

Management Plan for the Recovery of Burrowing Owls in Manitoba

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Table of Contents

1.0 Introduction (3)

- 1.1 Provincial Status
- 1.2 Recovery Team
- 1.3 Guiding Principles
- 1.4 Manitoba Population Size
- 1.5 Canadian Distribution
- 1.6 Life Cycle

2.0 Population Threats and Limiting Factors (5)

- 2.1 Threats
- 2.2 Limiting Factors

3.0 Knowledge Gaps (7)

4.0 Feasibility of Recovery (8)

5.0 Recovery Goal (9)

6.0 Recovery Objectives (9)

- 6.1 Increase and improve Burrowing Owl Habitat within Southwestern Manitoba
- 6.2 Increase fledgling survival rates of captive release Burrowing Owls in Southwestern Manitoba
- 6.3 To provide suitable vegetative height around burrows to encourage nesting and foraging in Southwestern Manitoba
- 6.4 Educate and collaborate with individuals within Southwestern Manitoba on how they can help to increase Burrowing Owl Populations.

7.0 Total Costs of Management Plan (15)

8.0 Conclusion (15)

9.0 Figures (17)

10.0 Tables (19)

11.0 References (20)

Introduction 1.0

1.1 Provincial Status

The Burrowing Owl (as seen in figure 1) was first listed as endangered in 1992 by regulation under Manitoba's *Endangered Species Act*. They are currently still listed as endangered within Manitoba, as well as the rest of Canada. The burrowing owls are also protected under the federal *Migratory Birds Convention Act* (Government, 2017).

1.2 Recovery Team

The Manitoba Burrowing Owl Recovery Program (MBORP) is a non-profit organization that works towards increasing the population of Burrowing Owls in Manitoba. Each year soft-releases are done with breeding pairs. The recovery program collects research information each year such as productivity relating to clutch size, hatching success, survival of young, foraging of males post-hatching, home range size, diet/prey use, dispersal, mortality, return rates/survival, and other behaviors. Throughout the year the recovery program also focuses on educating individuals within Manitoba on how they can help reduce the decline of this species population (MBORP, 2017).

1.3 Manitoba Population Size

Since 1992, the Burrowing Owl has been considered endangered under Manitoba's Endangered Species Act. Populations started declining in 1978, with a decrease from 110 breeding pairs to only 1 pair in 1996. From 2000-2005 there were no owls seen in Manitoba. Confirmed sightings were seen again in 2008-2009 with approximately 8-11 breeding pairs.

Within the past three years, there have been less than 10 breeding pairs known in Manitoba (Froese, A.L.M, 2016).

1.4 Canadian Distribution

The Burrowing Owl distribution in Canada once ranged as far east as Winnipeg, Manitoba, and as far west as Alberta's foothills. At this time there were also separated populations found around the Fraser River delta in British Columbia. In the early 1980s Burrowing Owls as a breeding species were completely extirpated in British Columbia. To this day there have only been captive-release owls seen breeding within this area. As seen in figure 1. 2 burrowing owls were completely extirpated in Manitoba in 2004. However, since this year there have been breeding pairs show up within Manitoba. These pairs range from 1 to a high of 11 breeding pairs seen in 2008. Overall, the breeding range of Burrowing Owls in Canada has been recorded as declining since the 1990s. Historically the breeding range of the Burrowing Owl in Canada covered roughly 450,000 km², and by the 1990s this range had decreased by 47%. By 2004, the range of Burrowing Owls had decreased to 36% of their historical range (Canada G.O, 2012).

1.5 Life Cycle

Burrowing Owls return to Canada every April/May to breed and have young. Males return slightly earlier than females to find a burrow and select their territory. After deciding on a burrow the male will start to prepare it for nesting. This includes lining the burrow with manure, grasses, and feathers. This helps to keep the temperature in the burrow stable, mask their smell from predators, and increase the number of insects around their burrow. Once the females arrive and they chose a male they see to be the best fit, the female will start laying eggs. A female can

have anywhere from 4-12 eggs. Eggs are laid approximately every 36-48 hours and are slightly smaller than a Ping-Pong ball. After 25-28 days of incubation, the eggs will begin to hatch. Hatching doesn't happen all at once but rather one at a time, over a period of time. The total length of hatching depends on how many eggs there are in each nest. This can cause a large difference in size between the young. It is not uncommon for the younger, smaller chicks do not survive due to the competition between their older and stronger siblings. After two weeks the young will begin to come out of their burrow, and within 5-6 weeks they will start to fly. The Burrowing owls will start their migration back down the Gulf of Mexico in September/October once the weather starts to get cold again (Froese, A.L.M, 2016).

2.0 Population Threats and Limiting Factors

2.1 Threats

There are several threats to burrowing owl populations in Southwestern Manitoba. One of the most influential threats to populations of burrowing owls in Manitoba is the loss of habitat suitable foraging and nesting habitat. The ongoing alteration of grassland landscape in Manitoba due to urban sprawl, farming activities and petroleum extraction has caused a major decline in available habitat for burrowing owls in Southwestern Manitoba (MBORP, 2017). Burrowing Owls required burrows, foraging habitat, and short vegetative height to ensure their successful breeding in our region (Uhumann, T, et al, 2001). As species that produce burrows are declining, and burrowing owls cannot make their own burrows, a lack of burrows is increasingly becoming a factor in burrowing owl population numbers in Southwestern Manitoba (MBORP, 2017). In Manitoba Richardson ground squirrel populations and badger populations are abundant, however burrowing owls seem to occupy a small percentage of the burrows made available to them

(Government of Canada, 2012). This suggests that lack of burrows is not alone factor determining the decline of burrowing owls in Southwestern Manitoba (Government of Canada, 2012).

There has been concern that lack of prey for burrowing owls or prey that has come into contact with pesticides has also affected burrowing owl populations in Manitoba (MBORP, 2017). Many landowners use pesticides on crops and grassland to protect crops against insects that are typically a food source for burrowing owls, such as grasshoppers (MBORP, 2017). If these insects are not killed by the pesticides, owls may ingest an insect that has come into contact with pesticides leading to a concern for burrowing owl health (MBORP, 2017). Another factor related to food availability for burrowing owls is the severity of weather in recent years with many years with rainfall or cold temperatures far exceeding the year before in terms of abundance and length that the region is affected (Government of Canada, 2012). Both rainfall amounts and colder temperatures could impact insect abundance in the area, especially if it overlaps with the time that burrowing owls are nesting and producing young (Government of Canada, 2012). Though many factors are contributing to the decline in burrowing owl populations in Manitoba, one of the highest levels of mortality of burrowing owls comes from an increase in predators on the landscape (Wellicome, T & Haug, E, 1995). Burrowing Owls have several natural predators on the prairie landscape including badgers, foxes, and larger birds such as owls and raptors (MBORP, 2017). When predators are not the main cause of mortality to burrowing owls, vehicle collisions can also cause deaths to burrowing owls as well (MBORP, 2017).

2.2 Limiting Factors

Clutch size reduction due to extreme cold or wet conditions may contribute to the limited population sizes we have experienced for burrowing owls since the 1990's (De Smet, K., 1997). In the 1990's studies on burrowing owls appeared to show a relationship between the failed success of a nest and a reduction in clutch size the following year (De Smet, K., 1997). In 1993, environmental conditions were poor leading to a 65% decrease in 1994 clutch sizes in Manitoba (De Smet, K., 1997). Since poor climatic conditions cannot be removed from areas experiencing burrowing owls, it is expected that poor conditions will continue to affect clutch size in burrowing owls.

3.0 Knowledge Gaps

There are current knowledge gaps around Canadian Burrowing Owls that if gained would help to aid the recovery of the species. These variables include:

- 1) Migration route and re-return success of burrowing owls
- 2) The effects of contaminants and pesticides on burrowing owls
- 3) Survival rates of the owls at all life stages
- 4) Migratory routes of Canadian owls
- 5) Locations of the majority of the nest within Canada
- 6) Best methods for increasing the successfulness of captive-releases

(Canada G.O, 2012)

4.0 Feasibility of Recovery

It is important to consider the feasibility of Burrowing Owls based on their current threats and low numbers. Based on the criteria to determine the feasibility of recovery, Burrowing Owl within Manitoba and Canada are considered recoverable. The criteria to base this decision on consists of:

- 1) The individual Burrowing owls are capable of reproduction currently or in the near foreseeable future.
- 2) Sufficient suitable habitat is available or could be made through habitat mitigation to support Burrowing Owls.
- 3) The major threats to Burrowing Owls and their habitat can be avoided or mitigated through management.
- 4) Recovery techniques exist to achieve the population and distribution objectives or can be developed within a reasonable time.
 - a. Currently Burrowing Owls are meeting these criteria, however, if their population continues to decline their distribution may continue to shrink inwards even with the management of the species. This will be something to watch throughout our 30-year management plan.

(Canada G.O, 2012)

Another consideration we looked into was if there was enough suitable habitat in Manitoba to support a higher population. As seen in figure ** there is currently enough suitable (treeless, grazed, and has burrows or partially suitable land in southwestern Manitoba (Froese, A.L.M, 2016). We were unable to obtain specific locations of any protected land within this southwest corner, however, the Nature Conservancy of Canada (NCC) did state that they do currently have

conserved mixed-grass prairie in the current range of Burrowing Owls through both easements and the purchasing of land. Throughout this contact, it was explained that their management plan could be adapted to better suit burrowing owls in the future.

5.0 Recovery Goal

The goal of this plan is to increase the wild Burrowing Owl population in Southwestern Manitoba to a self-sustaining population of 15 pairs within the next 30 years. This set number of breeding pairs will be achievable throughout our the increased and improved habitat, increased fledgling survival of captive release Burrowing Owls, provide optimum vegetation heights around burrows to encourage more nesting.

6.0 Recovery Objectives

6.1 Increase and improve Burrowing Owl Habitat within Southwestern Manitoba

Our first objective is to increase and improve the available Burrowing Owl habitat within Southwestern Manitoba. To do this, we would survey the land to find suitable habitat for nesting, and when we find the suitable land and, if it is being used as farmland, we would contact the farmers, and see if we could work with them. We would offer landowners funding to keep part of their land natural, with haying and grazing, to be suitable habitat for burrows. Suitable habitat would require short grass, a treeless area with little vegetation, dry land, and higher terrain to avoid flooding. Burrowing owls would need land where they can build burrows, like pastures and agricultural fields.

For this objective there would be funding options through Nature Conservancy, Species at Risk Funding Programs, West Souris River Conservation District, Turtle Mountain Conservation District, as well as Manitoba Heritage Habitat Corporation.

6.2 Increase fledgling survival rates of captive release Burrowing Owls in Southwestern Manitoba.

In recent years, the MBORP has seen issues with high predation rates within their captive-release owls. Foxes and raccoons have been the main culprits, however, coyotes, larger owls, and skunks have also been recorded frequently visiting the burrow entrances. Our objective is to increase the fledgling survival rates of captive-release Burrowing Owls in southwestern Manitoba by decreasing predation.

Pipe reducers are being more commonly seen across Burrowing Owl Recovery programs, and are currently being used in Alberta. These pipe reducers are used to create a smaller 4-inch diameter section near the entrance of the burrow. This change from 6-inch to 4-inch diameter reduces the chance of smaller predators making their way down the tunnel into the burrow.

The plan is to install these reducers to the entranceways of each of the 41 artificial burrows the MBORP already has installed within southwestern Manitoba. This will cost approximately \$492 for the initial year of our management plan. In the following years, it will cost \$480, this will cover the cost of installing new artificial burrows with reducers. These new burrows will be located within new release locations throughout each year.

Overall this objective will cost \$14,892 total over the 30-year time period.

6.3 To provide suitable vegetative height around burrows to encourage nesting and foraging in Southwestern Manitoba.

Burrowing owls rely on three main factors when determining suitability for their nesting and foraging activities (Uhumann, T., Kenkel, N., Baydack, R., 2001). These three factors are burrow availability, foraging availability and vegetation (as seen in table 1) at the nest site (Uhumann, T et al, 2001). On land suitable for burrowing owls to nest in Manitoba, some areas may have burrows available for burrowing owls, however, the vegetative height around the burrow may be a disincentive to use this burrow if the height of the grass around the burrow is too high. In a study done in 1989 in Oregon, they found that Burrowing Owls prefer grasses at a height of 5cm or less (Green, G & Anthony, R., 1989). Short grasses in front of the nest allow Burrowing Owls to locate predators before they reach the nest (Green, G & Anthony, R., 1989).

This objective will be carried out by informing farmers with suitable land about grazing practices that can maintain grass height at optimal amounts would benefit the suitability of land for burrowing owls. The regiment for the amount of grazing by cattle on the landscape would need to be studied and put into practice to determine how often grazing would need to be practiced (Marsh, A., Wellicome, T., Bayne, E, 2014). It is possible that too much or too little grazing could also affect the abundance of prey for burrowing owls in the area (Marsh, A et al, 2014). On land in Southwestern Manitoba that is determined to be suitable for nesting of burrowing owls, programs can be provided by the Nature Conservancy of Canada or Manitoba Habitat Heritage Corporation to provide landowners with monetary incentives for maintaining habitat for species at risk (NCC, 2017)(MHHC, 2016).

6.4 Educate and collaborate with individuals within Southwestern Manitoba on how they can help to increase Burrowing Owl Populations.

The increase of knowledge about Burrowing Owls will be a major factor in the success of their recovery. Throughout this stage of our management plan, we will be informing individuals in Manitoba about Burrowing Owls, and how they can help aid their recovery. Two objectives for effectively involving individual from various communities to achieve our goal include:

- 1) Creating awareness about the current state of Burrowing Owls: - The target audience would be the general public at large, the local communities in southwestern Manitoba, or companies that would be interested in possible funding opportunities.

- 2) Education through collaboration:
 - Education about how the state of Burrowing Owls can be improved. This would be achieved through collaboration with high school students or teachers or post-secondary students that would be interested in conducting projects or research on Burrowing Owls in Manitoba.

The objectives listed above will be carried out through various means that involves integrating awareness, education, and collaboration.

Methodology for achieving objective include:

- 1) Setting-up Public Information Centers (PICs) in local communities
- 2) Involving students in projects, presentations etc.
- 3) Creating a project website
- 4) Use of the media and social media

Public Information Centers will be set up in key local communities in southwestern Manitoba. This will be set-up mainly in communities located in within their current range within Southwestern Manitoba.

These PICs will serve to sensitize and educate people about the state of Burrowing Owls in southwestern Manitoba and educate on how the situation can be improved. Update on actions and programs will also be adequately communicated in the PIC through the display panels. There will also be representatives around to answer any questions and concerns attendees may have. This will create a good avenue for all stakeholders to dialogue, exchange information and spur collaboration. Individuals who are interested in improving their land for Burrowing Owls, and have not yet been contacted during objective 1 of our management plan can also be met during these PICs. A quick survey along with information regarding their land can be gathered at this time, and future contact can be made in regards to improving their land for Burrowing Owls.

This will work well as communities are better involved in the process, high schools will be encouraged to make students do presentations on Burrowing Owls as part of projects. This will help create awareness about Burrowing Owls and also educate both the students and the audience about Burrowing Owls status.

Through these projects and presentations, students will be well grounded and informed about the issues at hand. These students can also be made to be more involved by volunteering in Burrowing Owl recovery program during the field season to help with monitoring, digging artificial burrows, or any other daily activities.

There would be the possibility for involving individuals currently taking post-secondary schooling to get involved with helping the Burrowing Owls in Manitoba. This could be done by university projects on the species, grad students conducting research, or simply just volunteering to help with daily activities.

A project website is a very effective tool for creating awareness, education and even collaboration. Through website loads of information about Burrowing Owls can be uploaded online and made easily accessible by a virtually everyone. A platform where people can sign up for volunteer activities can be made available on the site. The website is primarily used for information dissemination, as well as a good platform where updates on project activities can be provided.

Use of media platforms like posters and newspaper articles will also be a good way of disseminating information and educating public on both Burrowing Owl and Burrowing Owl status. The social media will be an even more effective tool. Use of social media outlets like Facebook and Instagram to create awareness, educate and even spur collaboration through interactions. The social media site comes at no cost and has a very strong reach.

The cost for running the PIC will come to approximately \$1500. This will include the cost of flyers, deliveries, newspaper ads, rent for a community center, mileage, metal easels to hold panels etc. This cost will incur annually throughout our plan.

Creating a project website will cost approximately \$400. This will cover the cost of a domain name, hosting & other security features. The website could easily cost more if an expert is to be hired to create one. However, there are platforms where free websites can be created, so this eliminates the cost of labour. This will be an initial cost of \$400, then \$100 each year to update this website

The total cost for this objective will amount to \$51,400 for the entire 30 years of our plan.

Total Costs of Management Plan

The total costs of our management plan for the recovery of Burrowing Owls in Manitoba would come to a total of \$66,292 over the 30-year time period. This total may fluctuate slightly based on incoming funding available.

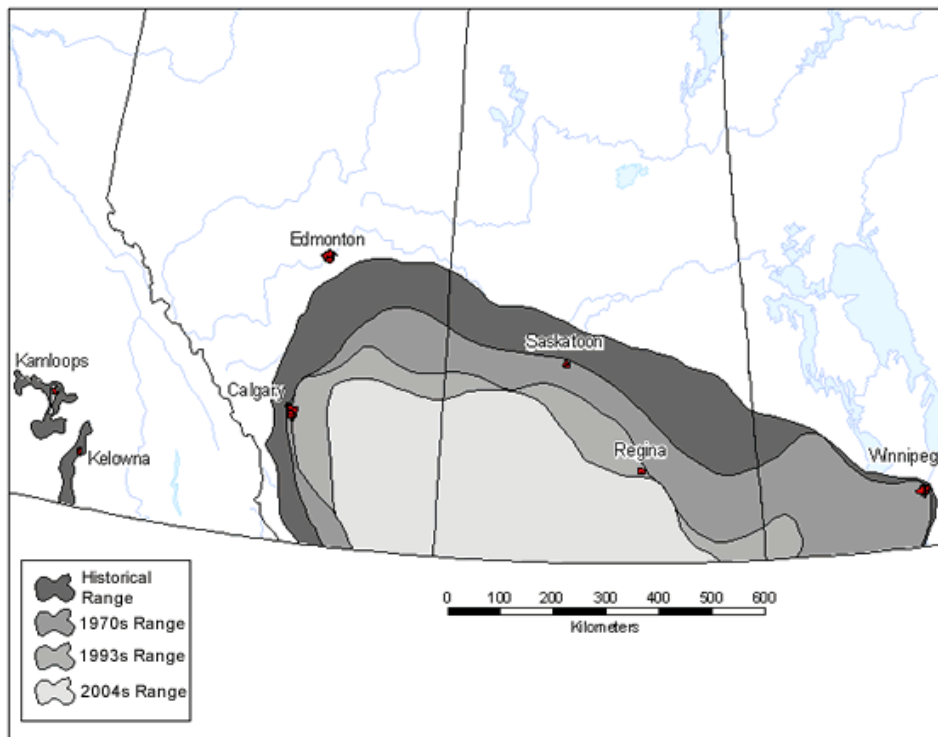
Conclusion

In conclusion, with the mitigation practices and increased knowledge of individuals as well as landowners described in our four objectives, we plan to see the population of Burrowing Owls within Manitoba increase to a self-sustaining population of 15 pairs within 30-years. We do realize that we will have to take an adaptive management approach at reaching this goal and adjust our plan as more research is done on the Burrowing Owls that are found both within in Manitoba and Canada.

9.0 Figures



Figure 1. Burrowing Owl photographed by A. Thomas.



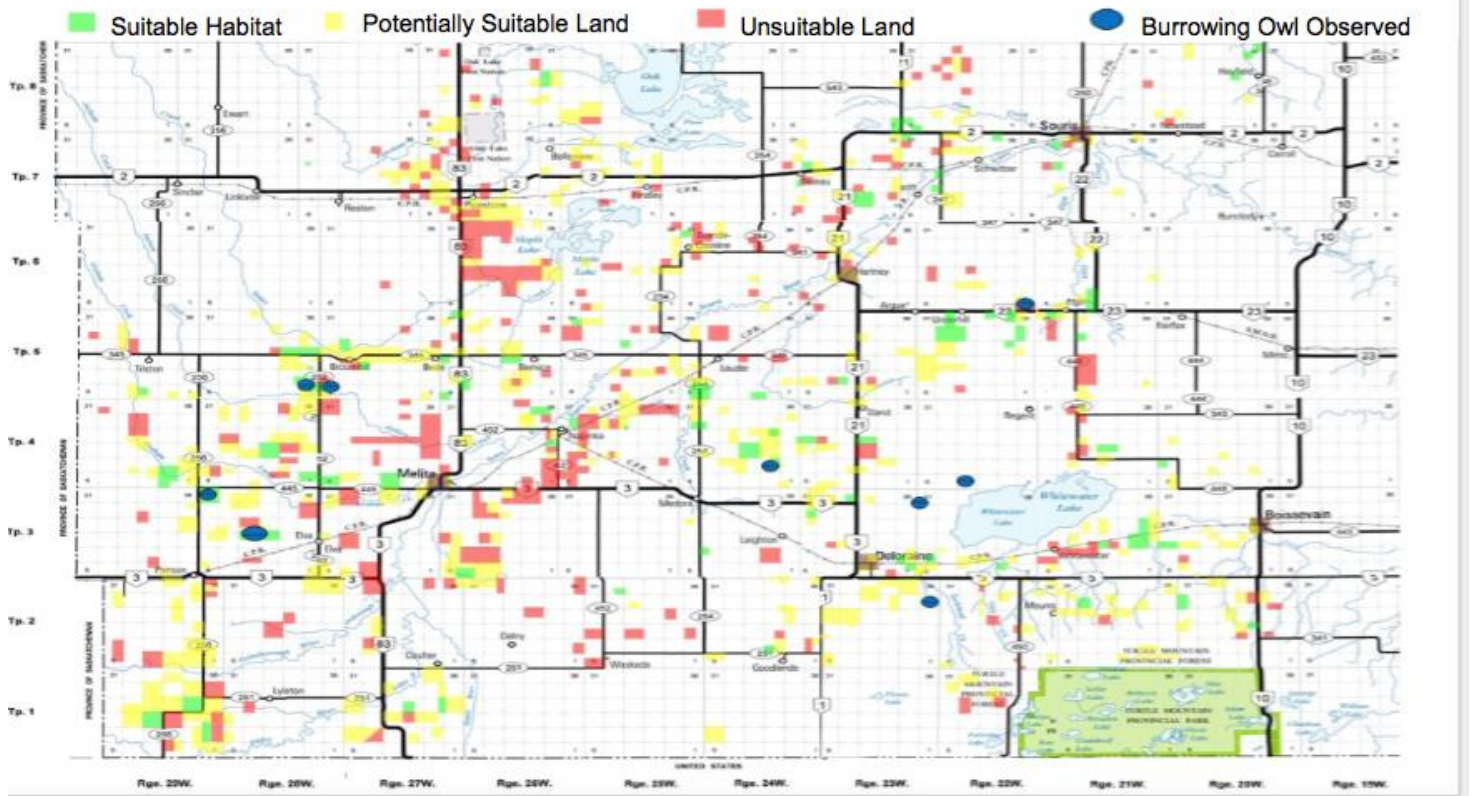


Figure 2. Historical Distribution of Burrowing Owls in Canada up to 2004

Figure 3. Map of habitat distribution for Burrowing Owls



Figure 3. Tunnel with reducer attachment (T.Wellicome)

10.0 Tables

Table 1. Habitat variables and importance (Uhumann, T, 2001)

PRIORITY	PRIMARY HABITAT VARIABLE	IMPORTANCE WEIGHT
1	Burrow availability	1.0
2	Forage availability	1.0
3	Vegetation at nest site	0.8
4	Openness	0.8
5	Habitat fragmentation	0.7
6	Forage habitat quality	0.9
7	Inter-nest distance	0.5
8	Areal extent of nest pasture	0.2
9	Topography of nest area	0.2
10	Perch availability	0.2

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