



## Iowa's Frog and Toad Call Survey

2012



### **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 even until 1991. Iowa was one of the earliest states to adopt this survey, which was developed in Wisconsin in response to alarm in the conservation community regarding amphibian declines. These alarm bells have only grown louder over the past 21 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 4 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 model and NAAMP is that NAAMP is run on previously 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, 2012 data are presented separately for each survey type.

### **Traditional Survey Results**

Data was reported for 61% (34) of the active routes in the traditional survey. This translated into 189 sites visited a total of 518 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 down to 20% compared to approximately 43% the last two years.

The Boreal Chorus Frog was the most detected species on the surveys followed by American Toad and Eastern Gray Treefrog. All three of these species also had a high average abundance index. The number of species not detected on the survey was up from six in 2011 to eight in 2012: Fowler's toad, Plains Spadefoot, Pickerel Frog, Wood Frog, Crawfish frog, Southern Leopard frog, Great Plains and Woodhouse's toad (Table 2). The first six species on this list are frequently not reported because of several factors such as limited distribution, rarity and episodic breeding. The increase in the number of undetected species is likely a function of a declining number of traditional routes being surveyed rather than a true representation of species' occurrence.

There are 10 species that are detected at high enough rates that trends can be reliably identified. From 2011 to 2012, five species had declining trends (Bull frog, Green frog, Plains Leopard frog, Chorus frog, Cope's gray treefrog) while five stayed the same or increased (American toad, Northern Leopard frog, Eastern gray treefrog, Spring peeper, Cricket frog). Trends from 2010 to 2011, in contrast, were negative for all but two species. Examining data for the last 10 years shows only the Spring Peeper with a marked negative trend across that time period (Figure 1). This is a little unexpected as Spring Peepers have been expanding their range in the state to the west. The number of surveyed sites classified as Timbered Riverine; the Spring Peeper's preferred habitat; have remained fairly constant over the ten year period. This is a species to watch.

### **NAAMP Survey Results**

Fifty out of a total of 85 available Iowa routes were assigned to a volunteer. Data was reported for 72% of the routes assigned (36 routes), though fewer (29 routes) were surveyed all three times during the breeding season. This level of participation is a notable increase from 2011 when only 55% of assigned routes were surveyed.

Fifteen out of Iowa's 18 species listed in NAAMP were heard by volunteers. It is worth noting that there are a few differences between the way NAAMP and the traditional survey track each species. The NAAMP survey combines Fowler's and Woodhouse's toad into one category, because these two species are hard to distinguish. There is a category added for unknown tree frogs, as Cope's and Eastern Grey Tree Frogs are difficult to tell apart. Pickerel frog, Plains Spadefoot, Great Plains Toad, and Woodhouse's/Fowler's toad were all species picked up on the NAAMP surveys that were not heard on the traditional survey, likely because the NAAMP routes being surveyed cover a larger geographic area.

Two of the three most commonly heard species across all sites and runs was the same for both traditional and NAAMP surveys: Boreal Chorus Frog and American Toad. However, the cricket frog was recorded at the second highest percentage of sites on the NAAMP survey and Eastern gray treefrog is fourth. The cricket frog also has the highest or second highest average abundance index on both surveys indicating it is doing well in Iowa despite evidence of a decline in the northern parts of its range. No species occurred on all 36 routes surveyed though American Toad was heard on 34 routes and cricket frogs were heard on 32 routes (Table 2 and 2a).

The NAAMP data showed a similar split to the traditional data with the number of species showing a decrease being about the same as those increasing or stable. However the species that exhibited the trends were, in some cases, different. Species that were detected at fewer sites in 2012 versus 2011 were (bolded species are those with an opposite trend from the traditional survey): Chorus Frog, **Eastern gray treefrog**, Cope's gray treefrog, Green frog, Great plains toad; and species that were seen more frequently or were stable: American toad, Cricket frog, Northern Leopard frog, **Bull frog**, Spring Peeper, **Plains Leopard frog** (Table 2a, Figure 2).

### **2012 Weather Implications**

One major factor in 2012 was the atypical weather patterns. Following a mild winter, we had a very early, warm spring and very low levels of precipitation through the summer months. These trends were exhibited by the environmental data collected by surveyors. For both surveys, average temperatures recorded during the first and second survey windows in 2012 were 3-4 degrees higher than those recorded in 2011. Temperatures for run three were roughly similar between the two years. In addition, the percent of routes run within 24 hours of a rain event for the traditional survey decreased from 43% to 20% in 2012 and the average number of days since rain in the NAAMP survey doubled from 2.3 in 2011 to 4.5 in 2012.

Overall species' trends between 2011 and 2012 showed very little indication of the different weather patterns. However, figure 3 is a series of bar graphs showing the distribution of detections of selected species between the 3 survey windows. Viewing the data this way demonstrates how the early spring and lack of rainfall may have changed species' breeding behavior. In most cases species breeding activity was shifted earlier in 2012 than in 2011. By the third survey window the number of individuals actively breeding is noticeably lower in 2012 versus 2011. Finally, any negative impact this year's weather may have had on successful reproduction may not be apparent until 2013.

### ***In the Coming Year***

We will be holding three nighttime training workshops this spring in Jefferson, Osceola and Cerro Gordo Counties. These workshops will hopefully recruit additional volunteers to assist with the survey. Our focus will continue to be the adoption of NAAMP routes until we have at least 90% of the 85 possible routes assigned.

### ***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!

## Participation Data

**Table 1 Traditional Survey: 2012**

Num. of Active Routes	56
Num. of Routes Run in 2012	34 (61%)
Num. of Active Sites	323
Num. of Sites Run in 2012	189 (59%)
Total Num. of Visits Made in 2012	518
Total Num. of Counties Surveyed	24
Num. of Empty Sites (no frogs heard all 3 runs)	6

**Table 1a. NAAMP Survey 2012 Participation Data, n = 85 total routes available in Iowa**

Num. of Routes Assigned	50 (58% of 85)
Num. of Routes Run	36 (72% of 50)
Num. of Sites Run	360 (72% of 500)
Total Num. of Surveys conducted	111 (74% of 150)
Number of routes where all 3 runs conducted	29 (58% of 50)

## Species Data

**Table 2 Traditional Survey: 2012 Frog and Toad Survey species data**

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

Species	Sites on which species detected	% of Total Possible Sites	Number of records per run			Total Num. Visits	Average call index 1=Single to 3=Full Chorus?
			1	2	3		
Chorus Frog	108	57.1%	102	33	4	139	2.06
American Toad	102	54.0%	65	44	16	125	1.90
Eastern Gray Treefrog	98	51.9%	35	77	29	141	1.89
Cricket Frog	86	45.5%	11	80	48	139	2.24
Bull Frog	66	34.9%	0	23	58	81	1.35
Spring Peeper	46	31.5%	40	10	0	50	2.04
Northern Leopard Frog	47	24.9%	40	13	4	57	1.30
Green Frog	33	24.4%	1	22	29	52	1.38
Cope's Gray Treefrog	26	13.76	6	18	5	29	1.45
Plains Leopard	6	9.8%	6	0	0	6	2.00
Leopard Frog	10	5.3%	8	4	0	12	1.33
Woodhouse's Toad	0	0.0%	0	0	0	0	NA
Great Plains Toad	0	0.0%	0	0	0	0	NA
Plains Spadefoot	0	0.0%	0	0	0	0	NA
Pickeral Frog	0	0.0%	0	0	0	0	NA
So. Leopard 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 2012**

Species	# of routes (n = 36)	# of Sites (%*)		Change in % sites from 2011- 2012	Total Num Visits	Average call index 1=Single to 3=Full Chorus	
		2010	2011				
American Toad	34	182(63)	132(55)	205(57)	+3	274	1.6
Cricket Frog	32	127(44)	108(45)	201(56)	+11	347	2.3
Chorus Frog	31	193(67)	155(65)	187(52)	-13	243	1.9
Eastern Gray Treefrog	26	134(46)	120(50)	153(43)	-7	241	1.7
Bull Frog	31	42(15)	49(20)	111(31)	+11	152	1.25
Spring Peeper	19	34(19)	39(26)	72(29)	+3	87	1.6
Cope's Gray Tree frog	16	59(20)	66(28)	61(17)	-11	94	1.7
Green Frog	12	21(12)	32(25)	32 (13)	-12	39	1.2
Northern Leopard Frog	21	34(12)	33(14)	47(13)	-1	52	1.3
Woodhouse/Fowlers	3	5(13)	6(15)	7(12)	-3	8	2.1
Great Plains Toad	2	2(7)	3(15)	4(10)	-5	5	2.4
Plains Leopard	8	18(13)	5(4)	11(6)	+2	13	1.4
Unknown Tree frog	8	21(7)	11(5)	22(6)	+1	23	1.3
Plains Spadefoot	1	1(3)	0(0)	2(5)	+5	2	1.5
Pickeral Frog	1	0(0)	0(0)	1(1)	+1	1	1
So. Leopard Frog	0	0(0)	3(30)	0(0)	-30	0	0
Wood Frog	0	0(0)	0(0)	0(0)	0	0	0
Crawfish Frog	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 2012 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 = 80; Green Frog = 240; Woodhouse's/Fowler's = 60; Plains Leopard = 190; Spring Peeper = 250; Plains Spadefoot = 40.

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

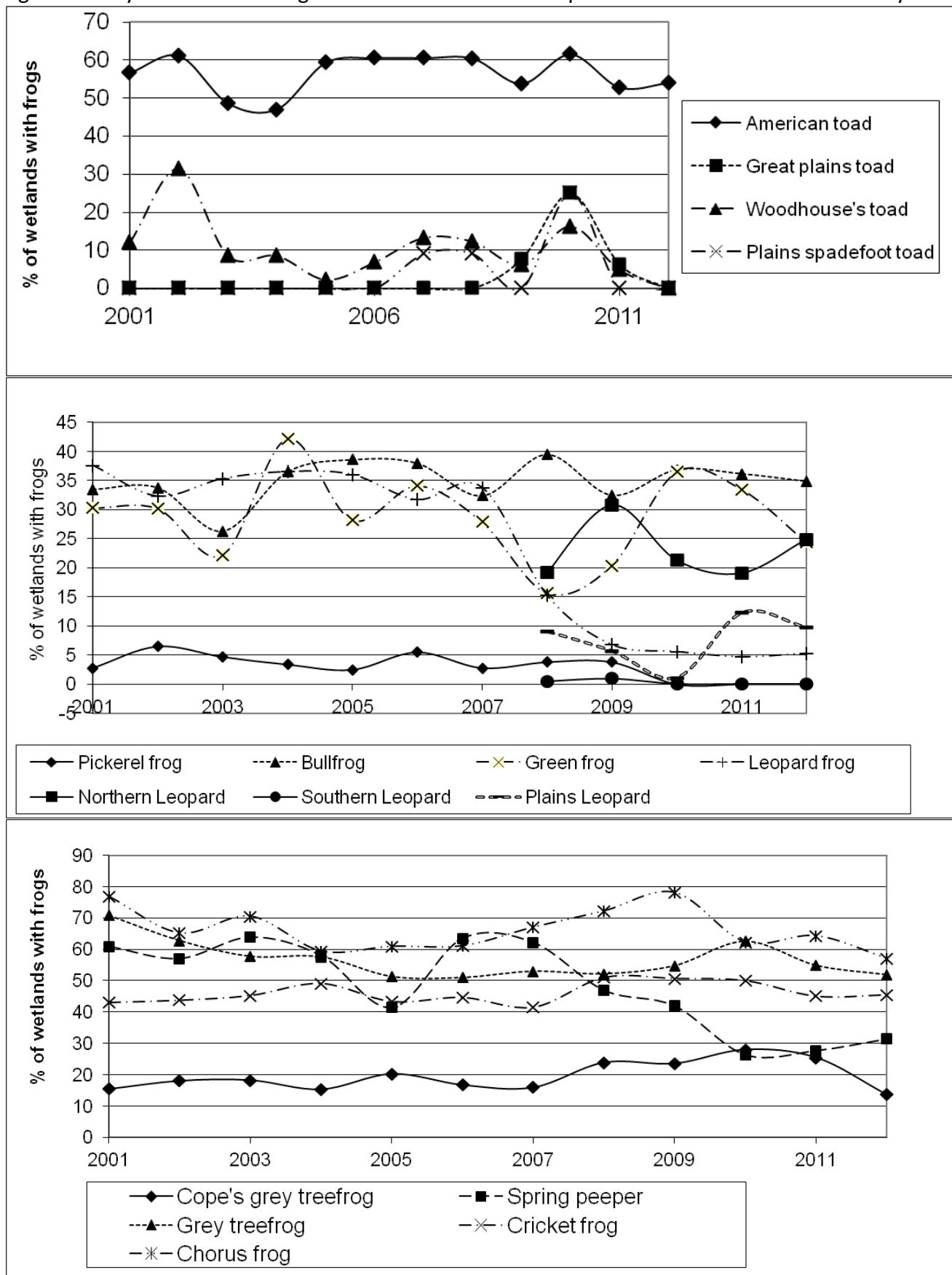


Figure 2. Three year trend in surveyed wetland occupancy with data collected in Iowa's NAAMP survey

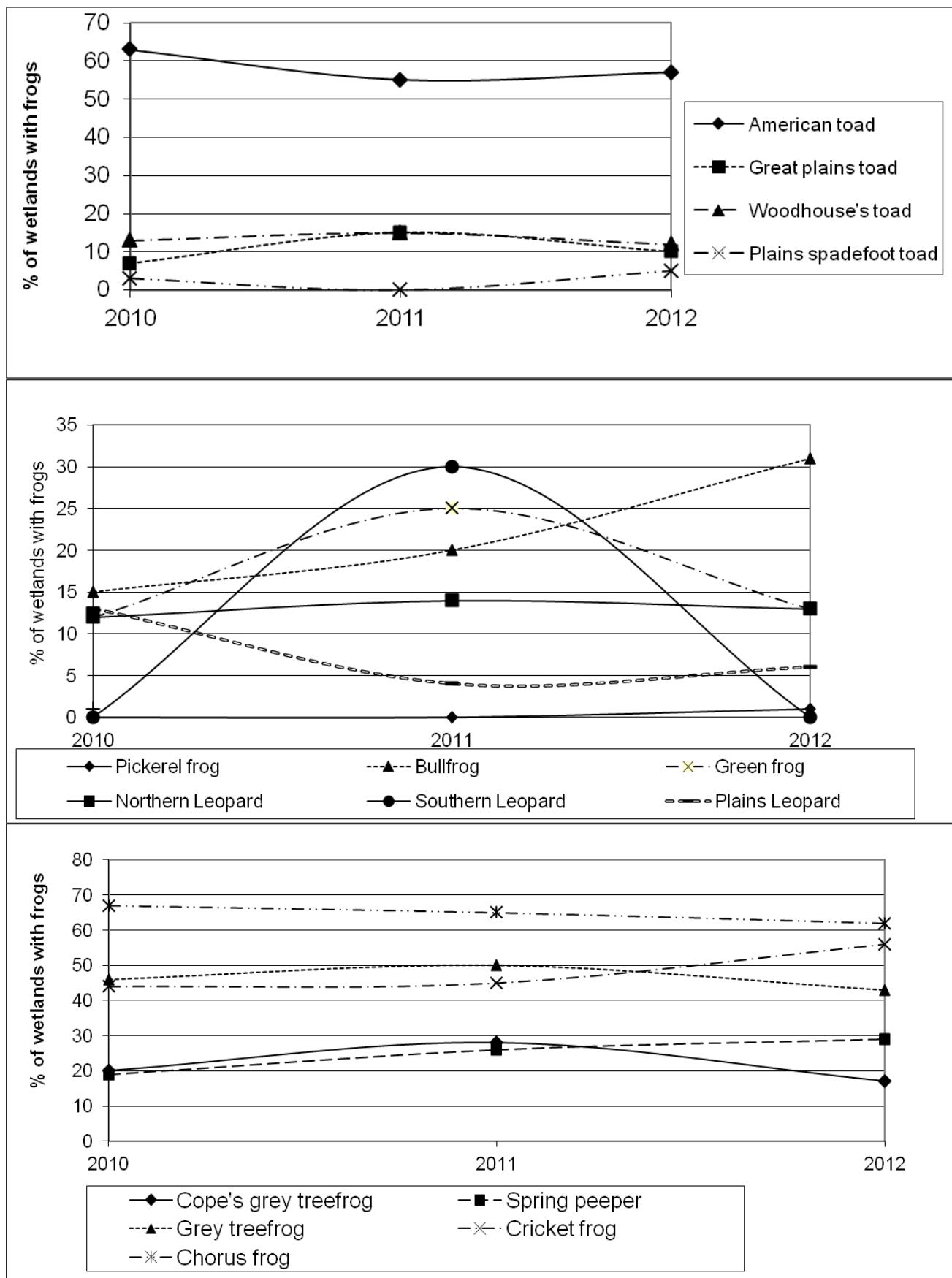
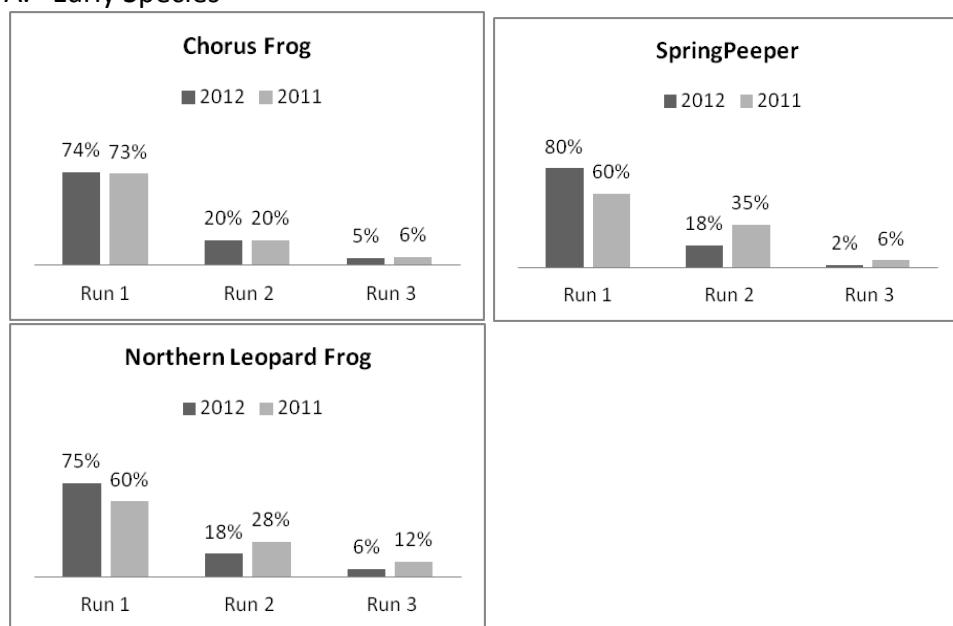
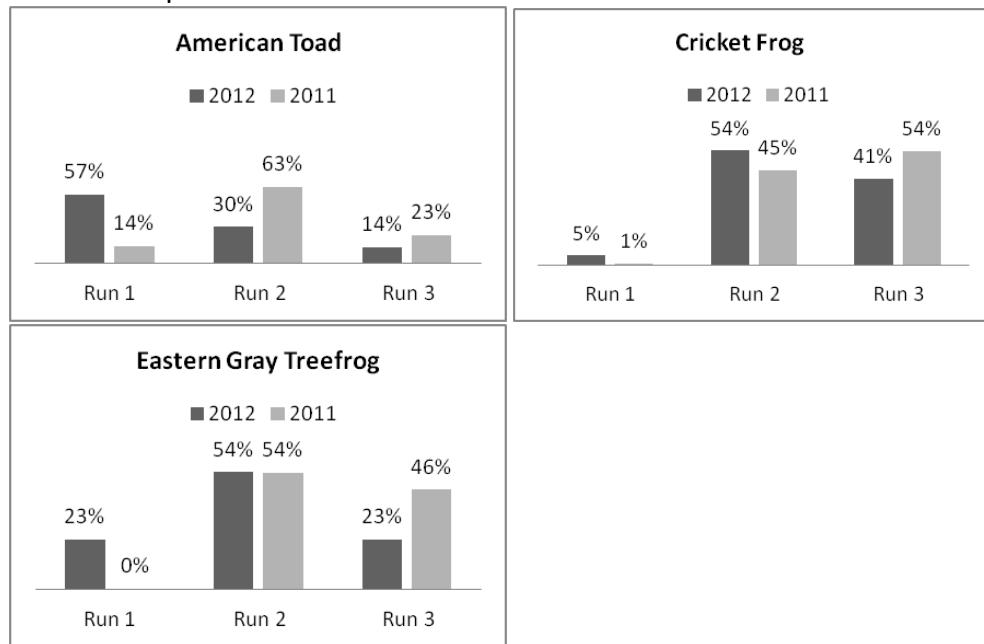


Figure 3. Combined dataset depicting species' phenology in 2012 vs. 2011 based on the percentage of site visits on which the species was recorded. The percentage is the number of visits per window/total number of visits.

#### A. Early Species



#### B. Middle Species



#### C. Late Species

