
Inventory Methods for Pond-breeding Amphibians and Painted Turtle

Standards for Components of British Columbia's Biodiversity
No. 37 (Version 2.0, March 1998)

Errata No. 3 October 2008

This document is a compilation of revisions and additions to the *Inventory Methods for Pond-breeding Amphibians and Painted Turtle* (No. 37, Version 2.0, March 1998)¹. Special emphasis on methods used to survey for Great Basin Spadefoot (*Spea intermontana*).

Name Change

Replace:

Scaphiopus intermontanus

With:

Spea intermontana

Replace:

Great Basin Spadefoot Toad

With:

Great Basin Spadefoot

¹ This document is located on the Resources Information Standards Committee (RISC) website at <http://ilmbwww.gov.bc.ca/risc/pubs/tebiodiv/index.htm>.

Section 2. INVENTORY GROUP

Table 1 (Page 3):

Replace the following row:

Species	Status	Movement Patterns		Habitat Preferences		Calls
		Daily	Seasonal	Terrestrial	Aquatic	
Great Basin Spadefoot Toad <i>Scaphiopus intermontanus</i>	Provincial Blue List	Nocturnal	Migrates to water to breed; Feb-April at low elevations	During dry weather, under the soil in burrows	Temporary or shallow ponds	Choruses large, loud, and insistent

With:

Species	Status	Movement Patterns		Habitat Preferences		Calls
		Daily	Seasonal	Terrestrial	Aquatic	
Great Basin Spadefoot Toad <i>Spea intermontana</i>	Provincial Blue List	Nocturnal	Migrates to water to breed; Early April to mid-May in the South Okanagan; mid-April to end May in the north Okanagan and Thompson; and just after ice-off to mid-July in the Cariboo	During dry weather, under the soil in burrows	Small lakes, ponds, seasonal wetlands and flooded grassy fields	Choruses large, loud, and insistent

Section 2.1 Natural History

Section 2.1.5 Great Basin Spadefoot Toad (*Scaphiopus intermontanus*)² (Pages 8-9):

Replace:

Range: East of the Cascade and Sierra mountains to Wyoming, from southern Nevada and northwestern Arizona to the Okanagan and Nicola valleys in British Columbia. It ranges as far north as 70 Mile House in the Cariboo region.

With:

Range: East of the Cascades and Sierra Mountains to Wyoming, from southern Nevada and northwestern Arizona to British Columbia. In British Columbia, it ranges in the Okanagan, Similkameen, Kettle-Granby, Fraser, Thompson and Nicola Valleys and the South Cariboo Region in low elevation shrub-steppe and open forest habitats.

² Species name as in *Inventory Methods for Pond-breeding Amphibians and Painted Turtle*, Standards for Components of British Columbia’s Biodiversity No. 37 (Version 2.0, March 1998).

Replace:

Habitat: Arid regions with sandy soils in open woodland, meadow, sage, or bunch grass prairie. It is often found near lakes or permanent ponds, but they can also be found far from permanent water.

With:

Habitat: Arid regions with sandy soils in open woodland, meadow, sage, or bunch grass prairie. They are often found near lakes, permanent and seasonal ponds, but they can also be found far from permanent water.

Replace:

Reproduction: Breeding begins with the onset of rain in the spring and early summer in roadside ditches, temporary pools, or shallow lakes. Choruses are large, loud, and insistent. The black eggs are laid in clumps attached to floating sticks and submerged vegetation in shallow water. A female can lay as many as 800 eggs in several small clusters. They have the most rapid rate of embryonic development of any North American frog or toad. Embryos hatch after two or three days of development. The carnivorous tadpoles are voracious, and transform in about six weeks. Tadpoles can reach 70 mm in length. Toadlets are 20 to 25 mm long and reach sexual maturity in two to three years.

With:

Reproduction: Migration to breeding ponds begins with the onset of rain in the spring. Spadefoots can be sporadic in their use of some breeding ponds and the absence of breeding at a given pond in one year does not necessarily mean that the pond is never used. Given that spadefoot calling is very loud, checking with local experts and regional biologists can provide insight to spadefoot use in the area. Spadefoots can use roadside ditches, temporary pools, seasonal ponds, permanent ponds and shallow lakes for breeding. In some years, grassy flooded fields can be important spadefoot breeding habitat in the south Okanagan.

Calling is not strongly correlated with rain but more closely correlated with water temperatures. Calling has been observed when water temperatures are about 8° to 10° C in the Okanagan. Calling has been observed to be more strongly correlated with air temperature of 12° to 13° C in the Thompson.

Spadefoots lay clumps of black eggs attached to floating sticks and submerged vegetation in shallow water. A female can lay as many as 800 eggs in several small clusters. They have the most rapid rate of embryonic development of any North American anuran. Embryos hatch after two or three days of development. The carnivorous tadpoles are voracious, and transform in about six weeks. Tadpoles can reach 70 mm in length. Metamorphic spadefoots are 20 to 25 mm long and reach sexual maturity in two to three years.

Section 3. PROTOCOLS

Table 2 (Page 20):

Replace the following row:

Species	Inventory Methods		
	Presence/ Not detected (possible)	Relative Abundance	Absolute Abundance
Great Basin Spadefoot Toad	<ul style="list-style-type: none"> • Auditory survey • Time-constrained search • Systematic survey 	<ul style="list-style-type: none"> • Systematic survey • Larval survey • Pitfall traps 	<ul style="list-style-type: none"> • Mark-recapture

With:

Species	Inventory Methods		
	Presence/ Not detected (possible)	Relative Abundance	Absolute Abundance
Great Basin Spadefoot	<ul style="list-style-type: none"> • Auditory survey • Time-constrained search • Systematic survey • Larval survey 	<ul style="list-style-type: none"> • Systematic survey • Larval survey • Pitfall traps 	<ul style="list-style-type: none"> • Mark-recapture

Section 3.2 Inventory Surveys

Larval Survey (Page 34):

Replace:

Level of Intensity? *Relative Abundance and Absolute Abundance*

With:

Level of Intensity? *Presence/Not Detected, Relative Abundance and Absolute Abundance*

Section 3.3 Presence/Not detected

Section 3.3.1 Auditory surveys (Page 39):

Replace:

Note: this method does not apply to salamanders or the Painted Turtle.

With:

Note: this method does not apply to salamanders or the Painted Turtle. Also, this method does not always detect breeding Great Basin Spadefoots because calling in this species can be irregular. Non-detection of calling at a pond should be followed up with larval surveys to verify absence of Great Basin Spadefoot breeding activity.

Sampling Design (Pages 39-40):

Add:

- A recent study shows that for a number of anurans, a listening duration of 15 minutes has been found to significantly increase detection efficiency compared to a listening duration of 5 minutes (Pierce and Gutzwiller 2004). This is especially true for anurans that call intermittently, such as Great Basin Spadefoots. Therefore, a minimum of 15 minutes is necessary at each calling station to increase detection probability of calling Great Basin Spadefoots.

Sampling Effort (Page 40):

Add:

- The site visits should be evenly spaced through the breeding season of the target species and may vary according to region. For example, call surveys for Great Basin Spadefoots should start in early-April and extend to end of May in the south Okanagan, start in mid-April and extend to mid-June in the North Okanagan and south Thompson, and start after ice-off and extend to the end of June in the Cariboo.

Field Procedures (Page 40-41):

Add:

- Surveys for Great Basin Spadefoots should start at least a half hour after sundown and continue for 2-3 hours or until midnight.

Replace:

- Stop at each pre-determined listening stop every 0.5 km. Listen at each station for 3 minutes. Observers can listen for up to two minutes longer if noise from traffic, etc., interferes with the ability to hear calls. Note: if driving a motor vehicle, turn off the engine and get out of the car. Wait for 1 minute after arriving to reduce the effect of any disturbance caused by the observer's approach, and then begin the three minute survey.

With:

- Stop at each pre-determined listening stop every 0.5 km. Listen at each station for 3 minutes, or 15 minutes if surveying for Great Basin Spadefoots. Observers can listen for up to two minutes longer if noise from traffic, etc., interferes with the ability to hear calls. Note: if driving a motor vehicle, turn off the engine and get out of the car. Wait for 1 minute after arriving to reduce the effect of any disturbance caused by the observer's approach, and then begin the survey.

Section 3.3.4 Systematic Surveys

Sampling Design

Amphibians (Page 49):

Add:

- Systematic surveys for Great Basin Spadefoots can be conducted from early April in the southern parts of the range in the Okanagan to mid-July in the northern parts of its range in the Cariboo.

Sampling Effort

Amphibians (Page 50):

Add:

- Egg-mass surveys are not suitable for Great Basin Spadefoots as the eggs hatch within a few days. A minimum of 3 site visits is recommended to detect presence of Great Basin Spadefoot tadpoles. Systematic surveys for larvae should start two weeks after calling has been detected. If no calling has been detected, spread site visits evenly from early May to mid June in the South Okanagan, from mid-May to the end of June in the North Okanagan, and from mid-May to end of July in the Cariboo. Great Basin Spadefoot metamorphs can be numerous but emergence of these metamorphs is difficult to predict. Therefore, searches for metamorphs may not be a suitable systematic survey technique for detection of this species.

Field Procedures – Amphibians

Visual Counts (Page 52):

Add:

- It is sometimes possible to detect non-calling Great Basin Spadefoots at night by using reflected eyeshine. Hold a flashlight beside your eyes (or use a head lamp) and slowly scan the shallow water zone of the pond.

Systematic Pond Survey -Surveying the different zones (Figure 3) (Page 54):

Insert after 3rd bullet in “Shallow Water Zone” section:

- When surveying for presence/non-detection of Great Basin Spadefoots, if no calling activity is detected at a site then a systematic larval survey is essential to confirm non-detection. Two survey transects, one close to shore and one at a depth of no more than 75 cm is recommended. Surveyors should stop every 3 m and do 10 sweeps with the dip-net at each site.

Section 3.4 Relative Abundance

Section 3.4.1 Auditory survey (Page 59):

Replace:

Note: this method does not apply to the Painted Turtle.

With:

Note: this method does not apply to the Painted Turtle. This method is also not suitable for estimating relative abundance of Great Basin Spadefoots because there is substantial within season and among year variation in calling activity.

Section 3.4.3 Larval surveys

Sampling Design

Sample Searches in each Habitat Type - for Larger Study Areas (Pages 62-63):

Add:

- When sampling for Great Basin Spadefoot tadpoles, one transect should be conducted close to shore paralleling the perimeter of the pond and one in deeper water. For smaller ponds, the entire perimeter of the pond can be surveyed and for larger sites, the sampling can be conducted at a subset of the suitable sites as described above in this section. A second transect should be conducted across the width of the pond in smaller sites, and for larger ponds in deeper water < 0.75 m at a selection of sites as described above.
- Along each transect, do one sweep every 3 metres counting the tadpoles captured in each sweep as described above.

Sampling Effort (Page 63):

Add:

- Larval surveys for Great Basin Spadefoots should start two weeks after calling has been detected. If no calling has been detected, spread the three site visits evenly from early May to mid June in the South Okanagan, from mid-May to the end of June in the North Okanagan and from mid-May to end of July in the Cariboo.

Literature Cited

Add:

Pierce, B. A., and K. J. Gutzwiller. 2004. Auditory Sampling of Frogs: Detection Efficiency in Relation to Survey Duration. *Journal of Herpetology* 38: 495-500.