alberta's species at risk program

Great Plains Toad Conservation Management Plan

2015-2020

Alberta Species at Risk Conservation Management Plan No. 11

Government of Alberta

Great Plains Toad

Conservation Management Plan

2015-2020

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December 2015

Alberta Environment and Parks

ISBN 978-1-4601-1626-5 (PDF)

Cover photo: Candace Neufeld

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This publication may be cited as:

Alberta Environment and Parks. 2015. Great Plains Toad Conservation Management Plan 2015-2020. Alberta Environment and Parks. Species at Risk Conservation Management Plan No.11. Edmonton, AB. 8 pp.

PREFACE

Albertans are fortunate to share their province with a diversity of wild species. A small number of these species are classified as *Species of Special Concern* because they have characteristics that make them particularly sensitive to human activities or natural events. Special conservation measures are necessary to ensure that these species do not become Endangered or Threatened.

Conservation management plans are developed for *Species of Special Concern* to provide guidance for land and resource management decisions that affect the species and their habitat. These plans are intended to be a resource tool for provincial and regional fish and wildlife, land and resource management staff in Alberta Environment and Parks and other government departments.

Conservation management plans provide background information including species biology, threats to species and habitat, and inventory/monitoring history. Plans also provide a goal, objectives, and actions (management recommendations). Management recommendations are typically categorised into inventory and monitoring needs; habitat management and conservation; education and communication; and additional management considerations as required.

Conservation management plans are generally prepared by an Alberta Environment and Parks fish and wildlife biologist who has been designated as the provincial species lead. Writers from outside the department are occasionally sought to prepare plans for species for which there is little in-house expertise. In order to ensure accuracy and utility, each plan is reviewed by a species expert and a designated provincial representative from forestry or land management programs. In some cases there may be additional reviewers from staff, industry, and other agencies.

Conservation management plans are internal guidance documents. They are implemented under the guidance of the species lead and are "living" documents that can be revised at any time as required. Conservation management plans are more succinct than the recovery plans that are prepared for Endangered and Threatened species and do not involve participation of a multi-stakeholder team.

Conservation management plans are approved by the Executive Director of Fish and Wildlife Policy. Plans will be reviewed annually by the species lead and updated if necessary, and a more in-depth review will occur five years after a plan's approval.

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ACKNOWLEDGEMENTS

Thank you to Lisa Wilkinson, Brandy Downey, Joel Nicholson, Dave Stepnisky and Terri France with Alberta Environment and Parks for their comments and reviewing this document, and to Brad Downey (Alberta Conservation Association).

EXECUTIVE SUMMARY

In Alberta, the Great Plains toad is restricted to the southeastern corner of the province within the Grassland Natural Region. Spending most of their time underground, they rely on sandy soil habitat to facilitate burrowing, providing them protection from the heat and dry conditions, and hibernation sites during the winter. Suitable breeding sites are essential for Great Plains toads. Preferred breeding sites are typically temporary, shallow wetlands with fresh, clear water. In the summer, adult and young toads move from their breeding ponds into the surrounding upland where they forage, thus having native grasslands within close proximity to breeding sites is also essential.

The Great Plains toad has been designated as a S*pecies of Special Concern* in Alberta because it has a very narrow range, it is found in a limited number of disconnected locations, there is potential for its habitat to continue to decline, and the population may be declining. The primary threat to this species is loss of habitat, particularly in relation to activities associated with the oil and gas industry, cultivation, and urban development, all of which have the potential to eliminate breeding sites and destroy upland foraging habitat. Additional threats to the population include: exposure to chemicals, excessive livestock activity, changes in hydrology, prolonged drought, disease, and predation.

This plan recommends various ways to conserve Great Plains toad populations and habitat, including: supporting ongoing surveys, providing habitat protection through Beneficial Management Practices (BMPs) and land-use planning processes, and providing education to landowners, land managers, industry, and the public about the importance of this species' habitat needs.

1.0 INTRODUCTION

The Great Plains toad (*Anaxyrus cognatus*) has been approved as a *Species of Special Concern* in Alberta because it has a very small range within the province, it is found in a limited number of disconnected locations, there is potential for its habitat to continue to decline, and the population may be declining. The Great Plains toad is protected as a "*non-game animal"* under Alberta's *Wildlife Act*.

The Endangered Species Conservation Committee's (ESCC) Initial Conservation Action Statement (2011) for the Great Plains toad indicates a need to:

1. Designate the Great Plains toad as a *Species of Special Concern* in Alberta,
2. Develop and implement a conservation and management strategy, including monitoring (population size, distribution, and trends), and
3. Secure funding and resources to support conservation actions.

1.1 Breeding Biology, Distribution and Habitat Requirements

The Great Plains toad is widespread throughout the grasslands of western North America. In Alberta, the species is restricted to the southeastern corner of the province in the Grassland Natural Region where it is strongly associated with sandy soils (ASRD and ACA 2009). The Great Plains toad is primarily nocturnal, spending most of its time underground, emerging mainly at night to forage. Being efficient diggers, they are well adapted to arid environments like southeastern Alberta, able to burrow to protect themselves from heat and dry conditions and hibernate below the frost line in the winter (ASRD and ACA 2009).

This species requires three habitat types: shallow wetlands for reproduction, upland grasslands for foraging and dispersal, and sandy soils for hibernation. All three of these habitat types need to be in close proximity of one another to allow seasonal movements (Environment Canada 2013).

Breeding activity is triggered by heavy spring and early summer rains. Preferred breeding sites are typically temporary and shallow wetlands with fresh, clear water, although permanent and semi-permanent waterbodies may also be used. These sites can range in size from small puddles to large ponds (i.e., Class 1-3 wetlands). Class 3 wetlands are optimal breeding sites because water usually remains long enough to allow completion of metamorphosis. Larger waterbodies are avoided because of increased risk of predation. Depending on their size, female toads can lay between 1,300 and 45,000 eggs. Eggs hatch within 1-5 days and tadpoles take between 17-49 days to develop into toadlets, depending on water temperature (ASRD and ACA 2009).

The population of Great Plains toads in Alberta is fragmented. Based on data available to 2008, three main population clusters have been identified which exist in and around the Suffield National Wildlife Area, the Taber/Brooks area, and in the extreme southeastern corner of the province in the Onefour area (Environment Canada 2013). The most extensive area occupied by Great Plains toads extends south from Empress to Medicine Hat, where the toads are found concentrated in the eastern portion of the Suffield

National Wildlife Area (ASRD and ACA 2009, Environment Canada 2013). The distance between these three populations ranges from approximately 12 km to 70 km, separated from one another by large areas of less suitable habitat (*e.g.* cultivation), making the exchange of individuals highly unlikely or impossible (ASRD and ACA 2009). With no potential rescue effect, these isolated populations are highly vulnerable to local extirpation.

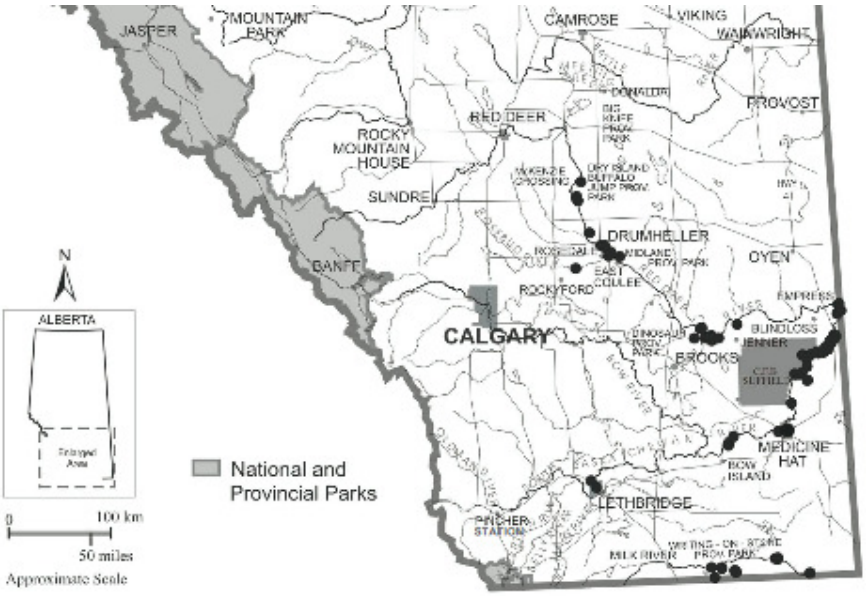

Figure 1. Distribution of Great Plains toads in Alberta.

1.2 Threats to Population

Habitat loss is the primary threat to the Great Plains toad in Alberta. Essential habitat requirements for this species include temporary wetlands to complete their reproductive cycle, native grasslands for dispersal and foraging, and sandy soil to facilitate burrowing. Because heavy rainfall events are essential for the reproductive cycle of this species, climate change is also a serious threat.

1.2.1 Habitat Loss and Alteration

Great Plains toads are strongly associated with sandy soil habitat types so the alteration and loss of breeding and upland habitat in these types of areas pose a serious threat to the long-term survival of this species. Oil and gas activity, urban development, and cultivation of grassland areas all occur in areas inhabited by Great Plains toads (ASRD and ACA 2009, Environment Canada 2013). Draining and degradation of wetlands destroy breeding habitat, and important foraging habitat is lost when grasslands are cultivated and converted to cropland, tame pasture, or other types of land use. In addition to altering or destroying habitat, these activities further fragment Great Plains toad populations, which is already a limiting factor for this species.

Oil and Gas Development

Activities associated with the oil and gas industry, including excavation and exploration, are responsible for altering and/or destroying Great Plains toad habitat, as well as direct mortality of toads. Draining wetlands for development projects is a common practice that destroys breeding habitat outright (ASRD and ACA 2009). Additionally, Great Plains toads have been dug up during the course of pipeline work, resulting in direct mortality (J. Nicholson, pers. comm.). Fracking is a major concern as it can significantly reduce water quality, compromising the quality and suitability of breeding habitat for Great Plains toads.

Cultivation

Cultivation of native grasslands on sandy soils for crops, such as potatoes, not only affects the hydrology in the area but also destroys suitable upland and breeding habitat for Great Plains toads (ASRD and ACA 2009, Environment Canada 2013).

Livestock Grazing

Excessive livestock activity around Great Plains toad breeding ponds can reduce the quality of breeding habitat, thereby limiting the reproductive success of the species. Negative impacts of cattle activity include the trampling of aquatic vegetation used for egg deposition, increased bank erosion, and decreased water quality due to contamination and increased turbidity, all of which result in less suitable breeding habitat for toads (ASRD and ACA 2009, Environment Canada 2013).

Hydrologic Changes

Many water management activities in southeastern Alberta, such as irrigation practices and the construction of dams, irrigation canals, and dugouts, have changed the hydrology in the region to the likely detriment of Great Plains toads (ASRD and ACA 2009). Increased water demands for industrial and domestic purposes potentially limits the availability and quality of breeding habitat, and the draining of ponds destroys essential breeding habitat.

1.2.2 Climate Change

Although dry conditions are typical for southeastern Alberta, prolonged periods of drought over the past decade have played a role in the decline in the Great Plains toad population in Alberta (ASRD and ACA 2009, Environment Canada 2013). Extended periods of drought significantly reduce the availability of breeding sites for Great Plains toads, directly affecting their ability to reproduce. Additionally, direct mortality of eggs and tadpoles results if breeding sites dry up prior to tadpole metamorphosis. It was estimated that in Alberta, between the mid-1970s and the late 1980s, the desiccation of breeding ponds accounted for a 50% decline in the Great Plains toad population (ASRD and ACA 2009).

1.2.3 Disease

To date, there are no diseases that have been identified with the Great Plains toad in Alberta; however, this may be due to limited amount of research. Diseases such as chytridiomycosis and ranavirus have affected the tiger salamander (*Ambystoma*

tigrinum), northern leopard frog (*Lithobates pipiens*), and Canadian toad (*Bufo hemiophrys*) in southeastern Alberta, which raises concern for this species as well (ASRD and ACA 2009).

1.2.4 Pesticides and Herbicides

Although not documented for the Great Plains toad specifically, the harmful effects of pesticides and herbicides on other amphibian species are well known (ASRD and ACA 2009, Environment Canada 2013). Given the use of agricultural pesticides and herbicides on crops in southern Alberta within the range of the Great Plains toad, the potential effects on the toad population could be significant. Studies of other amphibian species that were exposed to varying levels of pesticides showed a high mortality rate in tadpoles as well as many deformed individuals (ASRD and ACA 2009, Environment Canada 2013).

1.2.5 Predation

Great Plains toad tadpoles perish due to predation by carnivorous plains spadefoot toad tadpoles, which are often found in the same breeding pond, as well as from competition for food (ASRD and ACA 2009). Adult Great Plains toads fall prey to western hognose snakes (*Heterodon nasicus*), garter snakes (*Thamnophis sp.*), American badgers (*Taxidea taxus*), and some bird species. Ravens, nesting on an oil facility communications tower, have been observed eating toads in the surrounding area (J. Nicholson, pers. comm.). Since preferred breeding ponds for Great Plains toads in Alberta are generally small and temporary, predation by introduced species (*e.g.* game fish) is not a major concern. Changing habitat conditions that might favour their natural predators, however, is a foreseeable threat.

1.3 Inventory and Monitoring

It has not been possible to obtain an accurate population estimate for Great Plains toads in Alberta, due in part to their cryptic nature and irruptive reproductive behavior, but primarily because consistent, long-term survey data for Great Plains toads in Alberta are lacking. Based on surveys conducted between 1998 and 2008, the Great Plains toad population was roughly estimated to be between 2,100 and 10,000 individuals, compared to just 1,000-2,000 toads in 1992 (ASRD and ACA 2009). The range and variation in estimates highlights just how little is known about the size of the Great Plains toad population in Alberta and the importance of consistent, long-term monitoring surveys.

2.0 GOALS AND OBJECTIVES

2.1 Goal

Maintain the current distribution of Great Plains toads in Alberta and support and implement conservation strategies that help reduce threats to the species.

2.2 Objectives

1. Inventory, monitoring, and assessment: Support ongoing surveys of known populations in order to monitor population fluctuations, determine population trends,

assess whether threats to the species are increasing, and monitor the distribution of Great Plains toads in the province.

2. Habitat protection: Provide appropriate habitat protection and management in both breeding and non-breeding habitats.

3. Education and communication: Improve education and communication about the importance of conserving Great Plains toads and their habitats with government and non-government agencies, industry, landowners, and the general public.

3.0 MANAGEMENT ACTIONS

3.1 Inventory, Monitoring, and Assessment

Known populations should be surveyed when the conditions are optimal for detecting toads (*i.e.* after heavy rainfall events). The recommended survey method for Great Plains toads is roadside call surveys, which are standardized and repeatable. The inventory method to be followed can be found in the Sensitive Species Inventory Guidelines (AESRD 2013).

In addition to conducting inventory surveys and monitoring Great Plains toad populations regularly, heavy rainfall events should also be monitored. Because the breeding activity of this species is dependent on heavy precipitation, it would be beneficial to look at the rainfall data (*i.e.* frequency and amount) over a given period of time and correlate that with Great Plains toad population data. This comparison could provide valuable information on population trend and the impact that climate change may be having on the Great Plains toad population in Alberta.

The Alberta Volunteer Amphibian Monitoring Program (AVAMP) is a valuable volunteer organization that collects amphibian observation data throughout the province for use by biologists and other resource managers. It is important that observations of Great Plains toads, and other amphibian species, continue to be collected through this volunteer program and entered into the Fish and Wildlife Management Information System (FWMIS) database to inform future conservation management decisions.

The Multiple Species at Risk program (MULTISAR) has included the Great Plains toad in their amphibian surveys since 2002. The surveys are conducted annually, primarily in the late spring, provided sufficient rainfall is received (B. Downey, pers. comm.). These have been some of the most consistent surveys to date and have provided valuable population size and distribution data, and habitat information (*i.e.* because habitat type is recorded on the data sheets, it is possible to track changes on the landscape over time which may be useful in explaining population trends). The amphibian surveys conducted by MULTISAR only cover a small portion of the Great Plains toad population and habitat, in the most southeastern corner of their range. Thus, in order to cover all three populations, annual surveys of known toad populations in the Suffield National Wildlife Area and the Brooks/Taber area should be conducted, provided conditions are favourable

(*i.e.* adequate rainfall and warm enough temperature). Further inventories should be conducted in suitable habitat as resources permit.

Consistent, standardized surveys and continued monitoring will aid in determining the population size, distribution, and trends of the Great Plains toad in Alberta.

3.2 Habitat Protection and Research

3.2.1 Actions already underway

Several management practices and land use guidelines that help protect Great Plains toad habitat are already in place. These include:

- Provincial land use guidelines that address restricted activity timing windows (year-round) and setback distances (100 m from Class 3 ponds on native prairie). These need to be consistently applied, and revised as better information becomes available (ASRD-FW 2011). Alberta Environment and Parks resource management and approvals staff should use these setback and timing restrictions for land use applications on both private and public lands.
- Beneficial management practices (BMPs) for amphibians (Rangeland Conservation Services Ltd. 2004) that emphasize the importance of ephemeral wetlands and provide recommendations for maintaining them. Grazing management recommendations to help reduce potential impacts from livestock on essential breeding habitat are also highlighted. These BMPs should continue to be provided to land managers and land owners and implemented consistently on private and public lands, where it is warranted, through the help of the MULTISAR program and other prairie conservation programs.
- Standardized guidelines for the inventory of sensitive species, including the Great Plains toad, that provide direction for consultants (AESRD 2013). These guidelines will be updated and/or modified as required, pending survey data and when new research becomes available.

3.2.2 Habitat protection

Identifying and maintaining wetlands within areas known to be occupied by Great Plains toads is imperative; particularly Class 3 wetlands (temporary wetlands) which are the species' preferred breeding site (Stewart and Kantrud 1971). Ensuring habitat connectivity is also essential. Adult and young toads move between aquatic and terrestrial habitats for breeding, foraging, and hibernation. Thus, to help maintain connectivity between essential habitat types it is also important to identify and conserve remaining native grassland areas with sandy soil within the known range of the species.

3.2.3 Policies and guidelines

The following activities will ensure that Great Plains toad habitat, and habitat considerations are integrated into land use planning:

- Update the Sensitive Amphibian provincial wildlife layer to include the range of the Great Plains toad.
- Work with the Integrated Standards and guidelines committee to include Great Plains toad habitat protection in the standards required for oil and gas.

- Work with the Wetland Policy Implementation team to identify and avoid Great Plains toad breeding habitat in the approval process.

3.2.4 Research

With the increasing amount of cultivation throughout southeastern Alberta, it would be valuable to conduct research to determine whether Great Plains toads are able to survive and successfully reproduce in areas of native grassland that have been converted to cropland or another type of land use (Environment Canada 2013). The MULTISAR project recorded Great Plains toads at a cultivated site (Downey et al. 2007); however, toads in cultivated areas are vulnerable to farm machinery.

3.3 Education and Communication

Because of the cryptic nature of the Great Plains toad and their limited range within the province, it is essential to increase public awareness of this species in order to conserve their population and habitats over the long-term. The importance of ephemeral wetlands and native grasslands as key habitat for Great Plains toads must be conveyed to landowners, land managers, industry, and the general public. Working with existing programs that have already developed working relationships with landowners (*e.g.* MULTISAR) will help to facilitate outreach.

4.0 SUMMARY

The Great Plains toad has a limited distribution and fragmented population. They have specific habitat requirements to fulfill the various stages of their life cycle: wetlands for breeding, and native grasslands on sandy soil for dispersal, foraging, and burrowing. Increasing industrial, agricultural, and residential and commercial development activities within the range of the Great Plains toad contributes to loss and alteration of these essential habitat components. Climate change will likely exacerbate habitat loss; drought will reduce breeding events and wetland habitat. Habitat protection is a priority to prevent further population declines. In addition, efforts must focus on consistent annual surveys of known populations to help determine population size, trend, and distribution, which will help to inform management actions.

This plan will be reviewed and updated in five years, and may be updated prior to that time if new relevant information becomes available. The review will be led by Alberta Environment and Parks in consultation with amphibian researchers, participating agencies, and industry.

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