

Alberta Ferruginous Hawk Recovery Plan 2009-2014



Alberta Species at Risk Recovery Plan No. 17

Alberta Ferruginous Hawk Recovery Plan

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PREFACE

Albertans are fortunate to share their province with a diversity of wild species. Populations of most species of plants and animals are healthy and secure, however, a small number of species are either naturally rare or are now rare because of human activities. Recovery plans establish a basis for cooperation among government, industry, conservation groups, landowners and other stakeholders to ensure these species and populations are restored or maintained for future generations.

Alberta's commitment to the *Accord for the Protection of Species at Risk* and to the *National Framework for the Conservation of Species at Risk*, combined with requirements established under Alberta's *Wildlife Act* and the federal *Species at Risk Act*, has resulted in the development of a provincial recovery program. The overall goal of the recovery program is to restore species identified as *Threatened* or *Endangered* to viable, naturally self-sustaining populations within Alberta. For some naturally rare species, recovery is not possible, and maintenance objectives are identified.

Alberta species at risk recovery plans are prepared under the supervision of the Fish and Wildlife Division, Alberta Sustainable Resource Development. These recovery plans are prepared by recovery teams composed of a variety of stakeholders including conservation organizations, industry, landowners, resource users, universities, government agencies and others. Membership is by invitation from the Director of Wildlife Management, and includes representation from the diversity of interests unique to each species and circumstance. Conservation and management of these species continues during preparation of the recovery plan.

These plans are provided by the recovery team as advice to the Minister responsible for fish and wildlife management and to all Albertans. Alberta's Endangered Species Conservation Committee reviews draft recovery plans, and provides recommendations to the Minister. In addition, an opportunity for review by the public is provided. Once a plan is accepted and approved for implementation by the Minister it is published as a government recovery plan.

Recovery plans include three main sections: one on background information that highlights biology, population trends, and threats; a recovery section that outlines goals, objectives, and strategies to address the threats; and an action plan that profiles priority actions required to maintain or restore the *Threatened* or *Endangered* species.

Alberta recovery plans are "living" documents and are revised as conditions change or circumstances warrant. Each approved recovery plan undergoes an annual review, and progress of implementation is evaluated. Implementation of each recovery plan is subject to the availability of resources, from within and from outside government.

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The Species at Risk Program of the Department of Sustainable Resource Development – Fish and Wildlife Division (SRD-FW) provided funding for the first three recovery team planning meetings. Thanks to team member Nikki Heck and AltaLink for sponsoring team meeting #4.

Several of the team members donated their time and travel costs for the opportunity to participate in the recovery process. All team members spent considerable time and energy participating in the Alberta recovery planning process for the ferruginous hawk.

Cindy Kemper and Nikki Heck presented data from their recent graduate projects to the team relating to electrocution and collision at electrical structures. Their presentation helped the team in the threats assessment process.

Brandy Downey and Cindy Kemper, both of SRD-FW, provided technical secretariat assistance to the team in addition to their participation as team members.

EXECUTIVE SUMMARY

The ferruginous hawk is a bird of prey which occurs exclusively in North America. Ferruginous hawks are migratory, arriving in Alberta in late March to early April to nest. After fledging the young and adults remain near the nest for about one month with young beginning their migration to the southern United States and Mexico in August and adults leaving as late as mid-October. Ferruginous hawks are strongly associated with native grasslands and within Alberta their range is primarily within the Grassland Natural Region. In Alberta breeding density and success is linked to the distribution and abundance of ground squirrels which are their main prey. Ferruginous hawks nest in lone trees, abandoned shelterbelts, ledges on cliffs, and rarely, on level ground.

The breeding distribution of ferruginous hawks in Alberta has declined by about 40% since pre-settlement. Ferruginous hawk surveys carried out since the early 1980s showed an increase in the estimated number of breeding pairs in Alberta from 1982 to 1987, a slight decrease from 1987 to 1992, and a dramatic decline between 1992 and 2000. In 2005 the Alberta population estimate was 618 +/- 162 pairs, which is the lowest population estimate to date and is less than half of the 1992 estimate.

On November 8, 2006 an amendment to the Wildlife Act Regulations was passed by Legislative Council which designated ferruginous hawk as an *Endangered* species in Alberta. The ferruginous hawk qualified as *Endangered* primarily because of its small and declining population. The Alberta Ferruginous Hawk Recovery Team was initiated shortly after this listing. The team is composed of 14 members representing provincial and federal government, species experts and stakeholders from different sectors of Alberta society.

The Alberta recovery goal is to achieve a viable, self-sustaining ferruginous hawk population distributed across suitable habitat in Alberta's Grassland Natural Region through maintenance and/or enhancement of a functional prairie ecosystem. The Alberta population objective is 1 200 pairs for the initial period of this plan (approx. five years) with a longer term objective of up to 1 700 pairs over 20 years. The Alberta ferruginous hawk population should be part of a continuous population extending into Saskatchewan and Montana. The team has recognized that year to year population fluctuations may occur but that a positive population trend should be achieved throughout the next 20 years if the strategies in this plan are followed.

The range of the ferruginous hawk in Alberta is influenced by the distribution of native grasslands. Land uses such as cultivation, industrial development, urban/rural residential development as well as encroachment of trees and shrubs and competition with other raptors place constraints on the range of the species in Alberta. Alberta's economic expansion makes it unlikely that the presently reduced range could be increased. Therefore the objective is that the current 2007 range should be maintained and recovery initiatives should be emphasized within that range. However, any opportunities for grassland restoration to improve ferruginous hawk habitat should be pursued.

There are seven strategies to achieve ferruginous hawk recovery in Alberta:

- a) **Ferruginous Hawk Habitat Management** - includes actions required for the protection of existing habitat, habitat improvements and restoration of habitat.
- b) **Reduction of Human Disturbances** – addresses actions needed to reduce human disturbances.
- c) **Reduction of Human-Caused Mortality** – includes actions needed to reduce collision-caused mortality as well as persecution.
- d) **Ferruginous Hawk Prey Management** – includes actions related to retention of ferruginous hawk prey populations and habitat.
- e) **Ferruginous Hawk Population Monitoring** – population surveys to monitor success or failure of recovery actions over time.
- f) **Information and Outreach** – to increase awareness of ferruginous hawk recovery and conservation needs including multi-species and landscape based programs that also benefit other grassland-based species.
- g) **Research** – includes recommendations for research projects to provide information needed to guide future management of ferruginous hawks.

Within each strategy there are specific actions to be carried out in order to recover the population and habitat of this *Endangered* species. These have been summarized in an implementation table. Some priority actions include:

- Establishment of a grassland retention policy for Alberta Public Lands.
- Industrial pre-development surveys and consultation with SRD-Fish and Wildlife in grassland habitats.
- Use of sensitive species guidelines, avian protection plans and wind energy guidelines by industrial developers and government reviewers.
- Identification of power poles that pose a high risk of electrocution, and retrofitting them to reduce risk.
- Population monitoring.
- Research on impacts of industrial and human disturbance on ferruginous hawks.
- Information and education on importance of retaining trees for nesting and grasslands for foraging by ferruginous hawks.

The actions will be implemented through funding from a variety of sources, including in-kind and dedicated project funds from within government, industry, academia and conservation organizations. Budget needs from the SRD-Fish and Wildlife – Species at Risk budget have been estimated for each year of the five-year life of this plan. The five-year cumulative requirement is \$89,000. This estimate does not include costs associated with the MULTISAR project (for multi-species recovery), in-kind Departmental costs, or costs of other participants.

1.0 INTRODUCTION

The purpose of this recovery plan is to provide clear direction for recovery actions for the ferruginous hawk in Alberta. The plan was prepared by a recovery team comprised of individuals knowledgeable about the species, organizations influential in the management and recovery of the species and stakeholders who may be affected by recovery actions for the species. The recovery team was selected to provide informed and diverse input to preparation of the plan. The recovery planning process was comprised of 4 meetings chaired by the wildlife biologist with provincial responsibility for ferruginous hawk.

1.1 Provincial and Federal Status

The ferruginous hawk is an *Endangered* species as designated in Alberta's Wildlife Act. Endangered species are those "facing imminent extirpation or extinction". The *Endangered* status was recommended to the Minister of Sustainable Resource Development by Alberta's Endangered Species Conservation Committee on April 12, 2006 and the Minister endorsed that recommendation on May 17, 2006. On November 8, 2006 an amendment to the Wildlife Act Regulations AR 275/2006 was passed by Legislative Council which designated ferruginous hawk as an *Endangered* species in Alberta. The ferruginous hawk qualified as *Endangered* primarily because of its small and declining population.

The *Endangered* designation required development of a recovery plan within twelve months of the legal listing (i.e. by November 8, 2007). The Ministerial approval also identified that policy and management will be implemented to protect the current population and that the Fish and Wildlife and Lands Divisions will work together to monitor regulated activities on crown lands to ensure no resulting loss of individuals, nests or populations. The Ministerial Approval stated that interim measures to protect current populations on private and leased land will continue through ongoing grassland conservation initiatives such as multi-species conservation and stewardship programs.

Nationally the ferruginous hawk is a "species of special concern"; this is not a legal listing but reflects the sensitivity of the species to human activities or natural events. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) commissioned a status report in 2007 to enable a national status review of the species. Because of uncertainty relating to the timing of the national status review and the unknown outcome, a decision was made to proceed with the provincial recovery planning. If a legal status (*Endangered* or *Threatened*) is assigned to ferruginous hawk nationally then a new national recovery plan will be developed. That process would be led by the Canadian Government likely with involvement of Alberta and other jurisdictions within the range of the species. It should also be noted that, in 1980, the ferruginous hawk had been listed as *Threatened* in Canada and that a national recovery plan was developed in 1994 (Schmutz et al. 1994). However, due to subsequent de-listing by COSEWIC in 1995 that plan is no longer an active recovery plan.

In April 2008, as this recovery plan was being reviewed in final draft, COSEWIC met and recommended a listing of *Threatened* for the ferruginous hawk. That recommendation will lead to a public consultation, which may ultimately lead to a *Species at Risk Act* (SARA) listing as *Threatened*, followed by development of a national recovery plan. Under that scenario, the Alberta plan will be available as a resource to the national recovery team, and may ultimately be adopted by the national team as the action plan for the Alberta portion of the species range. The Alberta plan may require revisions to suit this purpose.

1.2 Biology of the Ferruginous Hawk

The biology of the ferruginous hawk is described in detail by Bechard and Schmutz (1995) and in the provincial status report titled *Status of Ferruginous Hawk in Alberta: Update 2006* (Alberta Sustainable Resource Development and Alberta Conservation Association 2006). While the scope of this plan is to identify recovery strategies and actions, an understanding of some key aspects of the species' biology is a necessary prerequisite to knowledgeable and wise decisions. A summary is provided below:

- The ferruginous hawk occurs exclusively within the Great Plains of North America and within Alberta the species range is primarily within the Grassland Natural Region (Bechard and Schmutz 1995).
- Ferruginous hawks are migratory arriving in Alberta in late March to early April to nest. Following fledging the young and adults remain near the nest for about one month with young beginning their southward migration to the southern United States and Mexico in August and adults leaving as late as mid-October (Schmutz and Fyfe 1987, Bechard and Schmutz 1995).
- Ferruginous hawks from Alberta jointly occupy wintering areas (e.g. west Texas) with other populations from North Dakota (Gilmer et al. 1985) and Saskatchewan (Houston et al. 1998), but over 90% appear to be faithful to their natal areas and both sexes return to Alberta annually (Schmutz et al. in press).
- Mortality factors are diverse (e.g. Schmutz and Fyfe 1987, Cully 1991) and survival reduced especially for juvenile hawks (55%) during their first migration and search for uncontested wintering areas. Even among adults, survival was somewhat low (71%), as compared to an average of 80% for a raptor of this size. More importantly, however, a survival study using Program MARK for over 7,000 ferruginous hawks banded in Alberta and Saskatchewan over more than three decades showed that the calculated rate of survival did not change over time. This suggests that the species' decline can be attributed to local effects. Thus conservation strategies implemented on the breeding grounds should be promising for a recovery of this species (Schmutz et al. in press).
- Ferruginous hawks occur in higher densities in areas dominated by native grassland. Several studies have shown that in Alberta, ferruginous hawk nest density decreases as the area of cultivation increases (Schmutz 1989, Stepniski et al. 2002, Downey 2005).
- Landscapes with sufficient natural grasslands for ferruginous hawks exist where livestock grazing is the main land use (Schmutz 1989, Schmutz 1993a)

- On a local level, ferruginous hawk density may increase with small amounts of cultivation but density declines when the area of cultivation approaches 50% of the landscape (Schmutz 1989, Schmutz 1993a).
- In Alberta, ferruginous hawk breeding density and success is linked to the distribution and abundance of Richardson's ground squirrels, which are their main prey (Schmutz 1989, Schmutz et al. 1980, Downey et al 2006).
- Ferruginous hawks nest in lone trees, large shrubs, abandoned shelterbelts, ledges on cliffs and rarely on level ground. They also nest on elevated man-made platforms.
- The breeding distribution of ferruginous hawks in Alberta has been reduced by about 40% since pre-settlement (Alberta Sustainable Resource Development and Alberta Conservation Association 2006). Currently a line through Waterton Lakes National Park, Pincher Creek, Calgary, Drumheller, Hanna, Consort and Altario represents the western and northern limit of their range with isolated pairs to the north and west (Figure 1).
- Ferruginous hawk surveys have been done since the early 1980s and they have shown an increase in the estimated number of breeding pairs in Alberta from 1982 to 1987, a slight decrease from 1987 to 1992, and a dramatic decline between 1992 and 2000 (Figure 2). In 2005 the Alberta population estimate was 618 +/- 162 pairs which is the lowest population estimate to date and is less than half of the 1992 estimate (Downey 2005). Although quantitative data do not exist it is believed that a much larger ferruginous hawk population existed in Alberta prior to European settlement.

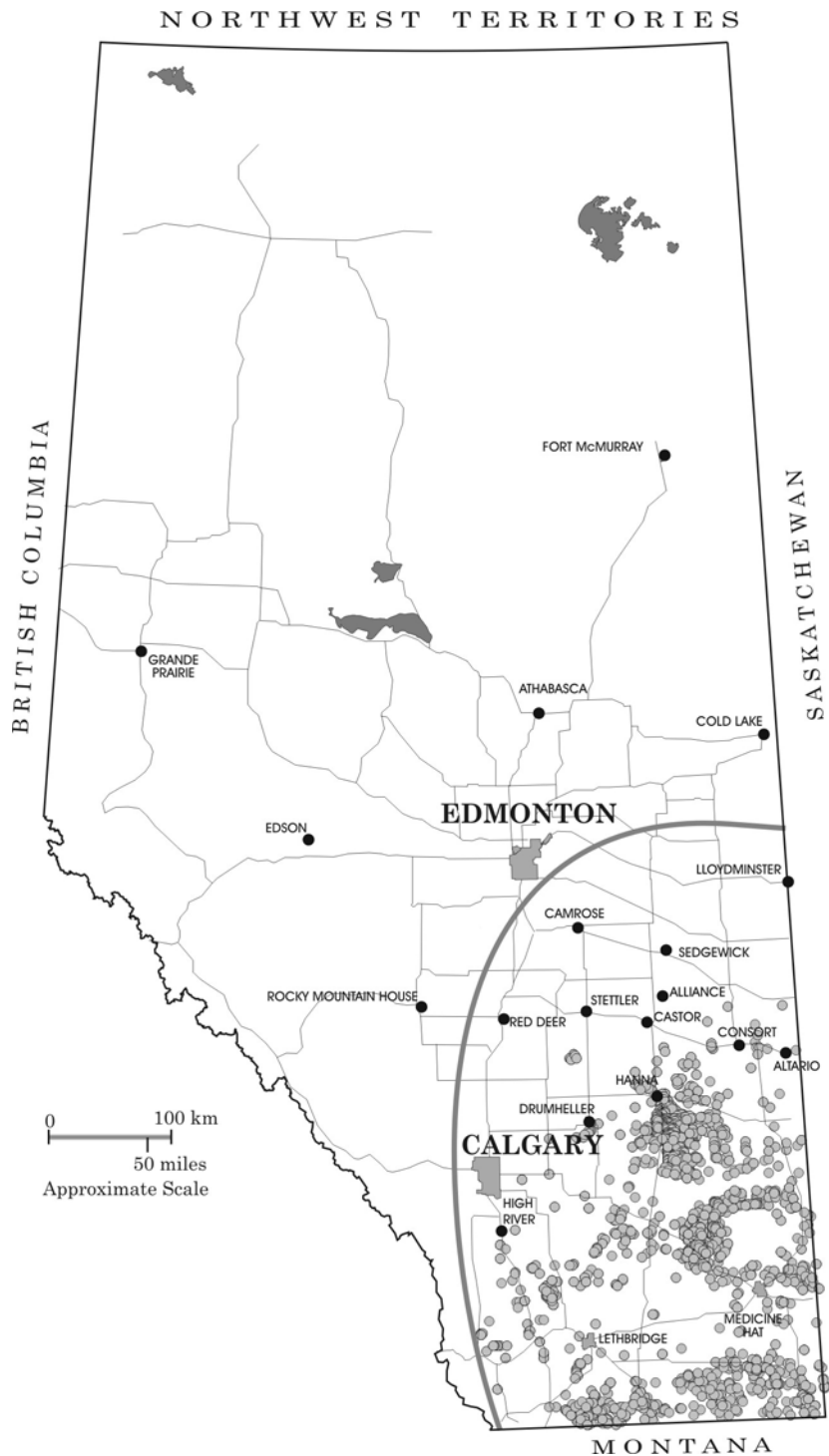


Figure 1. Distribution of the ferruginous hawk in Alberta based on observational records from 1958 to 2005. The grey line indicates the ferruginous hawk's historical range (from Downey 2005 and Schmutz and Schmutz 1980).

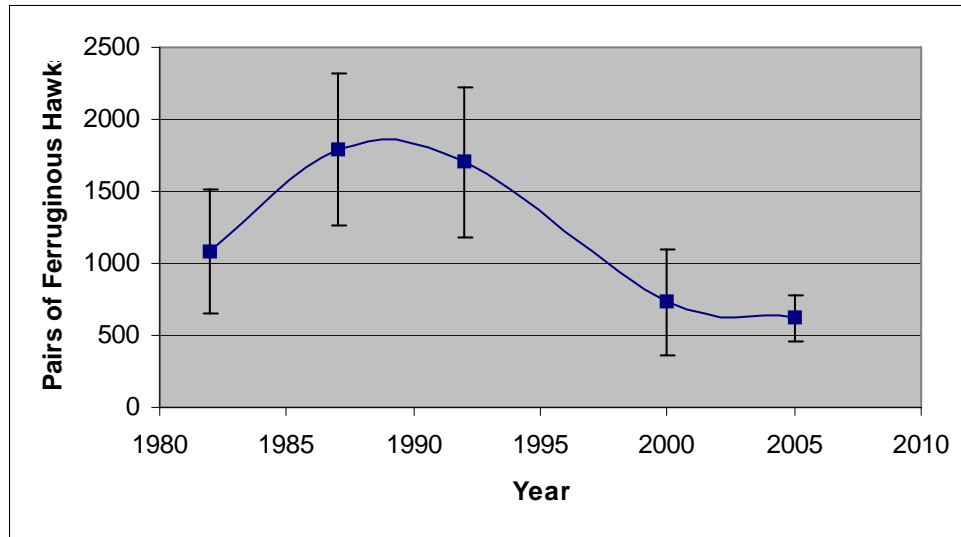


Figure 2: The estimated number of ferruginous hawk pairs and confidence intervals in Alberta between 1982-2005 (from Downey 2005).

2.0 LIMITING FACTORS

Limiting factors for the ferruginous hawk include natural and human-caused factors that reduce reproductive success or increase adult or juvenile mortality. These factors can be important both in the species' breeding range within Alberta, and outside of Alberta on migration and in winter. A summary of these Limiting Factors and some explanation related to their causes is provided.

2.1 Habitat Loss and Alteration

- a) Cultivation of grasslands results in direct loss of habitat for nesting and for the hawk's prey species.
- b) Fire suppression has led to the expansion of treed and shrubby habitats onto grasslands. This is particularly important on the northern and western prairie borders where grassland blends with woodland habitat.
- c) Expanded occupancy by the Swainson's hawk particularly in mixed farming/ranching landscapes, by the red-tailed hawk in the prairie-woodland edge (Schmutz et al. 1980), and by the Canada goose using tree nests near waterbodies (Schmutz et al. 1988), can create competition for nest sites, food, and/or space.
- d) Urban expansion, the creation of rural subdivisions, and industrial development can cause habitat loss and degradation.

2.2 Prey Availability

- a) Pest control has the potential to cause declines in the ferruginous hawk population. The greatest impact (Schmutz et al. 1989) may be expected in the mixed farming/ranching landscapes where both ground squirrels and ferruginous hawks are attracted to field edges in small tracts of grassland. (Schmutz 1989).

b) Some range management practices may reduce the suitability of rangelands for prey, thereby reducing prey availability on the grasslands for ferruginous hawks.

2.3 Nest Site Availability

- a) Ferruginous hawks prefer to nest on elevated nest substrates when available (Bechard and Schmutz 1995).
- b) In the open prairie landscape, excepting the increasingly treed prairie-woodland edge, many old shelterbelts and lone trees are dying or are being impacted by cattle.
- c) Many areas of the grasslands are windy. Ferruginous hawk nests are vulnerable to being blown out of trees, plus tree limbs break off or trees blow over. With the prediction of more severe weather events due to climate change, this may be of increasing concern.

2.4 Human Disturbance Impacts

- a) Nesting ferruginous hawks are particularly sensitive to disturbance during the incubation stage. Human disturbance can lead to nest abandonment.
- b) In some cases, ferruginous hawks at disturbed nests may persist with incubation and rearing but fledge fewer and/or smaller young.
- c) Industrial development, such as oil and gas, wind farms, power lines, and associated access construction and use, may result in increased human disturbance.
- d) There is a range of sensitivities, depending upon type of disturbance and other factors (White and Thurow 1985).

2.5 Human-caused Direct Mortality

- a) Industrial and infrastructure developments may increase direct mortality of ferruginous hawks due to vehicle collisions, collisions with elevated structures such as wind turbines, and electrocution.
- b) Direct persecution may be occurring in some areas through people killing ferruginous hawks or removing nests and nest trees.

2.6 Migration and Wintering Mortality

- a) Migration mortalities may occur due to storms, collision with towers and other elevated structures and electrocution at power distribution lines.
- b) Mortalities in wintering areas may occur due to electrocution, collisions with towers, shooting or a variety of causes (Bechard and Schmutz 1995).

2.7 Climate Change

- a) Long-term climate change may lead to changes in the migratory behaviour of ferruginous hawks.

b) Milder winters may reduce ground squirrel hibernation success with a subsequent reduction in prey availability for ferruginous hawks (Schmutz et al. in press).

c) With prediction of more severe weather events due to climate change, the tree and nest damage due to high wind events (see 2.3), may be of increasing concern.

A further explanation of these three points has been provided by Dr. Josef Schmutz, a member of the ferruginous hawk recovery team, as follows:

At the northern Great Plains of prairie Canada, ferruginous hawks rely primarily on ground squirrels for food (>80% of prey items). The ground squirrels are “true” hibernators and their survival over winter is potentially lowered during both abnormally cold and warm winters.

Different sex and age groups of ground squirrels enter hibernation – technically aestivation in summer, beginning in June up to December. The squirrels develop fat stores as energy reserves for the winter before going underground. Even during hibernation a small amount of urine is produced and squirrels wake up periodically to empty their bladder. If during that time the weather is favourable, they may come above ground briefly.

A true hibernator allows its body temperature to drop to just above zero; below zero it would freeze and die. As its temperature drops, its metabolic rate declines resulting in less fat being used at 2° C compared to 12° C. Two physiological factors are important in this temperature-survival link of ground squirrels. First, a ground squirrel cannot lower its temperature below the temperature in the burrow, as would be of survival value in an exceptionally warm winter, even though it could save fat reserves in so doing. Second, squirrels use more fat per day both at temperatures well above zero and at temperatures below zero. Factors such as soil type, soil moisture, and vegetation influence this temperature relationship.

Ground squirrels are adapted to the normal fluctuations in severity of winters, and have coped with these for several thousand years at our latitudes. However, when these temperature patterns change significantly or for prolonged periods, this could logically impact ground squirrels and thereby the squirrel dependent predators such as ferruginous hawks. The concern about a possible impact of climate change on hibernating mammals has been recognized (Inouye et al. 2000). It is conceivable that the ranges of hibernating mammals will change in time moving northward and to higher elevation.

In addition to its impact via hibernating mammals, changes in the timing of seasonal events can also lead to conservation challenges, especially for migrating birds. In Alberta, an earlier arrival of spring has been documented for flowering plants (Beaubien and Freeland 2000). In the case of ferruginous hawks, if this seasonal change also affects its prey, and if seasonal cues are mismatched between the wintering and breeding grounds, this could be an additional factor negatively impacting the survival and reproduction of ferruginous hawks.

2.8 Other Potential Limiting Factors

Other potential limiting factors include: disease, introduction of exotic species, increased numbers of predators, pesticide pollution, parasitism, cumulative impacts of various human activities, and loss of population viability due to population reduction or isolation. Recovery strategies and actions have generally not been provided for these in this plan.

3.0 THREATS ASSESSMENT

A threats assessment was carried out by the team. This involved determining the relative significance of each threat to the recovery and conservation of ferruginous hawks and identifying the degree to which each threat is likely to occur in present and future contexts. Appendix 1 provides this information as part of a matrix illustrating the progression of the team's decision-making process from identification of limiting factors and threats, to evaluating the degree to which the threat is impacting or will impact ferruginous hawks, to the development of objectives and strategies.

Using Appendix 1, it is possible to list and rank serious and imminent threats that need strategies to achieve recovery and conservation of the ferruginous hawk population in Alberta. The greatest present and future threats to the Alberta's ferruginous hawk population are listed here in high and moderate priority categories.

3.1 High Threats

1. Cultivation of native grasslands resulting in direct nesting and prey species habitat loss.
2. Loss of nest structures due to removal of native and historical remnant trees from the prairie landscape.
3. Cumulative impacts of industrial and infrastructure developments with potential for habitat loss, increased disturbance, and increased direct mortality of ferruginous hawks.

In addition, several other threats are serious, but limited to smaller portions of the ferruginous hawk range. We also need strategies to deal with these, but they can be applied in a more selective manner.

3.2 Moderate Threats

4. Electrocution on power distribution lines.
5. Direct mortality due to collisions with wind turbines and other tall structures: The degree of importance of this will be better understood as carcass monitoring continues at wind farms.
6. Expansion of urban and country residential developments onto ferruginous hawk habitat resulting in habitat loss and increased disturbance.

7. Persecution, although perceived by many to be a historical problem, still occurs and may increase due to perceptions of potential economic losses due to the presence of an Endangered species.
8. Migration and wintering losses of ferruginous hawks have been identified as a concern.
9. Reduction of prey availability possibly influenced by some range management practices.

Some threats were deemed by the team to be of lesser importance to ferruginous hawks. Prey fluctuations can greatly affect ferruginous hawk populations, but prey removal efforts by local residents were felt to be of such local influence as to be of little concern for the overall ferruginous hawk population recovery. However, there is continued concern relating to the potential for secondary toxicological impacts on non-target wildlife species for which strategies have been provided.

Some threats are of unknown significance requiring research and monitoring to discern their importance. Climate change was the most significant of these with the potential to change migratory behaviour of the species, and to create changes in hibernation behaviour of their prey. The possibility also exists that some results of climate change may benefit this species.

4.0 ESSENTIAL HABITAT

Some habitat is considered necessary for the recovery or survival of the species. Nesting and foraging habitat are necessary for survival of ferruginous hawk, and ongoing and potential threats exist to both. It is therefore important to know what comprises essential nesting and foraging habitats. Essential habitat is not “Critical Habitat” as defined in Canada’s *Species at Risk Act*. Critical Habitat determination is beyond the scope of this plan, because, at the time of writing, the ferruginous hawk was not listed as a *Threatened* or *Endangered* species in Canada’s *Species at Risk Act*.

4.1 Essential Habitat for Nesting

- a) Nest site availability has been shown to limit this hawk’s breeding distribution and possibly also it’s overall abundance in the wider region (Schmutz et al. 1988). In a given year currently used nest sites should be treated as essential habitat. These areas receive protection from destruction and disturbance under Alberta’s *Wildlife Act*.
- b) For application of sensitive species guidelines, a ferruginous hawk nest should retain “active” designation during the winter following nesting activity, through a second year, and into a third year, with the “active” designation being dropped on June 1 of the second year of inactivity. For example a nest used in 2007 would be considered active in 2008 even if no ferruginous hawks were to nest there. In 2009 it would still be considered active even if no nesting occurred. However on June 1, 2009, if no nesting has occurred the designation of that nest would then be

changed to "inactive" and it would no longer be managed as an active nest. At that point any identified timing constraints and setbacks would cease to be applied. An exception to this might occur when there are no other suitable structures present nearby (within 1 kilometre), then the SRD-FW Wildlife Biologist may choose to continue treating the site as an "active" nest.

4.2 Essential Habitat for Foraging

- a) All remaining native grasslands on Alberta's public lands within the Grassland Natural Region should be considered essential and retained and managed in a manner that retains their suitability for ferruginous hawk.
- b) Remaining native grasslands on Alberta private lands are just as valuable to ferruginous hawks as that found on public land, and good management should be encouraged through habitat stewardship programs.

5.0 RECOVERY STRATEGY

5.1 Recovery Goal

The Alberta Recovery Goal for ferruginous hawk is:

To achieve a viable self-sustaining ferruginous hawk population distributed across suitable habitat in Alberta's Grassland Natural Region through maintenance and/or enhancement of a functional prairie ecosystem.*

*viable: in this context, refers to genetic diversity as provided by interconnectivity through landscape linkages, the ability of the Alberta ferruginous hawks to have a continuous range with those in surrounding areas (Saskatchewan, Montana), and for some "mixing" of birds in wintering habitats. Large population size, in the absence of such linkages, may also provide some degree of viability.

5.2 Population and Range Objectives for the Recovery of Ferruginous Hawk

5.2.1 Population Objective

There have been five population estimates done over the past 25 years. This information shows that the Alberta ferruginous hawk population reached a low level of approximately 800 pairs during the mid to late 1990s, and has remained at or below that level. The recovery team has identified a population objective of 1200 pairs for the initial period of this plan (approx. 5 years), with a longer term objective of up to 1700 pairs over 20 years. Although year to year population fluctuations may occur, a positive population trend should be achieved throughout the next 20 years if the strategies in this plan are followed. The Alberta ferruginous hawk population should be part of a continuous population extending into Saskatchewan and Montana.

5.2.2 Range Objective

The range of the ferruginous hawk in Alberta is influenced by the distribution of native grasslands. Land use threats such as cultivation, industrial development, urban/rural residential development, as well as encroachment of trees and shrubs and competition with other raptors place constraints on the range of the species in Alberta. Ongoing economic expansion in Alberta, and the difficulties and high costs associated with large-scale grassland restoration reduce likelihood that the presently reduced range could be increased in the province. Therefore the objective is that the current range (2007) should be maintained, wherein recovery initiatives should be emphasized. Notwithstanding this, any opportunities for grassland restoration (thereby improving ferruginous hawk habitat), should be pursued.

5.2.3 Other Recovery Objectives

The team identified several other objectives, which are also in the Appendix 1 matrix. They are summarized below.

1. To maintain existing grasslands on both public and private lands in Alberta and increase Alberta's acreage of grasslands, where there is the opportunity.
2. To reduce human disturbance at nest sites.
3. To minimize the impacts of industrial developments on ferruginous hawk nesting and rearing.
4. To reduce the cumulative effects of industrial and infrastructure developments on ferruginous hawks and their habitat.
5. To ensure adequate nest sites are available in suitable grassland habitats.
6. To minimize incidence of electrocution of ferruginous hawks and other raptors.
7. To reduce any persecution of ferruginous hawks (direct killing, removal of nests, removal of trees).
8. To minimize ferruginous hawk habitat conversion to residential and commercial uses.
9. To reduce collision-caused mortality of ferruginous hawks at power lines and wind turbines
10. To minimize encroachment of trees and shrubs onto native rangeland.
11. To minimize competition pressure from other raptor species such as red-tailed and Swainson's hawks in areas of native grassland.
12. To ensure prey control or removal does not affect ferruginous hawk populations.
13. To ensure ferruginous hawk prey availability is considered in range management recommendations.
14. To reduce vehicle collisions with ferruginous hawks, especially during the fledging period.
15. To promote measures to reduce mortality during migration and in wintering areas.
16. To promote research on the impacts of climate change on ferruginous hawks and their habitat.

5.3 Strategies for Recovery

There are several strategies necessary for the recovery and conservation of Alberta's ferruginous hawk population. They are listed below with explanations provided.

- a) **Ferruginous Hawk Habitat Management** - includes actions required for the protection of existing habitat, habitat improvements, and restoration of habitat.
- b) **Reduction of Human Disturbances** – addresses actions needed to reduce human disturbances.
- c) **Reduction of Human-Caused Mortality** – includes actions needed to reduce collision-caused mortality as well as persecution.
- d) **Ferruginous Hawk Prey Management** – includes actions related to retention of ferruginous hawk prey populations and habitat.
- e) **Ferruginous Hawk Population Monitoring** – outlines population surveys needed to monitor success or failure of recovery actions over time.
- f) **Information and Outreach** – outlines information, outreach, and extension actions needed to increase awareness regarding ferruginous hawk recovery and conservation needs, some of which are multi-species or landscape based and benefit other grassland-based species as well.
- g) **Research** – includes recommendations for research projects needed to guide future management of ferruginous hawks.
- h) **Resource Acquisition** – provides actions needed to acquire funding and other resources to deliver identified actions.
- i) **Plan Management and Administration** – describes the lifespan of the recovery plan, the frequency of team meetings, and includes the Implementation Table showing responsibilities, timelines, and costs.

5.4 Biological and Technical Feasibility of Recovery

Most of the recovery strategies and actions identified in this plan should be achievable with focused efforts and resources from government, private industry, conservation groups, agricultural organizations and producers, and local stewardship groups.

6.0 ACTION PLAN

There are many actions needed to achieve recovery of the Alberta ferruginous hawk population to meet the goal and objectives identified in this plan. They are categorized here by society sector and nature of the action proposed.

6.1 Ferruginous Hawk Habitat Management

6.1.1 Government Policy

- Develop, through a collaborative effort between the Department of Sustainable Resource Development and Alberta's Prairie Conservation Forum, an Alberta government policy to ensure retention of remaining intact native grasslands on provincial public lands. This should also prevent selling or trading away of native grasslands as these are essential habitat for ferruginous hawks and many other wildlife.

6.1.2 Municipal Land Planning

- Establish referral procedures between Alberta Fish and Wildlife Division and Municipalities to ensure development planning for urban and rural residences on native grasslands considers the habitat needs of ferruginous hawk and other grassland-associated native wildlife.

6.1.3 Habitat Protection

- Inform private landholders of the importance of naturally-occurring trees and shrubs as important components of the prairie ecosystem, and encourage, through stewardship programs, their protection from destruction, and their careful management.
- Encourage keeping shelterbelts and woody vegetation surrounding abandoned farmsteads in place through stewardship programs and awareness activities.
- Identify through aerial and ground surveys, areas where ferruginous hawks nest on sloped ground, on cliff ledges, or atop hoodoos and protect these areas through protective notations, if public lands, or through awareness activities of stewardship programs.

6.1.4 Habitat Development

Given the objective to increase the provincial ferruginous hawk population, and the likelihood that, at least in some areas, availability of nest sites may be a limiting factor, it would be appropriate to provide additional nest platforms in suitable habitat within the range of the species. However, this should be done in areas where it is unlikely they will be used by competing species such as Swainson's hawk. There is also the potential that competing species such as Swainson's hawk, a more generalized predator than the ferruginous hawk, may prey upon other species at risk such as burrowing owl and sage grouse. The following actions are recommended:

- Install nest platforms in suitable habitat after a comprehensive evaluation of the overall ecological benefits has been done (Schmutz et al. 1988, Schmutz 1993b). This decision should involve the regional species at risk biologist.

- Carry out an inventory of existing hawk nest platforms and evaluate their effectiveness. This information should then be used for development of new hawk platform guidelines to assist in decisions. The use of hawk nest platforms in this planned manner may be an effective way to increase ferruginous hawk populations as well as for providing some biological regulation of ground squirrels.

6.1.5 Rangeland Management

- Revise provincial range management manuals should to accentuate the importance of providing a heterogeneous grassland structure across the landscape to accommodate ferruginous hawks and many other priority wildlife species. This can be achieved by providing localized areas of more heavily grazed grassland in association with areas of taller grass. While this is, in some respects, contradictory to the direction currently being provided by some range managers, it is an easily understood concept when the dependence of many species on ground squirrels is considered. It is generally understood by both range managers and landholders that many heavily grazed areas become heavily populated with ground squirrels. A need exists to develop greater clarity on the optimal extent of heavily grazed pastures relative to taller grasses.
- Engage range management professionals in the development of Beneficial Management Practices (BMPs) for ferruginous hawk and other wildlife species. This will help ensure that the recommendations provided are both technically sound and appropriate to maintain and enhance for ecosystem health.

6.1.6 Financial Incentives to Agricultural Producers

- Provide information on financial incentives to ranchers and farmers who are maintaining natural habitats for species at risk such as ferruginous hawks. Work is underway towards this objective by the Prairie BMP Project and programs of Alberta Environmental Farm Planning and MULTISAR and this should continue so that producers may realize financial benefits of having species at risk on their lands.

6.2 Reduction of Human Disturbances

6.2.1 Industrial Land Planning

Government and the industries whose activities have the greatest potential to impact ferruginous hawks need to agree upon several industrial land planning standards including:

- Provide information on current and historic locations of ferruginous hawk nests and other species at risk, as well as MULTISAR habitat suitability information that may exist for certain areas, mapping information, and local professional knowledge as part of industrial pre-planning consultation procedures.

- Carry out pre-development surveys by experienced wildlife technicians or biologists using appropriate protocols in native grasslands and other habitats with potential for ferruginous hawks and other species at risk.
- Apply the Prairie Sensitive Species Guidelines where ferruginous hawk nests or other species at risk production sites exist, in order to provide appropriate timing constraints to avoid impacts and to provide adequate setback distances to protect the sites from disturbance due to the industrial activity and associated human activities. These guidelines should be updated regularly and a decision-making matrix should be made available for SRD staff and industry to use in interpreting ferruginous hawk setbacks and timing constraints.

6.2.2 Industrial Mitigation

In circumstances where developments may be proceeding and a chance exists of long or short term impacts on ferruginous hawks, government and industries need to apply acceptable mitigation measures. Examples may include:

- Access design considerations (level of access and location of access).
- Access management to newly developed areas (e.g. well sites).
- Improved structural design (e.g. for power lines, towers, wind turbines).

This list is incomplete and existing guidelines, such as the Alberta Wildlife Guidelines for Wind Energy Projects, should be referred to. Where such mitigation guidelines do not exist for an industry, they should be developed.

6.3 Reduction of Human-Caused Mortality

- Reduce mortality of ferruginous hawks due to collisions with elevated structures through industrial land planning actions described in the previous section and adherence to the Prairie Sensitive Species Guidelines and Alberta Wildlife Guidelines for Wind Energy Projects.
- Reduce mortality of ferruginous hawks due to electrocution and collision with power lines through requiring the use of Avian Protection Plans (APLIC and USFWS 2005).
- Retrofit electrocution-hazardous structures in high priority areas according to the Avian Power Line Interaction Committee standards (APLIC 2006) to minimize ferruginous hawk mortalities.
- Develop messages relating to the values of ferruginous hawks and discouraging persecution of the species, and incorporate these messages into information and education programs. These awareness messages should be provided to landholders, land planners (e.g., municipalities) and industrial developers.

6.4 Ferruginous Hawk Prey Management

6.4.1 Pest Control

- Encourage maintenance of ferruginous hawk populations for help in regulating ground squirrel populations.

6.4.2 Rangeland Management

- Encourage use of the rangeland management recommendation identified in the Habitat Management Actions.

6.5 Ferruginous Hawk Population Monitoring

6.5.1 Population Monitoring

- Repeat the ferruginous hawk population inventory in 2010, and each 5 years thereafter. This is one of the most important ways to monitor success of the recovery program for ferruginous hawks.

6.5.2 Reintroduction

The recovery of endangered species often involves some type of population reintroduction. The swift fox and northern leopard frog provide recent examples of this in Alberta. However, the recovery team does not recommend any reintroductions for ferruginous hawk at this time. Should a further population decline be documented in the future, then reintroduction measures may become necessary.

6.6 Information and Outreach

6.6.1 Public Education and Awareness

Many actions need to be implemented through the provision of information and education in order to increase awareness of ferruginous hawks and native prairie conservation and to foster action through stewardship. They include:

- Incorporate information on ferruginous hawk conservation into prairie conservation messages of the Prairie Conservation Forum, Operation Grassland Community, MULTISAR, Nature Conservancy of Canada, Ducks Unlimited Canada, and agricultural organizations.
- Identify the presence of ferruginous hawks as a healthy grassland indicator.
- Promote the positive benefits of ferruginous hawk as a biological pest regulator.

- Promote A close relationship between the production of open range ranch-produced beef and the provision of habitat for ferruginous hawk and other prairie endangered species.
- Promote the retention of native shrubs and trees on the prairies as well as the value of keeping historical relict shelterbelts and abandoned farmsteads.
- Provide ferruginous hawk BMPs to agricultural producers through existing stewardship programs.

6.6.2 Economic Assessments

- Encourage ecological goods and services projects that can quantify the economic benefits of native grassland.
- Undertake a cost-benefit analysis of pest populations control to assess the actual economic impact of ground squirrel populations on cattle operations to help evaluate the perceived need to control this important prey species in native grassland habitat.

6.6.3 Market Incentives

Much of the habitat for species at risk in the province is managed by ranchers who are retaining native prairie habitats and grazing it in a manner compatible with wildlife. This is widely understood by both ranchers and wildlife managers however, the vast majority of urban Albertans are totally unaware of this important link. The following actions are recommended:

- Provided this key message through extension programs of the Prairie Conservation Forum, MULTISAR, Operation Grassland Community, Nature Conservancy of Canada, Alberta Beef Producers, Ducks Unlimited Canada, and Cows and Fish.
- Encourage urban consumers to purchase open range-raised beef.
- Promote market demand for labeling to identify beef produced by “Endangered Species Friendly” producers, leading to a system of market-based incentives to producers for providing species at risk habitat

6.6.4 National and International Relations

- Encourage COSEWIC to incorporate Alberta information into their reviews of the national status for the ferruginous hawk.
- Include recommendations of the Alberta Ferruginous Hawk Recovery Plan into the next update of the North American Conservation Action Plan for Ferruginous Hawk (Commission for Environmental Cooperation 2005).
- Provide the Alberta Ferruginous Hawk Recovery Plan to the national recovery team and encourage adoption of it as the Recovery Action Plan for the Alberta portion of the species’ range.

- Consider additional protection for ferruginous hawks by investigating benefits of inclusion of the species in federal Migratory Bird Convention Act, to determine if this would further benefit recovery and conservation of the ferruginous hawk.

6.7 Research

This section summarizes the team’s recommendations for research topics. Research should be encouraged by making this list available to prairie universities and other research institutions.

6.7.1 Population Monitoring

- Monitor trends in the ferruginous hawk population in five year intervals.
- Continue yearly trend monitoring of ferruginous hawks on a smaller sample of provincial ferruginous hawk blocks.
- Explore monitoring opportunities that may be possible through recreational banding.

6.7.2 Industrial and Human Disturbance

- Determine most appropriate setback distances under various industrial and human disturbance scenarios.
- Determine the level of cumulative disturbance from multiple land uses at which local ferruginous hawk populations are significantly impacted through increased mortality, reduced breeding success, and/or decreased recruitment.

6.7.3 Prey

- Study bioenergetics of ground squirrels, likely impacts of climate change on them, and how that could affect ferruginous hawk populations and those of other ground squirrel predators.
- Research improved environmentally-compatible “gopher” control methods as well as the economic impacts of various levels of ground squirrel populations in grasslands and croplands.
- Monitor toxicological impacts on resident ferruginous hawks in areas where toxic rodent control continues,
- Monitor Richardsons’ ground squirrel population cycles and evaluate the effect on ferruginous hawk populations.

6.7.4 Collision and Electrocutation

- Monitor flight behaviour of juvenile and adult ferruginous hawks around power lines to help understand collision risk
- Determine the level of power line electrocution impact on ferruginous hawks within Alberta.

- Determine the incidence of vehicle-caused collision mortality on recently-fledged ferruginous hawks.

6.7.5 Range Management

- Determine how grazing intensity affects prey species composition, density, and long-term stability.
- Develop an understanding of how range or riparian health corresponds with ferruginous hawk productivity or density.

6.7.6 Migration and Wintering

- Determine causes of mortality during migration and within wintering habitats.

6.7.7 Inter-Specific Competition

- Explore inter-specific competition with other raptors and how this is influenced by factors such as habitat and food availability.

6.7.8 Population Health

- Monitor the health of the population through nesting and fledging success.

6.7.9 Ecological Goods and Services

- Assess the natural, ecological, and other values of the ferruginous hawk and grassland habitat.

6.8 Resource Acquisition

Many of the actions identified in this plan (Section 7.0) will be delivered through “in-kind” activities of government and industry. These include revisions to policy and approval processes. They also include actions such as pre-development wildlife surveys that are part of the pre-development planning costs of industry and difficult to quantify.

Costs that must be budgeted for within the SRD-Fish and Wildlife Species at Risk Program include the annual team meetings, population and monitoring surveys and participation in the research projects identified.

6.9 Plan Management, Review and Administration

The Alberta Ferruginous Hawk Recovery Plan is designed to provide direction on conservation and recovery of the species for five years from the date of Ministerial approval. Approval was attained following an internal review for content and format

and a review by Alberta's Endangered Species Conservation Committee in spring 2008. During the ensuing five years, mid 2008-mid 2013, the Department of Sustainable Resource Development and several other government and non-government organizations will be encouraged to implement the actions identified in the recovery plan. Annual meetings of the recovery team will be held to monitor implementation of the actions. Following this initial five year period the plan will be revisited and revised as needed or, if major changes are needed the team may be reconvened to rewrite the plan.

This plan will represent the Ministerial-approved recovery plan for ferruginous hawk in Alberta until a revised plan replaces it, regardless of time elapsed. For example should for any reason there be no revised plan approved by mid 2013, then this plan will continue to be the Alberta recovery plan for any period of months or years thereafter, until a revised plan is approved.

7.0 IMPLEMENTATION TABLE

The implementation table summarizes each action, the strategy that action is delivering and the priority (Table 1). Priority codes are: 1= High priority for immediate species conservation, initiate as soon as possible; 2 = Medium priority for long term species conservation; 3 = Lower priority, primarily directed at potential future activities; 4=Not needed at this time but possible in future. Costs to the SRD-Fish and Wildlife Species at Risk Program are estimated. The term "In-kind" is used where there are costs associated but they are absorbed within the normal operating costs of government or provided by another organization or industry. The organization that should initiate the action is designated in the "Lead" column and the right side of the table shows when actions will be carried out.

Table 1: Implementation table for ferruginous hawk recovery actions

Action	Strategy Category	Priority	Lead	Cost and Year of Implementation				
				2008	2009	2010	2011	2012
<i>6.1.1 Develop policy for native grassland retention on Alberta public lands</i>	<i>Habitat Management</i>	<i>1</i>	<i>SRD-Lands; SRD-FW; Prairie Conservation Forum (PCF)</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.1.2 Establish native grassland referral process with municipalities</i>	<i>Habitat Management</i>	<i>1</i>	<i>SRD-FW, Counties</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.1.3 Information and Education encouraging retention of trees for nest sites.</i>	<i>Habitat Management</i>	<i>1</i>	<i>MULTISAR, conservation organizations</i>	<i>\$1,000</i>	<i>In-kind</i>	<i>In-kind</i>	<i>In-kind</i>	<i>Evaluate</i>
<i>6.2.1 Pre-planning consultation with SRD-FW and pre-development surveys in ferruginous hawk habitat</i>	<i>Reduction of Human Disturbances</i>	<i>1</i>	<i>Industrial Developers</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.2.1 Use of Prairie Sensitive Species Guidelines</i>	<i>Reduction of Human Disturbances</i>	<i>1</i>	<i>CAPP, SRD-FW, SRD-Lands</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.2.2 Mitigation of developments through access management and improved structural design</i>	<i>Reduction of Human Disturbances</i>	<i>1</i>	<i>Industrial Developers</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>

Action	Strategy Category	Priority	Lead	Cost and Year of Implementation				
				2008	2009	2010	2011	2012
<i>6.3 Use of Sensitive Species Guidelines and Alberta Wildlife Guidelines for Wind Energy Projects to reduce collision mortality</i>	<i>Reduction of Human-Caused Mortality</i>	<i>1</i>	<i>Energy Companies, SRD-FW, SRD-Lands</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.3 Use of Avian Protection Plans (APPs) to reduce electrocution and collision with power lines.</i>	<i>Reduction of Human-Caused Mortality</i>	<i>1</i>	<i>Electric utility companies operating in ferruginous hawk habitat</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.3 Retrofit electrocution-hazardous structures in high priority areas.</i>	<i>Reduction of Human-Caused Mortality</i>	<i>1</i>	<i>Electric utility companies operating in ferruginous hawk habitat</i>	<i>\$10,000 Survey & report</i>	<i>In-kind; Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.5.1; 6.7.1 Population monitoring and inventories every 5 years</i>	<i>Population Monitoring; Research</i>	<i>1</i>	<i>SRD-FW</i>	<i>In-kind; Annual Trends</i>	<i>In-kind; Annual Trends</i>	<i>\$40,000; Provincial Inventory</i>	<i>In-kind; Annual Trends</i>	<i>In-kind; Annual Trends</i>
<i>6.7.2 Research on Industrial and Human Disturbance</i>	<i>Research</i>	<i>1</i>	<i>University, Oil & Gas Industry, PCF, Canadian Electricity Association(CEA), SRD</i>	<i>\$5,000 plus in-kind; Design</i>	<i>\$5,000 plus in-kind; Ongoing</i>	<i>\$5,000 plus in-kind; Ongoing & Results</i>	<i>Implement Results</i>	<i>Implement Results</i>
<i>6.9 Plan Management and Administration</i>	<i>Plan Management</i>	<i>1</i>	<i>SRD-FW, Recovery Team</i>	<i>\$1,000; Plan Approval</i>	<i>\$1,000; Annual</i>	<i>\$1,000; Annual</i>	<i>\$1,000; Annual</i>	<i>\$3,000; Plan</i>

Action	Strategy Category	Priority	Lead	Cost and Year of Implementation				
				2008	2009	2010	2011	2012
	<i>and Administration</i>				<i>Reviews</i>	<i>Reviews</i>	<i>Reviews</i>	<i>Revision</i>
<i>6.1.3 Place public land reservations (PNTs) on ground/cliff nesting habitats</i>	<i>Habitat Management</i>	<i>2</i>	<i>SRD-FW, SRD-Lands</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.1.4 Inventory existing nest platforms</i>	<i>Habitat Management</i>	<i>2</i>	<i>SRD-FW</i>	<i>\$15,000</i>	<i>Update</i>	<i>Update</i>	<i>Update</i>	<i>Evaluate</i>
<i>6.1.4 New Hawk Nest Platform Guidelines</i>	<i>Habitat Management</i>	<i>2</i>	<i>SRD-FW; Energy Companies</i>	<i>In-kind: Development</i>	<i>Implement</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Review and Revise</i>
<i>6.1.5, 6.4.2 Produce and promote BMPs for ferruginous hawk</i>	<i>Habitat Management</i>	<i>2</i>	<i>MULTISAR, Operation Grassland Community (OGC), Canadian Wildlife Service (CWS)</i>	<i>\$1,000 plus In-kind: Development</i>	<i>Implement</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Review</i>
<i>6.1.6 Determine financial incentives to producers for providing SAR habitat</i>	<i>Habitat Management</i>	<i>2</i>	<i>National Farm Stewardship Program; Conservation Organizations</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.3 Information and education programs to discourage persecution of species at risk</i>	<i>Reduction of Human-Caused Mortality</i>	<i>2</i>	<i>Conservation Organizations, SRD-FW, CWS</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>

Action	Strategy Category	Priority	Lead	Cost and Year of Implementation				
				2008	2009	2010	2011	2012
6.6.1 Public Education & Awareness	Information and Outreach	2	PCF, Conservation Organizations	In-kind	Ongoing	Ongoing	Ongoing	Evaluate
6.6.4 National Status Review	National and International Relations	2	Committee on the Status of Wildlife in Canada (COSEWIC)	In-kind; Status Evaluation	In-kind; possibly National Recovery Planning	Complete	Complete	Complete
6.7.3 Prey monitoring and research (incl. annual ground squirrel trend surveys)	Research	2	Universities SRD-FW, conservation organizations	In-kind	In-kind	In-kind	In-kind	In-kind
6.7.4 Research on Collision and Electrocution	Research	2	CEA, Universities, SRD-FW	In-kind	Ongoing	Results	Implement Results	Implement Results
6.7.5 Research on range management and ferruginous hawks	Research	2	SRD-Lands, Universities	In-kind	In-kind	In-kind	Results	Implement Results
6.7.8 Monitoring of ferruginous hawk population health	Research	2	CWS, SRD-FW, Falconry banders	In-kind: Development of Protocol	Ongoing	Ongoing	Ongoing	Evaluate
6.4 AAMDC promote maintenance of hawk populations for regulation of ground squirrels	Ferruginous Hawk Prey Management	3	Alberta Association of Municipal Districts and Counties	In-kind	Ongoing	Ongoing	Ongoing	Evaluate
6.6.2; 6.7.9 Ecological Goods and Services	Research/Information and	3	PCF, MULTISAR,	In-kind;	In-kind;	Implement	Implement	Evaluate

Action	Strategy Category	Priority	Lead	Cost and Year of Implementation				
				2008	2009	2010	2011	2012
<i>projects to show economic benefits of grassland.</i>	<i>Outreach</i>		<i>Ducks Unlimited Canada (DUC)</i>	<i>Initiation</i>	<i>Results</i>			
<i>6.6.3 Market Incentives</i>	<i>Information and Outreach</i>	<i>3</i>	<i>PCF, MULTISAR</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.6.4 Translation of recovery plan into Spanish</i>	<i>National and International Relations</i>	<i>3</i>	<i>CWS</i>	<i>In-kind</i>				
<i>6.6.4 MBCA review</i>	<i>National and International Relations</i>	<i>3</i>	<i>CWS</i>	<i>In-kind</i>				
<i>6.7.6 Explore causes of mortality during migration and winter</i>	<i>Research</i>	<i>3</i>	<i>CWS</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.7.7 Research on inter-specific competition with other raptors</i>	<i>Research</i>	<i>3</i>	<i>Universities, conservation organizations</i>	<i>In-kind</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Ongoing</i>	<i>Evaluate</i>
<i>6.5.2 Reintroductions</i>	<i>Reintroduction</i>	<i>4</i>	<i>SRD-FW</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>Evaluate need</i>

<i>TOTAL budget needs from SRD-FW Species at Risk Budget (not including in-kind and MULTISAR sponsorship, and costs to other organizations)</i>	<i>Resource Acquisition</i>		<i>SRD-FW Species at Risk Program</i>	<i>\$33,000</i>	<i>\$6,000</i>	<i>\$46,000</i>	<i>\$1,000</i>	<i>\$3,000</i>
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8.0 SOCIO-ECONOMIC CONSIDERATIONS

Industrial and infrastructure developments may require a longer planning lead time in areas where ferruginous hawks are known or expected to occur. Additional costs related to hiring biologists and their carrying out of pre-development surveys can be expected. In some cases, setback distances and timing constraints may result in development delays, and special procedures, which will create increased costs. Socio-economic implications were considered in the Threats Assessment and are summarized in Appendix 1.

The retention of areas of native grassland to benefit ferruginous hawk and other grassland species may limit some potential crop development. This may be considered a financial loss but it may also be recognized as an ecological and societal gain for future generations. However, loss of economic opportunities due to considerations related to conservation of nature generally lead to creation of other, often long-term opportunities. Given the accelerating rates of industrial, infrastructure, and residential developments on the prairie landscape and the attractiveness of increasing the amount of cropland resulting from high commodity prices, an imminent need exists to develop methods of valuation of natural habitats and landscapes. Until such methods are usable, full-cost accounting of the socio-economic impacts of endangered species recovery can not be done.

While specific valuations of ferruginous hawk to society may not be available at this time, it is clear that Alberta society places high value on the continued presence of natural habitats and landscapes. Habitation of those natural areas by native species, including the ferruginous hawk, is also very important to all Albertans. Recovery team members were provided with opportunities to express their views on this at “Open Forum” discussions during the first two meetings. The Blood Tribe representatives reminded the group that society needs to consider the spiritual benefits of native wildlife on natural landscapes. Other team members acknowledged the importance of this, and several emphasized the important role of the ferruginous hawk as a strong indicator of intact native prairie at the landscape level. Some representatives, most notably the Western Stock Growers, cautioned that, while they liked ferruginous hawks being on their ranches, they were uneasy with the “politics” of endangered species management. They were concerned about any possible requirements or restrictions that may be imposed on landholders who have ferruginous hawks or other *Endangered* species on their lands. This helped to direct the team towards developing actions that are dependant on a cooperative approach rather than an enforcement approach.

9.0 LITERATURE CITED

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APPENDIX 1 FERRUGINOUS HAWK THREATS ASSESSMENT

Limiting Factor	Threat	Present & Future Threat (H-M-L)	Seriousness (H-M-L)	Objective	Strategy	Socio-economic Implications
Habitat Loss/Alteration	Cultivation	Low, locally medium or high	High	1. To maintain current grasslands-Public & Private 2. To increase acreage of grasslands where there is the opportunity	1. Public Lands policy for grasslands retention 2. Support sustainable ranching in Alberta 3. Encourage programs to restore grasslands	Loss of some economic opportunity; creation of other opportunities
	Urban, Country Residential	Low, locally high	Low, locally high	To minimize ferruginous hawk habitat conversion to residential and commercial uses	Provide input to priority municipalities to avoid residential developments on native grasslands	Loss of development opportunity; improved quality of life for present and future residents
	Expansion of Woody Vegetation	Low, locally medium	Low	To minimize encroachment of trees and shrubs onto native rangeland	Support prescribed burns in targeted areas of foothills fescue and northern fescue	Danger of escaped fire; increased domestic livestock foraging opportunities
	Range Expansion of Competing Species	Low, locally medium	Low	To minimize competition in areas of native grassland	Discourage habitat development projects that improve habitat for competing species	Possible conflict with other wildlife objectives

Limiting Factor	Threat	Present & Future Threat (H-M-L)	Seriousness (H-M-L)	Objective	Strategy	Socio-economic Implications
Prey Availability	Pest Control	Low	High	To ensure prey removal doesn't affect hawk production and recruitment, and other native species	<ol style="list-style-type: none"> 1. Avoid wide-scale gopher elimination from large areas. 2. Restrict gopher-control methods that have high secondary poisoning potential. 	Possible crop losses due to gopher damage
	Range Management	Low	Low	To ensure ferruginous hawk prey availability is considered in range management	<ol style="list-style-type: none"> 1. Encourage research to determine appropriate proportions of rangeland for prey management. 2. Promote grassland heterogeneity. . 	Contradicts "high range health" message, may be misconstrued by some to justify poor management
Nest Site Availability	Tree Removal	High	Medium to High	To ensure nest sites are available in suitable grassland habitats	<ol style="list-style-type: none"> 1. Protect treed shelterbelts 2. Protect existing nests 3. Provide new nest sites according to guidelines 	Bio-regulation of ground squirrels; Possible perceived conflicts with other wildlife objectives

Limiting Factor	Threat	Present & Future Threat (H-M-L)	Seriousness (H-M-L)	Objective	Strategy	Socio-economic Implications
Human Disturbance Impacts	General public Access	Medium	Medium	To reduce human disturbance at nest sites	1. Public information 2. Application of guidelines and mitigation measures	Some limitations on developments
	Industrial Development/Oil and Gas, Infrastructure	Medium, if guidelines used; locally High	Medium	To reduce impacts on ferruginous hawk nesting and rearing	1. Planning/regulatory processes 2. Application of guidelines and mitigation measures 3. Research and monitoring	Planning and field costs, possible non-approval of some developments
Human-caused Direct Mortality	Persecution	Low, Locally medium	High	To reduce any persecution of ferruginous hawks (direct killing, removal of nests, removal of trees).	1. Increase awareness about the positive values of ferruginous hawk. 2. Provide education on values of native grassland, native woody vegetation, and historical remnant woody vegetation	Counter negative perceptions

Limiting Factor	Threat	Present & Future Threat (H-M-L)	Seriousness (H-M-L)	Objective	Strategy	Socio-economic Implications
Human-caused Direct Mortality	Increased vehicle access and resultant vehicle collisions	Low	Low, Locally Medium	To reduce opportunity for vehicles colliding with ferruginous hawk (especially during fledging period)	1. Planning/regulatory processes 2. Application of guidelines and mitigation measures	Planning and field costs, possible non-approval of some developments
	Power line electrocutions	medium	Low, locally medium	To minimize incidence of electrocution of ferruginous hawk and other species	1. Encourage Avian Protection Plans (APPs) 2. Retrofit electrocution-hazardous structures in high priority areas.	Cost to implement; Economic gain from reduced electrical outages; Good public relations for companies
	Power Line Collisions	Low	Low	To minimize collisions with power lines	Encourage APPs	Cost to implement; Good public relations for companies
	Wind Turbine Collisions	Medium	Low, locally Medium	To reduce collision-caused mortality of ferruginous hawks at wind turbines	1. Planning/regulatory processes 2. Application of guidelines and mitigation measures 3. Research and monitoring	Planning and field costs, possible non-approval of some developments

Limiting Factor	Threat	Present & Future Threat (H-M-L)	Seriousness (H-M-L)	Objective	Strategy	Socio-economic Implications
Migration/Winter Mortality	Storms, Variety of Causes	Medium	Medium	Promote measures to reduce mortality		Possible costs to interests in USA & Mexico
Climate Change	Changes in migratory behaviour and prey availability	Unknown	Unknown	Promote research on the impacts of climate change on ferruginous hawks and their habitat.	Promote University studies on energetics of ground squirrel hibernation, and the potential impacts of warmer winters on ground squirrel winter survival.	Possible need for changes to industrial timing constraints
Cumulative Impacts	Increased impacts due to numerous developments	High	Low- High	To reduce cumulative effects of developments on ferruginous hawks and their habitat	1. Reinforce the need to evaluate cumulative effects during industrial approvals 2. Research impacts of various development densities	Some limitations on developments; Retention of energy reserves for future generations

List of Titles in the Alberta Species at Risk Recovery Plan Series

- No. 1 Maintenance and Recovery Plan for Western Blue Flag (*Iris missouriensis*) in Canada. (2002)
- No. 2 Alberta Piping Plover Recovery Plan 2002-2004. (2002)
- No. 3 Alberta Peregrine Falcon Recovery Plan 2004-2010. (2005)
- No. 4 Alberta Woodland Caribou Recovery Plan 2004/05-2013/14. (2005)
- No. 5. Recovery Plan for Ord's Kangaroo Rat in Alberta. (2005)
- No. 6 Recovery Plan for Burrowing Owl in Alberta. (2005)
- No. 7 Alberta Northern Leopard Frog Recovery Plan 2005-2010. (2005)
- No. 8 Alberta Greater Sage-Grouse Recovery Plan. (2005)
- No. 9 Maintenance and Recovery Plan for Western Spiderwort in Alberta 2005-2010. (2005)
- No. 10. Alberta Piping Plover Recovery Plan 2005-2010. (2006)
- No. 11. Recovery Plan for Soapweed and Yucca Moth in Alberta 2006-2010. (2006)
- No. 12. Alberta Trumpeter Swan Recovery Plan 2005-2010. (2006)
- No. 13. Alberta Shortjaw Cisco Recovery Plan 2006-2011. (2007)
- No.14. Alberta Swift Fox Recovery Plan 2006-2011. (2007)
- No. 15. Alberta Grizzly Bear Recovery Plan 2008-2013 (2008).
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- No. 17. Alberta Ferruginous Hawk Recovery Plan 2009-2014. (2009).