

Species Detection Survey Protocol

2.0 Amphibian Visual Surveys January 2020 – Update



2.0 AMPHIBIAN VISUAL SURVEY PROTOCOL

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The Alberta Ministry of Environment and Parks is gratefully acknowledged for providing its April 2013 Sensitive Species Inventory Guidelines and permission to adapt these guidelines to Saskatchewan. Updated content was developed through the Conservation Standards Program of Fish, Wildlife and Lands Branch, Saskatchewan Ministry of Environment.

COVER PHOTO CREDITS

Plains spadefoot (*Spea bombifrons*), Matthew Weiss, Ministry of Environment
Wood frog (*Lithobates sylvaticus*), Matthew Weiss, Ministry of Environment
Tiger salamander (*Ambystoma mavortium*), Matthew Weiss, Ministry of Environment
Great Plains toad (*Anaxyrus cognatus*), Shane Vallee, Ministry of Environment, July, 2012
Northern leopard frog (*Lithobates pipiens*), Matthew Weiss, Ministry of Environment

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Table of Amendments			
Version Date	Page	Section	Comments
January 2020			Initial Reformatted Version – amendments to updated versions of this protocol will be tracked in this table.

PREREQUISITES

Companion Documents

The Species Detection (SD) Survey Protocols (SDSPs) are a component of the [Conservation Standards Program \(CSP\)](#). The SDSPs are intended to be used in conjunction with other CSP documents, in particular:

- [Conservation Standards Terms and Conditions: Species Detection \(CSTC-SD\)](#)
- [Species Detection Application Form \(SDAF\)](#)
- [Species Detection Loadform \(SD Loadform\)](#)
- [Species Detection Personnel Documents](#) (see below)
- [Activity Restriction Guidelines \(ARG\) for Sensitive Species](#) – Contact the regional Ecological Protection Specialist (EPS) to discuss ARGs for your project.

Subscribe to the [mail-out lists](#) for updates regarding the documents listed above, research permits, Saskatchewan Conservation Data Centre (SKCDC) species lists and ranks, and HABISask.

The importance of reviewing the above documents in advance of conducting SD surveys cannot be overstated. Information contained in these documents is included to help ensure a complete and accurate data submission – please refer to hyperlinks in this document for helpful information. [SD Loadforms](#) that need to be returned to the client for corrections may delay regulatory approvals.

Personnel Requirements

Refer to the [Species Detection Personnel Instructions and Roster – SDSPs 1-20](#) for personnel requirements associated with this survey; submit and update the [Species Detection Survey Protocol \(SDSP\) – Staff Matrix](#) according to instructions.

Authority

Pursuant to Section 21 of *The Wildlife Act, 1998*, a Research Permit (RP) is required when conducting Species Detection (SD) surveys for commercial purposes. Regarding *The Wildlife Regulation's* – Section 6.2, the ministry is in the process of developing Qualified Persons (QP) requirements for SD surveys. The Personnel Requirements above pertain to all SD surveys.

Desktop Screening

Refer to the [CSTC-SD – Section C. 1.](#)

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 that 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 2016).

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 Storer 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.

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 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 found in both the southern and 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 efforts may provide new locations for the gray tree frog.

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](#).

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 1.1). Amphibians are small, primarily nocturnal and are widely dispersed for most of their active period. They are dormant throughout the winter, usually hibernating 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.

Species	Habitat (Russell and Bauer 2000, Fisher et al. 2007, Elliott et al. 2009, ASRD 2003)
Great Plains toad	Prairie species, frequents sandy areas near irrigation canals, ephemeral ponds, dugouts and flood plains. Identifiable during years of high precipitation.
Canadian toad	Associated with sandy soils. Can be found in borders of shallow lakes, ponds and ephemeral wetlands in prairies and open aspen groves.
Gray tree frog	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.
Boreal chorus frog	Almost any waterbody. Located in grassy pools, lakes, marshes, flooded fields, ponds and roadside ditches during the breeding season.
Plains spadefoot	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.
Northern leopard frog	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.
Wood frog	Primarily found in wooded areas, marshy areas, wet meadows and open ponds.
Tiger salamander	Nocturnal and often fossorial. The tiger salamander is found in a variety of habitats usually near water. Western tiger salamander larvae may overwinter.

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 survey standards provide instructions on the areal extent of surveys to be conducted, survey parameters deemed necessary to detect target species and associated habitat features, as well as minimum equipment needs. Adhering to these standards ensures data collected is defensible and provides the level of accuracy necessary to identify presence/absence of the target species and supports critical aspects of project development such as project siting and mitigation planning. Refer to these survey standards when completing the Survey Standards Data Worksheet in the [SD Loadform](#) to ensure any deviations are properly recorded.

2.2.1 Survey Area Extent

The proposed project area plus the [ARG](#) setback for the species must be assessed. Surveys must be conducted in all areas that provide suitable habitat for the target species, in addition to any areas with HABISask species or habitat occurrences. For the purposes of this protocol, suitable habitat is defined as all habitat types described in the Ecology and Life History section of [NatureServe Explorer](#) (i.e. use Species Quick Search), unless otherwise indicated.

2.2.2 Survey Effort and Interval

A minimum of three visits throughout the survey period are required. Surveys must be spaced one to two weeks apart.

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 [ARGs](#) must be applied.

2.2.3 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 coincide with the breeding period of May/June (timing will vary slightly with species, location and timing of ice melt).

2.2.4 Time of Day

Visual searches are best conducted from 09:00 to 15:00 hours under sunny conditions (Grant et al. 2005), when amphibians are basking and eggs and young are most visible (Kendell 2002).

2.2.5 Environmental Conditions

The following environmental conditions, which are summarized in the table below, are required to ensure detection and must be recorded in the [SD Loadform](#). Before starting surveys, refer to the Attribute Help and the Survey Standards Data Worksheets within the [SD Loadform](#).

Visual survey methods are not suitable during rain; wind above 13 km/h (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.

Section	Environmental Conditions	Value	Comment
2.2.5.1	Wind speed (Beaufort Scale)	<13 km/h (Level 2 Beaufort Scale)	Visual survey methods are not suitable wind above 13 km/h (i.e. 2 on the Beaufort Scale).
2.2.5.2	Precipitation		Visual survey methods are not suitable during rain.
2.2.5.3	Cloud cover		Visual survey methods are not suitable during heavy cloud because visibility at the water surface is limited.
2.2.5.4	Temperature (C)	≥6 C	Egg surveys can begin at temperatures as low as 6 C, although breeding activity will increase with warmer temperatures.
2.2.5.5	Moonlight		
2.2.5.6	Ambient noise		
2.2.5.7	Additional required conditions		
	Snow Conditions	N/A	
	Aerial Survey Conditions	N/A	

2.2.6 Equipment List

- ENV research permit and associated documentation (see [CSTC-SD – Section A.](#))
- Other appropriate permits and permissions (see [CSTC-SD – Section A.](#))
- [SD Loadform](#)
- GPS unit
- Camera to record uncertain species for future clarification
- Binoculars
- Rubber boots
- Wind/temperature meter
- Disinfectant for boots and equipment: use Clorox®-type bleach (5.25 per cent sodium hypochlorite concentration) and mix it with water to produce a 20 per cent bleach-to-water solution. Non-chlorine bleach is unsuitable for decontaminating field gear (K. Kendell pers. comm.)

2.3 SURVEY METHODS

This section describes the procedures for conducting amphibian visual surveys. Refer to these survey methods when completing the Survey Summary tab in the [SD Loadform](#) to describe any deviations from these survey methods.

2.3.1 Procedures

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.

2.3.2 Egg, Larvae and Young of the Year Surveys

This section was primarily adapted from Grant et al. (2005), Smith (2003) and Pretzlaw et al. (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 will help improve seeing through the water (Jung et al. 2013).

Suitable habitat around the entire pond edge must be surveyed if possible, using the double observer dependent technique-based surveys. These 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

To ensure the highest quality information is provided and to avoid having submissions returned, please refer to instructions in the [CSTC-SD](#) and the [SD Loadform](#) in advance of conducting surveys and submitting the [SD Loadform](#). Information on Common Mistakes and Tips is also mailed out annually in advance of the November 10 permit expiry/submissions deadline. Contact SD.researchpermit@gov.sk.ca.

2.5 ADDITIONAL RESOURCES

[Alberta Species at Risk Reports*](#)

[Alberta Wildlife Status Reports*](#)

[Calgary Zoo – Guidelines for Mitigation Translocations of Amphibians: Applications for Canada’s Prairie Provinces](#)

[Canadian Amphibian and Reptile Conservation Network \(CARCNET\) Saskatchewan*](#)

[Canadian Herpetological Society*](#)

[Committee on the Status of Endangered Wildlife in Canada \(COSEWIC\)*](#)

[Declining Amphibian Task Force \(DAFTA\) Fieldwork Code of Practice](#)

[FrogWatch Saskatchewan*](#)

HABISask*
[HABISask Application](#)
Nature Serve Explorer*
Saskatchewan Activity Restriction Guidelines for Sensitive Species*
[Saskatchewan Conservation Data Centre \(SKCDC\)](#)
[Saskatchewan Conservation Standards Terms and Conditions: Species Detection](#)
[Saskatchewan Publications Centre – Wild Species Research Permitting](#)
[Saskatchewan Wild Species Research Permitting webpage](#)
[Species at Risk Act \(SARA\) Registry*](#)
Stewart and Kantrud 1971 Wetland Classification System
The Manitoba Herps Atlas*
[The Wildlife Act, 1998](#)
[The Wildlife Regulations, 1981](#)

***search by species for additional information**

2.6 LITERATURE CITED

- CARCNET. 2012. Canadian Amphibian and Reptile Conservation Network.
http://www.carcnet.ca/english/amphibians/species_accounts/anurans/A_hemiophrys/hemiophrys2.php Accessed January 24, 2013, July 11, 2013.
- Elliott, L., C. Gerhardt and C. Davidson. 2009. The frogs and toads of North America: A comprehensive guide to their identification, behaviour and calls. Houghton Mifflin Co. New York. 343pp.
- Grant, E.H.C., R.E. Jung, J.D. Nichols and J.E. Hines. 2005. Double-observer approach to estimating egg mass abundance of pool-breeding amphibians. *Wetlands Ecology and management*. 2005. 13:305-320. DOI 10.1007/s11273-004-7524-7 Springer 2005.
- Johnson, D.H. and R.D. Batie. 2001. Surveys of calling amphibians in North Dakota. USGS Northern Prairie Research Center Paper 156.
<http://digitalcommons.uni.edu/usgsnpwrc/156> Prairie Naturalist. 33:227-247. Accessed July 10, 2013.
- Jung, L. and P. Nanjappa. Egg mass surveys. Managers Monitoring Manual. USGS. Patuxent Wildlife Research Center. Laurel MD. Accessed Jan. 23, 2013.
- Kendell, K. 2002. Survey protocol for the northern leopard frog. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 43, Edmonton, AB. 30 pp.
- Pretzlau, T., M. Huynh, L. Takats and L. Wilkinson. 2002. Protocol for monitoring long-toed salamander (*Ambystoma macrodactylum*) populations in Alberta. Alberta Sustainable Resource Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 35. Edmonton, AB.
- Russell, A.P. and A.M. Bauer. 2000. The amphibians and reptiles of Alberta – a field guide and primer of boreal herpetology. University of Calgary Press, Calgary, AB.

Saskatchewan Ministry of Environment. 2016. Amphibian auditory survey protocol. Fish, Wildlife and Lands Branch Technical Report No. 2014-1.0. 3211 Albert Street, Regina, Saskatchewan. 11pp.

Stewart, R.E. and H.A. Kantrud. 1971. Classification of natural ponds and lakes in the glaciated prairie region. Bureau of Sport Fisheries and Wildlife, U.S. Fish and Wildlife Service, Washington, D.C., USA. Resource Publication 92. 57 pp.
<http://pubs.usgs.gov/rp/092/report.pdf>. Accessed October 19, 2013.

Taylor, P. 2009. An extension of gray treefrog range in Manitoba and into Saskatchewan. Blue Jay. 67(4):235-241.

2.7 PERSONAL COMMUNICATION

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