

WISCONSIN FROG AND TOAD SURVEY

PHENOLOGY SURVEY MANUAL



Photos by Andrew Badje

Wisconsin Department of Natural Resources
Bureau of Natural Heritage Conservation
Bureau of Science Services

2022



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The Wisconsin Frog and Toad Survey (WFTS) – Phenology Survey is a volunteer-based program coordinated by the Bureau of Natural Heritage Conservation and the Bureau of Science Services at the Wisconsin Department of Natural Resources (WDNR), in cooperation with the U.S. Geological Survey (USGS) and the North American Amphibian Monitoring Program (NAAMP). The primary purpose of the Phenology Survey is to determine seasonal and behavioral breeding call adaptations of Wisconsin’s twelve species of amphibians due to fluctuations in climate and weather patterns. The WFTS was initiated in 1981 in response to known and suspected declines in several Wisconsin species, particularly northern leopard frogs (*Lithobates pipiens*), Blanchard’s cricket frogs (*Acris blanchardi*), pickerel frogs (*Lithobates palustris*), and American bullfrogs (*Lithobates catesbeianus*). The WFTS began annual statewide surveys in 1984 and is now one of the longest running amphibian monitoring projects in North America.

WFTS Contact Information: Wisconsin Frog and Toad Survey
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<http://wiatri.net/inventory/frogtoadsurvey/>



Acknowledgements:

The original materials for the Wisconsin Frog and Toad Survey –Phenology Survey (“Natural History” packets) were written by Ruth Hine and Mike Mossman, based on protocols developed by Ray Anderson and Debra Jansen. These existing WFTS materials were combined and updated into this “Wisconsin Frog and Toad Survey Phenology Survey Manual” by Rori Paloski, Tara Bergeson, Andrew Badje, Mike Mossman, and Bob Hay. We would also like to thank Jill Rosenberg for her assistance with this manual and associated updates to the WFTS website.

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INTRODUCTION

In recent decades, researchers have become concerned with the apparent rarity, decline, and/or population die-offs of amphibians throughout the world. This concern is not only for the species themselves but also for the ecosystems on which they depend. Frogs and toads, like many other aquatic organisms, are sensitive to changes in water quality and adjacent land use practices, and their health undoubtedly serves as an index to environmental quality.

Wisconsin is home to 12 native species of anurans (frogs and toads). Observers have noted declines in several of these species in recent decades as well. The Blanchard's cricket frog was once considered one of the most abundant and widespread frogs in southern Wisconsin, having been reported in 31 counties. However, over the past several decades this species has rapidly declined for unknown reasons, and breeding populations are now found in only seven counties in southwestern Wisconsin. In 1982, the cricket frog was placed on Wisconsin's endangered species list. The northern leopard frog, a species popular with medical laboratories and biology classes, has also experienced significant declines in Wisconsin over the past several decades. The northern leopard frog is still found throughout most of Wisconsin, however this species is not as abundant as it once was and populations continue to decline for unknown reasons. Several other Wisconsin anurans have experienced local declines as well.

As a result of these declines, the Wisconsin Frog and Toad Survey was initiated in 1981 to increase our knowledge of anuran abundance and distribution, and to monitor populations and phenological adaptations over the long term. At a phenology listening station, the observer identifies the species calling and records an estimate of abundance using a call index value of 1, 2, or 3. Monitoring occurs at least biweekly from late March until the first of August, but can fluctuate between years and is dependent on calling frogs. This cooperative survey, has and will continue to provide us with valuable information on the status of Wisconsin frog and toad populations, and help us monitor the quality of our environment.

INSTRUCTIONS

If you are interested in volunteering with the Wisconsin Frog and Toad Survey on behalf of the Phenology Survey, please first contact the Bureau of Natural Heritage Conservation.

SURVEYING A PHENOLOGY MONITORING LOCATION

1. Determine one monitoring location.

All phenology volunteers must find and choose a monitoring location that best suits their preferences. Your listening site must be easily accessible at night, preferably within a short walk or drive from your residence. If you happen to live near a wetland or stream with calling amphibians, you can even survey from the comfort of your deck or porch. Since you will be surveying on a biweekly basis, minimizing travel will benefit the surveyor over the season. You do not need to be able to physically reach the stream, wetland, etc., but you do need to be close enough to the site that you are confident you will be able to hear every species calling. Do NOT choose a location that requires trespassing on private lands.

Do not avoid ponds that dry up during the year, for they are often very productive throughout the spring. Do avoid swift streams, and deep or denuded shores of lakes. Also avoid areas with heavy background noise such as busy streets or highways, certain industrial sites, or farms with barking dogs.

Volunteers sometimes discover the first year that their original site turned out to be unsuitable breeding habitat, or was a poor site because of unforeseen background noise, access problems, etc... In this case it is usually necessary to replace the problem site with a new site as soon as possible.

2. Obtain and review instructional materials and data sheets.

The primary, designated cooperator will receive these materials in mid- to late March each year, until a request from the volunteer has been sent notifying the Wisconsin Frog & Toad Survey that they will no longer be able to survey. Please contact us if you have not received this information by April 7th. Packets will include:

- a) Cover letter
- b) Phenology Survey Manual (includes instructions and natural history information)
- c) Song phenology data sheet

3. Learn the calls, phenology, and general ranges of Wisconsin anurans.

All cooperators are required to have listened to and learned the Wisconsin anuran calls prior to conducting their first survey. At no charge, new cooperators can learn calls by visiting the U.S. Geological Survey Frog Quiz Website:

USGS Frog Quiz
<http://www.pwrc.usgs.gov/frogquiz/index.cfm?fuseaction=main.lookup>

For more information, volunteers can view the Wisconsin Frog and Toad Survey's species videos to learn all of Wisconsin's anuran breeding calls as well as their ecology and statewide distribution:

Wisconsin Frog & Toad Survey Videos
<http://wiatri.net/inventory/frogtoadsurvey/WIfrogs/>

In addition, if cooperators would also like to receive a CD or cassette tape of “Wisconsin Frogs and Toads,” this can be purchased through:

Madison Audubon Society
211 S. Paterson St., Suite 340
Madison, WI 53703
608-255-2473

madisonaudubon.org/store/wisconsin-frogs-and-toads-soundtrack-and-guide

New and experienced observers will find it helpful to review the calls periodically and to take recordings along during surveys to help identify uncertain calls. New observers can learn the calls gradually by starting with those species that may be calling during the early spring survey period (wood frog, boreal chorus frogs, spring peeper, northern leopard frog, and pickerel frog), followed by those that begin calling in late spring (American toad, gray treefrog, and Cope’s gray treefrog), and finally by those species that begin to call during the summer (Blanchard’s cricket frog, mink frog, green frog, and American bullfrog). It is highly recommended that new observers practice distinguishing calls in the field with the help of a more experienced observer.

This survey manual includes a “natural history” section that summarizes the geographic range, physical description, breeding habitat, breeding phenology, call, and status of each species in Wisconsin. Use this information to help determine which species are likely to occur in a given region, habitat, or season. Although it is entirely possible that you may find an unusually early or late singer, or a breeding population outside a species’ previously documented range, you should be aware that these unusual occurrences may require special scrutiny or verification. To help us document unusual species in your area, please audio record the calls and submit them for verification.

4. Run surveys after dark, under favorable weather conditions.

Under ideal circumstances, volunteers are allowed to survey as many nights throughout the season as possible; however a minimum of two nights per week will be accepted. The following parameters suggest ideal weather conditions for volunteers to follow if they have to choose between survey nights. Surveys can take place when wind is less than 12 mph (wind code value of 0, 1, 2, or 3), however a wind speed of 7 mph or less is preferred (wind code value of 0, 1, or 2). Warm, cloudy evenings with little or no wind and high humidity (even drizzle) are ideal. However surveys should not be conducted during a steady rain. Humidity and cloud cover are not critical, but temperature is: a sudden drop in air temperature will cause most anurans to cease calling.

5. Listen for calls at your single monitoring location.

Approach your listening point so as to cause minimal disturbance. The arrival of a car or a person on foot may cause frogs to stop calling for a short time. If this occurs, wait until the frogs begin calling again to start your 5 minute survey. Listen for 5 minutes and record all calls audible from your listening point, not just those emanating from a particular pond, one side of the road, etc. Some calls may be drowned out by others, especially by the full chorus of spring peepers or chorus frogs. Where you suspect this to be the case, and after carefully listening and recording your initial data, you may try to silence the chorus by making a loud noise with the horn, car door, or your voice; and then listen for the less conspicuous species as the calling gradually resumes. A tape recorder will enable you to record questionable situations that can be listened to and confirmed at a later time or date.

Where feasible, place a thermometer in the water near where the frogs are calling (don't forget to take it when you leave that site!). Water temperatures should be taken at all locations where access to the water is convenient and is possible without trespassing.

6. Record your observations on the Song Phenology Data Sheet.

Include county, year, observers' names and addresses, date, time, weather conditions, temperatures, and additional comments. Additional comments may include information on noise levels, attempts to silence loud choruses, changes in habitat since previous visits, site observations, or additional species observed. At each site record the abundance value for each species heard, according to the call index (Table 1). For species not calling, do not record a 0, instead leave the space blank.

Table 1. Wisconsin frog call index.

Call Index	Criteria
1	Individuals can be counted; there is space between calls (no overlapping of calls).
2	Calls of individuals can be distinguished but there is some overlapping of calls.
3	Full chorus. Calls are constant, continuous, and overlapping; individual calls cannot be distinguished

7. Verify records of rare or extralimital occurrences.

Verification is required for all records of the endangered Blanchard's cricket frog and any species found outside its previously documented range as indicated by the range maps. Verification can be accomplished by: a) an audio recording, b) testimony of 2 experienced observers, or c) a photograph. After an observer has verified a species, future verification of that particular species in the area may not be required.

8. Return the completed Song Phenology Data Sheet by **August 15th**.

Be sure to keep one copy of the field data sheet for your records (this is especially important if the data is lost in the mail). If you would like copies of other materials, please photocopy them, download information from the WFTS website (<http://wiatri.net/inventory/frogtoadsurvey/>), or request extra hard copies.

CALLING PHENOLOGY

Male frogs and toads, like male songbirds, advertise their presence to females by singing or “calling”. Also like songbirds, each species has a distinctive call. Wisconsin frogs call during one or more of three general breeding periods: early spring (early season breeders), late spring (mid-season breeders), and summer (late season breeders). Wisconsin anurans typically call for 4 to 8 weeks; however, the wood frog is considered a short-term breeder and usually completes its breeding activity within two weeks. The onset and duration of frog calling is determined by local air and water temperatures and may vary considerably from year to year (the extended length of the survey periods accounts for these annual variations). Although air and water temperatures are considered more important than calendar dates for anuran breeding. The anuran breeding phenology calendar (Figure 1) was determined for Portage County in central Wisconsin. Northern Wisconsin anurans may call a bit later and those in southern Wisconsin may call a bit earlier than the ranges presented in the calendar.

Calling times are closely related to the types of water in which anurans breed. The early season breeders typically use temporary bodies of water for breeding: a slough adjacent to a lake, a pothole that dries up by mid-July, or a roadside ditch. The tadpoles of these species metamorphose rapidly in these warmer, shallower bodies of water. You may often hear spring peepers or other early season breeders calling from what appears to be the shore of a lake but it is likely that they are often in a nearby body of water where the water has warmed more quickly than the lake. Late season breeders, such as the green frog, mink frog, and bullfrog breed only in permanent bodies of water. The tadpoles of these species overwinter and metamorphose the following year.

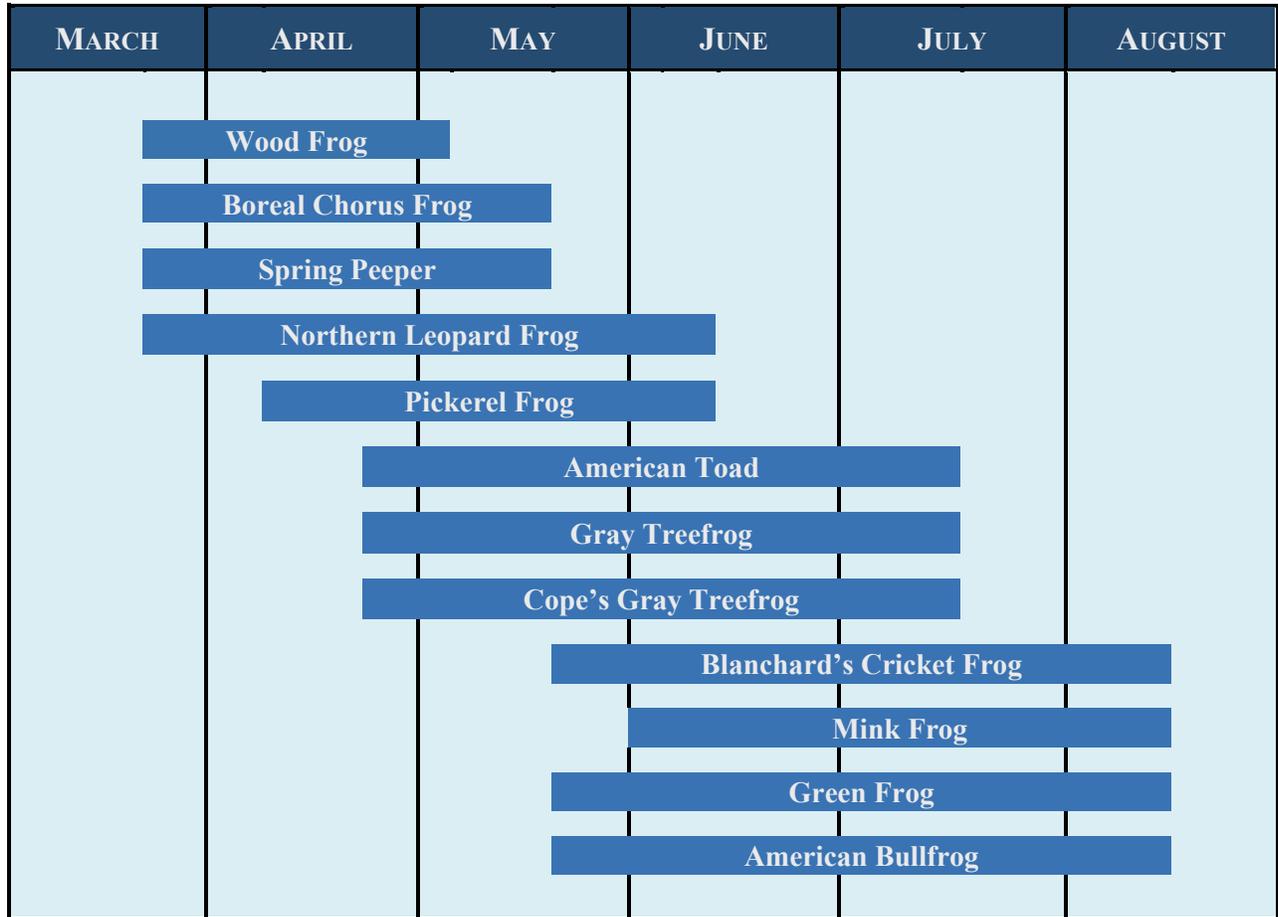


Figure 1. Breeding phenology of Wisconsin anurans. Determined for Portage County in central Wisconsin. Northern Wisconsin anurans may call a bit later and those in southern Wisconsin may call a bit earlier than the ranges presented in the calendar. May vary between years.

NATURAL HISTORY

CHARACTERISTICS OF WISCONSIN FROGS AND TOADS

There are 12 frog and toad species, collectively called "anurans", native to Wisconsin. Most Wisconsin anurans are generally present throughout the state: American toad, spring peeper, gray treefrog, Cope's gray treefrog, green frog, northern leopard frog, pickerel frog, wood frog, and American bullfrog. However, the mink frog is found only in northern Wisconsin and the Blanchard's cricket frog is found only in southwestern Wisconsin. As of 1989 chorus frogs in Wisconsin were split into two distinct species, western chorus frogs and boreal chorus frogs. More recently (2007), evidence from mitochondrial data has revised the geographic ranges of these two species, suggesting that all chorus frogs in Wisconsin belong to the boreal chorus frog species.

Even though some Wisconsin anurans spend part of their life cycle on land, all 12 species require water for breeding and have specific breeding habitat requirements. Some anurans breed in temporary waters while others require permanent bodies of water. Anurans may utilize woodland pools, cool waters of spring-fed seeps, water that accumulates in agricultural field depressions, cattail marshes, or shallow margins of lakes and streams. Eggs are laid in the water by the female and are fertilized by the male while clasping her. The eggs hatch into tadpoles that metamorphose into young frogs or toads in varying lengths of time, dependent upon the species.

Detailed information on Wisconsin anurans is presented by Vogt (1981). Additional information is also located on our website, <http://wiatri.net/inventory/frogtoadsurvey/>. For quick reference, a brief general description of each Wisconsin anuran including its status, physical description, breeding habitat, breeding phenology, call description, and distribution is presented here.

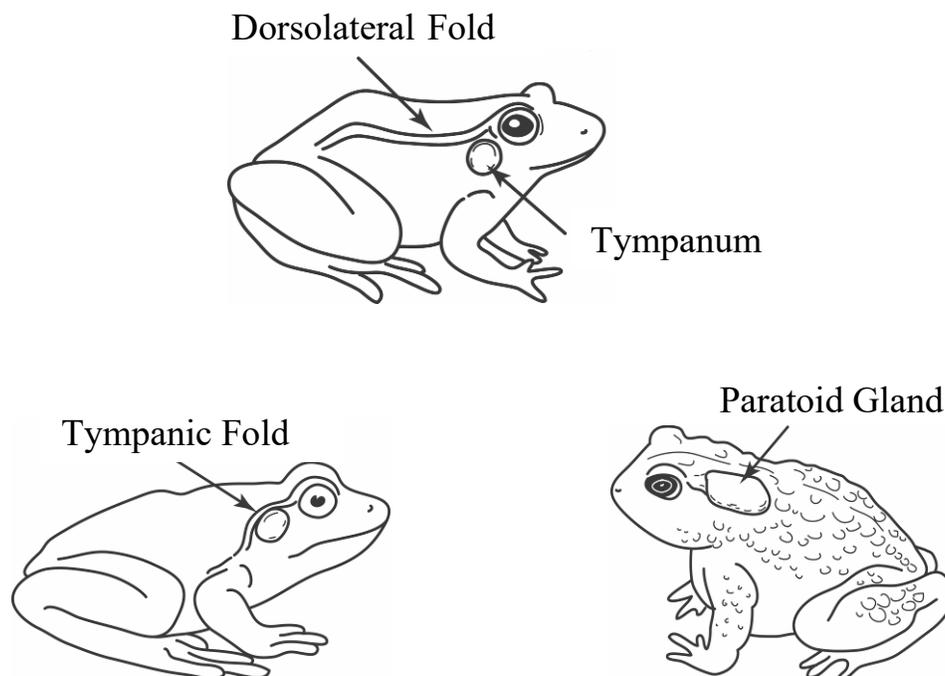


Figure 2. Anuran structures referred to in general descriptions.

WOOD FROG

Lithobates sylvaticus

Status:

Common

Physical Description:

1.5-2.75 inches (3.8-7.0 cm); pink, tan, or dark brown; dark mask through the eye; prominent dorsolateral ridges; light stripe on upper lip.

Breeding Habitat:

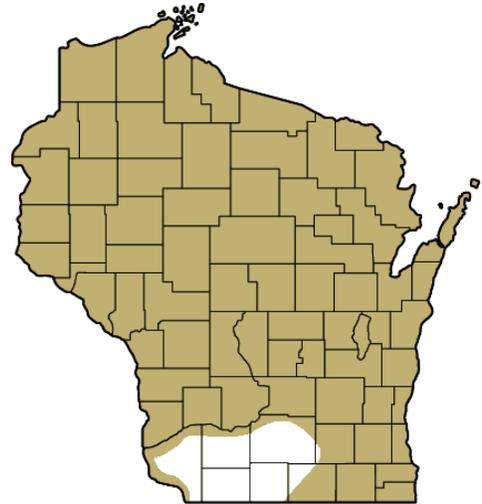
Temporary bodies of water within or adjacent to moist wooded areas.

Breeding Phenology:

Late March through early May (short-term breeder, typically only calls for 2 weeks during this period)

Call:

A hoarse, subtle quacking with little carrying power.



BOREAL CHORUS FROG

Pseudacris maculata

Status:

Common

Physical Description:

0.75-1.25 inches (1.9-3.2 cm); greenish-gray to brown; 3 dark stripes down the back; light stripe on upper lip; small, round toe pads.

Breeding Habitat:

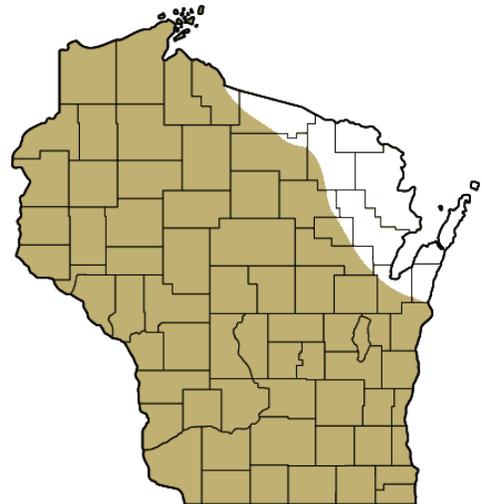
A variety of shallow, often temporary, bodies of water.

Breeding Phenology:

Late March through May

Call:

A “creek” lasting 1 or 2 seconds; similar to the sound of a fingernail running along the teeth of a fine-toothed comb.



SPRING PEEPER

Pseudacris crucifer

Status:

Common but declining

Physical Description:

0.75-1.25 inches (1.9-3.2 cm); tan, brown, or gray; a dark, often imperfect, “X” on the back; modest toe pads.

Breeding Habitat:

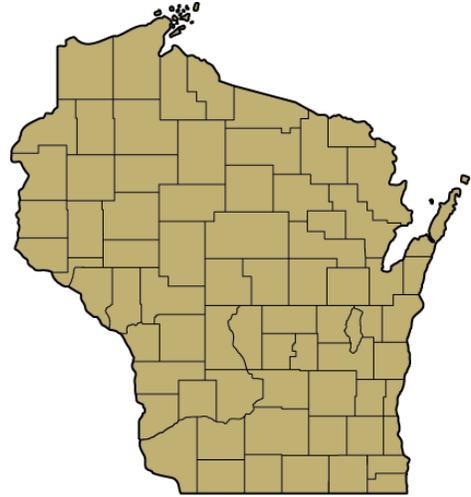
Temporary or semi-permanent marshes, swamps, and ponds within or adjacent to wooded areas.

Breeding Phenology:

Late March through May

Call:

A high ascending “peep”, sometimes with a short trill; a full chorus resembles the jingling of bells.



NORTHERN LEOPARD FROG

Lithobates pipiens

Status:

Species of special concern, common but significantly declining

Physical Description:

2.0-3.5 inches (5.1-8.9 cm); green, brown, or tan; rounded dark spots, often with light borders; light stripe on upper lip; dorsolateral ridges extend to the groin.

Breeding Habitat:

Lakes, streams, rivers, ponds; often far from standing water (the “meadow frog”) during the summer.

Breeding Phenology:

Late March through mid-June

Call:

A deep, rattling, broken snore interspersed with “chuckling”; resembles the sound of a thumb rubbing against a balloon; somewhat similar to the call of the pickerel frog.



PICKEREL FROG

Lithobates palustris

Status:

Species of special concern

Physical Description:

1.75-3.25 inches (4.4-8.2 cm); brown or tan; rectangular spots, without light borders, in parallel rows down the back; bright yellow or orange coloring on underside hind legs; light stripe on upper lip; dorsolateral ridges extend to the groin.

Breeding Habitat:

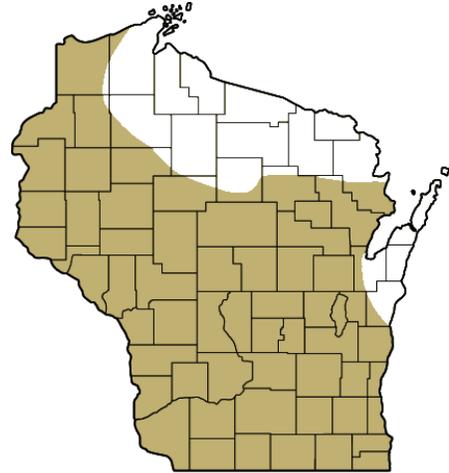
Cool, clear waters of spring-fed lakes, ponds, and streams; adjacent warm water habitats.

Breeding Phenology:

Mid-April through mid-June

Call:

A steady, low-pitched, short and constant snore with little carrying power; somewhat similar to the call of the northern leopard frog.



AMERICAN TOAD

Anaxyrus americanus

Status:

Common

Physical Description:

2.0-4.5 inches (5.1-11.4 cm); brown, red, or olive with darker warts; dry, rough skin; paratoid glands located behind each eye.

Breeding Habitat:

A variety of shallow water habitats.

Breeding Phenology:

Late April through mid-July (often an explosive breeder with the majority of individuals breeding in a 1-3 day period)

Call:

A musical trill lasting up to 30 seconds; considerable individual variation in tone.



GRAY TREEFROG*

(formerly EASTERN GRAY TREEFROG)

Hyla versicolor

Status:

Common

Physical Description:

1.25-2.0 inches (3.2-5.1 cm); green, gray, or brown and capable of changing color based on environmental conditions; darker blotches usually present; bright yellow or orange coloring on inner thighs; large toe pads.

Breeding Habitat:

A variety of permanent and semi-permanent bodies of water within or adjacent to wooded areas.

Breeding Phenology:

Late April through mid-July

Call:

A short, loud trill lasting up to 10 seconds; slower and more melodic than the call of the Cope's gray treefrog.



COPE'S GRAY TREEFROG*

Hyla chrysoscelis

Status:

Common but declining

Physical Description:

1.25-2.0 inches (3.2-5.1 cm); green, gray, or brown and capable of changing color based on environmental conditions; dark blotches often present; bright yellow or orange coloring on inner thighs; large toe pads.

Breeding Habitat:

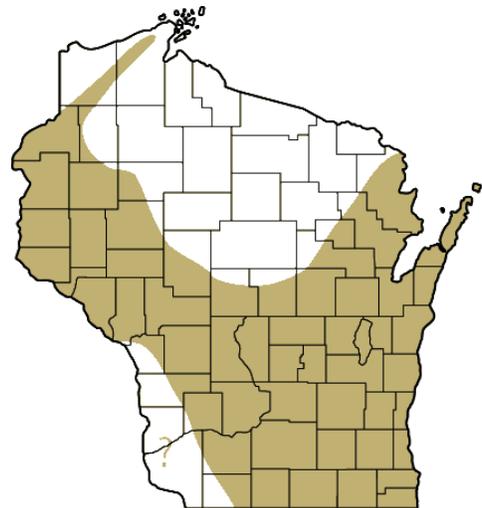
A variety of permanent and semi-permanent bodies of water in open areas and adjacent to wooded areas.

Breeding Phenology:

Late April through mid-July

Call:

A short, loud, raspy call lasting up to 1 second; faster and harsher than the gray treefrog. A nasally "wa-a-a-a-a".



**Few consistent physical differences exist between the gray treefrog and Cope's gray treefrog, however their calls are distinct.*

BLANCHARD'S CRICKET FROG

Acris blanchardi

Status:

Endangered, extremely rare

Physical Description:

0.75-1.5 inches (1.9-3.8 cm); brown, tan, gray or green and capable of changing color based on environmental conditions; darker brown, green or red dorsal stripe may be present; dark triangle between eyes sometimes present; rough skin; longitudinal dark stripe on back of thigh.

Breeding Habitat:

A variety of semi-permanent and permanent bodies of water with submergent and emergent vegetation.

Breeding Phenology:

Late May through mid-August

Call:

Resembles the clicking of pebbles or steel marbles; first increasing in speed and then sharply dropping off.



MINK FROG

Lithobates septentrionalis

Status:

Locally common

Physical Description:

1.75-2.75 inches (4.4-7.0 cm); green to brown often with spots or mottling on the back, sides, and legs; dorsolateral ridges absent; skin produces a musky, mink-like odor.

Breeding Habitat:

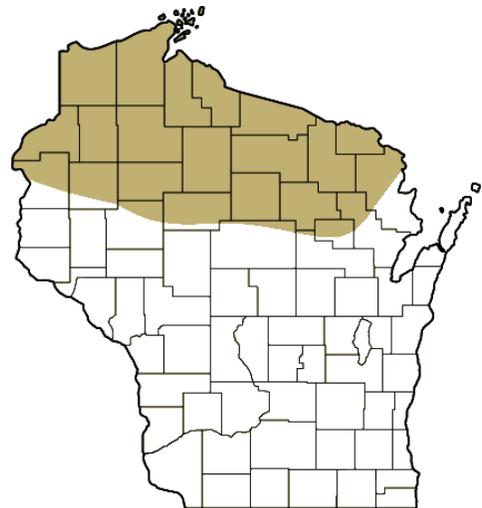
Cool, permanent water with abundant vegetation; often associated with bogs along lakes and streams.

Breeding Phenology:

June through mid-August

Call:

Resembles the sound of horses' hooves trotting over a cobblestone street.



GREEN FROG

Lithobates clamitans

Status:

Common

Physical Description:

2.25-3.5 inches (5.7-8.9 cm); green to brown; small dark spots often present on back, especially in younger individuals; dorsolateral ridges end on the body, do not reach groin; green on upper lip.

Breeding Habitat:

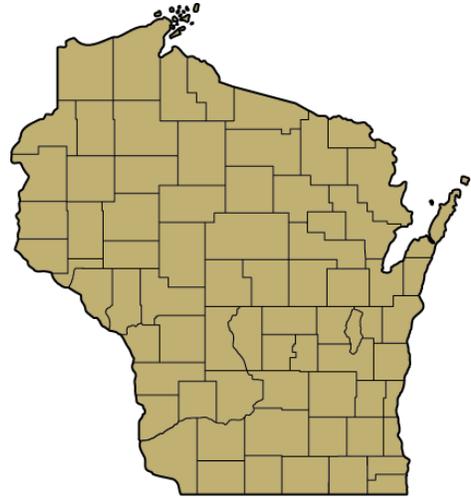
All types of permanent bodies of water.

Breeding Phenology:

Late May through mid-August

Call:

Similar to the twang of a loose banjo string; usually given as a single note.



AMERICAN BULLFROG

Lithobates catesbeianus

Status:

Species of special concern, locally common

Physical Description:

3.5-6.0 inches (8.9-15.2 cm); green to brown; dark markings often present on body; no dorsolateral ridges on the back, but obvious tympanic ridge.

Breeding Habitat:

All types of permanent bodies of water.

Breeding Phenology:

Late May through mid-August

Call:

Deep bass notes similar to a foghorn; resembles the sound made by drawing a bow across a bass fiddle; “jug-o-rum”.





Wisconsin Frog & Toad Phenology Survey

Bureau of Natural Heritage Conservation
 Wisconsin Department of Natural Resources
 P.O. Box 7921
 Madison, WI 53707-7921

Observer Name: Jane & Joe Smith
 Address: 101 S. Webster St.
Madison, WI 53707-7921
 Telephone Number: (608) 555-1234
 Year: 2014
 County: Dane
 Site Name: Oakwood

Instructions: Use this voluntary form to record call index values of species heard at one monitoring site throughout the year. Listen at any time after sunset for 5 minutes, at least twice weekly during the period 1 April – 15 June, and at least once weekly thereafter until 1 August.
IMPORTANT – Please return to the above address by 15 August.

Location (GPS): N43.059568 W-89.489264
 OR (Town/Range): T 7 N R 8E S 25 NE 1/4 NW 1/4
 Description of Lake, River, Stream, or Wetland: Kettle pond

Description of Listening Point: Oakwood Wildlife Preserve;
N/NE side of wooded pond on woodland trail.

							CALL INDEX*												
							Wood Frog	Boreal Chorus Frog	Spring Peeper	Northern Leopard Frog	Pickering Frog	American Toad	Gray Treefrog	Cope's Gray Treefrog	Blanchard's Cricket Frog	Mink Frog	Green Frog	American Bullfrog	
Time (CST)		Temperature °F																	
Date	Begin	End	Air	Water	Sky*	Wind*													Notes
4/4	7:45	7:50	46.9	36	0	1													Pond 90% ice
4/8	5:45	5:50	54	44	1	2	2												
4/8	8:00	8:05	46.2	43	1	2	3	2											Pond 50% ice
4/9	7:30	7:35	39	44	5	1	1												
4/10	7:45	7:50	36	46	5	2	1												Pond 30% ice
4/11	7:45	7:55	36	44	5	1	1												
4/12	6:45	7:00	36	45	2	1	1												
4/15	8:10	8:15	41	47	2	1	1	3	1										
4/16	8:30	8:40	50	50	1	1	2	3	3										*Chorus Frogs
4/17	7:00	7:10	40	49	2	3	2												
4/18	8:15	8:20	44	51	2	4	1	3	1										
4/19	8:00	8:05	34	46	5	4	2	1											Snowing
4/20	8:30	8:35	37	48	0	0	1	3	1										
4/21	8:30	8:45	48	50	1	1	1	3	1										
4/23	7:45	7:50	41	42	2	2	3	1											
4/24	8:25	8:30	48	54	1	0	1	3	2										
4/25	8:25	8:35	48	54	0	0	1	3	3										
4/28	8:20	8:40	66	55	0	0	1	3	3										*Chorus Frogs
4/29	8:55	9:00	66	56	1	1	1	3	3										*Chorus Frogs
4/30	8:40	8:50	77	60	0	2	1	3	3			1							*Chorus Frogs
5/1	8:05	8:10	66	59	0	3	3	3											
5/3	8:10	8:15	46	57	2	2	2	2											
5/4	9:50	9:55	59	58	1	0	3	2											*Chorus Frogs
5/5	8:30	8:45	65	59	0	0	3	3											

* The call index is a rough estimate of the number of calling males of a particular species, according to the following index values.

- 1 = Individuals can be counted; there is space between calls (no overlapping of calls).
- 2 = Calls of individuals can be distinguished but there is some overlapping of calls.
- 3 = Full chorus. Calls are constant, continuous, and overlapping; individual calls cannot be distinguished.

*See back of sheet for wind and sky codes

Form 1700-009
 Revised April 2022



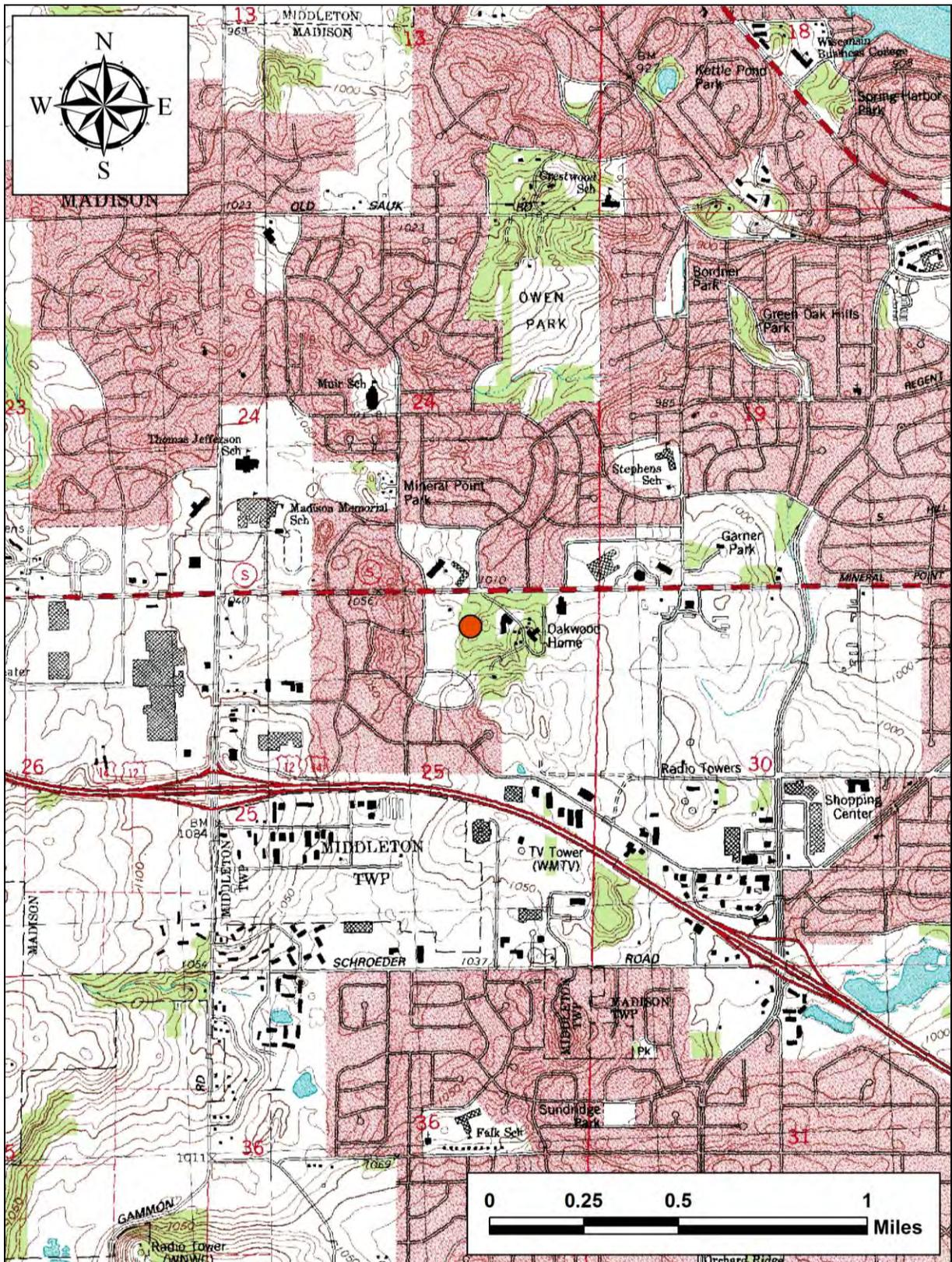


Figure 3. Sample topographic map used for setting up and mapping a new phenology monitoring station.

RESOURCES

- Anderson, R. and D. Jansen. Wisconsin frogs. AUDIO FILE. Wisconsin Audubon Society, Madison, Wisconsin. (**CD** or **audio tape**)
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Wisconsin Frog and Toad Survey Website:

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