sensitive
Grasshopper Sparrow	upland	✓	✓	Sensitive
Loggerhead Shrike	upland		✓	Sensitive*
Long-billed curlew	upland		✓	Sensitive*
Short-eared Owl	upland	✓	✓	May be at risk
Sprauge's Pipit	upland	✓	✓	Sensitive*
Swainson's Hawk	upland	✓	✓	Sensitive
Upland Sandpiper	upland		✓	Sensitive
American Bittern	wetland	✓	✓	Sensitive
American Green-winged Teal	wetland	✓	✓	Sensitive
American White Pelican	wetland		✓	Sensitive
Black Tern	wetland	✓	✓	Sensitive
Black-crowned Night Heron	wetland	✓	✓	Sensitive
Black-necked Stilt	wetland	✓	✓	Sensitive
Common Yellowthroat	wetland	✓	✓	Sensitive
Forster's tern	wetland		✓	Sensitive
Great Blue Heron	wetland		✓	Sensitive
Lesser Scaup	wetland	✓	✓	Sensitive
Northern Harrier	wetland	✓	✓	Sensitive
Northern Pintail	wetland	✓	✓	Sensitive
Pied-billed grebe	wetland		✓	Sensitive
Sora	wetland	✓	✓	Sensitive
Virginia Rail	wetland	✓	✓	Undetermined
Yellow Rail	wetland	✓	✓	Undetermined

Nomenclature and status follow The General Status of Alberta Wild Species 2005

(Alberta Sustainable Resource Development 2007)

* Denotes a status of Special Concern, following a detailed status assessment by the ESCC (Alberta Sustainable Resource Development 2007b).

3.2 Amphibians

Three species of amphibians were located during wildlife surveys (Table 3.2.1). Heavy rains fell on the first and seventh day of the project and all amphibian call surveys took place within 4 days of those rainfalls. Plains spadefoot toad (*Spea bombifrons*) calls were heard at five separate sites in field 4. Of these, 3 sites were located along the shallow ephemeral overflow leading south and east from the most southern wetland in field 4. Two sites were located in ephemeral overflow in the central wetland in field 4. Plains spadefoot toads were also heard at one site just east of the largest wetland in field 1, again in an overflow. The number of toads heard at each site was between two or three. No evidence of plains spadefoot toad eggs or tadpoles could be found during the day, however such searches are often difficult and call surveys are a more accurate indicator of breeding activity.

Table 3.2.1. Amphibian species recorded during surveys. Amphibians were detected through both nighttime call surveys and daytime searches.

Species Name	Breeding Calls	Individual(s) Located	Status
Tiger Salamander		✓	Secure
Boreal Chorus Frog	✓	✓	Secure
Plains Spadefoot Toad	✓		May Be at Risk

3.3 Mammals

Six mammal species were observed during general and incidental surveys (Table 3.3.1). A long-tailed weasel (*Mustela frenata*) was observed in the southeast corner of field 4. In addition, there are other records on the ACHDA for the American badger (*Taxidea taxus*) and pronghorn (*Antilocapra Americana*) (Alberta Sustainable Resource Development, unpublished data). No specific effort was made to survey for small mammals and those expected in the area are not designated as sensitive (see Appendix II).

Table 3.3.1. Mammal species recorded during the survey and in other records (Alberta Sustainable Resource Development, unpublished data).

Species Name	Observed	General Status
Long-tailed Weasel	✓	May be at Risk
Pronghorn	2005/2008	Sensitive
American Badger	2005	Sensitive
Coyote	✓	Secure
Muskrat	✓	Secure
Red Fox	✓	Secure
Richardson's Ground Squirrel	✓	Secure
White-tailed Deer	✓	Secure
White-tailed Jackrabbit	✓	Secure

3.4 Other observations

While conducting general surveys, industrial noise in field 3 could be heard at all point count locations and was often cumulative, with noise coming from multiple sources and directions. In field 3, noise was also heard from sources south of the ACHDA boundary. Furthermore, in Cassil's field, noise was heard from across San Francisco Lake. Particularly in field 3, this noise disrupted survey efforts by reducing the ability to hear bird and amphibian songs and calls.

4. DISCUSSION AND RECOMMENDATIONS

4.1 Wetland habitats

It is important to manage and conserve wetland basins to alleviate the overall loss of wetland habitat across the prairie (Gibbs 2000). This is supported by survey results on the ACHDA. Nineteen of the sensitive species observed are of important conservation status primarily because of their dependence on disappearing wetland habitats (Alberta Sustainable Resource Development 2007).

Local habitat characteristics are important for wetland species distributions (Murkin et al. 1997, Koper and Schmeigelow 2006a). Responses of one species to habitat characteristics may not be the same for another species (Koper and Schmeigelow 2006b). Thus, maintenance of a diversity of wetland sizes and types across the ACHDA benefits a variety of sensitive wildlife species. The ACHDA supports both ephemeral and permanent wetlands of variable size with shorelines that range from muddy and exposed to densely vegetated with cattail and bulrush. The largest wetland, Lake San Francisco, borders the ACHDA and has a thick contiguous wetland fringe. Koper and Schmeigelow (2006a) identify thick wetland fringe as important in models for songbird richness and abundance (Koper and Schmeigelow 2006a). Sightings of juveniles indicate Lake San Francisco is an important breeding habitat for black-crowned night herons (*Nycticorax nycticorax*), and calling indicates its importance to other sensitive species, such as the American bittern (*Porzana carolina*) and sora (*Porzana Carolina*). At fairly large shallow wetlands with muddy shores, such as in field 1 and 4, observations were made of large numbers of foraging shorebirds and ducks, including the black-necked stilt (*Himantopus mexicanus*), northern pintail (*Anas acuta*), and American green-winged teal (*Anas crecca*).

The availability of suitable breeding habitat is a major limiting factor for plains spadefoot toads in Alberta (Lauzon 1999). Wetland drainage and cultivation, pesticide and herbicide use, and oil and gas activity have decreased habitat suitability and availability (Klassen 1998). Klassen (1998) emphasized the importance of small, semi-permanent and ephemeral water to the breeding activity of spadefoot toads. Thus, the

small ephemeral wetlands such as those in the drainage system of field 4, where toads were detected at several locations, are of conservation importance for plains spadefoot toads.

No bats were sighted during nighttime amphibian surveys; however, no specific survey effort for bats was made. It is unlikely that sensitive species of bats breed on the ACHDA due to a lack of suitable natural roost habitat (see Appendix II). There is potential however, that sensitive species of bats could forage over wetlands with abundant invertebrates.

Restricting development near the shoreline of Lake San Francisco and other managed wetland basins, and also along smaller ephemeral water bodies, including canal and basin spillovers, will reduce disturbance to the many sensitive and may be at risk species dependent on wetland and wetland fringe habitats. It is important to note that many wetland associated species, such as the northern pintail, also require a matrix of well managed wetland and upland habitat (Podruzney et al. 2002).

4.2 Upland habitats

The conservation of native mixed-grass prairie is critical to several sensitive upland songbird species (Davis 2004, Koper and Schmiegelow 2006b, Davis et al. 2006). Fragmentation from road development in prairie habitats can reduce upland songbird species richness (Koper and Schmiegelow 2006b). The Sprague's pipit (*Anthus spragueii*) is reliant on large areas of native grassland (Davis 2004, Davis et al. 2006) and is less abundant along roads (Sutter et al. 1999). Baird's sparrow (*Ammodramus bairdii*) density increases with distance from non-native habitat (Koper and Schmiegelow 2006b). Furthermore, Davis (2004) identifies that even within smaller grassland patches, the more attractive patches to sensitive species are those with a low proportion of edge habitat relative to interior habitat. To benefit sensitive upland songbirds, including the Baird's sparrow and Sprague's pipit, the relatively contiguous upland habitats in field 4 and field 1 should be left intact by (1) avoiding any further fragmentation from road and trail development, and (2) limiting development that will remove or divide upland habitat through structures and extensive human activity.

While no active burrowing owl nests were found during the 2007 survey, records of burrowing owl activity from October 2004 (Alberta Sustainable Resource Development, unpublished data) indicate that the ACHDA is used for roosting and foraging during the fall, a time period outside the scope of this survey. The most recent record of an active burrowing owl nest site on the ACHDA was in 1993 (Alberta Sustainable Resource Development, unpublished data). Current grazing regimes promote relatively tall vegetation in the native grass and idle fields. Burrowing owls effectively forage in habitats with denser taller vegetation, such as in ephemeral wetland areas that support populations of small mammal prey items (Alberta Sustainable Resource Development and Alberta Conservation Association 2005). Thus, the matrix of wetlands and thick cover available on the ACHDA supports the management goal of providing high quality forage habitat for burrowing owls. Furthermore, maintaining dense vegetation near shorelines and ephemeral wetland habitats will benefit other sensitive predators, such as the short-eared owl (*Asio flammeus*), northern harrier (*Circus cyaneus*), and long-tailed weasel. Limited prey availability, due to loss of wetland edge habitats, has contributed to population declines of long-tailed weasels (Gehring and Swihart 2004). Short-eared owl distribution is also highly dependent upon prey availability (Clayton 2000, Poulin et al. 2001).

There is however, a lack of suitable nesting habitat for the burrowing owl on the ACHDA. The high state of range health throughout the ACHDA supports tall thick vegetation. Burrowing owls, however, typically nest in areas with short (<10 cm) sparse vegetation (Alberta Sustainable Resource Development and Alberta Conservation Association 2005). The dense vegetation on the ACHDA also limits the Richardson's ground squirrel (*Spermophilus richardsonii*) that prefers habitats with short and medium grass (Downey et al. 2006). Richardson's ground squirrels are important food for sensitive species such as the ferruginous hawk and American badger. Furthermore, the burrows of the Richardson's ground squirrel and the American badger provide nest sites for the burrowing owl.

Grazing management can be used to provide opportunities for sensitive species by creating a matrix of upland habitat types on the ACHDA. Establishing some areas with shorter sparser vegetation, particularly near locations with historic burrowing owl nest

sites or current Richardson ground squirrel activity, may encourage nesting by burrowing owls on the ACHDA. Vegetation that promotes the Richardson's ground squirrel could also attract sensitive species like the ferruginous hawk and American badger.

In Alberta, loggerhead shrikes are limited by suitable breeding habitat (Prescott and Collister 1993). Management for tall grass by reducing the grazing pressure of cattle around areas with silver buffaloberry shrubs will increase availability of breeding habitat (Prescott and Collister 1993). Because the NW and NE idle fields on the ACHDA are managed for tall nesting cover, they contain the tall grass required by loggerhead shrikes. Although no nest sites were observed, the loggerhead shrike activity and apparent available nesting habitat in the NE and NW idle fields indicates these areas are a priority for loggerhead shrike conservation on the ACHDA. When clearing obstructive brush in and around canals, leaving areas with silver buffaloberry bushes intact will protect this nesting habitat for loggerhead shrikes.

4.3 Noise

Many prairie bird and amphibian species rely on songs and calls for breeding displays and communication. Chronic noise can change the age structure and reduce the pairing success of songbirds (Habib et al. 2007). Non-passerine species can also be impacted by noise. For example, courtship behaviour in harlequin ducks (*Histrionicus histrionicus*) has been reduced for over an hour following noise from military jets (Goudie and Jones 2004). In a prairie system, Holloran (2005) identified that noise intensity at leks (breeding sites) negatively affected the greater sage-grouse (*Centrocercus urophasianus*). Noise could be a significant stressor to wildlife populations on the ACHDA, however, research into the specific effects of chronic noise on prairie birds and amphibians is extremely limited. The cumulative noise at a site, including noise with a source outside the ACHDA, should be considered when planning development in areas with sensitive species. Furthermore, implementing noise reduction technologies for both new and existing developments could potentially reduce the negative consequences of these structures on sensitive wildlife. The cooperative management of the ACHDA presents an opportunity to encourage research of anthropogenic noise in prairie upland and wetland habitats.

4.4 Monitoring strategy

Long-term monitoring will guide management efforts by tracking changes in species abundance and species occurrence. Future survey efforts should use standardized methodology and survey locations to increase the interpretability of survey results through time.

The calling, timing and location of breeding can be irregular for plains spadefoot toads in Alberta (Klassen 1998). If a spring is dry or does not have heavy rains, spadefoot toads may not call or breed at all that year. Monitoring efforts should therefore occur in the days immediately following heavy spring rains (Lauzon 1999). Due to the reliance on weather conditions for plains spadefoot toad detection, annual surveys are recommended so that years with calling activity are not missed. Annual participation by the ACHDA in the Alberta Volunteer Amphibian Monitoring Program coordinated by the Alberta Conservation Association is encouraged.

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Appendix I.

List of all species observed during the 2007 survey of the ACHDA. Nomenclature and status follow The General Status of Alberta Wild Species 2005 (Alberta Sustainable Resource Development 2007).

Animal Type	Scientific Name	Common Name	Status
Amphibians	<i>Spea bombifrons</i>	Plains Spadefoot Toad	May Be at Risk
Amphibians	<i>Pseudacris maculata</i>	Boreal Chorus Frog	Secure
Amphibians	<i>Ambystoma tigrinum</i>	Tiger Salamander	Secure
Mammals	<i>Mustela frenata</i>	Long-tailed Weasel	May Be at Risk
Mammals	<i>Canis latrans</i>	Coyote	Secure
Mammals	<i>Ondatra zibethicus</i>	Muskrat	Secure
Mammals	<i>Vulpes vulpes</i>	Red Fox	Secure
Mammals	<i>Spermophilus richardsonii</i>	Richardson's Ground Squirrel	Secure
Mammals	<i>Odocoileus virginianus</i>	White-tailed Deer	Secure
Mammals	<i>Lepus townsendii</i>	White-tailed Jack Rabbit	Secure
Birds	<i>Ammodramus bairdii</i>	Baird's Sparrow	May Be at Risk
Birds	<i>Asio flammeus</i>	Short-eared Owl	May Be at Risk
Birds	<i>Botaurus lentiginosus</i>	American Bittern	Sensitive
Birds	<i>Anas crecca</i>	American Green-winged Teal	Sensitive
Birds	<i>Pelecanus erythrorhynchos</i>	American White Pelican	Sensitive
Birds	<i>Hirundo rustica</i>	Barn Swallow	Sensitive
Birds	<i>Chlidonias niger</i>	Black Tern	Sensitive
Birds	<i>Nycticorax nycticorax</i>	Black-crowned Night-heron	Sensitive
Birds	<i>Himantopus mexicanus</i>	Black-necked Stilt	Sensitive
Birds	<i>Dolichonyx oryzivorus</i>	Bobolink	Sensitive
Birds	<i>Geothlypis trichas</i>	Common Yellowthroat	Sensitive
Birds	<i>Sterna forsteri</i>	Forster's Tern	Sensitive
Birds	<i>Ammodramus savannarum</i>	Grasshopper Sparrow	Sensitive
Birds	<i>Ardea herodias</i>	Great Blue Heron	Sensitive
Birds	<i>Aythya affinis</i>	Lesser Scaup	Sensitive
Birds	<i>Lanius ludovicianus</i>	Loggerhead Shrike	Sensitive
Birds	<i>Numenius americanus</i>	Long-billed Curlew	Sensitive
Birds	<i>Circus cyaneus</i>	Northern Harrier	Sensitive
Birds	<i>Anas acuta</i>	Northern Pintail	Sensitive
Birds	<i>Podilymbus podiceps</i>	Pied-billed Grebe	Sensitive
Birds	<i>Porzana carolina</i>	Sora	Sensitive
Birds	<i>Anthus spragueii</i>	Sprague's Pipit	Sensitive
Birds	<i>Buteo swainsoni</i>	Swainson's Hawk	Sensitive
Birds	<i>Bartramia longicauda</i>	Upland Sandpiper	Sensitive
Birds	<i>Rallus limicola</i>	Virginia Rail	Undetermined
Birds	<i>Coturnicops noveboracensis</i>	Yellow Rail	Undetermined
Birds	<i>Perdix perdix</i>	Gray Partridge	Exotic/Alien
Birds	<i>Phasianus colchicus</i>	Ring-necked Pheasant	Exotic/Alien
Birds	<i>Columba livia</i>	Rock Pigeon	Exotic/Alien

Continued on next page

Appendix I continued

Animal Type	Scientific Name	Common Name	Status
Birds	<i>Recurvirostra americana</i>	American Avocet	Secure
Birds	<i>Fulica americana</i>	American Coot	Secure
Birds	<i>Corvus brachyrhynchos</i>	American Crow	Secure
Birds	<i>Falco sparverius</i>	American Kestrel	Secure
Birds	<i>Anas americana</i>	American Wigeon	Secure
Birds	<i>Anas discors</i>	Blue-winged Teal	Secure
Birds	<i>Euphagus cyanocephalus</i>	Brewer's Blackbird	Secure
Birds	<i>Molothrus ater</i>	Brown-headed Cowbird	Secure
Birds	<i>Larus californicus</i>	California Gull	Secure
Birds	<i>Branta canadensis</i>	Canada Goose	Secure
Birds	<i>Calcarius ornatus</i>	Chestnut-collared Longspur	Secure
Birds	<i>Anas cyanoptera</i>	Cinnamon Teal	Secure
Birds	<i>Spizella pallida</i>	Clay-colored Sparrow	Secure
Birds	<i>Sterna hirundo</i>	Common Tern	Secure
Birds	<i>Phalacrocorax auritus</i>	Double-crested Cormorant	Secure
Birds	<i>Podiceps nigricollis</i>	Eared Grebe	Secure
Birds	<i>Tyrannus tyrannus</i>	Eastern Kingbird	Secure
Birds	<i>Larus pipixcan</i>	Franklin's Gull	Secure
Birds	<i>Anas strepera</i>	Gadwall	Secure
Birds	<i>Bubo virginianus</i>	Great Horned Owl	Secure
Birds	<i>Eremophila alpestris</i>	Horned Lark	Secure
Birds	<i>Charadrius vociferus</i>	Killdeer	Secure
Birds	<i>Ammodramus leconteii</i>	Le Conte's Sparrow	Secure
Birds	<i>Anas platyrhynchos</i>	Mallard	Secure
Birds	<i>Limosa fedoa</i>	Marbled Godwit	Secure
Birds	<i>Cistothorus palustris</i>	Marsh Wren	Secure
Birds	<i>Zenaida macroura</i>	Mourning Dove	Secure
Birds	<i>Ammodramus nelsoni</i>	Nelson's Sharp-tailed Sparrow	Secure
Birds	<i>Anas clypeata</i>	Northern Shoveler	Secure
Birds	<i>Vireo olivaceus</i>	Red-eyed Vireo	Secure
Birds	<i>Aythya americana</i>	Redhead	Secure
Birds	<i>Podiceps grisegena</i>	Red-necked Grebe	Secure
Birds	<i>Agelaius phoeniceus</i>	Red-winged Blackbird	Secure
Birds	<i>Larus delawarensis</i>	Ring-billed Gull	Secure
Birds	<i>Oxyura jamaicensis</i>	Ruddy Duck	Secure
Birds	<i>Passerculus sandwichensis</i>	Savannah Sparrow	Secure
Birds	<i>Pooecetes gramineus</i>	Vesper Sparrow	Secure
Birds	<i>Tyrannus verticalis</i>	Western Kingbird	Secure
Birds	<i>Sturnella neglecta</i>	Western Meadowlark	Secure
Birds	<i>Catoptrophorus semipalmatus</i>	Willet	Secure
Birds	<i>Phalaropus tricolor</i>	Wilson's Phalarope	Secure
Birds	<i>Gallinago delicata</i>	Wilson's Snipe	Secure
Birds	<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird	Secure

Appendix II.

The At Risk, May Be at Risk, and Sensitive mammals listed in The General Status of Alberta Wildlife 2005 (Alberta Sustainable Resource Development 2007). Current species range was determined by comparison with range maps in Pattie and Fisher (1999). The presence of a species record is derived from both this survey and previous records (Alberta Sustainable Resource Development, unpublished data).

Within current species range	Existing species record	Potential for use of the ACHDA	Common Name	Scientific Name	Status
Yes	Yes	Yes	Long-tailed Weasel Pronghorn American Badger	<i>Mustela frenata</i> <i>Antilocapra americana</i> <i>Taxidea taxus</i>	May Be at Risk Sensitive Sensitive
	No	Lack of roost habitat. Some potential as a foraging site.	Hoary Bat Red Bat Silver-haired Bat Western Small-footed Bat	<i>Lasiurus cinereus</i> <i>Lasiurus borealis</i> <i>Lasionycteris noctivagans</i> <i>Myotis ciliolabrum</i>	Sensitive Sensitive Sensitive Sensitive
			Bobcat Fisher Olive-backed Pocket Mouse Red-tailed Chipmunk Water Vole Canada Lynx Northern Long-eared Bat Vagrant Shrew Wolverine	<i>Lynx rufus</i> <i>Martes pennanti</i> <i>Perognathus fasciatus</i> <i>Tamias ruficaudus</i> <i>Microtus richardsoni</i> <i>Lynx canadensis</i> <i>Myotis septentrionalis</i> <i>Sorex vagrans</i> <i>Gulo gulo</i>	Sensitive Sensitive Sensitive Sensitive Sensitive Sensitive May Be at Risk May Be at Risk May Be at Risk May Be at Risk
No	No	No	Grizzly Bear Ord's Kangaroo Rat Swift Fox Woodland Caribou Wood Bison	<i>Ursus arctos</i> <i>Dipodomys ordii</i> <i>Vulpes velox</i> <i>Rangifer tarandus caribou</i> <i>Bos bison athabasca</i>	At Risk At Risk At Risk At Risk At Risk

Appendix III.

Locations of upland point counts given as an UTM Easting and Northing in Zone 12, map datum NAD 83. Plot codes consist of field name or number followed by the plot number within that field, and finally the habitat type.

Plot Code	Eastings	Northing
1-1-upland	415421	5606823
1-2-upland	415219	5606604
1-3-upland	415095	5606331
1-4-upland	415030	5606036
1-5-upland	415428	5605900
1-6-upland	415336	5605610
1-7-upland	415320	5605304
1-8-upland	415933	5606173
1-9-upland	416118	5606411
1-10-upland	415812	5607510
2-1-upland	417214	5605739
2-2-upland	417318	5606009
2-3-upland	417700	5606370
2-4-upland	417270	5606763
2-5-upland	417700	5607050
2-6-upland	417413	5607622
2-7-upland	417712	5607641
2-8-upland	418071	5606754
3-1-upland	417560	5604059
3-2-upland	417407	5604174
3-3-upland	417124	5604263
3-4-upland	417097	5604573
3-6-upland	418839	5603760
3-7-upland	418990	5603500
3-8-upland	419154	5603243
3-9-upland	418140	5603552
3-10-upland	418450	5603552
3-11-upland	418750	5603530
3-12-upland	416980	5605027
3-14-upland	417393	5603242
3-15-upland	417350	5603050
3-16-upland	417090	5603211
4-2-upland	416344	5604375
4-4-upland	416121	5604184
4-5-upland	416574	5604573
4-7-upland	416652	5603312
4-8-upland	416359	5603298

Plot Code	Eastings	Northing
4-9-upland	416062	5603300
4-10-upland	415447	5603902
4-11-upland	415216	5603715
4-12-upland	414990	5603515
4-13-upland	414762	5603322
4-14-upland	415313	5603093
4-15-upland	415083	5603213
4-16-upland	416683	5604946
cassils-1-upland	421243	5604311
cassils-2-upland	421228	5604614
cassils-3-upland	421480	5604545
cassils-4-upland	421553	5604282
cassils-5-upland	421770	5604643
cassils-6-upland	422140	5604736
cassils-7-upland	422167	5604341
grazed-1-upland	420133	5603140
grazed-2-upland	419986	5603300
grazed-3-upland	419903	5603338
home-1-upland	418565	5605073
ne idle-1-upland	418385	5607239
nw idle-1-upland	416357	5607401
nw idle-2-upland	416500	5607678
oakland-1-upland	416929	5608631
oakland-2-upland	417225	5608565
oakland-3-upland	417511	5608501
oakland-4-upland	417806	5608439
oakland-6-upland	417403	5608067
oakland-7-upland	417116	5608146
oakland-8-upland	416818	5608226
oakland-9-upland	416280	5608086
oakland-10-upland	416402	5608372
oakland-11-upland	416507	5608658
oakland-12-upland	416192	5608810
oakland-13-upland	415998	5608583
oakland-14-upland	415809	5608353
oakland-15-upland	415617	5608124

Appendix IV.

Locations of wetland counts given as an UTM Easting and Northing in Zone 12, map datum NAD 83. Plot codes consist of field name or number followed by the plot number within that field, and finally the habitat type.

Plot Code	Easting	Northing
1-1-wetland	415554	5606960
1-5-wetland	415550	5605881
1-8-wetland	415847	5606109
1-10-wetland	415812	5607390
2-1-wetland	417190	5605630
2-2-wetland	417392	5606105
2-3-wetland	417635	5606291
2-3b-wetland	417794	5606481
2-6-wetland	417311	5607606
2-8-wetland	417978	5606715
3-1-wetland	417608	5603946
3-5-wetland	417438	5604779
3-6-wetland	418786	5603844
3-8-wetland	419189	5603077
3-9-wetland	418040	5603540
3-12-wetland	417104	5605033
4-4-wetland	416051	5604114
4-9-wetland	415962	5603300
4-10-wetland	415286	5603785
cassils-2-wetland	421245	5604715
cassils-3-wetland	421480	5604650
cassils-5-wetland	421770	5604745
cassils-6-wetland	422141	5604822
grazed-1-wetland	420190	5603230
home-1-wetland	418767	5605274
ne idle-1-wetland	418455	5607307
nw idle-1-wetland	416457	5607400
nw idle-2-wetland	416400	5607678
oakland-4-wetland	417906	5608382
oakland-5-wetland	417900	5608053
oakland-9-wetland	416220	5607980

Appendix V.

Locations of amphibian counts given as an UTM Easting and Northing in Zone 12, map datum NAD 83. Foot accessed plots match the naming of avian point counts. Road accessed points are numbered arbitrarily as a road route.

Plot Code	Easting	Northing	Plot Code	Easting	Northing
1-1-wetland	415554	5606960	Road Route-5	421930	5604780
1-5-wetland	415550	5605881	Road Route-6	420137	5603617
1-8-wetland	415847	5606109	Road Route-7	419366	5604008
1-10-wetland	415812	5607390	Road Route-8	419315	5604115
2-1-wetland	417190	5605630	Road Route-9	418547	5604943
2-2-wetland	417392	5606105	Road Route-10	416188	5607463
2-3-wetland	417635	5606291	Road Route-11	416378	5607279
2-3b-wetland	417794	5606481	Road Route-12	420190	5603230
2-6-wetland	417311	5607606	Road Route-13	416190	5607460
2-8-wetland	417978	5606715	Road Route-14	417245	5607150
3-1-wetland	417608	5603946	Road Route-15	416891	5606128
3-5-wetland	417438	5604779	Road Route-16	418168	5604257
3-6-wetland	418786	5603844	Road Route-17	419480	5603358
3-8-wetland	419189	5603077	Road Route-18	418618	5603216
3-9-wetland	418040	5603540	Road Route-19	418213	5603453
3-12-wetland	417104	5605033	Road Route-20	418213	5603890
4-4-wetland	416051	5604114	Road Route-21	416188	5607463
4-9-wetland	415962	5603300	Road Route-22	417312	5607191
4-10-wetland	415286	5603785	Road Route-23	416880	5605200
cassils-2-wetland	421245	5604715	Road Route-24	418003	5603474
cassils-3-wetland	421480	5604650	Road Route-25	415877	5603872
cassils-5-wetland	421770	5604745	Road Route-26	416874	5604193
cassils-6-wetland	422141	5604822	Road Route-27	416072	5603937
grazed-1-wetland	420190	5603230	Road Route-28	415588	5604056
home-1-wetland	418767	5605274	Road Route-29	415292	5604471
ne idle-1-wetland	418455	5607307	Road Route-30	421930	5604780
nw idle-1-wetland	416457	5607400	Road Route-31	420137	5603617
nw idle-2-wetland	416400	5607678	Road Route-32	419366	5604008
oakland-4-wetland	417906	5608382	Road Route-33	419315	5604115
oakland-5-wetland	417900	5608053	Road Route-34	418547	5604943
oakland-9-wetland	416220	5607980	Road Route-35	416188	5607463
Road Route-1	415877	5603872	Road Route-36	417312	5607191
Road Route-2	416874	5604193	Road Route-37	416880	5605200
Road Route-3	416072	5603937	Road Route-38	418003	5603474
Road Route-4	415588	5604056	Road Route-39	415292	5604471

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(as of March 2008)

- No. 1 Alberta species at risk program and projects 2000-2001, by Alberta Sustainable Resource Development, Fish and Wildlife Division. (2001)
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