AMPHIBIAN VISUAL SURVEY PROTOCOL

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COVER PHOTO CREDITS
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2.0 AMPHIBIAN VISUAL SURVEY PROTOCOL

2.1 INTRODUCTION
This survey protocol provides instruction on collecting data for the occupancy (presence/not-detected) of amphibians which cannot be identified or detected readily by their call using auditory surveys. In order to improve detection, all amphibians found in Saskatchewan have been included in this protocol. A separate Amphibian Auditory Survey Protocol exists for anurans that can be detected by call (Saskatchewan Ministry of Environment 2014a).

2.1.1 Inventory Group
Saskatchewan has eight known species of amphibians. Until 2012, there were seven species documented in the province. Plains spadefoot (*Spea bombifrons*), Great Plains toad (*Anaxyrus cognatus*), tiger salamander (*Ambystoma mavortium*), Canadian toad (*Anaxyrus hemiophrys*), boreal chorus frog (*Pseudacris maculata*), northern leopard frog (*Lithobates pipiens*) and the wood frog (*Lithobates sylvaticus*). In addition, observation record cards for gray tree frogs (*Hyla versicolor*) were submitted by P. Taylor to the Royal Saskatchewan Museum in 2008 and 2009 (R.G. Poulin pers. comm).

2.1.2 Status and Distribution
Over the past 50 years, many species of amphibians throughout the world have experienced population declines and, in some cases, have become extirpated or extinct. There is global concern about these declines, which take place even in undisturbed areas. However, the extents of the declines are not well known (Collins and Storfer 2003). The annual population size for many species is quite variable and this is especially evident for two irruptive species: the Great Plains toad and the plains spadefoot. For further information on the status of amphibians in Saskatchewan, please visit the Saskatchewan Conservation Data Centre (SKCDC). Additional information may be provided in Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports and in the *Species at Risk Act* (SARA) Registry documents.

Seven Saskatchewan amphibians are found predominantly in the southern extent of the province. Plains spadefoot (*Spea bombifrons*), Great Plains toad (*Anaxyrus cognatus*) and the tiger salamander (*Ambystoma mavortium*) inhabit only in the southern part of the province. Conversely, the Canadian toad (*Anaxyrus hemiophrys*), boreal chorus frog (*Pseudacris maculata*), northern leopard frog (*Lithobates pipiens*) and wood frog (*Lithobates sylvaticus*) are also found in the northern part of the province (CARCNET 2011). Several records for gray tree frogs (*Hyla versicolor*) were reported near Armit in the eastern part of Saskatchewan (Taylor 2009). Unconfirmed locations for gray tree frogs reported by Ron Hooper, include Fort Qu’Appelle and Katepwa (Taylor 2009). Most species are at the northern edge of their global range, with a few species (e.g., wood frogs) extending their distribution into the territories. Increased search effort may provide new locations for the gray tree frog.

2.1.3 Biology
Amphibians develop from gilled larvae that are completely aquatic to primarily terrestrial adults that breathe air. Their skin remains permeable, keeping them closely tied to water and leaving them susceptible to environmental contaminants. Terrestrial habitats must offer cover and moisture. They are both ectothermic and poikilothermic (i.e., body temperature mainly controlled by the external environment, with considerable variation in internal temperature).
Amphibian habitat requirements vary with species (Table 2.1). Amphibians are small, primarily nocturnal and are widely dispersed for most of their active period. They are dormant throughout the winter, hibernating usually alone in protected terrestrial habitats, subterranean burrows, or mud at the bottom of standing or slow-flowing water. Mima mounds created by pocket gophers (Thomomys talpoides), may be used by species such as the Canadian toad where thousands of individuals may hibernate together (Elliott et al. 2009).

### Table 2.1. Description of amphibian habitat.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Great Plains toad</td>
<td>A prairie species, frequents sandy areas near irrigation canals, ephemeral ponds, dugouts and flood plains. Identifiable during years of high precipitation.</td>
</tr>
<tr>
<td>Canadian toad</td>
<td>Associated with sandy soils. Can be found in borders of shallow lakes, ponds and ephemeral wetlands in prairies and open aspen groves.</td>
</tr>
<tr>
<td>Gray tree frog</td>
<td>Nocturnal and arboreal, may be found on trees and shrubs near permanent water. Prefer mature or second growth forests. Daytime retreats are tree cavities in wet wooded areas.</td>
</tr>
<tr>
<td>Boreal chorus frog</td>
<td>Almost any waterbody. Located in grassy pools, lakes, marshes, flooded fields, ponds and roadside ditches during the breeding season.</td>
</tr>
<tr>
<td>Plains spadefoot</td>
<td>Primarily in native short-grass prairie, near permanent or temporary bodies of water (Class 2, 3 and 4 wetlands; Stewart and Kantrud 1971). Usually in areas with soil that is suitable for burrowing - such as sand. Strongly associated with years of high precipitation.</td>
</tr>
<tr>
<td>Northern leopard frog</td>
<td>Inhabits springs and permanent waterbodies with abundant vegetation. Generally found where sufficient ground cover from vegetation is available. Requires shallow waterbodies with emergent vegetation for breeding; moist meadows, pastures, or scrublands for foraging, and; deep, permanent waterbodies that do not freeze to the bottom for overwintering.</td>
</tr>
<tr>
<td>Wood frog</td>
<td>Primarily found in wooded areas, marshy areas, wet meadows and open ponds.</td>
</tr>
<tr>
<td>Tiger salamander</td>
<td>Nocturnal and often fossorial. The tiger salamander is found in a variety of habitats usually near water. Western tiger salamander larvae may overwinter.</td>
</tr>
</tbody>
</table>

In Saskatchewan, amphibians typically congregate for breeding from early April to mid-June. Waterbodies used for breeding lack fish and are permanent or semi-permanent. An early breeding period allows larvae to take advantage of high algal productivity and, if breeding in ephemeral waterbodies, to complete metamorphosis before the water dries up.

Population sizes can fluctuate dramatically from year to year and may be weather dependant. Maturation is delayed for most species in Saskatchewan. Further amphibians can store resources internally, not breeding every year if conditions are poor.
2.2 SURVEY STANDARDS
The standards provide instructions on the areal extent of surveys to be conducted. They provide information on experience, capabilities, minimum equipment needs, survey conditions and permit requirements.

2.2.1 Survey Area Extent
Surveys must be conducted in areas with SKCDC observations as well as in any areas that provide suitable habitat for the species in question. The proposed project area, plus the appropriate setback distances, must be assessed. All suitable habitat within this area must be surveyed. Setback distances identified in the Saskatchewan Activity Restriction Guidelines for Sensitive Species (Saskatchewan Ministry of Environment 2014b) are based on the species and the level of disturbance associated with the project.

2.2.2 Personnel
Personnel must be able to identify amphibians in all life stages, identify suitable habitat and be familiar with the survey methodology. Personnel must have a well-developed search image for amphibians. Knowledge of specific amphibian biology, behaviour and preferred habitat allows for more accurate results.

2.2.3 Survey Effort
Surveys must be conducted three times during the appropriate survey period (Paton et al. 2003). Surveys must be spaced between one and two weeks apart depending on the stage of development at the time of the first survey.

Once target species are detected, subsequent survey visits are not necessary. However, if additional surveys are not conducted to detect additional individuals, presence is assumed in suitable habitat throughout the project area and the appropriate setback distances in the Saskatchewan Activity Restriction Guidelines for Sensitive Species must be applied.

2.2.4 Time of Year
Surveys must be conducted between May and September. The specific timing varies with the type of survey method used, i.e., looking for eggs, larvae, or adults. Generally, the best method is egg surveys, which coincides with the breeding period of May/June (timing will vary slightly with species, location and timing of ice melt).

2.2.5 Time of Day
Visual searches are best conducted between 0900-1500 hours under sunny conditions (Grant et al. 2005), when amphibians are basking and eggs and young are most visible (Kendell 2002).

2.2.6 Environmental Conditions
A compendium of environmental condition standards (Saskatchewan Ministry of Environment 2014c) has been prepared to complement the survey protocols for Saskatchewan. The full range of values for the respective environmental condition (e.g., temperature, precipitation, cloud cover, noise, etc.) has been provided in the standards document with the expectation that appropriate value range(s) will be applied as per the survey protocol parameters.
Visual survey methods are not suitable during rain; wind above 13 kph (i.e., 2 on the Beaufort Scale) (Johnson and Batie 2001), or; heavy cloud because visibility at the water surface is limited. If the purpose of the survey is to identify species presence (not estimates of abundance) and eggs have been discovered, then the survey does not need to be repeated. Egg surveys can begin at temperatures as low as 6°C although breeding activity will increase with warmer temperatures.

2.2.7 Equipment List
- GPS receiver
- Camera to record uncertain species for future clarification
- Binoculars
- Rubber boots
- Thermometer
- Disinfectant for boots and equipment: use Clorox®-type bleach (5.25% sodium hypochlorite concentration) and mix it with water to produce a 20% bleach-to-water solution. Non-chlorine bleach is unsuitable for decontaminating field gear (K. Kendell pers. comm.)
- Amphibian Auditory and Visual Survey Loadform

2.2.8 Permit Requirements
Notification is requested for amphibian visual surveys. Notification implies the appropriate survey protocol(s) will be used and data loadforms submitted. Survey protocols and loadforms are available on the ministry Research Permit downloads webpage. Please refresh your internet browser to clear any cached websites or bookmarks for this website to ensure you have the most up-to-date information and document versions. Properly conducted surveys and reliable data submissions are vital tools required to understand and manage wildlife populations and their habitat. Data submissions also facilitate and expedite environmental assessment reviews by Fish and Wildlife Branch.

2.3 SURVEY METHODS
The Survey Methods section describes the procedures for conducting amphibian visual surveys.

2.3.1 Procedures
Visual survey procedures are explained herein. The egg, larvae and young-of-the-year surveys are done at different times of the year based on the phenology of the target amphibians. They are conducted using the double observer dependent wetland survey to detect amphibians, reduce observer error and reduce disturbance to wetlands and amphibians.

2.3.1.1 Egg, Larvae and Young of the Year Surveys
This section was primarily adapted from Grant and colleagues (2007), Smith (2003) and Pretzlaw and colleagues (2002). Wetland surveys are recommended for confirming the presence of breeding amphibians.

Similar to lekking birds, most anuran females move away from breeding sites to lay eggs (Elliott et al. 2009). Egg searches must be carried out soon after spring melt. Larvae surveys must be carried out in early summer when eggs have begun to hatch. Young-of-the-year surveys must be carried out in late summer when metamorphosis has occurred. Timing of visits will vary among sites according to local conditions.
Avoid moving in the water as eggs and larvae may be disturbed or trampled. Most eggs are located near the edges of wetlands (Jung et al. 2013), except in the case of tiger salamanders, whose eggs may occur throughout the pond. Wearing polarized glasses also improves seeing through the water (Jung et al. 2013).

Suitable habitat around the entire pond edge must be surveyed if at all possible, using the Double Observer Dependent Technique-based surveys adapted from Grant and colleagues (2007). Double Observer Dependent Technique-based surveys should be sufficient for detection and abundance estimates (Grant et al. 2005).

Two observers circumnavigate the wetland together, walking very slowly and quietly (Jung et al. 2013). Observer One counts and points out eggs and egg masses to Observer Two. Observer Two records what Observer One reports and writes down any missed or duplicate eggs or egg masses without making any comments about them to Observer One. Halfway through the survey, the roles of the observers are switched.

Shoreline searches for larvae and young-of-the-year should follow the methods used for the egg survey. The number of larvae and young-of-the-year are recorded. Both are cryptic and are difficult to quantify; therefore, data are only used to record presence/not detected within surveyed wetlands. A minimum of three visits throughout the summer are required.

2.4 SUBMISSIONS
Please refer to the Submissions section under the Standard Permit Conditions on the Ministry of Environment website. Observations should be submitted using the appropriate loadform from the Biodiversity webpage. Any incidental wild species (plant or animal) observations should also be submitted to the ministry (ENV.researchpermit@gov.sk.ca) using the Plant or Wild Species Loadform respectively.

iMapInvasives is the provincial system for submitting the occurrence of invasive plant or animal species. Any observations of prohibited, noxious or nuisance weeds, along with observations of any other invasive species, should be submitted using this website. An account is not required to submit observations. If you have any questions, please contact the SKCDC for more information.

2.5 ADDITIONAL RESOURCES

Alberta Northern Leopard Frog Recovery Plan

Alberta Species at Risk Reports

Alberta Status Reports

Canadian Amphibian and Reptile Conservation Network (CARCNET)

COSEWIC Assessment and Update Status Report on the Northern Leopard Frog *Lithobates pipiens*: Rocky Mountain population, Western Boreal/Prairie populations, Eastern populations in Canada.

Declining Amphibian Task Force (DAFTA) Fieldwork Code of Practice
FrogWatch Saskatchewan

Saskatchewan Activity Restriction Guidelines for Sensitive Species

Saskatchewan Activity Restriction Guidelines for Sensitive Species Background Information

Saskatchewan Conservation Data Centre (SKCDC)

Status of Canadian Toad in Alberta

Status of Plains Spadefoot in Alberta

Status of the Plains Spadefoot (*Spea bombifrons*) in Alberta

Stewart and Kantrud 1971 Wetland Classification System

The Encyclopedia of Saskatchewan

The Manitoba Herp Atlas

**2.6 LITERATURE CITED**


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Resource Development), Fisheries and Wildlife Management Division and Alberta

estimating egg mass abundance of pool-breeding amphibians. Wetlands Ecology and

Alberta Environmental Protection, Fisheries and Wildlife Management Division and Alberta

Northern Prairie Research Center Paper 156.
July 10, 2013


Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 43,
Edmonton, AB. 30 pp.


2.7 PERSONAL COMMUNICATION
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