

Iowa's Frog and Toad Call Survey

2014



Introduction and Background

The first volunteer based frog and toad call survey in Iowa took place in 1984 but it did not become a permanent yearly event until 1991. Iowa was one of the earliest states to adopt this survey, which was developed in Wisconsin in response to the alarm in the conservation community regarding amphibian declines. These alarm bells have only grown louder over the past 23 years of the survey and this long-term dataset is more important than ever.

From 1991-2009 Iowa's frog and toad survey followed a traditional model based on Wisconsin's survey. Volunteers chose 5-8 quality wetland sites and then visited each of these sites at night three times during the frog and toad breeding season. Volunteers listen and identify all species by their unique call. Each species they hear is assigned an abundance index: 1 for a few individuals, 2 for a moderate number of individuals, some overlapping calls, and 3 for a full chorus. The listening time period was initially 10 minutes but in the last 5 years has been reduced to 5 minutes at each stop and environmental variables such as air and water temperature, cloud cover, wind and time since rain are also recorded.

Starting in 2010, Iowa adopted a second frog and toad survey protocol following guidelines from the North American Amphibian Monitoring Program (NAAMP) coordinated by the U.S. Geological Survey. NAAMP was initiated in the mid-1990's with a purpose of helping standardize frog and toad survey methodologies across state lines. The NAAMP protocol is based on the original survey developed in Wisconsin and the USGS Breeding Bird Survey. The main difference with the traditional survey is that NAAMP is run on pre-established 10-stop long randomly placed routes. The routes are run at the same time and in the same way with most of the information being collected overlapping with the traditional routes.

Both of these monitoring protocols are important to monitoring Iowa's anuran populations. Each provides complementary data, with the traditional survey likely biased towards higher quality sites while the NAAMP routes hit a mix. Currently we are focused on recruiting volunteers for the 85 NAAMP routes in Iowa but we definitely intend to continue the traditional survey and potentially add new routes in the future. Below, 2014 data are presented separately for each survey type.

Traditional Survey Results

Data was reported for 88% (38) of the active routes in the traditional survey. This translated into 214 sites visited a total of 556 times (# of sites X # of surveys) (Table 1). The average weather conditions were well within the parameters of the survey. The percentage of surveys done within 24 hours of a rain event was once again higher in 2014 with almost half of the surveys meeting this criterion (49%). This is compared to 36% in 2013 and 20% in 2012 (drought year). Temperatures were on average 3 -5 degrees cooler across all runs than in 2013.

The Boreal Chorus Frog was the most detected species on the surveys followed by the Eastern Gray Treefrog and American Toad which was consistent with 2013. The highest average abundance indices were associated with Plains Spadefoot and Great Plains Toad (average >2.59 out of 3). The relatively high occurrence rate and abundance index for these species as well as the Southern Leopard Frog is attributable to the low number of potential sites for these species that were surveyed. There were four species not detected during the survey: Fowler's toad, Pickerel Frog, Wood Frog, and Crawfish frog (Table 2). Some species that are frequently not detected because of sporadic breeding and a limited distribution were recorded this year on at least one site: Great Plains Toad, Plains Spadefoot, and Southern Leopard Frog.

There are ten species that are routinely detected at high enough rates and for which the samples size of potential sites is large enough, that trends can be reliably identified. These species are: Boreal Chorus Frog, Eastern Gray Treefrog, Cope's Gray Treefrog, Cricket Frog, Spring Peeper, American Toad, Northern Leopard Frog, Green Frog, Bull Frog, and Plains Leopard Frog. For four species the % wetlands occupied between 2013 and 2014 was basically level: American Toad, Chorus Frog, Eastern Gray Treefrog, and Plains Leopard Frog (Figure 1). Of the remaining six species, four decreased in occupancy (Northern Leopard Frog, Bull Frog,

Cricket Frog, and Spring Peeper) while two increased (Green Frog and Cope's Gray Treefrog). The species with the sharpest decline between 2013 and 2014 (-12%) was the Bullfrog. The longer trend in for almost all species fluctuates with no overall significant negative or positive inclination.

NAAMP Survey Results

Fifty-five out of a total of 85 available Iowa routes were assigned to a volunteer. Data was reported for 65% of the routes assigned (36 routes), though fewer (23 routes) were surveyed all three times during the breeding season. This level of participation is a decrease from 2013 when 71% of assigned routes were surveyed.

Fifteen out of Iowa's 18 species listed in NAAMP were detected by volunteers. There were no species detected on the NAAMP surveys that were not heard on the traditional survey and vice versa.

The three most commonly heard species across all sites and runs was the same for both traditional and NAAMP surveys (Boreal Chorus Frog, American Toad, Eastern Gray Treefrog) though the order was slightly different. The percentage of American Toads was heard on a higher percentage of sites in the NAAMP survey versus the traditional survey and vice versa for the Gray Treefrog which could represent a difference between in the two surveys in the dominant wetland types being surveyed. The Cricket Frog was the only species with an average call index over two meaning that where they were found they were frequently fairly abundant. No species occurred on all 360 sites surveyed though Chorus Frogs were heard on 75% of these sites (Table 2a).

The NAAMP data exhibited an overall negative trend between 2013 and 2014, with only 5 of the fifteen species being found on a higher percentage of wetlands. Species that went up were Spring Peeper, Cope's Gray Treefrog, Great Plains Toad, Plains Spadefoot and Woodhouse's Toad. All but the first two are species with a very limited distribution range which can influence their numbers. In the traditional survey, Cope's Gray Treefrog also went up between 2013 and 2014 but Spring Peeper went down (Table 2A, Figure 2).

Conclusions

Overall, 2014 seemed to be an average year for frogs and toads with many species being detected less than in 2013 but not deviating too much from the longer term trend averages. The only species with a really notable dip was Bullfrogs, which is probably because of a poor production year (high mortality among tadpoles) in 2012 during the drought coupled with high tadpole mortality in the especially cold 2013/2014 winter. Bullfrogs (along with Green Frogs and Crawfish Frogs) remain tadpoles for two years thus tadpoles hatched in 2012 would only have emerged as adults this year. Bullfrogs will almost certainly rebound but in the meantime a check on this occasionally invasive species is positive. The simple long term trends in wetland occupancy, for most species, seems to be highly variable from year to year but basically steady overall. The two types of surveys (NAAMP and Traditional) continue to complement each other and provide crucial information in monitoring our frogs, toads and wetlands.

In the Coming Year

We are planning on at least two nighttime training workshops to be held in spring 2015 in Dallas County on April 13th and in Sac County on a date yet to be determined. These are being hosted by the Dallas and Sac County Conservation Boards. The workshops are meant to recruit and train additional volunteers to assist with the survey. If you or a friend are interested in getting involved you can find more details on how to register at www.iowadnr.gov/volunteerwildlifemonitoring/.

Acknowledgements

As always we'd like to acknowledge the amazing volunteers who donate their time to this survey and to Iowa's wildlife as a whole. It is no easy task to find three nights during the summertime when the weather is just right to go listen to frogs. This is a truly amazing and inspiring group of people! Thank you!

Table 1 2014 Traditional Survey: Participation Data

Num. of Active Routes	43
Num. of Routes Run in 2014	38 (88%)
Num. of Active Sites	245
Num. of Sites Run in 2014	214 (87%)
Total Num. of Visits Made in 2014	556
Total Num. of Counties Surveyed	26
Num. of Empty Sites (no frogs heard all 3 runs)	5

Table 1a. 2014 NAAMP Survey: Participation Data, n = 85 total routes available in Iowa

Num. of Routes Assigned	55 (65% of 85)
Num. of Routes Run	36 (65% of 55)
Num. of Sites Run	360 (65% of 550)
Total Num. of Surveys conducted	110
Number of routes where all 3 runs conducted	23 (63% of 36)

Table 2 Traditional Survey: 2014 Frog and Toad Survey species data

Number of records per run
(count of the num. of surveys during which species was detected)

<i>Species</i>	<i>Sites on which species detected</i>	<i>% of Total (n=Possible Sites)</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>Total Num. Visits</i>	<i>Average call index 1=Single to 3=Full Chorus?</i>
Chorus Frog	157	73.4% (214)	123	90	42	270	2.18
Eastern Gray Treefrog	129	60.2% (214)	5	99	110	215	2.13
American Toad	112	52.3% (214)	4	92	54	150	1.71
Great Plains Toad	5	41.7% (12)	0	0	5	5	2.6
Cricket Frog	89	41.6% (214)	0	61	73	134	2.38
Cope's Gray Treefrog	65	30.4% (214)	0	52	40	92	1.66
Northern Leopard Frog	58	27.1% (214)	40	24	16	80	1.39
Green Frog	38	25.3% (150)	0	14	32	46	1.63
Plains Spadefoot	3	25.0% (12)	0	0	3	3	2.67
Spring Peeper	34	21.7% (157)	30	15	0	45	2.13
Bullfrog	41	19.2% (214)	0	11	38	49	1.49
Woodhouse's Toad	4	11.8% (34)	0	2	4	6	1.83
So. Leopard Frog	1	10.0% (10)	0	1	0	1	3
Leopard Frog	16	7.5% (214)	11	6	0	17	1.18
Plains Leopard	4	5.8% (69)	0	3	2	5	1.8
Pickeral Frog	0	0.0%	0	0	0	0	NA
Wood Frog	0	0.0%	0	0	0	0	NA
Crawfish Frog	0	0.0%	0	0	0	0	NA
Fowler's Toad	0	0.0%	0	0	0	0	NA

Table 2a. NAAMP Survey: Species Detection for 2010 through 2014

Species	# of Sites (%*)					Change in % sites from 2013-2014	Total Num Visits	Avg. Call Index (Max= 3)
	2010	2011	2012	2013	2014			
Chorus Frog	193(67)	155(65)	187 (52)	278 (75)	271 (75)	0	470	1.95
American Toad	182(63)	132(55)	205 (57)	238 (64)	210 (58)	-6	320	1.63
Eastern Gray Treefrog	134(46)	120(50)	153 (43)	179 (48)	145 (40)	-8	232	1.86
Cricket Frog	127(44)	108(45)	201 (52)	175 (47)	143 (40)	-7	214	2.08
Spring Peeper	34(19)	39(26)	72 (29)	83(29)	72 (33)	+4	96	1.75
Cope's Gray Treefrog	59(20)	66(28)	61 (17)	96 (26)	102 (28)	+2	153	1.67
Great Plains Toad	2(7)	3(15)	4(10)	3(14)	6 (15)	+1	6	2.3
Green Frog	21(12)	32(25)	32 (13)	32(17)	27 (14)	-3	36	1.14
Northern Leopard Frog	34(12)	33(14)	47(13)	60 (16)	51 (14)	-2	56	1.27
Gray Treefrog Spp.	21(7)	11(5)	22 (6)	69 (19)	45 (13)	-6	59	1.90
So. Leopard Frog	0(0)	3(30)	0 (0)	4(15)	4 (13)	-2	5	1.4
Bullfrog	42(15)	49(20)	111 (31)	83(22)	44 (12)	-10	53	1.06
Woodhouse/Fowlers	5(13)	6(15)	7(12)	3(3)	8 (10)	+7	12	1.3
Plains Leopard	18(13)	5(4)	11 (6)	21(10)	10 (5)	-5	14	1.7
Plains Spadefoot	1(3)	0(0)	2 (5)	0(0)	1 (3)	+3	1	1
Pickeral Frog	0(0)	0(0)	1 (1)	1(1)	0 (0)	-1	0	0
Wood Frog	0(0)	0(0)	0 (0)	0(0)	0 (0)	0	0	0
Crawfish Frog	0(0)	0(0)	0(0)	0(0)	0 (0)	0	0	0

* Percent listed in percent of potential sites for each species. EX: For species with a statewide distribution the total number of potential sites in 2014 with 36 routes run = 360, For species with a limited distribution the number of total potential sites is limited by routes in counties where they occur. These are: Great Plains toad= 40 ; Pickeral Frog = 71 ; Green Frog = 200; Woodhouse's/Fowler's = 81; Plains Leopard = 186 ; Spring Peeper =220 ; Plains Spadefoot = 40, Southern Leopard Frog = 31 .

Figure 1. Ten year trends in wetland occupancy for frog and toad data collected as part of Iowa's traditional call survey.

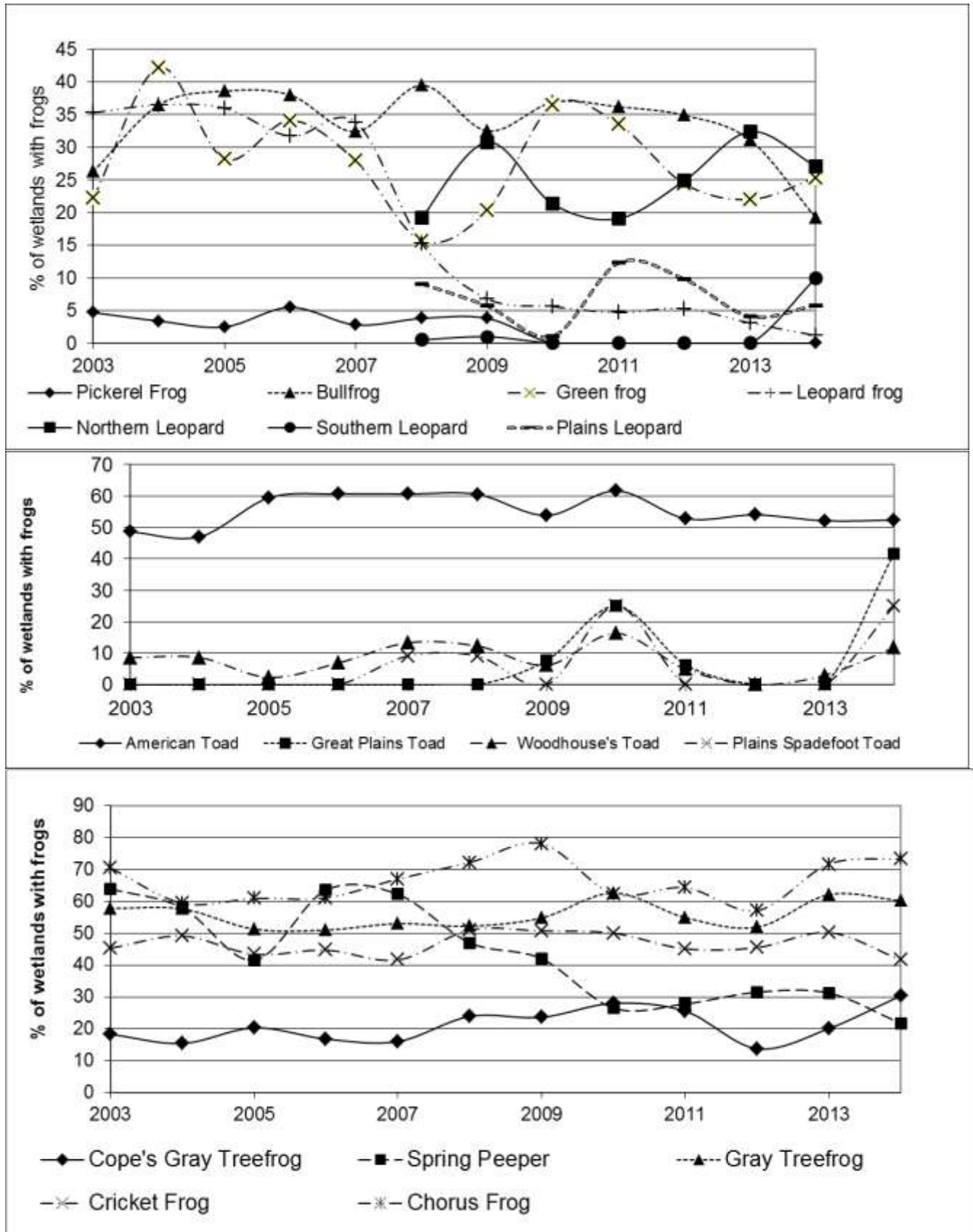


Figure 2. Three year trend in surveyed wetland occupancy with data collected in Iowa's NAAMP survey

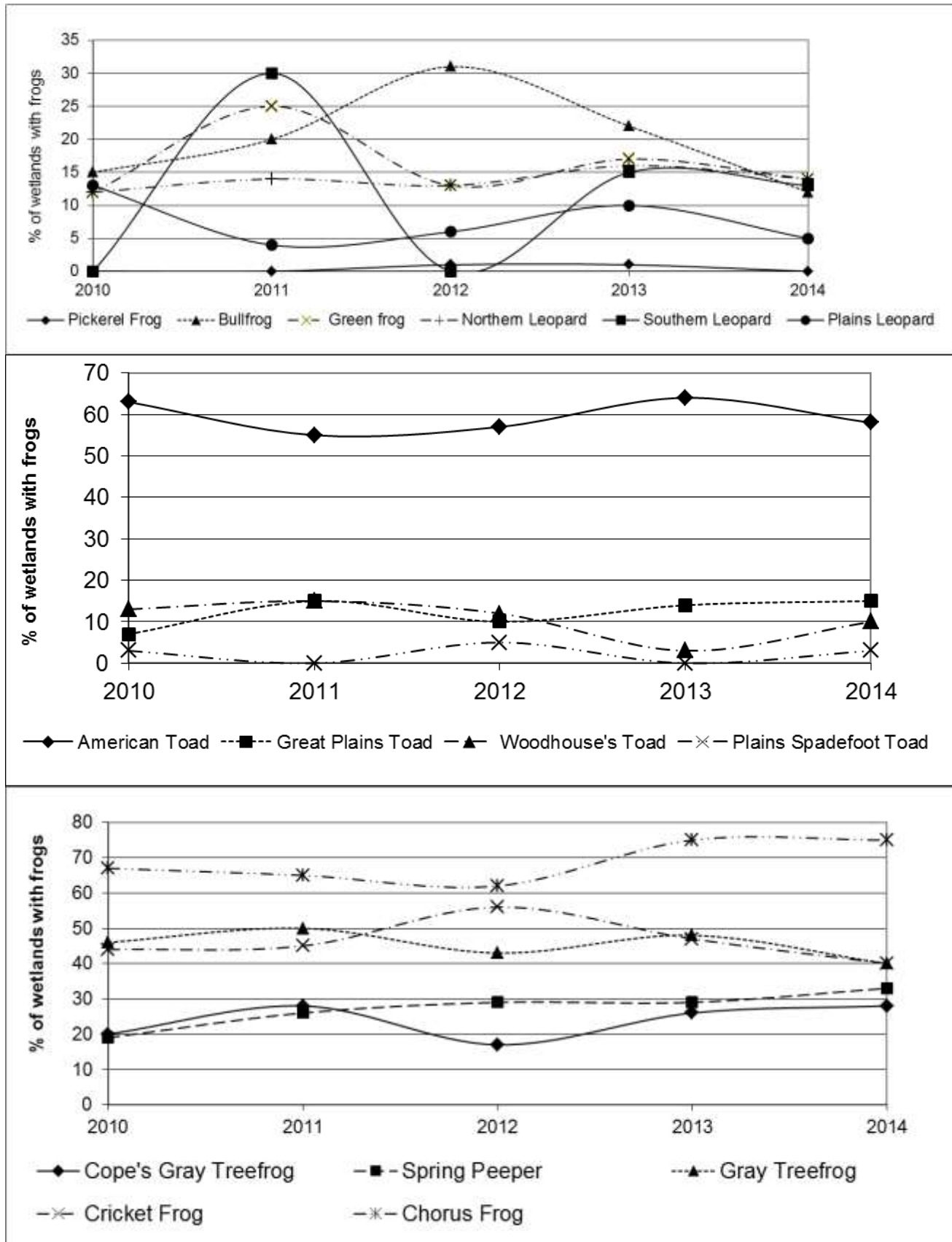


Figure 3. Map of Sites Surveyed

