CALLING PERIODS FOR FROGS AND TOADS NEAR PINAWA, MANITOBA, WITH AN UPDATE ON MINK FROG AND GREEN FROG DISTRIBUTION

PETER TAYLOR, P.O. Box 597, Pinawa, MB R0E 1L0, Email: taylorp@granite.mb.ca

The spring frog chorus in the moist forests of southeastern Manitoba is a big event in the wildlife calendar, a reassuring sign that the cycle of nature continues to turn, even if it may hamper some birders' efforts to listen for owls! After the long silence of winter, it is astonishing to hear the woods come alive with an early Wood Frog chorus, followed a few weeks later by the ear-splitting calls of uncountable Spring Peepers. But all is not well for amphibians, and there is concern about declines of many species worldwide.[2,4] One response to these declines has been the development of amphibian calling surveys in North America, starting in Wisconsin in 1981.[3,6] The gatherings of calling male frogs and toads at breeding locations provide a convenient means of identifying the species present and tracking their numbers and distribution from year to year.

While most Manitoba amphibians seem secure in their abundance, there has been concern about Northern Leopard Frog populations throughout western North America.[9,13,16] During the mid-1970s, populations of this species "crashed" in Manitoba, "greatly declined" in Saskatchewan, and "almost totally disappeared" in Alberta.[16] Parallel declines have been documented in many of the western United States.[13] Some other species, including Green Frog and Mink Frog, approach their range limits in Manitoba.[8,14] Though globally secure, these two species have been assigned the provincial conservation status ranks S2 (Rare; may be vulnerable to extirpation) and S3 (Uncommon/ Sensitive), respectively.[17] This article includes some new distributional information on these two frogs.

The natural history and distribution of Manitoba amphibians is descibed in *The Amphibians and Reptiles of Manitoba*.[8] This book includes a

Northern Leopard Frog near Davidson Lake, Ontario-Manitoba border, 6 July 2005. *Peter Taylor*

synopsis of calling dates, but little information on daily calling cycles. Many amphibian calling survey protocols call for surveys to commence one-half to one hour after sunset and cease before midnight.[2,4] While it is true that most frog and toad species call strongly in the late evening, this is not necessarily the ideal time to survey all species. For example, Smith has pointed out the difficulty of surveying Northern Leopard Frogs, because the calling period is short and chorusing behaviour is poorly understood.[12] Typically, a minimum of three surveys is recommended on any given route or study area, on dates selected for adequate coverage of all species from early to late breeders.[4,6] Weather conditions are obviously important; overall, calling tends to be most intense on calm, warm, humid evenings. However, no two species are identical in their response to changing weather conditions.[7]

This article summarizes daily and seasonal calling patterns for eight species of amphibians in the Pinawa area (50°N, 95°W) of southeastern Manitoba. The intention is to help others refine survey methods, and also to provide baseline information to help detect future population and distribution changes that may arise from climate change or habitat alteration. The information may also help naturalists to plan outings to experience frog calls at their peak.

Data were collected between 1989 and 2005, but I was absent for the entire spring in 1999 and 2004, most of April 2000, and all of April and May 2005. While the data include some "official" roadside amphibian survey results, most were collected opportunistically. Some observations were incidental to various bird surveys (for owls and American Woodcock, as well as the more generalized Breeding Bird Surveys) or the nocturnal and early-morning portions of 24-hour birding marathons ("Big Days"). The majority were made while walking near home or the workplace, driving or birding in the area, or simply listening from the doorstep or bedroom window at home. A preliminary report on this project was presented at an amphibian conservation workshop in Winnipeg in 1994.[15]

Inevitably, my zeal for data collection has varied over the 17-year duration of this project, but an effort was made to sample all hours of the day and night within the peak calling periods. Coverage is weakest in the "wee hours" of the morning and in mid-afternoon. There are no data for Cope's Gray Treefrog *(Hyla chrysoscelis)* or Canadian Toad *(Bufo hemiophrys)*, whose range limits lie a little southwest of Pinawa. Data are sparse for the Mink Frog and Green Frog, which are not known to occur in the immediate vicinity of Pinawa.

Data were compiled on charts divided into five-day periods from April 1 to September 8, and one-hour periods throughout the day. For each combination of date and time intervals, a score of 0 to 3 was assigned to each species, based on the highest observed calling intensity, employing the scale commonly used in amphibian surveys:[6]

0 - No records
1 - Individuals can be counted; there is space between calls
2 - Calls of individuals are distinguishable, but some calls overlap
3 - Full chorus; calls are constant, continuous, and overlapping [such that individual calls are not distinguishable].

Condensed versions of these charts, based on total scores for 10-day and three-hour periods, are given in Figures 1 to 4. To help make comparisons, the vertical scale on these figures is adjusted (normalized) to a peak value of 1.0 for all species. The figures exclude occasional calling by a few species after early August, as described in the individual species accounts. Extreme calling dates, as well as extreme dates for full choruses, are summarized in Table 1. I would be pleased to provide the full data tabulations, either printed or electronically, to any interested reader.

There is, of course, a lot of variation between seasons, with emergence and calling being earlier if sustained mild weather brings an early thaw. Thus, Boreal Chorus Frogs and Wood Frogs started calling on 8–9 April in the relatively mild spring of 1998 (and on similar dates in some years before 1989), but not until 27–30 April in 1995–1997, when cool conditions prevailed in early spring. The recommended survey periods are selected to be near the calling peaks, at least in most seasons. The summaries also include some anecdotal observations made outside the breeding season.

Long-term average temperatures for the Pinawa area range from about -18°C in January to +20°C in July, with an average frost-free period of about 108 days from late May to mid-September. Calling dates for the early-emerging frogs are about a week earlier in the Red River Valley (100 km southwest of Pinawa), and probably one or two weeks later in the northern Interlake region (200 km northwest of Pinawa) or areas with comparable climates. The sequence in this list and in Table 1 follows the normal sequence of

Species	Earliest calling	Earliest full chorus	Latest full chorus	Latest calling
Boreal Chorus Frog	April 8, 1998	April 9, 1998	June 7, 1997	July 16, 1992
Wood Frog	April 9, 1998	April 9, 1998	May 20, 1996	May 31, 1997
Spring Peeper	April 12, 1998	April 26, 1998	June 10, 1996	June 20, 1993
Northern Leopard Frog	April 24, 1998	May 13, 2003	May 25, 1996	June 7, 1993
Gray Treefrog	April 30, 1998	May 11, 1998	July 5, 1992	Sept. 6, 1996
American Toad	April 30, 1998	May 15, 1991	June 11, 1996	July 16, 1992
Mink Frog	May 25, 1991	June 11, 1995	July 12, 2002	July 31, 1989
Green Frog	June 13, 1991	——	——	July 31, 1989

Table 1: Extreme Dates for Calling and for Full Choruses of Frogs and Toads near Pinawa, Manitoba.

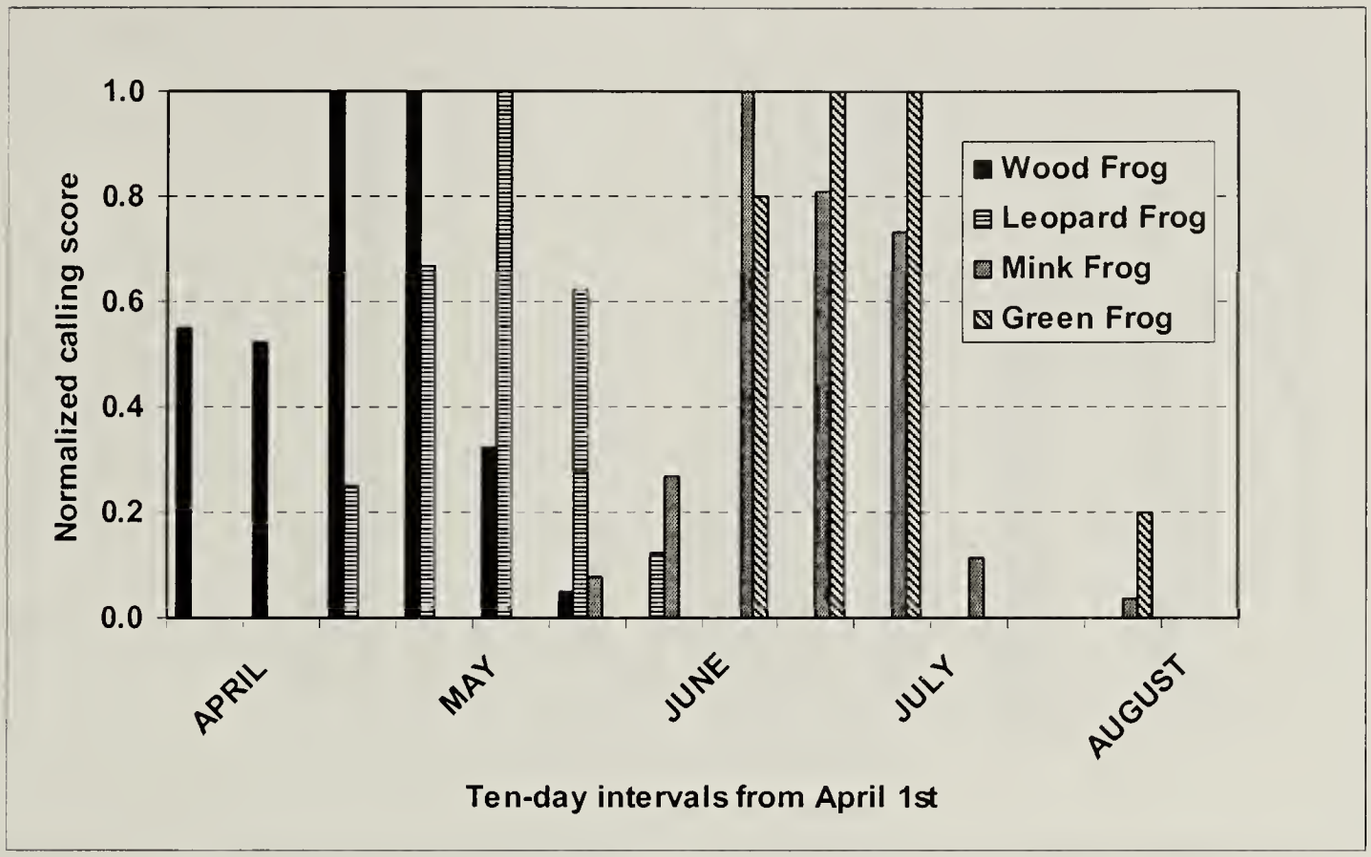

Figure 1. Summary of calling dates for "true" frogs (genus Rana*) near Pinawa, Manitoba.*

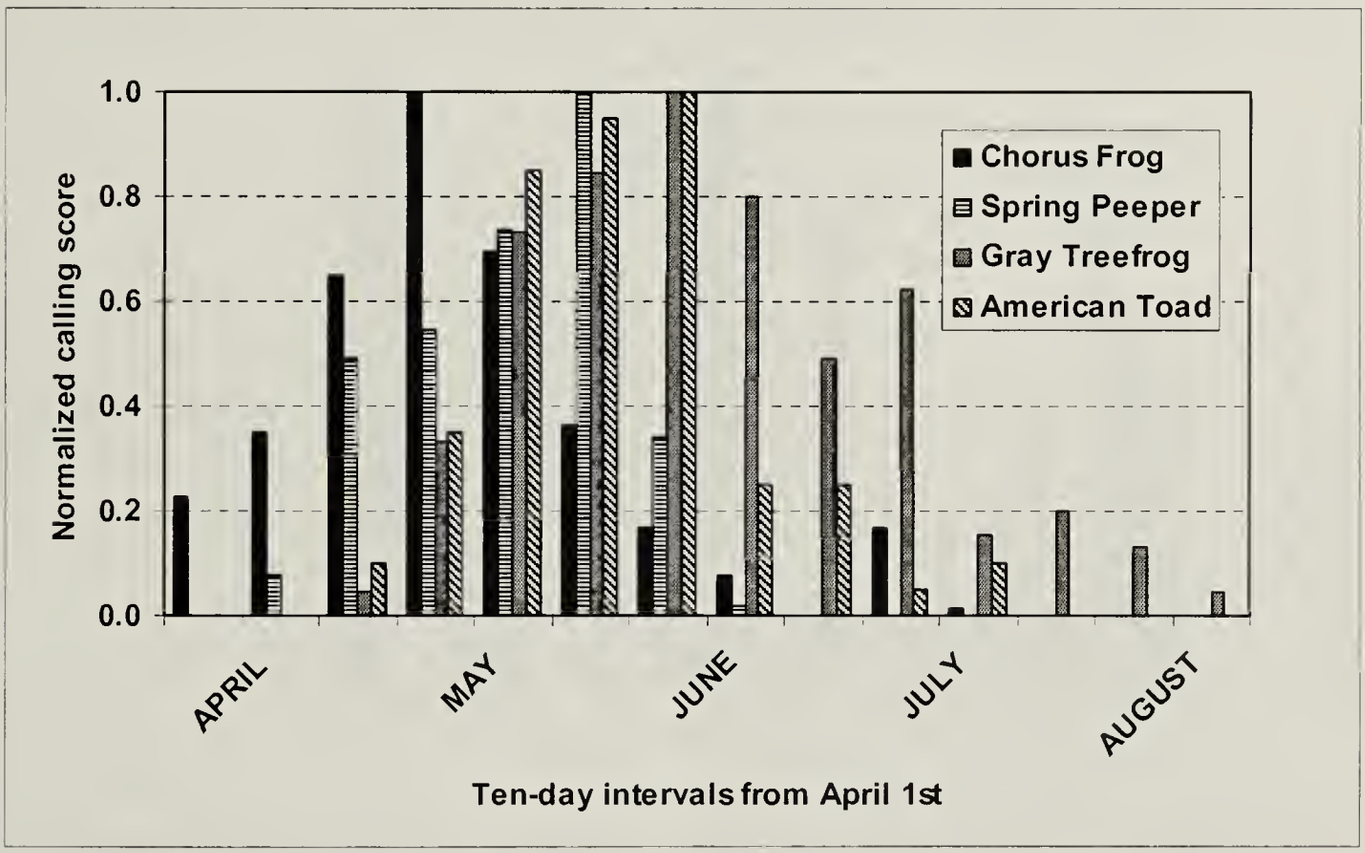

Figure 2. Summary of calling dates for toads, treefrogs and allies near Pinawa, Manitoba.

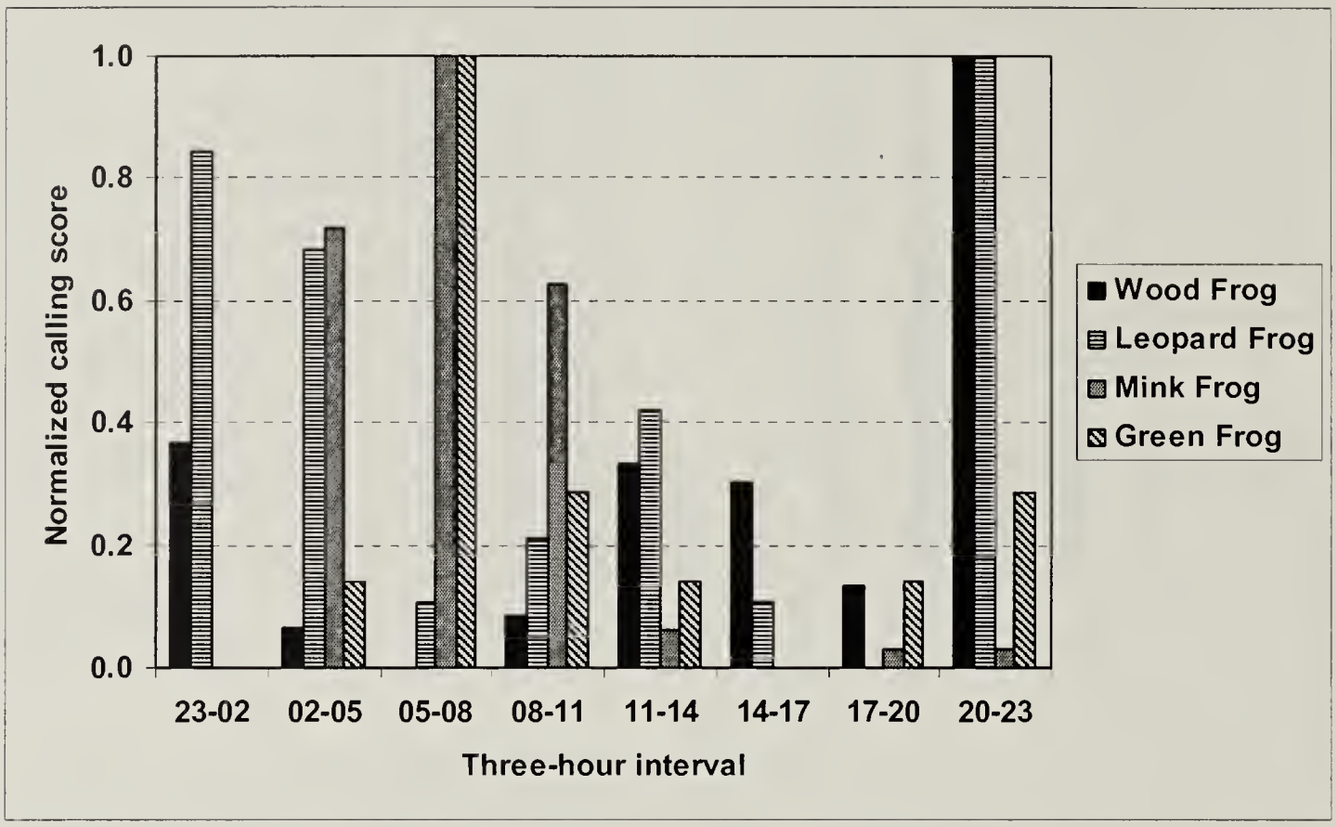

Figure 3. Summary of calling times for "true" frogs (genus Rana*) near Pinawa, Manitoba.*

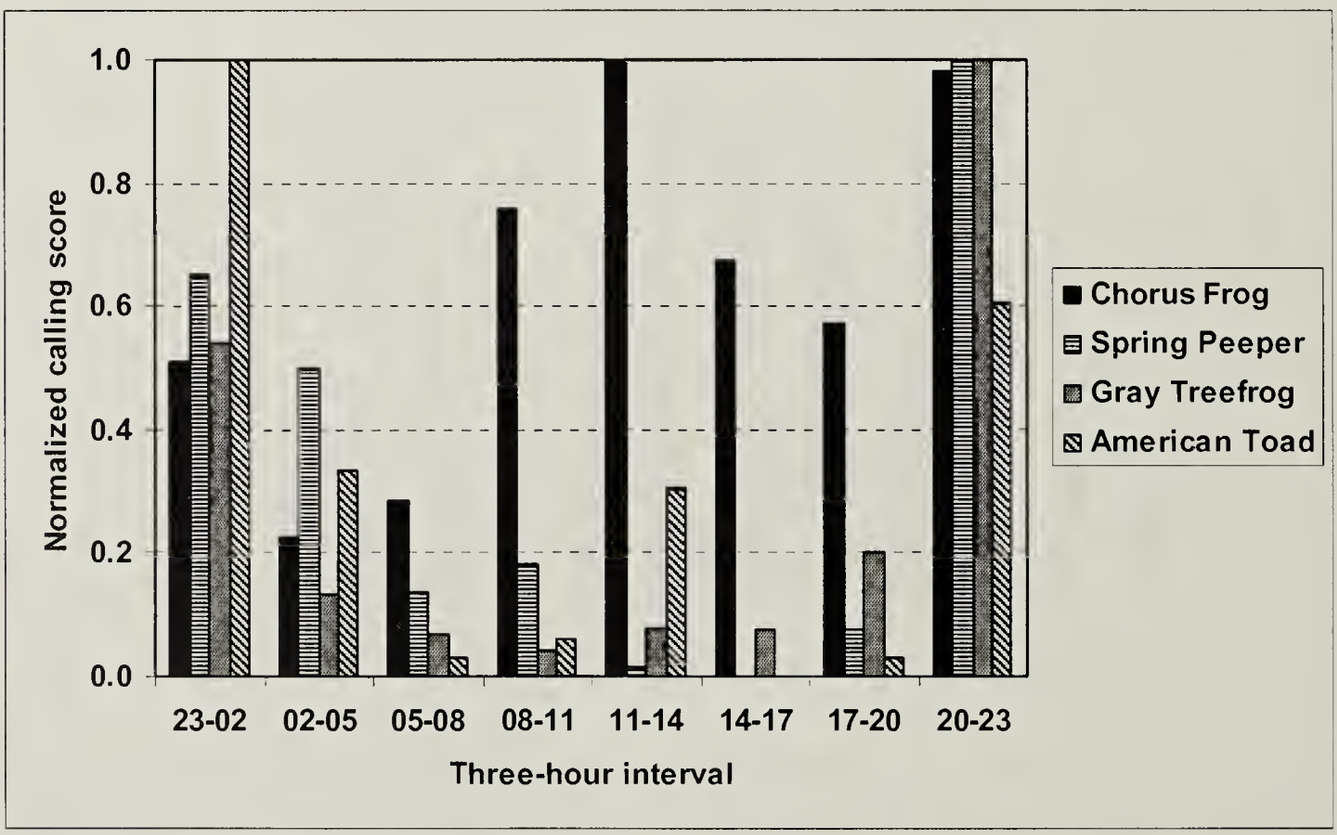

Figure 4. Summary of calling times for toads, treefrogs and allies near Pinawa, Manitoba.

emergence for the eight species, and the nomenclature follows the Canadian checklist of Weller and Green.[16]

BOREAL CHORUS FROG *(Pseudacris maculata)*

■ Extreme calling dates:
8 April 1998, 16 July 1992.
■ Extreme dates of full choruses:
9 April (1998) – 7 June (1997).
■ Recommended survey period:
25 April to 15 May.
■ Recommended survey time:
Noon to 5 PM; later on warm evenings.

This widespread species emerges and commences calling during the first warm, sunny spell in April, when much of the winter's snow accumulation has gone and daytime temperatures rise to about 15°C. It breeds at temporary roadside and woodland pools in farmland as well as forested areas. The distinctive call is often likened to the teeth of a comb being plucked. Calling is sporadic, rising and falling in intensity with the temperature, and may cease for a week or more during cool weather. Although full choruses usually die down well before the end of May, there is often a resurgence in calling (though never at full intensity) after heavy rains in June or early July. Sporadic, weak calling has been noted as late as September, but this is not thought to be related to breeding.[8]

Presumably because of the early emergence, when overnight frosts are still frequent, the first calls of the season are typically heard in the warmest part of the day, around noon or early to mid-afternoon. Calling often commences around 9–10 AM, once the overnight chill has eased, and peaks between noon and 5 PM. On warmer nights it may continue through to the small hours of the morning; indeed, this species has been noted calling at all hours of the day and night. Nevertheless, there is often a marked reduction in calling at nightfall, and silence reigns on cool nights. Thus, Boreal Chorus Frogs may be under-represented in some evening calling surveys, while the daylight hours can be very productive for finding breeding localities. Even when calling strongly, this tiny frog is extremely difficult to see; it normally falls silent when a human approaches within about 10 metres of a calling site. Though still easily found in spring, this species seems less abundant now than when I first came to Pinawa 30 years ago.

WOOD FROG *(Rana sylvatica)*

■ Extreme calling dates:
9 April 1998, 31 May 1997.
■ Extreme dates of full choruses:
9 April (1998) – 20 May (1996); much variation from year to year within these limits.
■ Recommended survey period:
25 April to 10 May; earlier in some years.
■ Recommended survey time:
8 PM to 11 PM.

Wood Frogs are abundant in marshes and moist woodland, both coniferous and deciduous. The voice suggests a quacking Mallard, leading some people to think that small marshes have an amazingly large population of ducks! Wood Frogs usually emerge during the first warm spell in April, within a day or two of the first Boreal Chorus Frogs. They, too, call habitually from late morning through the afternoon, but calling is usually most intense between about 8 PM and 11 PM; evening surveys are therefore ideal for this species. Calling usually tapers off quickly around midnight, and the species is rarely heard between 5 AM and 10 AM.

The calling period is relatively short; breeding calls diminish rapidly in mid-May and cease by the end of the month. Wood Frogs are commonly encountered along woodland trails or gravel roads throughout the summer and early fall. The occasional soft chuckle, presumably not related to breeding activity, is heard from them during the summer months.

SPRING PEEPER *(Pseudacris crucifer)*

- Extreme calling dates:
12 April 1998, 20 June 1993.
- Extreme dates of full choruses:
26 April (1998) – 10 June (1996).
- Recommended survey period:
10–30 May.
- Recommended survey time:
9 PM to 11 PM.

In southeastern Manitoba, Spring Peepers occur primarily in dense black spruce forest. They are well named for their intense *peep* calls, which can be almost painful at close range. The first individuals typically start calling just a few days after the first Boreal Chorus Frogs and Wood Frogs, but full choruses are rarely heard before the first week of May. Calling usually commences after 8 PM and is most intense between 9 and 11 PM, so that evening surveys are ideal for this species. On warm nights in the second half of May, calling often continues throughout the night, gradually diminishing after about 3 AM, though a few individuals may continue for several hours after dawn. The species is normally silent from 11 AM to 8 PM. Calling falls off rapidly after the end of May, and is rarely heard after 10 June. Individuals can be found in late summer by searching in the moist, mossy substrate of spruce bogs.

NORTHERN LEOPARD FROG *(Rana pipiens)*

- Extreme calling dates:
24 April 1998, 7 June 1993.
- Extreme dates of full choruses, and recommended survey period:
13 May (2003) – 25 May (1996).
- Recommended survey time:
10 PM to midnight; possibly around 4 AM.

Northern Leopard Frogs are typically found in marshy areas around ponds, sewage lagoons, lakes, and quiet backwaters along rivers. The breeding call is a drawn-out snoring sound, terminating in a series of croaks. The species may well emerge from deep-water hibernation sites some time before calling commences in late April or early May.[8] The calling period is relatively short, and full choruses are heard only occasionally in marshy areas near Pinawa: sometimes between 10 PM and midnight, and sometimes around 4 AM. A definite, brief "dawn chorus" phenomenon might be exploited for surveys, but it is probably limited to just a few days each year.

Between mid-July and early September, Leopard Frogs (perhaps immature individuals?) often make a soft, chuckling sound, more reminiscent of a Wood Frog's spring "quacking" than the Leopard Frog's breeding call.

Leopard Frogs wander well away from water during the summer months and individuals are often flushed, for example, by a passing lawnmower. Immense numbers (several per metre of shoreline) were noted at the Pinawa sewage lagoons in late July 1990—enough to attract a small number of bitterns and herons, including a rare

Green Heron, to feed on them. I have not seen such numbers before or since. This observation resembles Martin Bailey's report of a sudden profusion of Leopard Frogs at a water hazard on the Weyburn, Saskatchewan golf course in July 2003, and illustrates how the species' huge reproductive potential may be realized under ideal breeding conditions.[1]

It may be mid-October before the last Leopard Frogs drag themselves back to hibernation, sometimes leaving interesting trails on sandy lakeshores; around Pinawa, they are usually the last amphibians to be seen on land before freeze-up.

GRAY TREEFROG *(Hyla versicolor)*

■ Extreme calling dates:
30 April 1998, 6 September 1996.
■ Extreme dates of full choruses:
11 May (1998) – 5 July (1992).
■ Recommended survey period:
25 May – 25 June.
■ Recommended survey time:
8 PM to midnight at temperatures above 15°C.

This is usually the last of the more terrestrial frogs to emerge in spring. It occurs in various woodland habitats, but seems to prefer moist, deciduous forest with access to fairly deep, permanent pools or ditches for breeding. These include flooded sand quarries and "borrow pits" where gravel has been extracted for road construction. The grey and light-green coloration gives excellent camouflage in leafy trees and shrubs, and calling individuals are almost impossible to see, even in shallow pools with sparse vegetation. Gray Treefrogs sometimes visit houses, where they hunt insects around windows on summer nights. As shown in the photograph on the back cover, their remarkable toe pads give adhesion even on a vertical glass surface.

The call is a short, modulated trill, not unlike the advertising call of a Red-headed Woodpecker. It is rarely heard before the second week of May, and calling may be irregular until consistently warm weather gets established towards the end of May. Full choruses can usually be heard for most of June, sometimes continuing into the first week of July. Calling gradually tapers off through July, though a few individuals may call sporadically until early September. Preston cites an exceptionally late calling date, 3 October 1981, near Libau (about 60 km WNW of Pinawa).[8]

Gray Treefrogs have been noted calling at all hours of the day and night, but primarily between 8 PM and 2 AM; they are therefore well suited for late evening surveys. The first individuals may start calling around 5 PM, and a full chorus often develops before sunset. Duration of the chorus is weather-dependent. If overnight temperatures remain above about 15°C, a full chorus may continue unabated until about 2 AM, gradually tapering off through the pre-dawn hours, with only scattered individuals being heard after 4 AM.

AMERICAN TOAD *(Bufo americanus)*

■ Extreme calling dates:
30 April 1998; 16 July 1992.
■ Extreme dates of full choruses, and recommended survey period:
15 May (1991) – 11 June (1996).
■ Recommended survey time:
10 PM to 12 PM.

Toads are scattered around the Pinawa area, and no obvious habitat preferences for the breeding pools have been noted. The male's call is a prolonged trill at a constant pitch, but usually differing in pitch between neighbouring individuals. Most records involve just one or two individuals, and full choruses are quite rare. This is perhaps the most nocturnal of the eight species, with a marked peak in calling records between 10 PM and 2 AM. Nevertheless, strong calling has occasionally been heard around noon, especially during the early part of the calling period. Toads are not often heard before the second week of May or after the first week of June. Large numbers of newly transformed toadlets may sometimes be encountered on gravel roads in moist, forested areas.

MINK FROG *(Rana septentrionalis)*

- Extreme calling dates:
25 May 1991, 31 July 1989.
- Extreme dates of full choruses:
11 June (1995) – 12 July (2002).
- Recommended survey period:
11-30 June.
- Recommended survey time:
4 AM to 7 AM.

This aquatic frog reaches the northwestern limit of its known range in and around Whiteshell and Nopiming Provincial Parks (PPs), which adjoin the Ontario border in southeastern Manitoba.[8,14] There it occurs in slow-flowing creeks, small lakes and bays of larger lakes, often where Yellow Pond-lilies *(Nuphar variegatum)* are present. I have encountered Mink Frogs primarily while running Breeding Bird Surveys on the Bird River and Springer Lake routes in and near Nopiming PP, or immediately afterwards.[14,15] The time frame of these surveys explains a preponderance of records, including some full choruses, between 4 AM and 7 AM, with few individuals heard outside the period from 3 AM to 11 AM. The resonant "*chuck-chuck*" call can sometimes be mistaken for the staccato tapping of a Yellow-bellied Sapsucker. There are insufficient data on calling at other hours to judge whether late-evening surveys are appropriate, but there is a definite "dawn chorus" effect that can easily be exploited by "piggybacking" Mink Frog surveys onto Breeding Bird Surveys in suitable habitat.[15]

The presence of Mink Frogs in the Springer Lake area (50° 32' N, 95° 28' W) has been described elsewhere.[14] They have since been found at several other locations in the southern portion of Nopiming PP. Winnipeg resident Doug Barry, who formerly owned a cottage in the park, tells me he has frequently heard Mink Frogs in and near Beresford Lake (50° 52' N, 95° 14' W) and nearby at Stormy Lake and in the creek linking Beresford and Garner Lakes. On 28 June 2000, I heard one or two Mink Frogs near Bissett at Horseshoe Lake (51° 03' N, 95° 44' W; one of five Manitoba lakes with this name), thus extending the Manitoba range north of the 51st parallel. Schueler and Ross suggested that the range may extend as far northwest as the Nelson River, which flows from the north end of Lake Winnipeg to Hudson Bay.[11] This speculation was based mainly on the frog's known occurrence at Moosonee, near the southern shore of James Bay in Ontario, and much farther north in Labrador.[10] It is unlikely that Horseshoe Lake is the Mink Frog's northernmost outpost in Manitoba, but surveys would be difficult to conduct farther north because there is no road access.

Figure 5. This beaver pond near Davidson Lake, ON, just east of the Manitoba border, is inhabited by both Mink Frogs and Green Frogs. Peter Taylor

GREEN FROG *(Rana clamitans)*

■ Extreme calling dates:
13 June 1991, 31 July 1989.
■ Peak calling and recommended survey periods: probably mid-June to early July, but more data are needed.
■ Recommended survey time:
4 AM to 7 AM.

This frog also reaches its northwestern range limit near the Ontario–Manitoba border. Aquatic like the Mink Frog, it occurs in similar creek and lakeshore habitats, and the two species are often found together. However, the Green Frog's range is more restricted and its numbers are much lower than those of the Mink Frog. Its resonant *clung* call is often compared to a loose banjo string.

Preston shows only three records from Whiteshell PP, the most recent in 1952; the rediscovery of this species at Springer Lake in Nopiming PP in 1989 has been described previously.[8,14] A brief update is given below. The comments about calling times for Mink Frogs, including the dawn chorus phenomenon and the possibility of piggybacking on Breeding Bird Surveys, also apply to this species. However, in a recent study of Green Frogs in New Brunswick, Mazerolle did not detect any relationship between time of day and probability of calling, at least between 3:30 PM and midnight, though other observers have remarked more intense calling in the evening and at night.[5,7]

Following the rediscovery of the

Green Frog in Manitoba at Springer Lake in 1989, several additional records have been obtained, as follows.

Beresford Lake area (50° 52' N, 95° 14' W) — Doug Barry (pers. comm.) has heard "the twangy tune of the Green Frog" in and around Beresford Lake, including the stream that connects Beresford and Garner Lakes, during the 1990s.

Davidson Lake area (50° 27.7' N, 95° 8.5' W) — This small lake straddles the Manitoba–Ontario border, and the coordinates correspond to a large beaver pond (Figure 5) alongside the Werner Lake road, Ontario, just north of the lake and about 1 km east of the border. This road is an eastward extension of Manitoba Provincial Road (PR) 315. Four Green Frogs were heard at or near this pond on 30 June 2001 (P. Taylor, R. Zach), and six were heard along a 6-km stretch of the road running east from the pond on 6 July 2005 (P. Taylor, R. Zach, R.F. Koes). On the latter date, a large, green frog with a yellowish throat (either a Green Frog or a Mink Frog) was seen struggling and finally succumbing in the jaws of a pike near the shore of a small lake alongside the road. On 7 July 2001, one Green Frog was heard calling in a small pond alongside PR 315 about 1 km west of the provincial border (P. Taylor, R.F. Koes, G.D. Grieef).

Rabbit River (50° 39.2' N, 95° 24.7' W) — These coordinates correspond to the point where PR 314 crosses the Rabbit River; one Green Frog was heard here on 8 July 2002.

Springer Lake (50° 32' N, 95° 28' W) — Green Frogs have been heard in or near the small, western arm of Springer Lake as follows: one on several occasions between 23 June and 31 July 1989, as described previously;[14] at least one on 13 June and two on 14 June 1991; one on 20 June 1993; three or four on 21 June 2001; at least four on 8 July 2002.

Thus, while the numbers detected are low and the species is not found every year, a small population of Green Frogs does appear to persist in and near Nopiming PP.

Acknowledgments

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17. Conservation status ranks can be found at the following websites: http://www.especessauvages.ca/ and http://www.natureserve.org/explorer/. Information on the Manitoba Conservation Data Centre, which assesses provincial conservation status ranks, is available at http://web2.gov.mb.ca/conservation/cdc/ .

The following websites contain a wealth of information on amphibian identification, conservation, and survey techniques; all were accessed on 2 March 2006.

Canadian Amphibian and Reptile Conservation Network: http://www.carcnet.ca/

Frogwatch identification page for Western Canadian frogs and toads, including calls http://www.cnf.ca/naturewatch/frogwatch/west.html

U.S. Geological Survey, Patuxent Wildlife Research Center, Laurel, MD http://www.pwrc.usgs.gov/monmanual/techniques/

Tony Gamble webpage, with photos of Minnesota species and many links http://www.tc.umn.edu/~gambl007/hylidae.htm

Boreal Chorus Frog *Wayne Lynch*