

WOOD FROG SURVEYS 2002
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INTRODUCTION

Many amphibian populations are declining over broad geographic regions world wide (Barinaga 1990, Blaustein and Wake 1990, Phillips 1990, Wyman 1990). A number of factors may be contributing to these declines, including habitat destruction, pollution, global climate change, ultraviolet radiation, habitat fragmentation, disease, introduction of exotic species, and acidification of wetland habitats (Wyman 1990, Blaustein 1993). Unfortunately, most of the reports on declining amphibian populations are based on anecdotal information. Lack of long-term population trend data makes it difficult to assess the significance of these declines (Blaustein 1993).

Amphibians serve as good indicators of environmental health. Their permeable skin and exposed egg masses are sensitive to pollution, ultraviolet radiation, and acidification in breeding habitats. Additionally, the life cycles of many species make them susceptible to environmental stresses in both aquatic and terrestrial environments (Blaustein 1993).

The purpose of this study was to continue documenting the presence and relative abundance of wood frogs (*Rana sylvatica*) along the McCarthy Road. Surveys conducted in 2002 were designed to repeat the surveys done from 1991-1993. The same survey sites and methods were used.

STUDY AREA

The study area and sampling sites in 2002 followed those of Kozie and Route (1995) (Figs. 1-4, Table 1). Long Lake (L-3) was not sampled in 2002. Long Lake is a deep lake with a steep shoreline. Suitable breeding habitat is limited. It was replaced with L-2 (Crystal Lake) in 1992.

Table 1. Location of survey sites for wood frogs along the McCarthy Road.

Location	Habitat Type	Elevation	Lat	Long
T-3	Deep Marsh	1580	61.40866	-143.057
L-6	Pond	1630	61.39643	-143.149
L-2	Lake	1400	61.36632	-143.419
L-1	Lake	1395	61.36566	-143.443
G-7	Lake	1457	61.37466	-143.597
G-1	Pond	1530	61.45666	-143.789
KU-6	Pond	1300	61.46839	-143.934
KU-1	Pond	1250	61.50498	-144.051
KO-5	Pond	1200	61.52611	-144.156
KO-3	Pond	1250	61.52267	-144.222
Datum: NAD27 Alaska				

METHODS

We surveyed frogs along the McCarthy Road during 2002 using calling surveys developed by Anderson et al. (1981). Type of water area, location, date, time, air and water temperatures, calling species, and relative abundance were recorded at each survey site (Appendix 1). Observers listened for a minimum of 5 minutes at each site and recorded wood frog relative abundance. Relative abundance is defined as a rough estimate of the numbers of calling males, according to the following index:

<u>Index Number</u>	<u>Criteria</u>
1	Individuals can be counted; there is space between calls
2	Calls of individuals can still be distinguished but there is some overlapping of calls (intermediate between "1" and "3")
3	Full chorus. Calls are constant, continuous, and overlapping

Type of water area was defined as lake, pond, or deep marsh according to the following definitions (Benyus 1989):

Lake - Permanent open water greater than 10 acres and usually deeper than 6 feet.

Pond - Permanent open water less than 10 acres and usually less than 6 feet.

Deep Marsh - A shallow basin with 6 inches to 3 feet of standing water throughout much of the year. Herbaceous aquatic plants grow throughout the marsh.

RESULTS AND DISCUSSION

In 2002, surveys were conducted along the McCarthy Road on May 9 and May 10, and again on May 20 and May 21. No frogs were observed or heard during the early surveys, most likely because the water was still too cold for breeding and the ponds and marshes were still mostly ice-covered. The later surveys resulted in an abundance of frog sightings and calling in 8 of 10 survey sights. The water was still too cold for breeding in one site for which no frogs were recorded (Moose Lake, G-7). Many eggs and tadpoles were observed in Ruth Lake (L-1) on 5-25-02. However, only cursory searches were made for egg masses in 2002, due to time constraints and because I was not sure what I was looking for.

According to Herreid and Kinney (1967), wood frogs begin breeding and laying eggs when the water temperature reaches 7-9 degrees Celsius; and their peak singing hours are in the late morning and early afternoon. The unusually clear, hot weather in mid-May quickly warmed the marshes and ponds this spring (2002); subsequently, wood frogs were quite active.

Overall, the 2002 surveys indicate that frog abundance was at least as great, if not greater, than that indicated by the 1991-1993 surveys (Table 2). No frogs were detected at two sites (G-7 and G-1), where they were present in the 1991-1993 surveys. This is likely due to the water temperature being too low for 3 of the 4 surveys in 2002 (ice, 3.5, and 4.0 degrees Celsius).

The short calling period of the wood frog (approximately 2 weeks) makes it difficult to time surveys, because the timing of break-up varies from year to year. Surveys should be scheduled to coincide with water temperatures reaching at least 7-9 degrees Celsius. Observers should make notes when they have difficulty deciding abundance.

Frog surveys should be conducted annually to detect changes in population abundance. Once every 3-5 years is probably adequate for a presence/absence inventory. It should be noted that this method is a gross indicator of change in population abundance and is probably not useful in detecting small population fluctuations.

Table 2. Results of wood frog surveys along the McCarthy Road, Wrangell-St. Elias National Park and Preserve, 1991-1993, 2002.

Location	Date	Time	Temperature (C)		Relative Abundance	Eggs?
			Water	Air		
T-3	5/20/1991	22:03	7	13	2	N
	5/29/1992	14:47	10	--	0	N
	5/13/1993	12:51	11	19	1	N
	5/9/2002	13:45	1	6	0	
	5/21/2002	14:45	23	27	3	
L-6	5/20/1991	22:24	13	--	2	N
	5/29/1992	15:03	16	23	1	N
	5/13/1993	13:45	11	23	2	N
	5/9/2002	14:25	3	6.5	0	
	5/21/2002	15:15	7.5	21	3	
L-3	5/20/1991	22:47	3	--	0	N
	5/29/1992	15:27	13	24	0	N
	5/13/1993	14:10	1	20	0	N
L-2	5/29/1992	15:48	16	20	0	N
	5/13/1993	14:29	13	20	3	N
	5/10/2002	11:45	3	12.5	0	
	5/20/2002	20:15	13	15.5	3	
L-1	5/20/1991	23:06	15	--	1	N
	5/29/1992	16:11	17	23	0	N
	5/13/1993	14:40	9	20	3	N
	5/10/2002	12:15	10.5	9.5	0	
	5/20/2002	19:50	16.5	19.5	2	Y
G-7	5/20/1991	23:31	14	--	2	N
	5/29/1992	16:28	16	--	0	N
	5/13/1993	14:58	16	21	2	N
	5/10/2002	12:45	3.5	7	0	
	5/20/2002	19:00	4	20	0	

G-1	5/21/1991	0:03	13	--	2	N
	5/29/1992	16:58	14	21	1	N
	5/13/1993	15:40	16	21	2	N
	5/10/2002	13:40	ice	9.5	0	
	5/20/2002	18:30	10.5	21	0	
KU-6	5/21/1991	0:27	9	--	2	N
	5/29/1992	17:16	19	17	1	N
	5/13/1993	16:16	9	18	1	N
	5/10/2002	14:10	5.5	8.5	0	
	5/20/2002	18:00	17.5	24	2.5	
KU-1	5/21/1991	0:55	13	--	1	N
	5/29/1992	17:38	15	20	1	N
	5/13/1993	16:50	15	19	1	Y
	5/10/2002	14:55	3	12	0	
	5/20/2002	17:30	21.5	24.5	2.5	
KO-5	5/21/1991	1:09	16	--	1	N
	5/29/1992	17:58	19	21	0	N
	5/13/1993	17:02	13	24	1	N
	5/10/2002	15:20	3	6.5	0	
	5/20/2002	17:15	19	27.5	2.5	
KO-3	5/20/1991	1:17	14	9	1	N
	5/29/1992	18:03	17	--	0	N
	5/13/1993	17:13	16	20	1	N
	5/10/2002	16:00	3.5	12.5	0	
	5/20/2002	16:30	20.5	20	2	

While conducting these surveys, I noticed that the passage of vehicles on the road caused the frogs to cease their singing for up to several minutes at a time. This suggests that vehicle traffic on the McCarthy Road may disrupt the breeding activities of the wood frog adjacent to this corridor. The 'vehicle effect' could easily be quantified by recording the intensity of frog calls prior to vehicle traffic, the length of time after a vehicle passes before they begin calling again, and the length of time that it takes to reach the intensity of calling prior to the vehicle passing. Future reductions in frog numbers along the McCarthy road could be associated with increased vehicle traffic. Therefore it may be advisable to monitor sites further from the road for comparison, as the 'vehicle effect' would be very localized, and would not accurately represent more regional trends.

RECOMMENDATIONS

- Continue wood frog monitoring
- Assess effects of vehicle traffic on breeding calls of frogs

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