

# Frog and Toad Call Survey Results for Iowa, 2022

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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 2022, call data was collected on 781 sites and 14 different frog and toad species were identified. The four most common species recorded on the survey were Chorus frog (*Pseudacris maculata*), Cricket Frog (*Acris blanchardi*), American toad (*Anaxyrus americanus*), 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.

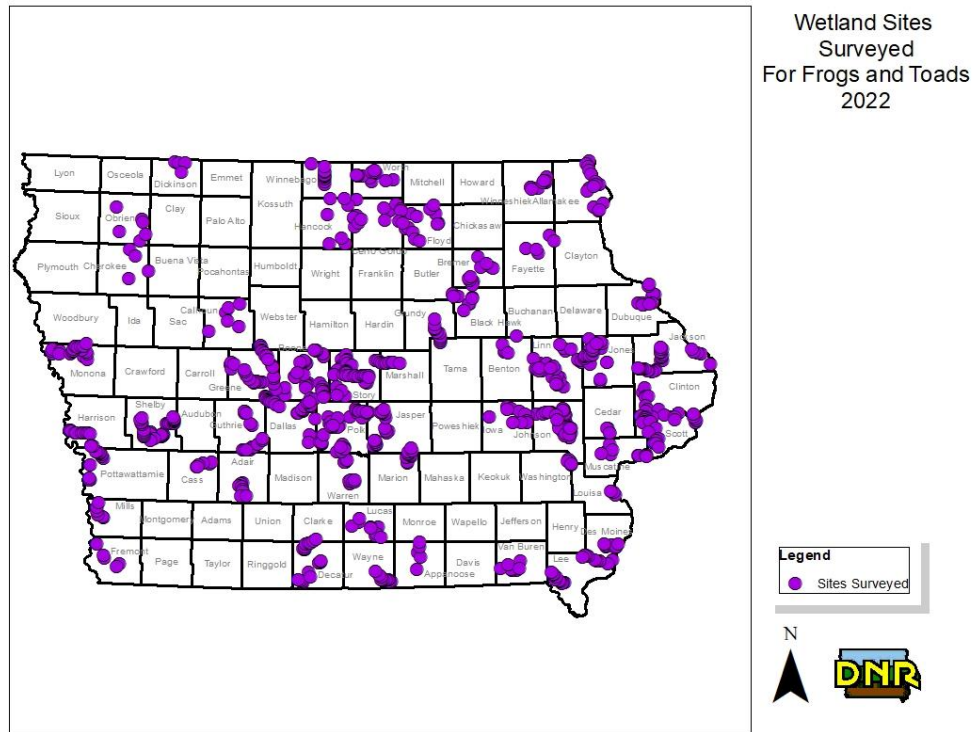
The survey has evolved over the years. Training workshops started to be offered in the early 2000s and became a requirement by 2008. Up until 2007, monitors listened for 10 minutes per site, per survey but that was shortened to 5 minutes. Analysis has indicated that while this change may have impacted the detection for a couple of species, this change made the survey easier to perform for the volunteers and did not have a significant impact on the overall data. 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 routes statewide. An effort is made to have the surveyed routes evenly spread across the state, though western and southern Iowa could still use additional survey effort (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.

In 2022, a total of 138 routes were assigned. Of those assigned, 116 routes comprising 781 wetland sites were surveyed. This represents the highest number of routes conducted in the survey's history surpassing a record high in 2021. One element that has contributed to this increased participation was an influx of new volunteers that were able to go through the online training. Online trainings were held for the first time in 2021 and they have helped open the door for more volunteers to be trained and participate in the survey.

Figure 1. Wetland sites surveyed in 2022.



## METHODS

The frog and toad call survey is conducted by volunteers at night on routes that are repeatedly surveyed each year. Routes contain a collection of 5-10 “wetland” sites and there are two different types of routes. Traditional survey routes are not random, having sites which were chosen by a volunteer surveyor, and they 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 distance rule. The second type of route are the randomly placed NAAMP routes added in 2010. The NAAMP routes have a set 15-mile 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:

Relative Call Index Codes	
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 naïve trends in species occurrence 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

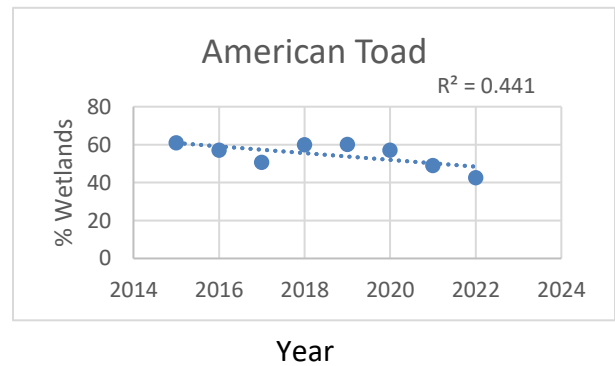
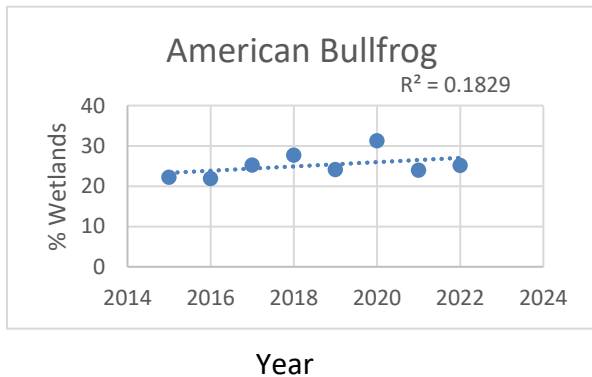
Environmental variables taken during the survey (air temperature, wind speed, sky conditions and days since rain) all indicate that surveys were done within recommended parameters. Surveys were done on average within 1.9 days of a rain event which was a considerably shorter time than the previous 6 years which averaged 2.7 days. April 2022 was particularly cold which made finding a survey night that met the minimum temperature criteria (42° F) and subsequently the 55° F average temperature recorded during this window of the survey was the coldest recorded in several years. It did not appear to have a consistent effect on early breeding species; spring peeper and the leopard frogs were heard at fewer locations than last year but chorus frogs were heard in a few more locations (Figure 2). Average temperatures during survey windows two and three were consistent with previous years. All runs 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 use many different types of wetland for breeding. One notable trend among these very common species is that American toads have been in declining trend for the last 3 years but this may be part of a natural population cycle (Figure 2). There were four species not detected on the survey in 2022; Fowler's toad, Pickerel frog, 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 cricket frog which had an average call index of 2.37 (Table 1).

For those species for which we have enough data, the species with the strongest trends over the last 6 years are the cricket frog (+), green frog (+), eastern gray treefrog (-) and American toad (-) (Figure 2). Most other species show a weak or flat trend. Chorus frog, spring peepers, and Northern leopard frogs show variation from year to year but the overall trend is flat. Bull frogs, Plains leopard frogs and Cope's gray treefrog all show a slight positive trend (Figure 2).

Table 1. 2022 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	531	781	68.0%	472	207	48	727	2.11
Cricket Frog	419	781	53.6%	3	289	358	650	2.37
American Toad	333	781	42.6%	87	221	109	417	1.8
Eastern Gray Treefrog	287	781	36.7%	21	209	192	422	2.07
Cope's Gray Treefrog	234	781	30.0%	8	148	130	286	1.7
Bullfrog	196	781	25.1%	0	41	182	223	1.23
Green Frog	131	540	24.3%	0	51	110	161	1.2
Spring Peeper	140	597	23.5%	128	25	2	155	2.13
So. Leopard Frog	10	51	19.6%	9	5	0	14	1.64
Northern Leopard Frog	135	781	17.3%	99	42	3	144	1.44
Unknown Gray Treefrog	101	781	12.9%	0	37	82	119	2.02
Plains Leopard	25	333	7.5%	12	14	1	27	1.59
Woodhouse's Toad	12	178	6.7%	0	8	4	12	1.25
Leopard Frog	32	781	4.1%	21	16	4	41	1.27
Plains Spadefoot	2	55	3.6%	0	0	2	2	1
Great Plains Toad	2	55	3.6%	0	0	2	2	1
Fowler's Toad	0	51	0.0%	0	0	0	0	0
Pickerel Frog	0	199	0.0%	0	0	0	0	0
Crawfish Frog	0	0	0.0%	0	0	0	0	0
Wood Frog	NA	NA	NA	NA	NA	NA	NA	NA



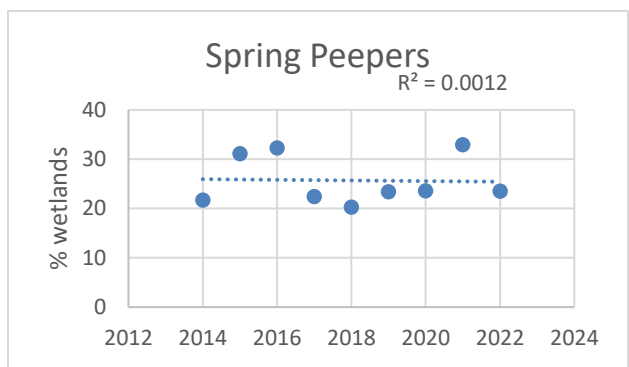
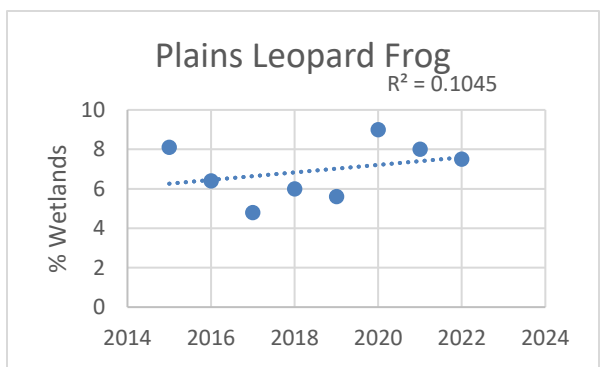
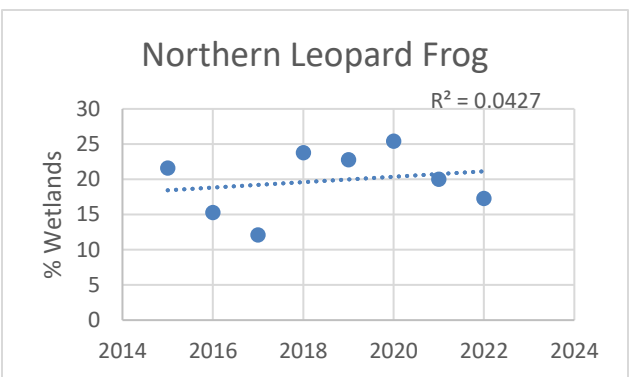
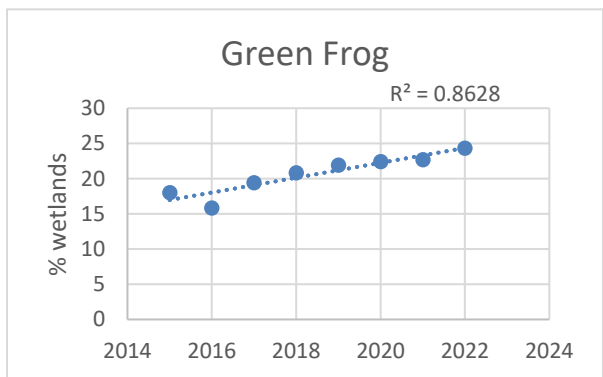
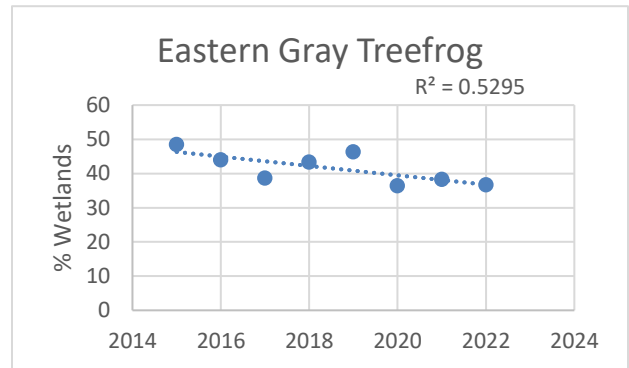
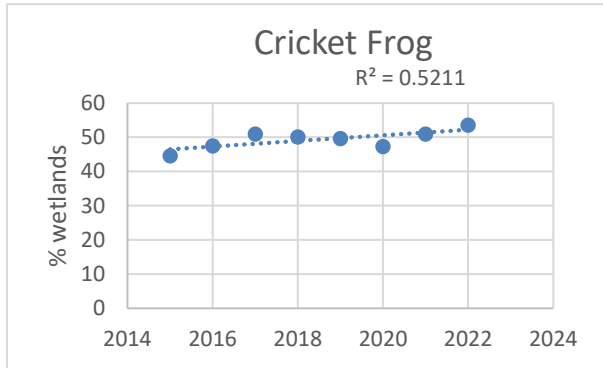
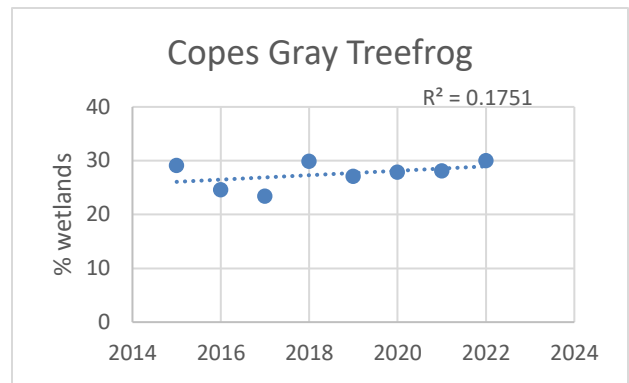
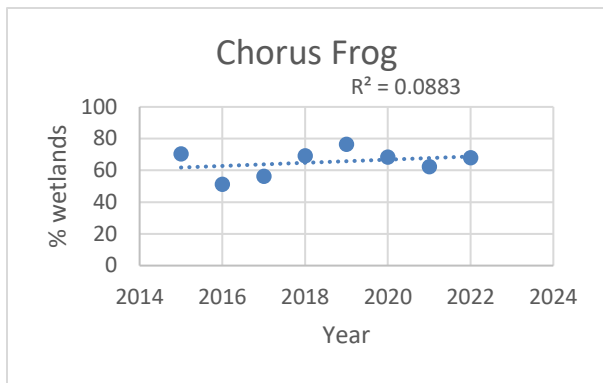


Figure 2. Charts showing the trends from 2015 to 2022 for frog and toad species detected regularly in 2022.

## **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 2015-2022 to be summarized as a whole and this report focuses on those years.

Despite a cold start, the 2022 breeding season was characterized by a return to average precipitation levels after drought conditions in 2021. The cold temperatures in April may have had a slightly suppressive effect on the early season breeders; Northern and Plains leopard frogs and spring peepers were all detected at lower rates from the previous year and chorus frogs increased only a little despite spring of 2021 being very dry. There are no other obvious responses in the data to the environmental variables.

The three species that demonstrate the strongest trends since 2015 is green frog and cricket frog which have increased and eastern gray treefrog which has decreased. This analysis doesn’t really examine the reason for these shorter-term trends but a more thorough analysis of 30 years of these survey data may clarify whether this is a more recent phenomenon and what might be driving it. On this short time frame this may just be evidence of a natural fluctuation in species populations.

The survey continues to provide useful information on frog and toad trends across the state. One future goal is to collect more data with more consistency on some of the more range restricted species. Western, northeastern and southeastern Iowa, in particular, could use more survey effort. More data collection in rural areas would also help even out the distribution of data.

Iowa DNR staff have also been working on a long-term analysis of the first 30 years of data collected by this survey. This analysis will hopefully provide insight into what variables might be influencing Iowa’s frogs and toads and will also highlight where the survey could be enhanced to collect the most useful data for amphibian management.

## **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. Forty-five volunteers have been participating for over 10 years and 14 of them have collected data for over 20! 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.