

Iowa's Frog and Toad Survey, 1995 – 2003



Provided by Wildlife Diversity Program



This survey began in response to widespread interest of declines in amphibians. More recently, a comprehensive statewide planning group discovered 44% of Iowa's herpetofauna (amphibians and reptiles) to be of special concern. In response to these concerns, the Iowa Department of Natural Resources Wildlife Diversity Program (WDP) initiated an auditory survey for calling anurans to determine geographic distributions within the state. This survey has established itself as an extensive, long term monitoring program. This 2005 report is the second edition since the first report of this survey was shared in 1998 by then program biologist Lisa Hemesath. The goals of the survey are to: (1) determine the distributions of Iowa's anuran species, (2) determine population trends for each species, and (3) promote education about aquatic life by using volunteers to conduct the survey. In addition to Iowa, volunteer-based auditory surveys for frogs and toads are currently being used in the Midwest by Wisconsin, Minnesota, Missouri, and Illinois.

Information regarding changes in anuran species distributions is emphasized. Advantages and disadvantages of using a volunteer-based survey are discussed, and suggestions are given to improve the accuracy of data collection by volunteers.

METHODS

Survey methods used in Iowa are adapted from Wisconsin's annual anuran survey. Each volunteer receives an informational packet about Iowa's frogs and toads that includes a species identification booklet (Christiansen and Bailey 1991), a tape of anuran calls, a survey route description form, data sheets, and survey instructions. Volunteers are encouraged to familiarize themselves with the calls of fifteen species of anurans and to read the species identification booklet. The volunteer surveyors receive no training beyond the informational packet.

Survey routes typically consist of visits to five wetland sites of the volunteer's choice, however there can be more. Surveyors are encouraged to choose a variety of wetlands. Each wetland site on a route is placed in one of eight categories. Locations and descriptions of survey sites are sent to the IDNR along with a route map. The 1995-2003 locations have been converted and digitized into a GIS mapping program.

Routes are surveyed three times annually. Volunteers are encouraged to run the survey when conditions are optimal for calling as well as listening. These conditions are necessary to ensure that all species are surveyed during their peak calling periods. Survey periods were established based on the known calling

phenology of Missouri and Wisconsin anuran species and adapted to fit Iowa's anuran calling phenology (Reeves 1984).

Comprehensive observation information is recorded on the data sheet. At each survey site, volunteers are encouraged to listen for ten minutes and record a relative calling index value of each species. The general condition of the wetland (wet or dry) and water temperature is also recorded at each survey site.

Similarities in calls between some species caused the IDNR to modify its survey techniques from that of Wisconsin. For example, all three species of leopard frogs in Iowa were recorded as one species. In addition, because the call of pickerel frogs (*Rana palustris*) is similar to the call of leopard frogs, visual verification of pickerel frogs was encouraged in addition to auditory observation.

RESULTS and DISCUSSION

This survey has provided the most widespread set of observation data that Iowa has for its anurans. Several general items have been looked at: distribution, wetland use, and relative species abundance during each run time.

The survey has guidelines of dates to conduct each run, as mentioned previously, based upon expected periods of calling for each species. Figure 1 shows general species composition found during the survey period 1995-2003 for each run and illustrates the general expectations of observation.

The graphs (Figure 2) illustrate how the percentage of wetland sites occupied by a given species has changed over time. These graphs are based upon observations recorded within the historic range of each species, using data from all volunteers between 1995 and 2003. The species historic range was decided by using the range maps from Iowa GAP

(<http://www.iowagap.iastate.edu/>). The range maps in GAP were determined using published literature and expert opinion from scientists and biologists that have worked with these species. Within a species range, the number of wetlands where a frog species was heard was divided by the total number of wetlands surveyed.

Many factors can affect whether or not a species is heard. Weather conditions, especially, will influence the presence or absence of a species from a given site during a given year. Wood frogs were left out of the graphs as there have only been 12 observations of these animals and they do not have a historic range within Iowa. The crawfish frog had zero observations during 1995-2003.



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Another result of this survey is the potential range extensions of several of Iowa's anurans. Between 1995 and 2003, there were 7,607 site-visits conducted as part of the survey (Table 1). During these site-visits, 404 observations of anurans occurring outside the historical range for that species were recorded from 153 different wetlands. As one example, prior to the beginning of this survey, wood frogs were not known to occur in Iowa (Hemesath 1998). Between 1991 and 1994, they were found in 2 counties along the eastern edge of Iowa (Hemesath 1998), and since 1995, wood frogs have been recorded an additional 12 times not only along Iowa's eastern edge, but also further west in the state. However, on a few of these occasions, the frogs were heard later in the season than would be expected and may represent misidentifications.

In addition to wood frogs, pickerel frogs, green frogs, gray treefrogs, Cope's gray treefrogs, spring peepers, cricket frogs, Woodhouse's toads, and great plains toads appear to be extending their ranges beyond the areas previously known (Figures 3, 4, and 5 show the general distribution of species observations for the three main groups of frogs and toads from 1995-2003). The majority of these observations most likely represent true range extensions, perhaps the animals have been there all along but the areas were not searched by the people that wrote the original species accounts, or perhaps the frogs have moved into the wetlands on their own from nearby counties.

An additional reason could be the inadvertent release of captured animals from one wetland to another: perhaps a small child brought home tadpoles from grandpa's farm several counties away and then released the adults in local ponds. These 'new' frogs could form breeding colonies that extend the range of the species.

CONCLUSIONS

The Frog and Toad call survey is entering the 15th year. This first summary report in 10 years is one manner in which the Iowa DNR can express appreciation to the volunteers' time and efforts. As 98% of Iowa is privately owned, volunteer survey efforts are critical as volunteers have access to lands that agency employees may not. We know that populations of anurans are influenced by weather conditions and the number of wetlands which have been recorded as having a species may change yearly, depending upon rainfall and temperature for that year. We also know that some of these frogs and toads appear to be more widespread throughout the state of Iowa than previously believed.

Additional detail and clarity can be sought after using several tools and methods available today that were

not in 1995. Although there is indication of species being more widespread than previously believed, we are as yet uncertain as to the abundance of a species at a given site. We have the calling index data that has been collected by the volunteers since 1991 and we are currently working on discovering a robust method to analyze this data.

FUTURE WORK

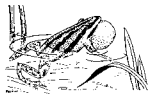
1. Trend analysis: The US Geological Survey has developed a software program that is capable of analyzing the frog and toad survey data. Program PRESENCE can estimate a probability of occurrence along with the estimate of the percentage of sites occupied. Comparing these estimates across years will allow us to learn about the stability of populations of frogs and toads in Iowa.
2. Range extensions: We hope to document the occurrence of frogs and toads with photographs at some of the 153 wetlands outside of historic ranges. This information can then be published in scientific journals, thereby publicly acknowledging new, extended species ranges within Iowa.
3. Abundance estimates based on the call index values is another aspect of analysis to be explored. However, a statistically reliable manner to accomplish this has yet to be established.
4. Iowa State University graduate student project: ISU graduate student, Anne Peterson, will be working within a 50-mile radius of Ames. Anne hopes to provide additional insight of the scientific utility of this survey data.

Acknowledgements

The Iowa Frog and Toad Call Survey has been an ongoing all volunteer project since 1991. Since its inception, there have been nearly 100 different volunteers submitting observations from all around the state. In 2004 this group of volunteers received recognition as the Group of the year and Director's choice from the DNR- Keepers Of The Land volunteer coordination program.

Given the operational restrictions within the WDP, this group of volunteers continues to provide data vital to conservation in Iowa. With our management staff time being stretched on our public lands, and our program budget being so little, it is truly critical to coordinate a survey such as this through volunteers. The WDP is humbled and gracious for the volunteers' diligent, loyal, and professional support.

Compiled and co-written by Mark McInroy, WDP technician and Karen Kinkead, wildlife diversity science consultant. Additional thanks to Bruce Ehresman, WDP biologist, for initiating and coordinating this survey; and to various other DNR staff who provided technical assistance during the compilation and mapping process.



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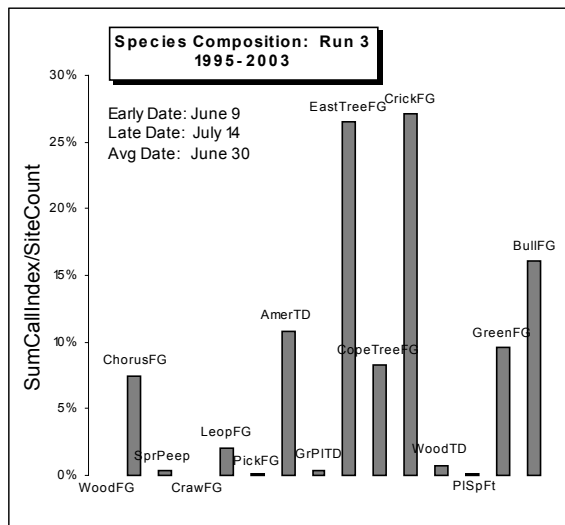
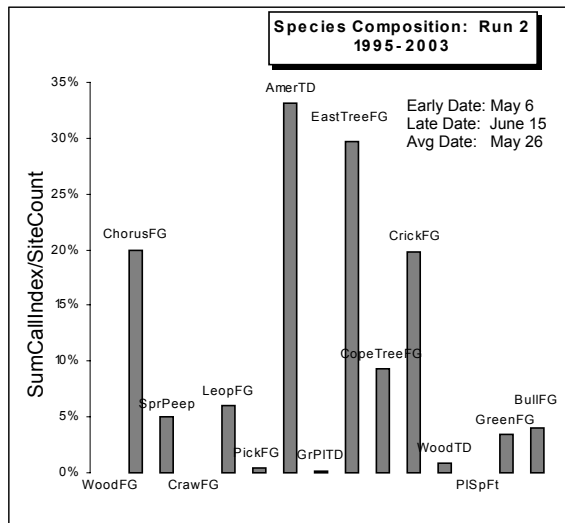
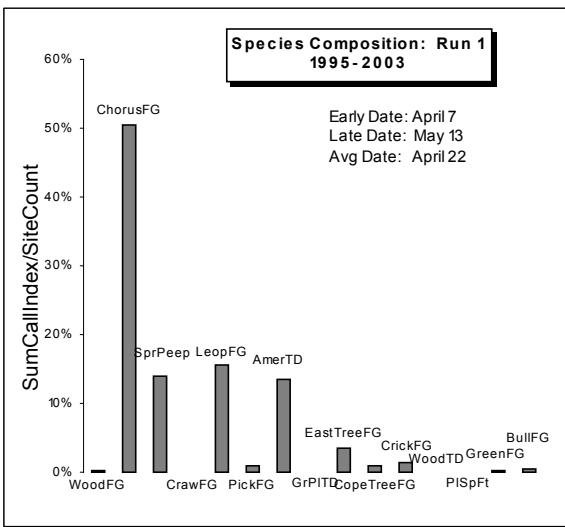


Figure 1- General species composition during each run period from 1995-2003.

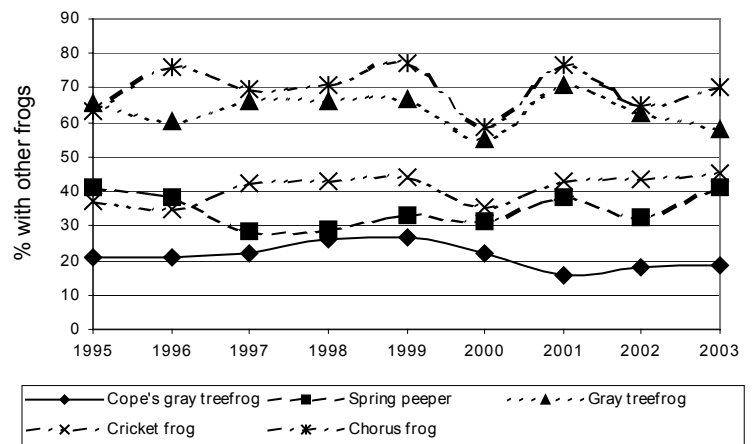
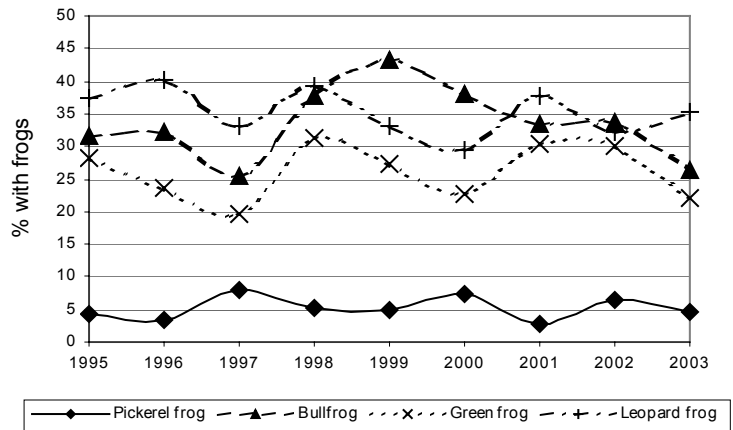
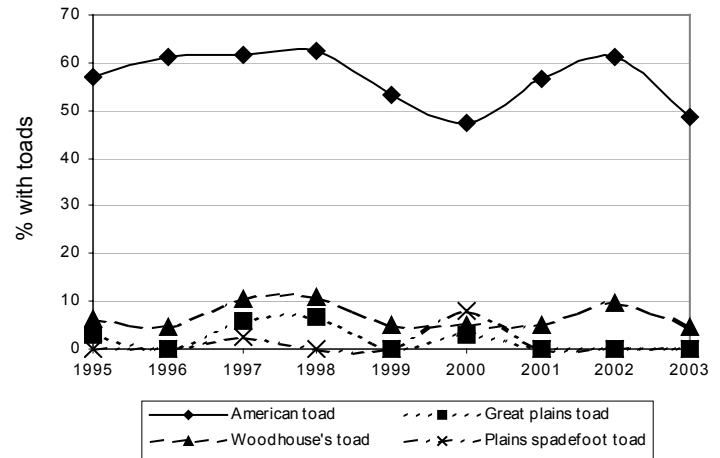


Figure 2- These graphs show the percent of wetlands where the frog or toad was found at any time during the given year. The data was restricted to the occurrences which were recorded within the historic range of the animal based upon the Iowa Gap Analysis Project (GAP).



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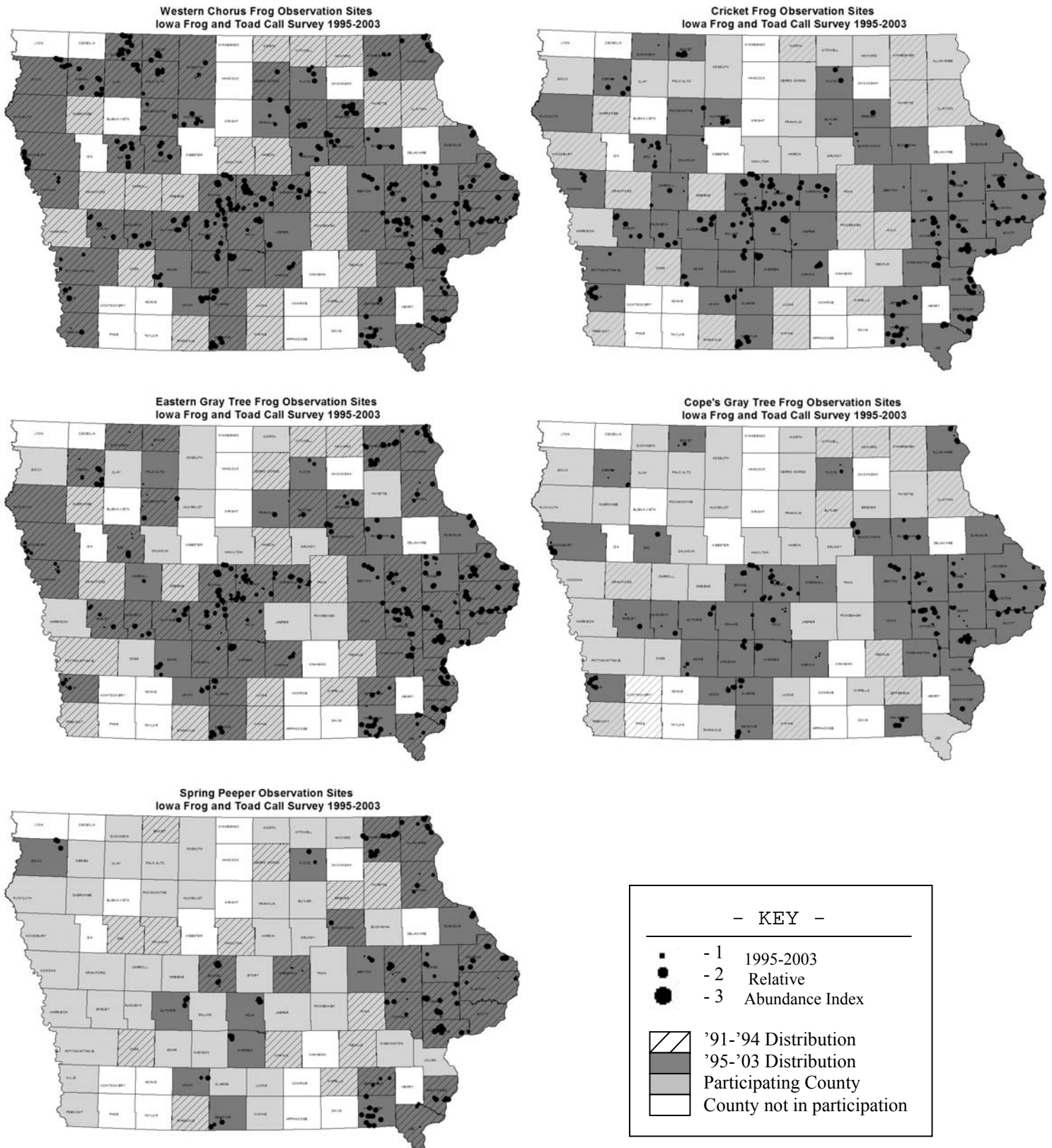


Figure 3- These five maps show the general distribution of survey data associated with tree frogs and other frogs in Iowa during 1995-2003. Observations recorded without location data are not represented on these maps.



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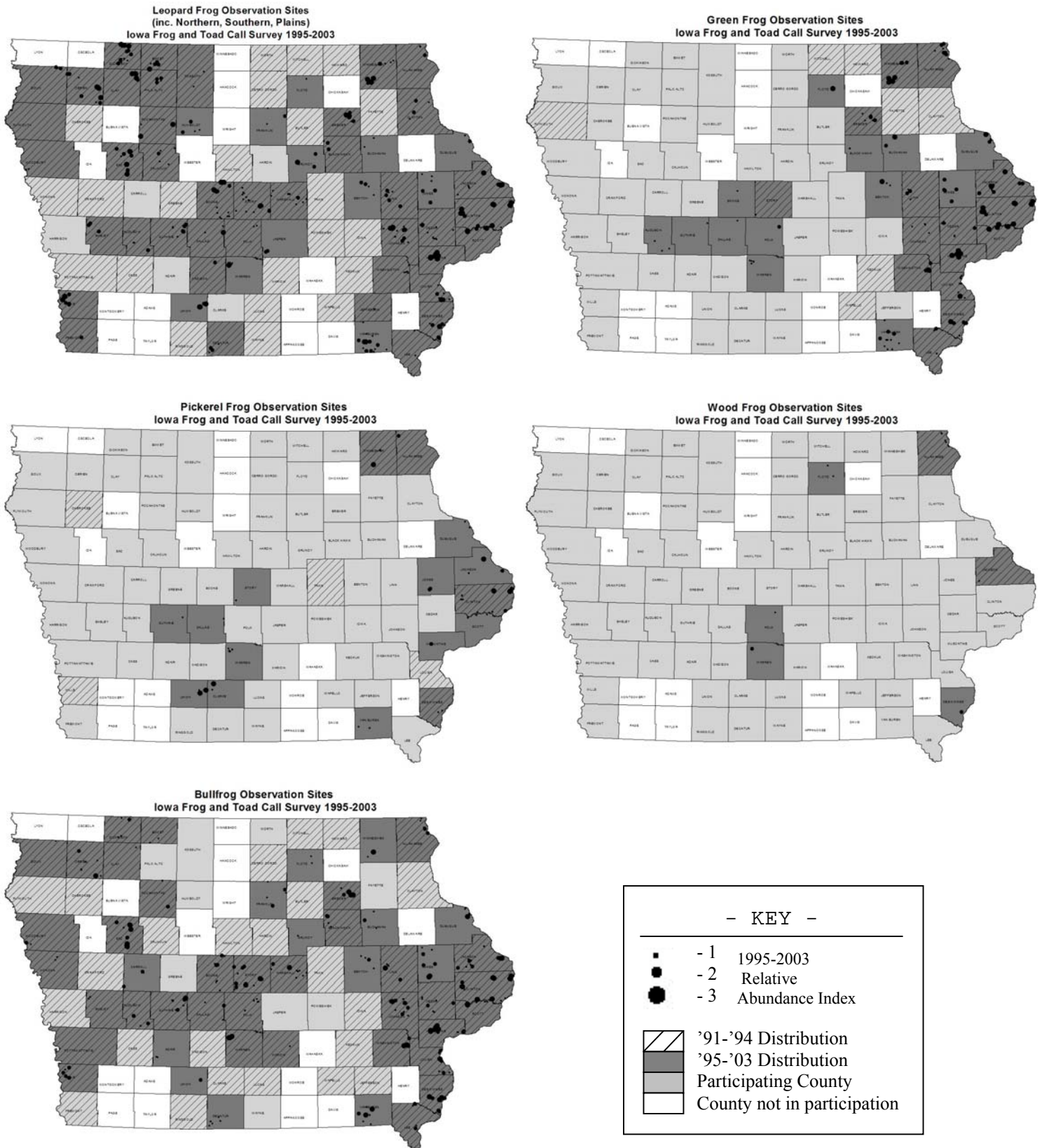
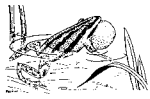


Figure 4- These five maps show the general distribution of survey data associated with frogs in Iowa during 1995-2003. Observations recorded without location data are not represented on these maps.



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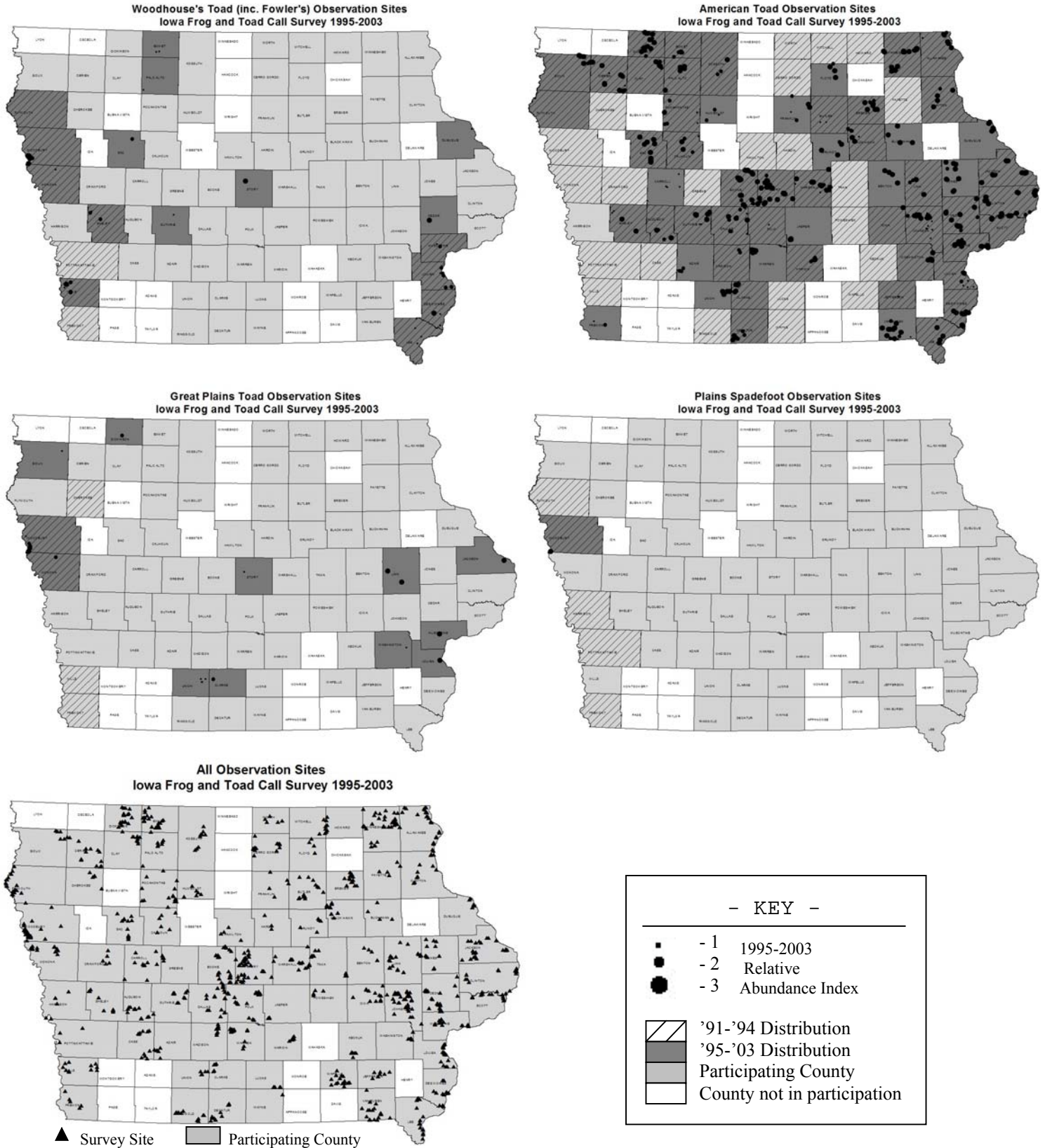


Figure 5- These five maps show the general distribution of survey data associated with toads and spadefoots in Iowa, also the survey site locations from 1995-2003. Observations recorded without location data are not represented on these maps.



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Table 1. Total number of anuran occurrences within and outside of the historical range for each species during 7,607 site-visits between 1995 and 2003.

Species	Within historical range	Outside historical range
Leopard frog complex (<i>Rana pipiens</i> spp.)	1233	Range covers all IA.
Pickerel frog (<i>Rana palustris</i>)	62	27
Crawfish frog (<i>Rana areolata</i>)	0	0
Green frog (<i>Rana clamitans</i>)	651	7
Bullfrog (<i>Rana catesbeiana</i>)	1139	Range covers all IA.
Gray treefrog (<i>Hyla versicolor</i>)	2166	98
Cope's gray treefrog (<i>Hyla chrysoscelis</i>)	636	164
Spring peeper (<i>Pseudacris crucifer</i>)	673	34
Western chorus frog (<i>Pseudacris triseriata</i>)	2797	Range covers all IA.
Blanchard's cricket frog (<i>Acris crepitans blanchardi</i>)	1669	37
American toad (<i>Bufo americanus</i>)	2154	Range covers all IA.
Woodhouse's toad (<i>Bufo woodhousii</i>) This includes both subspecies <i>woodhousii</i> and <i>fowleri</i>	77	8
Great plains toad (<i>Bufo cognatus</i>)	7	17
Plains spadefoot (<i>Scaphiopus bombifrons</i>)	4	0
Wood frog (<i>Rana sylvatica</i>)	No historical range in IA.	12

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