

DISTRIBUTION AND POPULATION TRENDS OF IDAHO AMPHIBIANS
AS DETERMINED BY MAIL QUESTIONNAIRE

by

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ABSTRACT

During summer 1990, we conducted a mail survey to better determine the population status and distribution of amphibians in Idaho. Returns of the questionnaire reported distributional data on all 15 Idaho species. Approximately 60 potential new county records were among these returns. We also received over 80 observations of population trends, with about 60% noting decreases and 40% reporting increases. No consistent geographic pattern was noted in these trends. Problems connected to surveys of this type are discussed. We make recommendations for establishment of long-term monitoring sites.

INTRODUCTION

Many amphibian populations appear to be declining worldwide (Phillips 1990), particularly in the western United States (e.g., Corn and Fogelman 1984, Corn and Vertucci, in press). Various causes have been suggested for the declines, including acid deposition, increases in ultraviolet radiation from a thinning ozone layer, heavy metal and pesticide contamination, predation by exotic species such as bullfrogs (Rana catesbeiana) and fish stocked in lakes, habitat alterations and fragmentation (particularly deforestation), and global climate changes linked with droughts and unusual rainfall patterns. However, the exact cause(s) remain obscure and are hampered by few data on population trends and distribution. A major difficulty is distinguishing human-related impacts to amphibian populations from natural population fluctuations (Pechmann et al. 1991).

Determining the status of amphibian populations is important for several reasons. First, this information is needed to properly manage amphibian populations. Second, amphibians play an important role in ecosystems both as predators and prey. Finally, amphibians may be well-suited to serve as indicators of environmental health and change. Because most species live in aquatic and terrestrial environments, they are exposed to a wide array of environmental factors. Their thin, permeable skin makes them particularly susceptible to the impacts of drought and environmental contaminants. Due to their limited mobility, many

populations are isolated and, therefore, more susceptible to local extinctions due to human-caused and natural disturbances.

Little information on the distribution and population status of amphibians exists in Idaho. Nussbaum et al. (1983) provide the best summary of information on the distribution of Idaho's amphibians. The Coeur d'Alene salamander (Plethodon idahoensis) is the only amphibian species in Idaho for which information on population status and distribution has been gathered in recent years (Cassirer et al. 1992). To obtain more information on the distribution of Idaho amphibians and possible population declines, we distributed a questionnaire statewide. The purpose of this report is to summarize questionnaire results which include: 1) statewide contacts with individuals who have information on amphibians and reptiles, 2) new distributional information for several species, and 3) population trends for some species.

METHODS

During the summer of 1990, we mailed approximately 400 questionnaires statewide to wildlife and fisheries biologists, land managers, conservation officers, academicians, members of the Idaho Herpetological Society, and other interested parties (See Appendix A for questionnaire). The questionnaire asked respondents to provide information on amphibians observed in their region of the state (counties and watersheds), assess the abundance of individual species in a general way (few (< 5

individuals) vs. many), comment on any observed population trends, and provide us with any additional sources of information on amphibians such as reports or other knowledgeable individuals.

Results from the questionnaire were entered into a computer spreadsheet program which contained fields for common name, scientific name, county of record, place name, abundance, date, population trend, cause, name of respondent, affiliation, and additional remarks. Data were then sorted by species and location to tabulate results. Potential new county records were determined by comparison with county dot-distribution maps in Nussbaum et al. (1983). We also summarized all comments regarding population trends and their possible causes. To check for geographical variation in population changes, we prepared maps for each species which showed the location and status (i.e., increasing, decreasing, or stable) of each population for which trend information was provided.

RESULTS AND DISCUSSION

We received 98 questionnaires for a return rate of approximately 25%. Although most responses were based on single, incidental observations, we also received some reports based on repeated observations over a several-year period. These returns provided distributional data for all 15 species of Idaho's amphibians (Table 1). A total of 301 records of amphibian occurrences was received; 62 of these records are potential new county records (Table 2). Potential new county records were

noted for all but three species (Dicamptodon aterrimus, Plethodon idahoensis, Rana sylvatica). Due to difficulties in properly identifying some amphibian species, many of these potentially new county records will need to be verified by a qualified herpetologist. Nevertheless, the questionnaire provided important leads on new distributional information and clearly indicated the inadequacy of the current information for Idaho.

Forty-one respondents commented on population trends (Table 3). Eighty-eight observations of population trends, mostly from casual observations, were received. About 60% of the comments noted population decreases, whereas about 40% indicated stable or increasing populations. More responses were received concerning population declines in northern leopard frogs (Rana pipiens) than for any other species. Several respondents indicated that these declines were long-term. Although anecdotal in nature, these Idaho observations are consistent with declines noted in other parts of the range of Rana pipiens (Corn et al. 1989).

Declines for two other species, the western toad (Bufo boreas) and the spotted frog (Rana pretiosa), have been observed in the western United States (Corn et al. 1989, McAllister and Leonard 1990). The spotted frog was recently classified as a C2 candidate for listing as threatened or endangered under the Endangered Species Act and is also listed as a Sensitive Species by the U.S. Forest Service in Region 4 (Moseley and Groves 1992). Results from the questionnaire on these two species were either

ambivalent on population trends (western toad) or too few to be conclusive (spotted frog) (Table 3). Information from Yellowstone National Park and Idaho's Panhandle indicate that populations of spotted frogs are strong regionally and that the species is still widespread, although historical data for comparative purposes are lacking (Peterson et al. 1992, Groves, pers. observ.).

Our analysis of variation in population trends did not reveal any consistent geographic pattern in declines or increases for any species (e.g., Figure 1). For those species occurring statewide, we found no differences between southern, arid regions and more northern, wetter regions of the state.

Of the 72 responses concerning population trend, only 14 noted possible causes of declines. The majority of these responses (about 80%) suggested drought as an explanation for the declines, whereas others mentioned habitat alteration as a probable cause.

Several sorts of problems are associated with the type of information collected through this survey. First, as previously mentioned, respondents may have misidentified species. Second, simply asking for information concerning "declines" might bias respondents toward reporting population decreases. Third, respondents may recall extremes of natural population fluctuations and interpret those as declines. Finally, there is a geographic bias towards more heavily populated areas of the state. Consequently, care in interpretation of these data is

warranted. The data suggest that declines may be occurring in some frog and toad species; sample sizes for salamanders were too small for conclusions. However, we feel that this information will be most valuable when considered in conjunction with data from other studies in the region.

The lack of any quantitative trend data indicates the need to establish long-term monitoring sites for amphibian populations in Idaho. We presently know of only one such site - a pond in northern Idaho being monitored by herpetologists from Washington State University. They have noted that populations of the long-toed salamander (Ambystoma macrodactylum) have remained stable at this site for the last 10 years (Beneski et al. 1986, J. Larsen, pers. comm.). We are planning to establish a monitoring program for the Coeur d'Alene salamander (Plethodon idahoensis), a northern Rockies endemic (Cassirer et al. 1992), and for amphibians at several selected sites in southeastern Idaho.

RECOMMENDATIONS

We suggest that the most urgent conservation needs for amphibians in Idaho are twofold:

- 1) In as many parts of the state as possible, initiate inventories to gather simple presence/absence information on amphibian populations. Information obtained in these surveys should be forwarded to Dr. Chuck Peterson of Idaho State University who is developing a statewide database on the occurrence of all amphibian and reptile species.
- 2) Establish several sites throughout the state where data on population trends of amphibians can be gathered on a long-term basis. Care should be taken to establish such monitoring stations in coordination with other regional and national efforts. The Species Survival Commission (SSC) of

IUCN has recently established a Declining Amphibians
Population Task Force headed by Dr. James Vial (Center for
Analysis of Environmental Change, 200 S. W. 35th St.,
Corvallis OR 97333 (503) 757-4798).

ACKNOWLEDGMENTS

We'd like to extend our thanks to all the individuals who took the time to complete and return the survey form. Thanks also to Mike Dorcas of Idaho State University for help in compiling the survey results.

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Table 1. Species and number of records tabulated from the 1990 Idaho Amphibian Questionnaire.

<u>Species</u>	<u>Number of Records</u>
Salamanders	
Long-toed Salamander (<u>Ambystoma macrodactylum</u>)	31
Tiger Salamander (<u>Ambystoma tigrinum</u>)	19
Idaho Giant Salamander (<u>Dicamptodon aterrimus</u>)	8
Coeur d'Alene Salamander (<u>Plethodon idahoensis</u>)	6
Roughskin Newt (<u>Taricha granulosa</u>)	1
Anurans	
Tailed Frog (<u>Ascaphus truei</u>)	24
Western Toad (<u>Bufo boreas</u>)	50
Woodhouse's Toad (<u>Bufo woodhousii</u>)	5
Pacific Chorus Frog (<u>Pseudacris regilla</u>)	33
Western Chorus Frog (<u>Pseudacris triseriata</u>)	18
Bullfrog (<u>Rana catesbeiana</u>)	23
Northern Leopard Frog (<u>Rana pipiens</u>)	35
Spotted Frog (<u>Rana pretiosa</u>)	34
Wood Frog (<u>Rana sylvatica</u>)	1
Great Basin Spadefoot (<u>Spea intermontana</u>)	13
Total	301

Table 2. List of potential new county records as determined by returns of mail questionnaires.

County	Amma	Amti	Diat	Plid	Tagr	Astr	Bubo	Buwo	Spin	Psre	Pstr	Raca	Rapi	Rapr	Rasy
Ada	1	*	0	0	0	0	1	1	1	1	1	1	1	*	0
Adam	*	0	1	0	0	1	1	0	*	0	*	0	*	1	0
Bannock	0	1	0	0	0	1	0	1	0	1	0	1	0	0	0
Bear Lake	0	1	0	0	0	0	1	0	0	0	0	0	1	0	0
Benewah	1	0	1	1	0	1	1	0	0	1	0	0	0	1	0
Bingham	0	1	0	0	0	0	*	0	1	0	1	0	1	0	0
Blaine	1	0	0	0	0	*	1	0	0	1	0	0	1	1	0
Boise	1	0	0	0	0	1	1	0	0	*	*	*	*	1	0
Bonner	1	0	0	1	0	0	1	0	0	1	0	*	1	1	1
Bonneville	0	1	0	0	0	0	1	0	0	0	1	0	1	0	0
Boundary	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0
Butte	0	0	0	0	0	0	0	0	1	0	0	0	0	*	1
Camas	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Canyon	0	0	0	0	0	0	*	1	1	1	1	0	0	0	0
Caribou	0	*	0	0	0	0	*	0	0	0	*	0	*	0	0
Cassia	0	0	0	0	0	0	*	0	1	1	1	*	1	0	0
Clark	0	0	0	0	0	0	1	0	*	0	0	0	0	1	0
Clearwater	1	*	1	1	0	1	*	0	0	*	0	0	0	1	0
Custer	*	0	0	0	0	*	1	*	0	*	0	0	*	1	0
Elmore	1	0	0	0	0	1	1	0	*	0	0	0	1	0	0
Franklin	0	1	0	0	0	0	0	0	*	0	0	0	1	0	0
Fremont	0	1	0	0	0	0	1	0	1	0	*	0	1	0	0
Gem	0	0	0	0	0	0	*	1	*	0	0	*	1	1	0
Gooding	0	0	0	0	0	0	1	0	0	*	0	0	*	0	0
Idaho	1	0	1	1	0	1	1	0	0	*	0	1	1	0	0
Jefferson	0	1	0	0	0	0	*	0	1	0	1	0	0	1	0
Jerome	0	0	0	0	0	0	1	*	0	*	*	0	1	0	0
Kootenai	1	1	0	1	0	1	1	0	0	*	0	1	0	1	0
Latah	1	1	1	0	1	1	1	0	0	1	0	1	*	1	0
Lemhi	1	0	0	0	0	1	1	0	0	*	0	0	0	1	0
Lewis	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Lincoln	0	0	0	0	0	0	*	0	*	0	0	0	0	1	0
Madison	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Minidoka	0	0	0	0	0	0	*	0	1	0	0	0	1	0	0
Nez Perce	1	0	0	0	0	0	*	0	0	0	1	*	1	0	0
Oneida	0	1	0	0	0	0	0	0	0	0	*	0	0	1	0
Owyhee	0	0	0	0	0	0	1	1	1	1	*	1	1	1	0
Payette	0	0	0	0	0	0	0	0	0	0	0	*	0	0	0
Power	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0
Shoshone	1	0	1	1	*	1	1	0	0	*	0	0	1	0	0
Teton	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0
Twin Falls	0	0	0	0	0	0	1	0	1	1	0	0	1	0	0
Valley	1	0	1	0	0	1	1	0	0	1	1	0	*	1	0
Washington	*	0	0	0	0	1	0	1	1	0	*	1	1	1	0

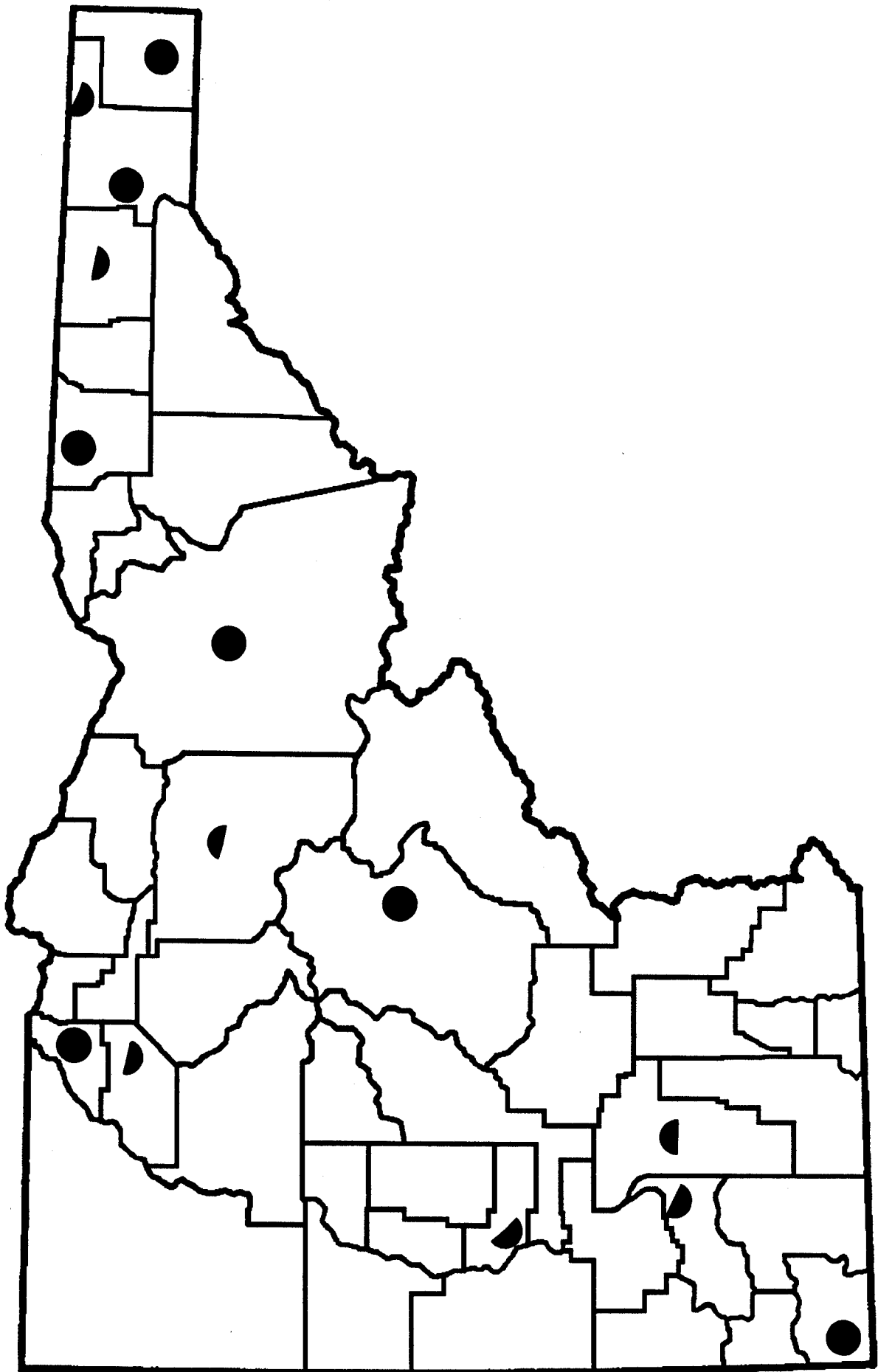
Ambystoma macrodactylum = Amma *Ambystoma tigrinum* = Amti
Dicamptodon aterrimus = Diat *Plethodon idahoensis* = Plid
Taricha granulosa = Tagr *Ascaphus truei* = Astr
Bufo boreas = Bubo *Bufo woodhousei* = Buwo
Spea intermontana = Spin *Pseudacris regilla* = Psre
Pseudacris triseriata = Pstr *Rana catesbeiana* = Raca
Rana pipiens = Rapi *Rana pretiosa* = Rapr
Rana sylvatica = Rasy

0 = not recorded from this county
 1 = previously recorded from this county
 * = potential new county records

Table 3. Population trends of Idaho amphibians reported in returns of mail questionnaire.

	Number of Records	Stable or Increasing	Decreasing
Salamanders			
Long-toed Salamander (<u>Ambystoma macrodactylum</u>)	7	43%	57%
Tiger Salamander (<u>Ambystoma tigrinum</u>)	4	75%	25%
Idaho Giant Salamander (<u>Dicamptodon aterrimus</u>)	1	0%	100%
Coeur d'Alene Salamander (<u>Plethodon idahoensis</u>)	0	-	-
Roughskin Newt (<u>Taricha granulosa</u>)	0	-	-
Anurans			
Tailed Frog (<u>Ascaphus truei</u>)	4	75%	25%
Western Toad (<u>Bufo boreas</u>)	14	50%	50%
Woodhouse's Toad (<u>Bufo woodhousii</u>)	1	100%	0%
Pacific Chorus Frog (<u>Pseudacris regilla</u>)	12	33%	67%
Western Chorus Frog (<u>Pseudacris triseriata</u>)	5	20%	80%
Bullfrog (<u>Rana catesbeiana</u>)	6	33%	67%
Northern Leopard Frog (<u>Rana pipiens</u>)	9	22%	78%
Spotted Frog (<u>Rana pretiosa</u>)	4	25%	75%
Wood Frog (<u>Rana sylvatica</u>)	1	100%	0%
Great Basin Spadefoot (<u>Spea intermontana</u>)	4	0%	100%
	72	44%	56%

Figure 1. Population trend for the western toad (Bufo boreas) as determined by results of the 1990 amphibian questionnaire. Full circles represent locations of reported population increases; half circles refer to locations of reported declines.



APPENDIX A:1990 Idaho Amphibian Questionnaire

Name _____ Phone No. _____

Work Address _____

If you need more space to answer the following questions, please continue on the back of this form or on an additional page.

1. Which species of amphibians (frogs, toads, and salamanders) have you observed in your region of the state? Please refer to the enclosed pamphlet for information on species identification and distributions. Under abundance, please indicate if you have observed a few (F; less than 5) or many (M) individuals.

Species Observed	Counties / Drainages Observed In	Abundance
Example: Spotted Frog	Fremont County; Henry's Fork	F
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

2. If possible, please comment on population trends for any of the species in your area (i.e., are they stable, increasing or decreasing). Please be as specific as possible with respect to the species, dates, and locations but don't hesitate to include general observations as well. Have you noticed any habitat changes associated with a decline? Example: an IDFG conservation officer in Camas County has noted that tree frogs no longer call from Mormon Reservoir where he used to hear them during the spring in 1984-86.

3. Please provide us with any other sources of information (lake surveys, class projects, theses, fisheries reports, the names of other knowledgeable persons, etc.) you are aware of that have information on the occurrence of amphibians in Idaho.

Please return this form to:

Craig Groves
 Idaho Fish & Game
 600 South Walnut / Box 25
 Boise, Idaho 83707

Submitted by: Craig F. Groves

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

Tom Reinecker
Tom Reinecker, Chief
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