

**Bantam Sunfish (*Lepomis symmetricus*) survey of  
Constructed Wetlands at Grassy Slough Preserve,  
Johnson County, Illinois**

Report by:

John G. Palis  
Consulting Biologist  
P.O. Box 387  
Jonesboro, Illinois 62952  
jpalis@yahoo.com  
618-833-3227

Report submitted to:

Illinois Department of Natural Resources  
Office of Resource Conservation  
One Natural Resources Way  
Springfield, Illinois 62702-1271

Grant Agreement # 08-022W

July 2008

**RECEIVED**  
JUL 17 2008  
**FEDERAL AID**

## **Introduction**

The bantam sunfish (*Lepomis symmetricus*) is a small (up to 3.5 inches long) sunfish that reaches the northern limit of its range in Illinois (Page and Burr 1991). The species inhabits heavily-vegetated swamps, lakes, and stream backwaters (Burr 1977). Historic collections in the state, dating back to the early 1880s, include the middle Illinois River valley (Tazewell County), the lower Wabash River valley (White County), and the upper Clear Creek drainage (Union County; Burr 1977). Presumed to be extirpated in Tazewell and White counties, the bantam sunfish has persisted into the 21<sup>st</sup> century in Union County. The bantam sunfish is considered threatened in the state by the Illinois Department of Natural Resources and is listed as a species in greatest need of conservation in the Illinois Comprehensive Wildlife Conservation Plan and Strategy.

In 1982, bantam sunfish were discovered further downstream in the Clear Creek system into Alexander County (Burr et al. 1988). They were also observed near Horseshoe Lake in the Cache River drainage (Burr et al. 1988). Additional Cache River specimens were collected in the mid-1990s at Buttonland Swamp and Limekiln Slough in Pulaski County (Burr et al. 1996). In 2002 and 2004, during amphibian and reptile surveys at Grassy Slough Preserve (GSP; owned and managed by The Nature Conservancy), I captured bantam sunfish in constructed wetland 11. These observations not only extended the known range of the bantam sunfish further upstream in the Cache River system (into Johnson County), but it was apparently the first record for a wetland constructed under the auspices of a federal habitat restoration program (Wetland Reserve Program). As such, it provided direct evidence of an additional benefit (threatened species habitat creation) of the Natural Resource Conservation Service's Wetland Reserve Program.

This survey was designed to answer the following questions: Do bantam sunfish still inhabit wetland 11? Have bantam sunfish colonized seven other wetlands scattered across the preserve? Herein, I provide results of a 2008 survey of wetland 11 and seven other constructed wetlands on GSP.

## **Methods**

I surveyed eight constructed wetlands (numbers 1, 3, 4, 6, 7, 8, 10, and 11) scattered across the preserve (Figure 1). Wetlands varied in size from 2.4-17.5 ha and supported a lush growth of aquatic herbaceous vegetation (Table 1).

I sampled for the presence of bantam sunfish using a combination of commercially-made minnow traps and dipnetting. I timed my sampling to coincide with the greatest likelihood of capturing young-of-the-year bantam sunfish (i.e., approximately mid-May to late June; Burr 1977). Targeting bantam sunfish during and following the breeding season increases the chances of encountering the species due to the greater number of individuals potentially

inhabiting the wetlands at that time. Additionally, young-of-the-year bantam sunfish are readily distinguished from young-of-the-year of other species of sunfish by the black spot, flanked by an orange halo, at the rear of dorsal fin (Page and Burr 1991, Wetzel 2007).

I set plastic, cylindrical funnel traps, having 3-mm mesh and a 24-mm wide interior opening at each end, in water < 35 cm deep amid aquatic herbaceous vegetation. Aquatic vegetation is the preferred microhabitat of bantam sunfish (Burr 1977). To prevent accidental drowning of bycatch such as amphibians and reptiles, I set traps such that approximately 1/4 of each trap extended above the water surface. I set 25 traps in each wetland, spaced 20 m apart (600 m of shoreline sampled). I checked and removed traps 24 hours later. All captured vertebrates were identified, counted, and released. Wetlands 3, 6, 8, and 11 were trapped 15-16 May 2008, and wetlands 1, 4, 7, and 10 were trapped 19-20 May 2008. Following trap removal, I sampled each wetland for 1.5 hours by dipnet (41 cm hoop diameter and 4 mm mesh). I forced the net through aquatic herbaceous vegetation in water ranging from approximately 2.5-60 cm deep. I dipnetted wetlands 7, 8, and 11 on 6 June 2008; wetlands 1 and 3 on 8 June 2008; and wetlands 4, 6, and 10 on 10 June 2008. I identified and released captured vertebrates.

## Results

**Funnel Trapping:** Funnel traps yielded a total of 1744 individuals of 15 vertebrate species (Table 2). Bantam sunfish were not among the eight species of fish captured. Banded pygmy sunfish (*Elassoma zonatum*), a species in greatest need of conservation (Illinois Comprehensive Wildlife Conservation Plan and Strategy), were captured in wetlands 3 and 8. Young-of-the-year bowfin (*Amia calva*) dominated the fish catch (68.7%). Seven species of amphibians were also captured (Table 2). Southern leopard frog (*Rana sphenoccephala*) tadpoles dominated the amphibian catch (96.3%), as well as the total catch (90%).

**Dipnetting:** I captured a total of 27 vertebrate species during dipnet sampling (Table 3). Bantam sunfish were not among the 16 fish species captured. Three fishes of conservation concern (Illinois Comprehensive Wildlife Conservation Plan and Strategy) were captured: banded pygmy sunfish, fliers (*Centrarchus macropterus*), and lake chubsuckers (*Erimyzon sucetta*). I captured banded pygmy sunfish in all eight wetlands, and fliers and lake chubsuckers in four. All fliers and lake chubsuckers, as well as the vast majority of banded pygmy sunfish, were young-of-the-year individuals. Banded pygmy sunfish and fliers were common to abundant in each wetland they inhabited. I also captured nine species of amphibians and two species of reptiles (Table 3). One of these, the mole salamander (*Ambystoma talpoideum*) is categorized as a species in greatest need of conservation (Illinois Comprehensive Wildlife Conservation Plan and Strategy).

## Discussion

Despite 4800 hours of funnel trapping and 12 hours of dipnetting, I was unable to confirm the presence of bantam sunfish in the eight constructed wetlands I sampled on GSP. Because absence is difficult to prove, the lack of captures does not necessarily mean the absence of bantam sunfish from the wetlands I sampled. Although it is possible that bantam sunfish are, indeed, absent from the wetlands I sampled, they potentially occur in such low densities that the likelihood of capture is extremely low. Additional sampling, perhaps including other techniques such as electrofishing, may be necessary to prove presence or absence. Due to the dense growth of aquatic vegetation, especially water primrose (*Jussiaea diffusa*), seining is impractical.

Three fishes of conservation concern in Illinois – banded pygmy sunfish, fliers, and lake chubsuckers – appear widespread on GSP. I captured banded pygmy sunfish in all eight wetlands I sampled, and fliers and lake chubsuckers in four. Young-of-year individuals of banded pygmy sunfish and fliers were common to abundant in each wetland. The observation of lake chubsuckers on GSP is especially significant because 1) there are relatively few such records for southern Illinois and 2) this appears to be the first record for the species in the Cache River system (Burr et al. 1988; Brooks Burr, Southern Illinois University, personal communication 2008).

Other species of fishes and amphibians that appear widespread (in at least ½ of wetlands sampled) on GSP include: bowfin, pirate perch (*Aphredoderus sayanus*), grass pickerel (*Esox americanus*), largemouth bass (*Micropterus salmoides*), golden shiner (*Notemigonus crysoleucus*), northern cricket frog (*Acris crepitans*), mole salamander, central newt (*Notophthalmus viridescens*), southern leopard frog, and siren (*Siren intermedia*). The mole salamander is a species in greatest need of conservation (Illinois Comprehensive Wildlife Conservation Plan and Strategy).

## Management Concerns

Although beyond the scope of this survey, I would like to share my observations of management concern. Two invasive plant species, autumn olive (*Elaeagnus umbellata*) and common reed (*Phragmites australis*) have colonized the preserve. A light infestation of autumn olive occurs across the preserve. Common reed occurs in at least four wetlands: 7, 9, 10, and 11. The infestation in wetland 9 may be as large as one acre. I encourage control of these invasive species while their populations are still relatively small.

## Acknowledgments

Funding provided by the Illinois Wildlife Preservation Fund is gratefully acknowledged. I thank Brooks Burr for sharing copies of two publications and for fish-identification discussions. I also thank Mike Baltz, Deanna Zercher, and Kelly Neal for permission to sample wetlands; Joe Kath for permission to sample for and collect bantam sunfish (permit number # 96-17S); and Erin Palmer for recording data and assistance carrying traps in May.

## Literature Cited

Burr, B. M. 1977. The bantam sunfish, *Lepomis symmetricus*: systematics and distribution, and life history in Wolf Lake, Illinois. Illinois Natural History Survey Bulletin 31(10):437-465.

Burr, B. M., M. L. Warren, and K. S. Cummings. 1988. New distributional records of Illinois fishes with additions to the known fauna. Transactions of the Illinois academy of Science 81:163-170.

Burr, B. M., K. M. Cook, D. J. Eisenhour, K. R. Piller, W. J. Polly, R. W. Sauer, C. A. Taylor, and E. R. Atwood. 1996. Selected Illinois fishes in jeopardy: new records and status evaluations. Transactions of the Illinois academy of Science 89:169-186.

Page, L. M. and B. M. Burr. 1991. A field guide to freshwater fishes of North America north of Mexico. Houghton Mifflin Company, Boston, Massachusetts.

Wetzel, J. E. 2007. Spawning and raising the bantam sunfish, *Lepomis symmetricus*. American Currents 33:11-15.

Figure 1. Constructed wetlands on Grassy Slough Preserve, Johnson County, Illinois. Wetlands 1, 3, 4, 6, 7, 8, 10, and 11 were surveyed for bantam sunfish. Location of drift fences, coverboards, and transects are not applicable to this report.

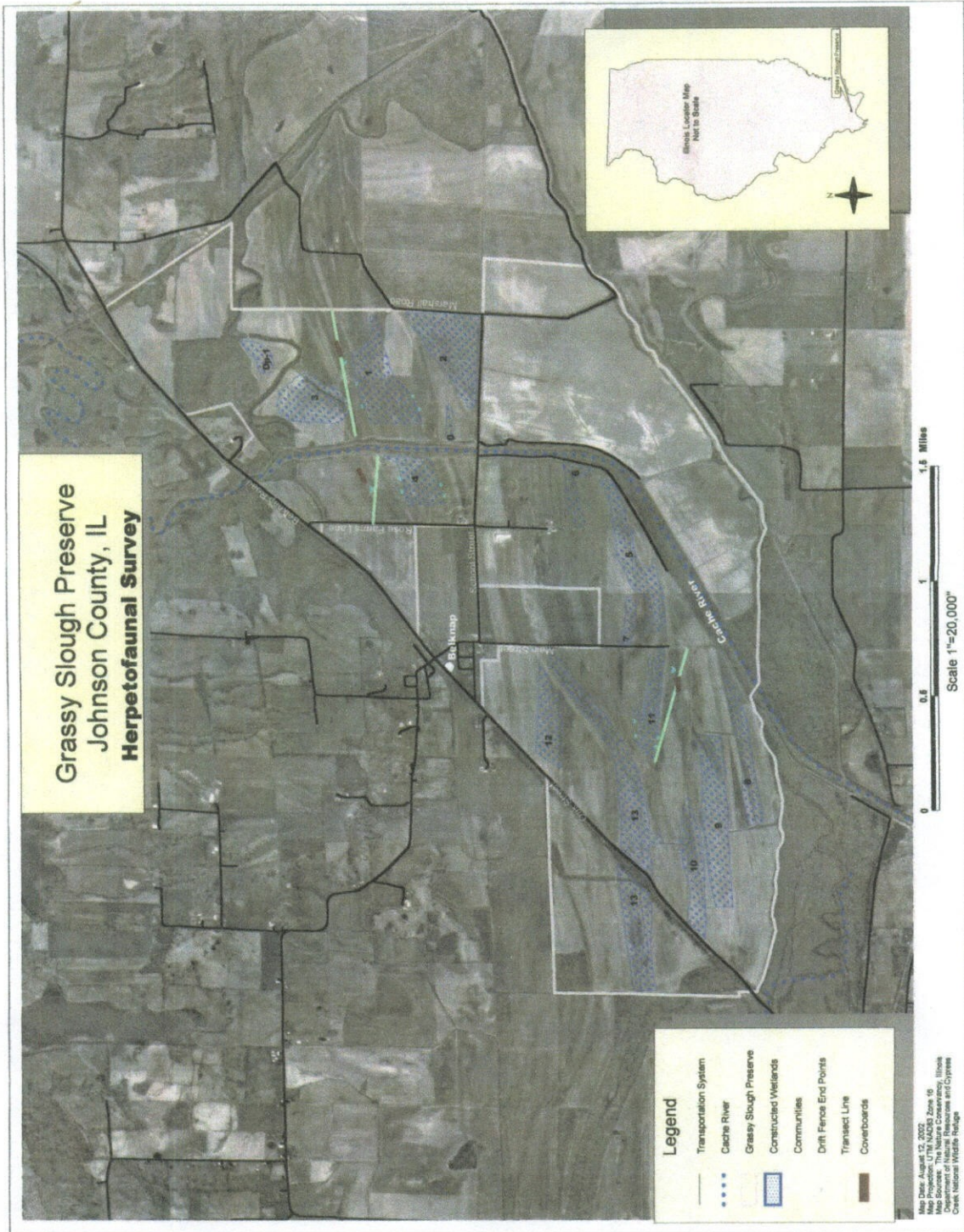


Table 1. Size, location, and prominent herbaceous vegetation of eight constructed wetlands on Grassy Slough Preserve sampled for the presence of bantam sunfish. Herbaceous vegetation: 1 = water primrose (*Jussiaea* ), 2 = smartweed (*Polygonum* sp.), 3 = algae, 4 = American lotus (*Nelumbo lutea*), 5 = cocklebur (*Xanthium commune*), 6 = rush (*Juncus* sp.), cattail (*Typha latifolia*).

Wetland Number	Size (ha)	GPS point	Herbaceous Vegetation
1	17.5	37°19.678N, 88°55.221W	1, 2, 3
3	12.9	37°19.870N, 88°55.190W	1, 2, 3, 4
4	8.1	37°19.450N, 88°55.512W	1, 2, 3, 5
6	4.3	37°18.901N, 88°55.547W	1, 2, 5
7	2.4	37°18.687N, 88°56.154W	1, 2, 3, 5
8	9.5	37°18.239N, 88°56.873W	1, 2
10	10.6	37°18.392N, 88°57.584W	1, 2, 6, 7
11	7.8	37°18.586N, 88°56.478W	1, 2, 3

Table 2. Fishes and amphibians captured in funnel traps set in eight constructed wetlands on Grassy Slough Preserve in May 2008.

Species	<u>Wetland Number</u>								Total
	1	3	4	6	7	8	10	11	
<b>Fishes</b>									
<i>Amia calva</i>	29	6	0	0	4	37	1	2	79
<i>Cyprinus carpio</i>	0	0	0	0	0	0	0	1	1
<i>Elassoma zonatum</i>	0	1	0	0	0	1	0	0	2
<i>Esox americanus</i>	2	0	2	0	0	3	1	0	8
<i>Gambusia affinis</i>	7	13	0	0	0	0	0	0	20
<i>Lepomis cyanellus</i>	0	0	2	0	0	0	0	0	2
<i>Lepomis gulosus</i>	1	0	1	0	0	0	0	0	2
<i>Notemigonus crysoleucas</i>	0	0	0	1	0	0	0	0	1
<b>Amphibians</b>									
<i>Ambystoma texanum</i>	1	0	0	2	0	0	0	0	3
<i>Notophthalmus viridescens</i>	0	2	1	1	0	1	4	1	10
<i>Pseudacris crucifer</i>	0	0	0	0	0	3	1	2	6
<i>Pseudacris feriarum</i>	0	0	0	0	0	0	2	0	2
<i>Rana catesbeiana</i>	18	0	0	1	0	0	3	0	22
<i>Rana sphenoccephala</i>	25	8	124	670	40	397	114	191	1569
<i>Siren intermedia</i>	0	1	3	2	0	4	6	1	17
Total individuals	83	31	133	677	44	446	132	198	1744
Total species	7	6	6	6	2	7	8	6	15



Table 3. Fishes, amphibians, and reptiles captured while dipnetting eight constructed wetlands on Grassy Slough Preserve in June 2008. 1 = observed, 0 = not observed.

Species	<u>Wetland Number</u>							
	1	3	4	6	7	8	10	11
<b>Fishes</b>								
Ameiurus melas	0	0	0	1	0	0	0	0
Amia calva	0	0	0	0	0	0	1	1
Aphredoderus sayanus	0	0	0	1	0	1	1	1
Centrarchus macropterus	0	0	0	1	1	1	0	1
Cyprinus carpio	0	0	0	0	0	1	0	1
Elassoma zonatum	1	1	1	1	1	1	1	1
Erimyzon sucetta	1	1	1	0	0	0	1	0
Esox americanus	1	1	0	0	0	0	0	0
Etheostoma gracile	1	0	0	0	0	0	0	0
Gambusia affinis	1	1	0	0	0	0	1	0
Lepisosteus oculatus	0	0	0	0	0	0	0	1
Lepomis cyanellus	0	0	1	0	1	0	0	1
Lepomis gulosus	1	0	0	1	0	0	0	0
Micropterus salmoides	1	1	1	1	0	0	0	1
Notemigonus crysoleucus	1	1	1	1	1	1	1	1
Pomoxis nigromaculatus	1	0	1	0	0	0	0	0
<b>Amphibians</b>								
Acris crepitans	1	1	1	1	1	1	1	1
Ambystoma talpoideum	1	0	1	0	0	1	1	0
Bufo fowleri	0	0	0	0	1	0	0	0
Hyla chrysoscelis	1	0	0	0	1	1	0	0
Hyla cinerea	0	1	0	1	0	0	0	0
Notophthalmus viridescens	1	0	1	1	1	1	1	0
Rana catesbeiana	1	1	0	0	0	0	1	0
Rana sphenoccephala	1	1	1	1	1	1	1	1
Siren intermedia	0	1	1	1	0	1	1	1
<b>Reptiles</b>								
Sternotherus odoratus	1	0	0	0	0	1	0	0
Trachemys scripta	0	0	0	0	0	0	0	1
<b>Total species</b>	<b>15</b>	<b>11</b>	<b>11</b>	<b>12</b>	<b>8</b>	<b>12</b>	<b>12</b>	<b>13</b>