2001 Squaw Creek National Wildlife Refuge
Amphibian Deformity Monitoring Report

Submitted By

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Introduction

In 1997 the Region 3Assistant Regional Director (ARD) requested that all staffed field stations conduct amphibian deformity surveys. The purpose of these surveys was to conduct a first-level screening of national wildlife refuges (NWRs) and wetland management districts (WMDs) for the presence of deformed frogs (R3 ARD, 1997). This request was based on the noticeable and documented increase in amphibian deformities in the mid-western United States. Although many factors including solar radiation due to ozone loss, pollution and disease have been suggested as causes for this increased deformity rate, little is known and research efforts are ongoing. Collection of this data is important as it provides both a baseline for future amphibian monitoring on refuges and WMDs and additional data for identifying the extent of the problem on a national basis. Squaw Creek NWR (SCNWR) complied with this request and collected data in 1997 and has continued with this effort through 2001. Due to the importance and need for this type of information SCNWR will continue to dedicate additional effort toward the collection of frog deformity data on an annual basis. Monitoring efforts from 1997-2001 were conducted by a combination of refuge volunteers and refuge staff. All of SCNWR's data, to date, has been incorporated into the United States Geological Survey North American Reporting Center for Amphibian Malformations (USGS NARCAM). SCNWR will continue to submit all amphibian deformity data to USGS NARCAM as this information is valuable to research efforts on amphibian deformities, as well as the refuge, especially in light of the possibility that high deformity rates could be a function of water quality.

Materials and Methods

Survey efforts were coordinated by refuge wildlife biologist Durbian. The sampling protocol suggested by Mattsson (1998) was followed with the following exception: 1) Instead of randomly choosing 2 wetlands to sample, an effort was made to sample several (6) wetlands holding water on SCNWR. This provided a broader range of areas to sample based on water conditions in SCNWR's seasonally flooded impoundments and more complete coverage of the refuge. Surveyors attempted to capture as many frogs as possible, with a minimum target of 200, using hands, dip-nets, and seines. Frogs examined were identified using a field guide prepared by Johnson (1987). All age brackets of frogs captured were examined, although froglets and metamorphs were the primary target. All data was submitted to dthe USGS NARCAM.

Results

The 2001 survey effort resulted in the capture of 77 frogs representing 2 species - Bull Frog (*Rana catesbeiana*) and Plains Leopard Frog (*Rana blairi*). No deformities were identified in this sample (Table 7).

To date, 724 frogs, representing a minimum of 4 species, have been captured and examined for deformities on SCNWR (Tables 1-7). Species examined thus far include Bull Frog, Plains Leopard Frog, Cricket Frog (*Acris crepitans blanchardi*) and

Western Chorus Frog (*Pseudacris triseriata*). In previous surveys not all Leopard Frogs (*Rana* sp.) were identified to genus and are listed as Leopard Frog sp. Deformity rates range from 0.0% in 1997 and 2001 to 4.22% in 2000. The types of deformities encountered included missing feet; missing digits; and digits shortened, fused or clubbed (Tables 4 and 6).

Table 1. The species, number examined, number deformed and percentage deformed of frogs captured in 1997.

Species	**# Examined**	**# Deformed**	**% Deformed**
Bull Frog	45	0	0
Leopard Frog sp.	59	0	0
Totals	104	0	0

Table 2. The species, number examined, number deformed and percentage deformed of frogs captured in 1998.

Species	**# Examined**	**# Deformed**	**% Deformed**
Bull Frog	188	0	0
Leopard Frog sp.	9	0	0
Plains Leopard Frog	1	0	0
Cricket Frog	2	0	0
Totals	200	0	0

Table 3. The species, number examined, number deformed and percentage deformed of frogs captured in 1999.

Species	**# Examined**	**# Deformed**	**% Deformed**
Bull Frog	131	0	0
Leopard Frog sp.	70	1	1.4
Totals	201	1	0.5

Table 4. The species, type of deformity and number of individuals found for each deformity type in 1999.

	Type of Deformity
Species	**Foot Missing**
Leopard Frog sp.	1

Totals	1

Table 5. The species, number examined, number deformed and percentage deformed of frogs captured in 2000.

Species	**# Examined**	**# Deformed**	**% Deformed**
Bull Frog	54	4	7.4
Plains Leopard Frog	86	2	2.3
Western Chorus Frog	2	0	0
Totals	142	6	4.2

Table 6. The species, type of deformity and number of individuals found for each deformity type in 2000.

	Type of Deformity		
Species	**Foot Missing**	**Digits Missing**	**Digits Shortened, Fused or Clubbed**
Bull Frog	1	1	2
Plains Leopard Frog			2
Totals	1	1	4

Table 7. The species, number examined, number deformed and percentage deformed of frogs captured in 2001.

Species	**# Examined**	**# Deformed**	**% Deformed**
Bull Frog	4	0	0
Plains Leopard Frog	73	0	0
Totals	77	0	0

Discussion

The 2001 survey fell well below the mark of a minimum capture rate of 200 frogs. The contributing factors for this problem were weather, lack of volunteers, and staff

time. In the future extra effort will be placed in securing additional volunteers to assist with collection efforts and sampling will start at an earlier date

Although it appears that the frog deformity rate on SCNWR increased between 1997 and 2000, caution needs to be exercised when interpreting these results. Deformity rates around 3% may be considered normal for some areas (Briggler, 2000). This relatively low deformity rate coupled with the low number of years sampled (n = 4) and relatively small sample sizes may lead to erroneous conclusions at this time. Future effort should emphasize larger sample sizes, with a minimum of 200 frogs sampled/year.

Management Implications

None at this time.

Literature Cited

Briggler, J. 2000. Personal communication with MDC herpetologist.

Johnson, T.R. 1987. The amphibians and reptiles of Missouri. Missouri Department of Conservation, Jefferson City, Missouri. 368 pp.

Mattsson, J. 1998. Memo. Subject: Voluntary Frog Monitoring. 6pp.

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