

# Frog and Toad Call Survey Results for Iowa, 2020

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**ABSTRACT** Since 1991, volunteers across the state of Iowa have collected data on the frogs and toads in Iowa wetlands. In 2020, call data was collected on 516 sites and 15 different frog and toad species identified. The four most common species recorded on the survey were Chorus frog (*Pseudacris maculata*), American toad (*Anaxyrus americanus*), Cricket Frog (*Acris blanchardi*) and Eastern Gray Treefrog (*Hyla versicolor*). Trends indicate that overall species are stable in the number of wetlands where they are found.

## INTRODUCTION

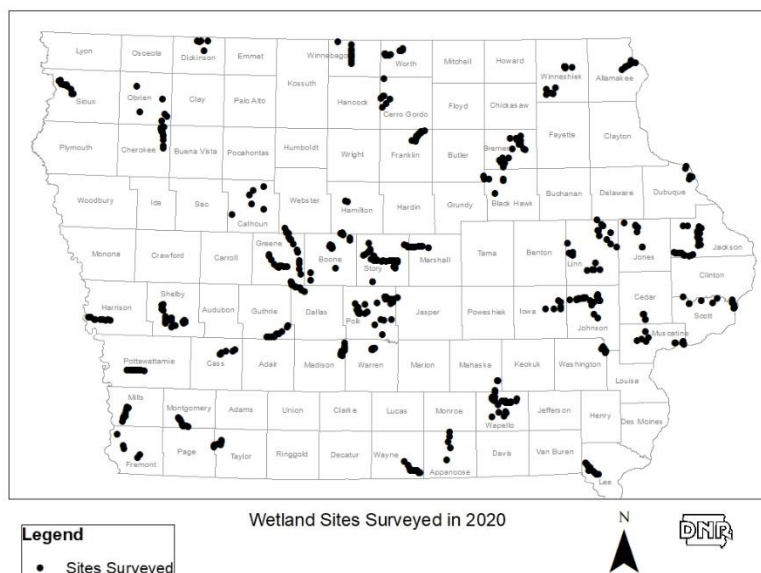
The first volunteer based frog and toad call survey in Iowa took place in 1984 but it did not become a permanent yearly event until 1991. Iowa was one of the earliest states to adopt this survey, which was developed in Wisconsin in response to the alarm regarding amphibian declines. These alarm bells have only grown louder over the past 30 years of the survey and this long-term dataset is more important than ever.

The survey has evolved over the years. Training workshops started to be offered in the early 2000s and became a requirement by 2008. Up until 2007, monitors listened for 10 minutes per site, per survey but that was shortened to 5 minutes. Analysis has indicated that this change did not have a significant effect on the data but made the survey easier to perform for the volunteers. The three leopard frog species in Iowa were not identified by species in the survey until 2009. Finally, in 2010, Iowa started participating in the USGS' North American Amphibian Monitoring Program (NAAMP) which added 84 randomly placed routes needing survey. In 2015, USGS discontinued NAAMP but Iowa has absorbed these routes into our traditional survey and database.

## STUDY AREA

The frog and toad call survey is conducted on established routes statewide. An effort is made to have the surveyed routes evenly spread across the state, though western and southern Iowa could still use some additional surveys (Figure 1). The sites represent a mix of wetland types from roadside ditches to relatively pristine marshes to large areas of open water and riverine systems.

Figure 1. Wetland sites surveyed in 2020.



In 2020, a total of 89 routes were assigned. Seventy-one of those routes comprising 516 wetland sites were surveyed. This number is down from the high of 2019, but still represents excellent participation!

## METHODS

The frog and toad call survey is conducted by volunteers at night on a route made up of 5-10 sites that are repeatedly surveyed each year. Routes contain a collection of “wetland” sites and there are two different types of routes. Traditional survey routes are not random, having sites which were chosen by the volunteer surveyor, and follow no set driving route. They contain anywhere between 5-10 sites with the sites being at least 0.5 mile apart, though there are a few exceptions to the 0.5 mile apart rule. The second type of route are the randomly placed NAAMP routes added in 2010. The NAAMP routes have a set 15 miles route to drive, along which are 10 survey stops all that are at least 0.5 miles apart.

To conduct the survey, volunteers are assigned to a route which they are annually responsible for until they retire from the survey. They are instructed to collect data on their route three times each year during month-long survey windows, each with a minimum temperature requirement:

<b>3 Run Windows</b>	<b>Minimum Temperature</b>	<b>Dates</b>
Run 1	5.6° C (42° F)	Apr.1 -May 1
Run 2	10° C (50° F)	May 7 - June 7
Run 3	12.8° C (55° F)	June 13 - July 13

The structure of the survey, with three survey windows, is designed to capture data on all of the possible species using a wetland regardless of their timeline for breeding. To maximize the ability to detect all frogs the survey is run at night, starting at least 30 minutes post-sunset when the wind is calm and preferably after a rain or even during a light rain event. Air temperature, sky condition, and wind are collected at the start and end of the survey. Days since rain is also recorded. At each wetland stop, the surveyor records the time, whether the site is wet or dry, whether the moon is visible, how many cars pass and if there are any noise interferences.

At each stop the volunteers stand and listen quietly for 5 minutes. They record all the species of frog and toad they hear calling during that time and estimate abundance using the following index:

<b>Relative Call Index Codes</b>	
0-	No individuals heard.
1-	Individuals can be counted. There may be space between calls.
2-	Calls of individuals can be distinguished, but there is some overlapping.
3-	Full chorus of calls. Constant, continuous, and overlapping.

Since 2008, volunteers have been required to go through a training workshop if they don’t have previous experience with the survey or with identifying frogs and toads by sound.

The data is recorded in an online database by the end of August each year. The data are then summarized to produce annual trends in species abundance by examining the percentage of surveyed wetlands where each species is detected and the average call index. The data also gives useful information about species distribution and their breeding chronology.

## RESULTS

Environmental variables taken during the survey (air temperature, wind speed, sky conditions and days since rain) all indicate that surveys were done within recommended parameters. Surveys were done on average within 2.07 days of rain.

Average temperatures during runs one, two and three were pretty consistent with previous years and were well above the minimum temperature requirement.

Chorus frogs, American toads, cricket frogs and eastern gray treefrogs were the four most common species recorded on the survey. All of these species have a statewide distribution and can occur in many different types of wetland. The order of which is the most common does vary from year to year but Chorus frog and American toad are always the top two (Table 1). There were three species not detected on the survey in 2020; Fowler’s Toad, the state endangered Crawfish frog, and the Wood Frog, which is possible in the state but has never been detected.

The most abundant species when found, based on the average call index, was the Plains Spadefoot which had an average call index of 2.5 (Table 1). Plains Spadefoots tend to engage in short bursts of intense mating directly after rain and they are also only found in specific wetlands. The cricket frog and unknown gray treefrog species also had an average call abundance index over 2.

For those species for which we have enough data, examining trends from 2015-2020 for each species suggests that there were no strong overall downward or upward trends (Figure 2 a-c), however there are some patterns. The species in the true frog group (Xylobates sp.) show an average positive trend in year to year fluctuations while the tree frog species (ex. chorus and cricket frogs and the gray treefrogs) are on average negative (Table 2).

Table 1. 2020 Summary of data collected by volunteer monitors on Iowa’s Frog and Toad Call Survey

Species	Total Sites Detected	Total Possible sites	%Sites Detected	Sites Run 1	Sites Run 2	Sites Run 3	Total Visits Detected	Average Call Index
Chorus Frog	353	516	68.4%	295	174	33	502	2
American Toad	294	516	57.0%	151	210	54	415	1.98
Cricket Frog	244	516	47.3%	3	153	207	363	2.19
Eastern Gray Treefrog	188	516	36.4%	26	144	119	289	1.92
Bullfrog	161	516	31.2%	0	47	15	62	1.36
Cope's Gray Treefrog	144	516	27.9%	17	108	77	202	1.63
Northern Leopard Frog	131	516	25.4%	103	39	14	156	1.5
Spring Peeper	82	348	23.6%	69	36	1	106	1.99
Green Frog	71	317	22.4%	0	28	66	94	1.52
Unknown Gray Treefrog	69	516	13.4%	5	50	38	93	2.02
Woodhouse's Toad	13	115	11.3%	1	10	3	14	1.79
So. Leopard Frog	2	20	10.0%	2	0	0	2	2
Plains Leopard	20	223	9.0%	14	8	1	23	1.52
Great Plains Toad	4	45	8.9%	2	2	0	4	0
Plains Spadefoot	4	45	8.9%	0	4	0	4	2.5
Leopard Frog	30	516	5.8%	20	11	1	32	1.13
Pickeral Frog	2	107	1.9%	0	2	0	2	1.5
Crawfish Frog	0	0	0.0%	0	0	0	0	0
Fowler's Toad	0	20	0.0%	0	0	0	0	2
Wood Frog	0	0	0.0%	0	0	0	0	0

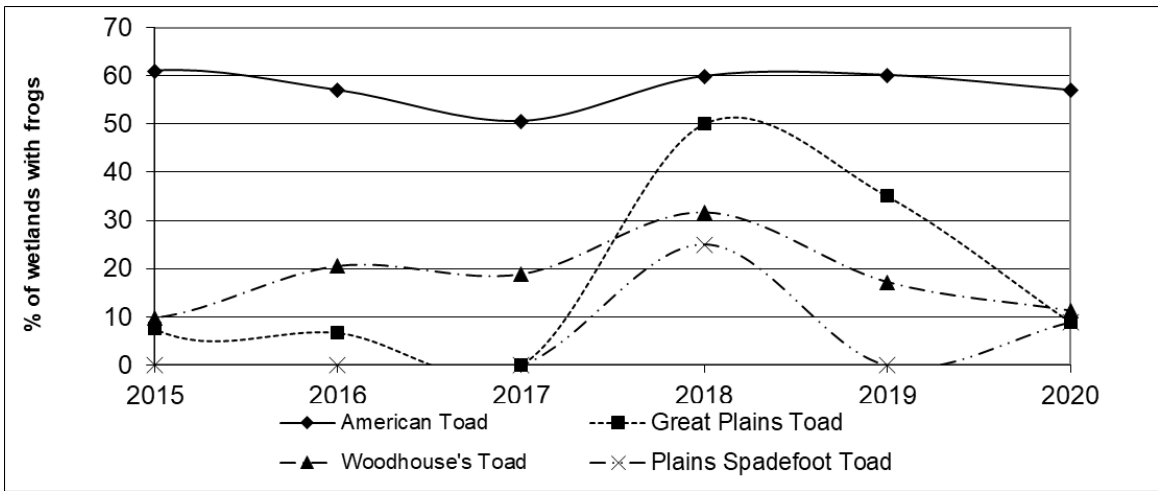


Figure 2a. Percentage of wetlands where Toad species were detected on Iowa's Frog and Toad Call Survey, 2015-2020.

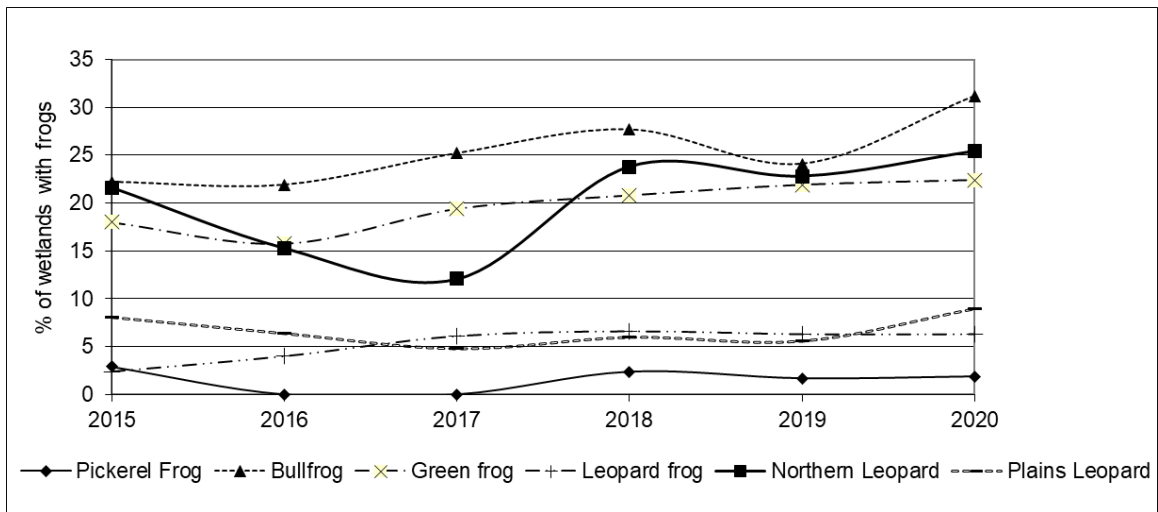


Figure 2b. Percentage of wetlands where True Frog species were detected on Iowa's Frog and Toad Call Survey, 2015-2020.

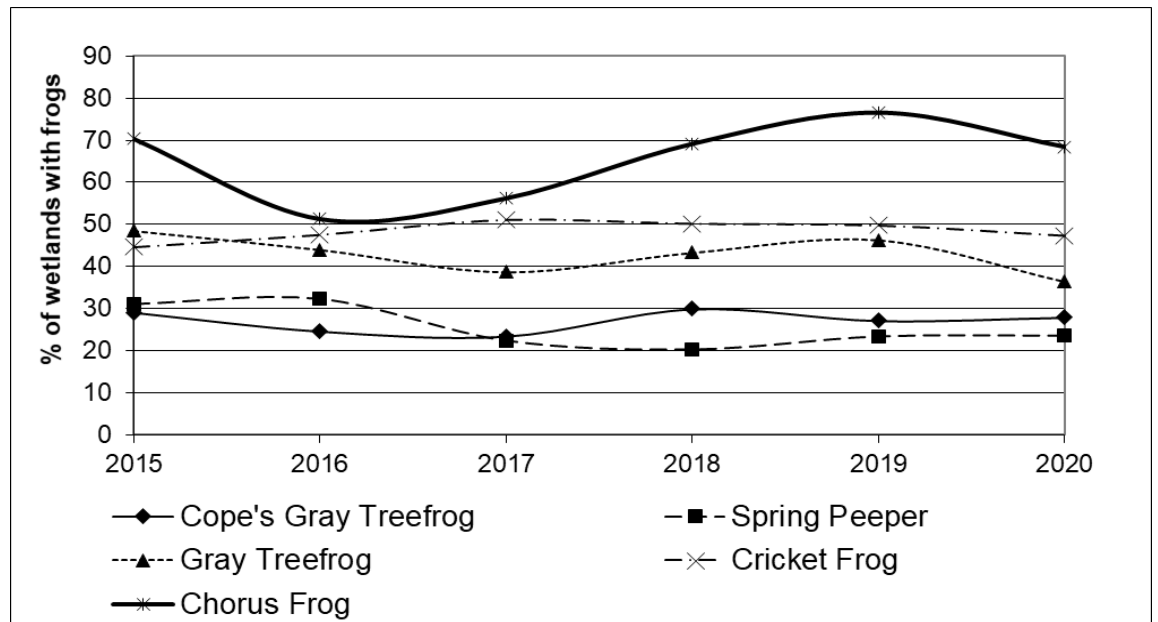


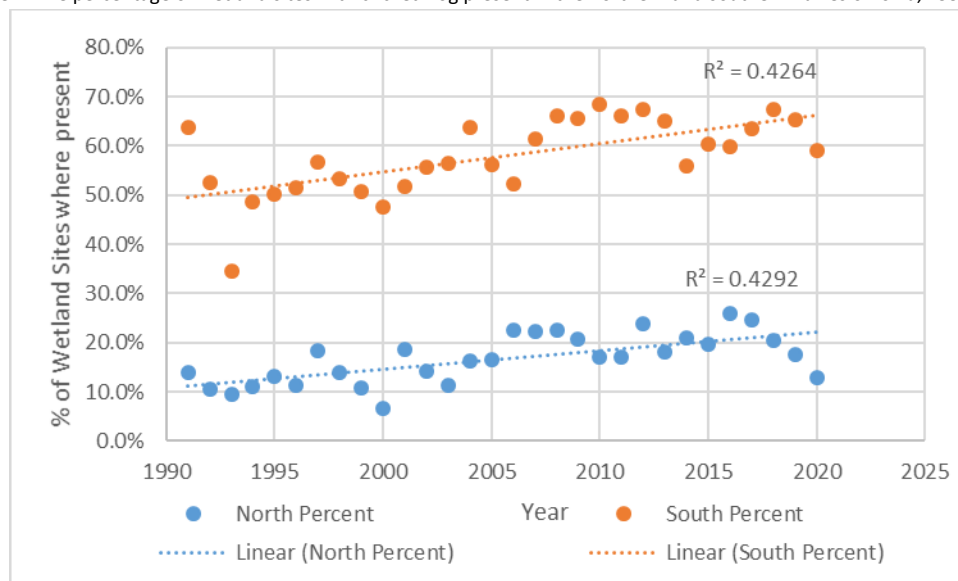
Figure 2c. Percentage of wetlands where Tree Frog species were detected on Iowa's Frog and Toad Call Survey, 2015-2020.

Table 2. Changes in the percentage of wetlands where each species is present from year to year and on average in Iowa's Frog and Toad Call Survey.

Species	% Change in Sites Present 2019-2020	% Change in Sites Present 2018-2019	% Change in Sites Present 2017-2018	% Change in Sites Present 2016-2017	% Change in Sites Present 2015-2016	Average % change
American Toad	-5.44%	0.41%	9.29%	-6.47%	-3.97%	<b>-1.24%</b>
Bullfrog	22.76%	-15.09%	2.57%	3.31%	-0.34%	<b>2.64%</b>
Chorus Frog	-11.84%	9.67%	12.92%	4.92%	-19.08%	<b>-0.68%</b>
Cope's Gray Treefrog	2.87%	-10.43%	6.56%	-1.25%	-4.48%	<b>-1.35%</b>
Cricket Frog	-5.07%	-0.85%	-0.89%	3.52%	2.90%	<b>-0.08%</b>
Eastern Gray Treefrog	-27.20%	6.46%	4.66%	-5.32%	-4.54%	<b>-5.19%</b>
Green Frog	2.23%	4.94%	6.60%	18.80%	-14.04%	<b>3.71%</b>
Northern Leopard Frog	10.24%	-4.58%	11.71%	-3.19%	-6.32%	<b>1.57%</b>
Plains Leopard	37.78%	-6.43%	1.14%	-1.61%	-1.62%	<b>5.85%</b>
Spring Peeper	0.85%	13.13%	-2.12%	-9.83%	1.18%	<b>0.64%</b>

One species of particular interest that the survey can help us evaluate is Blanchard's cricket frog, which is listed as threatened or endangered in both Wisconsin and Minnesota to Iowa's north. However, the species continues to be common in Iowa. It is one of the top four most common species detected on the survey and when found it is usually abundant (table 1). Examining the data separately for the northern counties versus the southern counties of the state does reveal that cricket frogs are much less common in northern Iowa versus central and southern. However, trends indicate despite lower numbers in the north it has remained stable and even increased across time (figure 4).

Figure 4. The percentage of wetland sites with cricket frog present in the northern and southern halves of Iowa, 1991-2020.



## DISCUSSION

In 2015, the USGS NAAMP survey was discontinued and in response the Iowa DNR chose to continue to monitor NAAMP routes but to integrate them with our long established "traditional" routes. The datasheet was modified to combine elements of both surveys and the data was ultimately combined into one database. This allows the data collected in 2015-2020 to be summarized as a whole and this report focuses on those years.

There were no significant differences in weather variables during the 2020 survey season versus previous years. Chorus frogs and eastern gray treefrogs showed decreases between 2019 and 2020 while plain's leopard frog and bull frog showed increases. Overall the treefrogs species were detected less in 2020 than in 2019, while the true frogs were detected more. It's unclear if there is a reason for these trends. April 2020 was colder and dryer than the average which may have impacted the early calling tree frog species like spring peeper and chorus frogs (U.S. Department of Agriculture and Land Stewardship).

The survey continues to provide useful information on frog and toad trends across the state. It would be useful to try and collect more data with more consistency on some of our more range restricted species. Western Iowa in particular could use more survey effort. In 2020, one volunteer picked up and surveyed 7 routes in southwest Iowa and may have discovered a new species to the state! Another future plan is to continue the long-term analysis of the data that has been undertaken. The long-term analysis is using data from 1991 through 2016 and will provide more detailed information on species colonization and extinction rates at sites and the factors that might be influencing these dynamics. We hope to have this completed this year for the Frog and Toad Survey's 30<sup>th</sup> Anniversary!

## **ACKNOWLEDGMENTS**

This survey is one of the longer running surveys on amphibians in North America and certainly in Iowa. This accomplishment would not have been possible without an army of volunteers over the years, some of whom have been involved with the survey for a staggeringly long time! A huge thank you to all of the volunteers who have braved the night time country roads to further Iowa's frog and toad conservation efforts.

## **LITERATURE CITED**

Christianson, J.L. and R. M. Bailey. 1991. The Salamanders and Frogs of Iowa. Nongame Technical Series 2, Iowa Department of Natural Resources. 24pp.