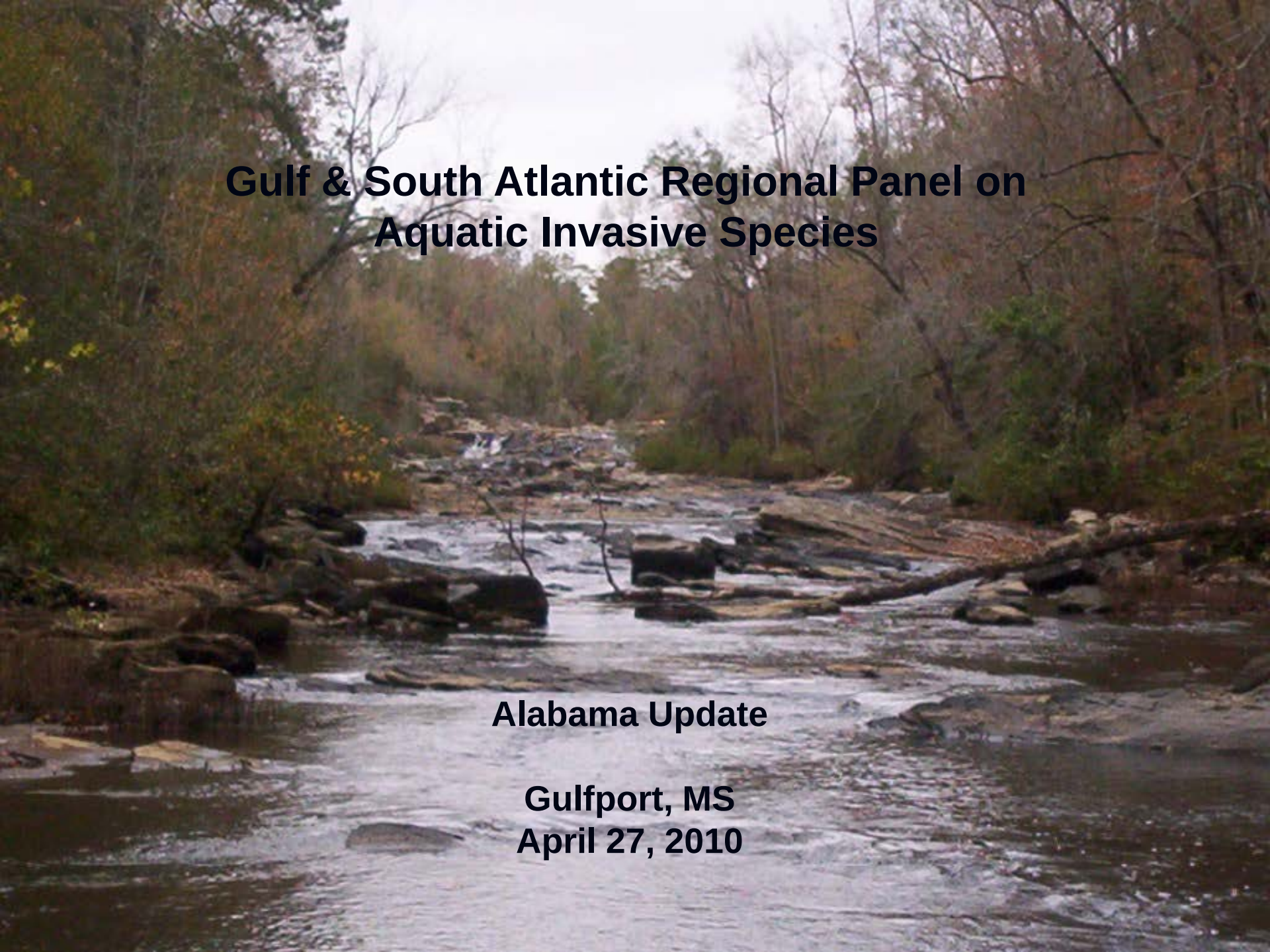


Gulf & South Atlantic Regional Panel on Aquatic Invasive Species

Alabama Update

Gulfport, MS
April 27, 2010

Alabama
Aquatic Nuisance Species
Management Plan

State of Alabama
Bob Riley, Governor

Alabama Department of Conservation
and Natural Resources
M. Barnett Lawley, Commissioner

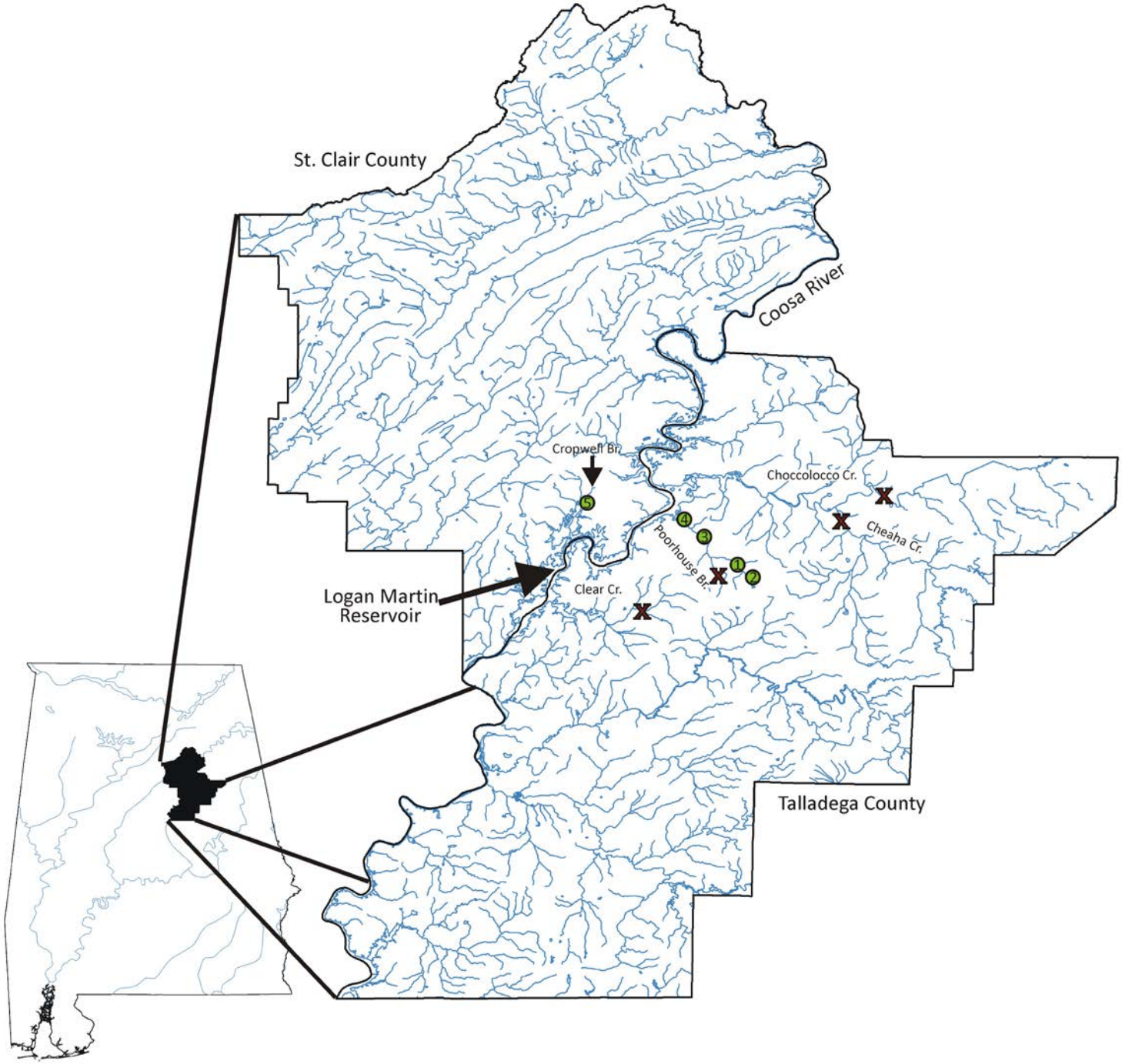
Alabama Department of Conservation and Natural Resources
Division of Wildlife and Freshwater Fisheries
Fisheries Section

Montgomery, Alabama
December 2009

- Presented to Commissioner and Asst. Commissioner.
- Requested support letter "No Way"
- Will submit to Governor within the next couple of weeks.
- Plan should be submitted to ANSTF for formal review at Fall 2010 meeting.


Poorhouse Branch
Talladega County
September 2009

Oriental Weatherfish (*Misgurnus anguillicaudatus*)


St. Clair County
Coosa River
Cropwell Br.
Choccolocco Cr.
Cheaha Cr.
Poorhouse Br.
Clear Cr.
Logan Martin
Reservoir
Talladega County

The First Record of the Exotic Oriental Weatherfish *Misgurnus anguillicaudatus* in Alabama

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The University of Alabama, Department of Biological Sciences, Tuscaloosa, AL 35487

Introduction

The oriental weatherfish (*Misgurnus anguillicaudatus*; Fig. 1A, B) is a member of the Loach family Cobitidae with a native distribution in eastern Asia (1). The species has been introduced to several states including California, Florida, Hawaii, Idaho, Illinois, Michigan, Oregon, and Tennessee (1). Introductions of the oriental weatherfish have most often been attributed to either aquarium supply escapees or released aquarium pets (1, 2, 3). However, Hawaiian populations were presumably introduced as a food source by Asian immigrants in the 1800s and the species utility as baitfish may have facilitated its spread there (1). While sampling for coldwater darters on 19 September 2009, one of the authors (BRK) discovered the oriental weatherfish in Poorhouse Branch, a direct tributary to the Coosa River in Talladega County, Alabama (Fig. 2). Here, we document the first record of the oriental weatherfish in Alabama and present preliminary forensic DNA results on the origin of the population.

Current known distribution

The initial discovery of the oriental weatherfish in Poorhouse Branch was at Talladega county road 371 (Fig. 1C, D; site 1, Fig. 2), in which a total of 29 specimens were collected ranging from 30-90 mm standard length (SL). On 20 October 2009, additional specimens were discovered upstream (site 2, Fig. 2) and downstream of county road 371 (sites 3-4, Fig. 2; A. R. Henderson, pers. comm.). On 16 November 2009, an additional occurrence was reported from the shore of Logan Martin Reservoir near the mouth of Cropwell Branch (site 5, Fig. 2; M. P. Holley and A. R. Henderson, pers. comm.).

The presence of adult and juvenile specimens at our sampling sites suggests that reproduction is occurring. Our limited sampling revealed that the oriental weatherfish is established throughout the entire reach of Poorhouse Branch. The species was located in a wide range of habitat types, including lotic headwaters and lentic portions of the stream at the junction of Logan Martin Reservoir. The discovery of specimens near Cropwell Branch (site 5, Fig. 2) suggests that the species is established in Logan Martin Reservoir.

Source of Coosa population

Using a mitochondrial DNA sequence (cytochrome *b* gene) from one of the Poorhouse Branch specimens, we conducted a search for highly similar DNA sequences on the National Center for Biotechnology Information website. Results from the BLAST search revealed that the Poorhouse Branch population is most similar to oriental weatherfish from the Yangtze River in China, possibly near the city of Zigui (Table 1). The local source of the population is still unknown and, as with other introductions of this species, probably resulted from aquarium supply escapees, released pets, or from use as baitfish. Additional forensic DNA analyses could potentially identify the local source of the introduced population by comparing our samples with specimens from local aquarium shops.

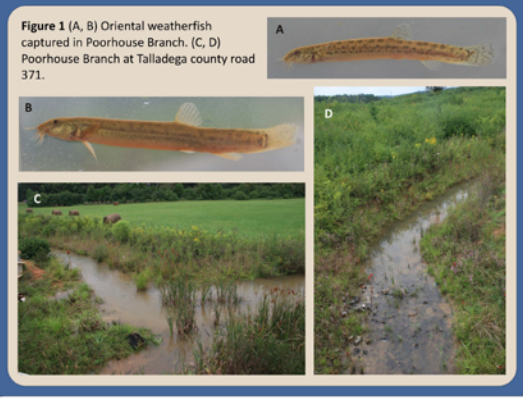


Figure 1 (A, B) Oriental weatherfish captured in Poorhouse Branch. (C, D) Poorhouse Branch at Talladega county road 371.

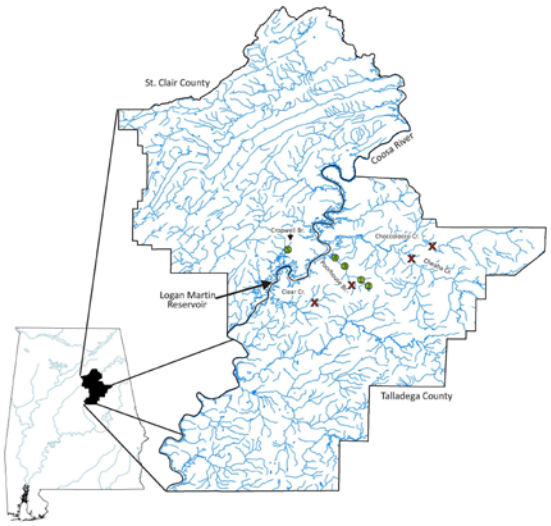


Figure 2 Map of St. Clair and Talladega counties showing known occurrences (green dots) and absences (red Xs) of the oriental weatherfish. Sites: #1- Poorhouse Branch at county road 371; #2- Poorhouse Branch at AL Hwy 77; #3- Poorhouse Branch at jct. AL Hwy 34 and county road 366; #4- Poorhouse Branch mouth at Logan Martin Reservoir; #5- Logan Martin Reservoir bank near mouth of Cropwell Branch (property of Tom Samford).

Threats to native fishes

The oriental weatherfish has been described as a coolwater species, capable of inhabiting streams, man-made channels, and lakes where introduced (1). Individuals can tolerate low oxygen conditions by burrowing into soft substrates and breathing air (1), making them extremely tolerant in poor water quality or drought conditions. The most imminent threat is its potential impact on the state-listed coldwater darter (*Etheostoma ditrema*; Fig. 3A) where the two co-occur in Poorhouse Branch. Introduced populations in Washington feed mostly on chironomids, amphipods, and cladocerans (3), a diet that partially overlaps with the coldwater darter. In addition to competition, exotic species including the oriental weatherfish often introduce non-native parasites (4) which could be harmful if host compatibility occurs. If oriental weatherfish become established in nearby Choccolocco Creek, they could potentially negatively impact the federally-listed blue shiner (*Cyprinella caerulea*; Fig. 3B) and pygmy sculpin (*Cottus paulus*; Fig. 3C) and the state-listed holiday darter (*E. brevirostrum*; Fig. 3D).

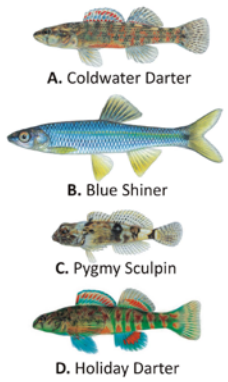


Figure 3 Native imperilled fishes potentially threatened by the introduced oriental weatherfish.

Locality	% Similarity
China: Zigui, Hubei	99.47
China: Hejiang, Sichuan	99.11
Japan: Kochi	99.02
China: Enshi, Hubei	99.02
Japan: Yamaguchi	98.93
Japan: Aichi	98.93
Japan: Okayama	98.84
Japan: Nara	98.84
China: Xianning, Hubei	98.84
China: Poyang, Jiangxi	98.75
China: Tianmen, Hubei	98.75
China: Shiyan, Hubei	98.66
China: Shangrao, Jiangxi	98.57
China: Xiaogan, Hubei	98.48
China: Yangxin, Shandong	98.30
China: Wuhan, Hubei	98.30
China: Shashi, Hubei	98.21
Japan: Hokkaido	97.85
Japan: Gunma	97.58
China: Chongqing	96.84
China: Guangxi	94.13
Japan: Shimane	90.33

Table 1 Percent similarity of the Poorhouse Branch specimen's mitochondrial DNA (cyt *b*) compared to highly similar oriental weatherfish identified in the BLAST search.

Needs

Additional sampling is needed to better determine the distribution of the oriental weatherfish in the Coosa drainage. Given that Poorhouse Branch is a relatively small watershed, routine quantitative sampling could shed light on the impacts of the oriental weatherfish on the coldwater darter and other stream fishes. Since a previous study found that largemouth bass occasionally feed on introduced oriental weatherfish (3), additional work is needed to determine if they are being sold as baitfish near Logan Martin Reservoir.

Acknowledgments

Andrew Henderson, Steve Rider, and Tom Ringenberg assisted with field surveys and provided information about occurrences at localities 3 and 4 (Fig. 2). Michael Holley provided much needed information about the occurrence in Logan Martin Reservoir (site 5, Fig. 2). We also thank the Fall 2009 UA Biogeography Class for collection assistance. Illustrations in Figure 3 were generously provided by Joseph R. Tomelleri.

References

1. Fuller P.L., Nico L.G., Williams J.D. 1999. Nonindigenous fishes introduced into inland waters of the United States. American Fisheries Society, Special Publication 27. Bethesda, MD.

2. Schultz E.E. 1960. Establishment and early dispersal of a loach, *Misgurnus anguillicaudadus* (Cantor), in Michigan. Transactions of the American Fisheries Society 89:376-377.

References continued

3. Tabor R.A, Warner E., Hager S. 2001. An oriental weatherfish (*Misgurnus anguillicaudadus*) population established in Washington State. Northwest Science 75:72-76.

4. Dove A.D.M., Ernst I. 1998. Concurrent invaders- four exotic species of Monogenea now established on exotic freshwater fishes in Australia. International Journal for Parasitology 28:1755-1764.

The Plan

Step 1: Access the current apple snail population

What we found

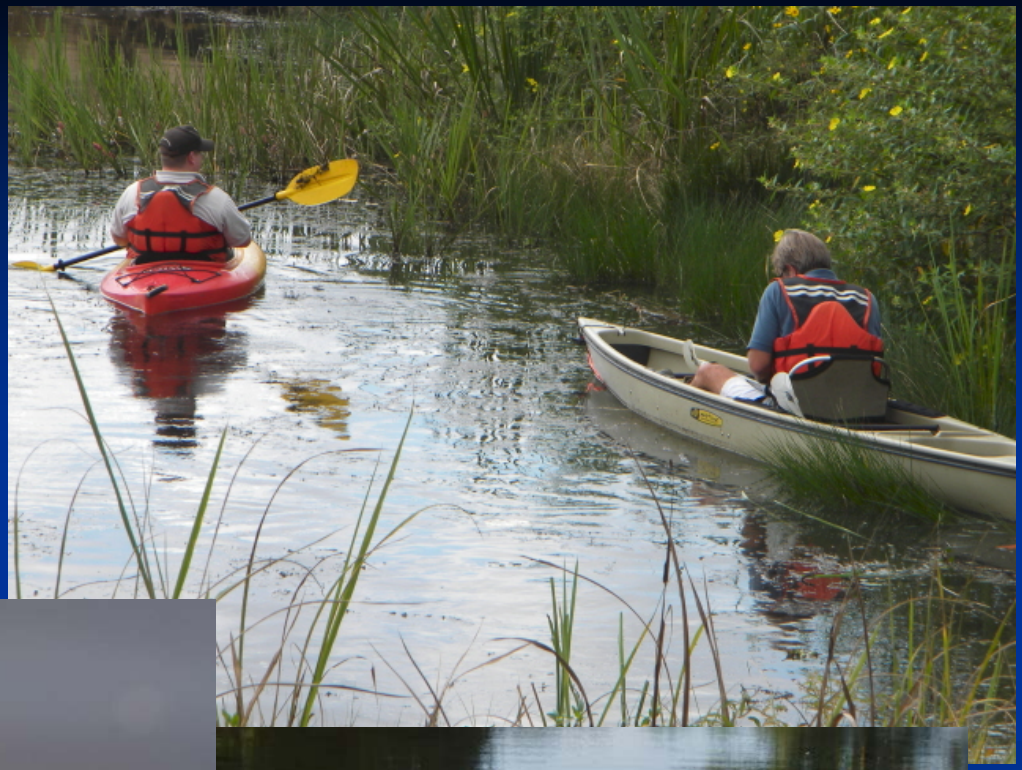
- 20 traps soaked for 3 days yielding 222 snails. 4 snails/day.

The Plan

Step 2: 2 ppm Copper sulfate application to control adults

The Plan

Step 3: Scrape eggs to control juvenile population.



Volunteers

- 74 volunteers volunteered 290 hours of their time.
- Thank you.

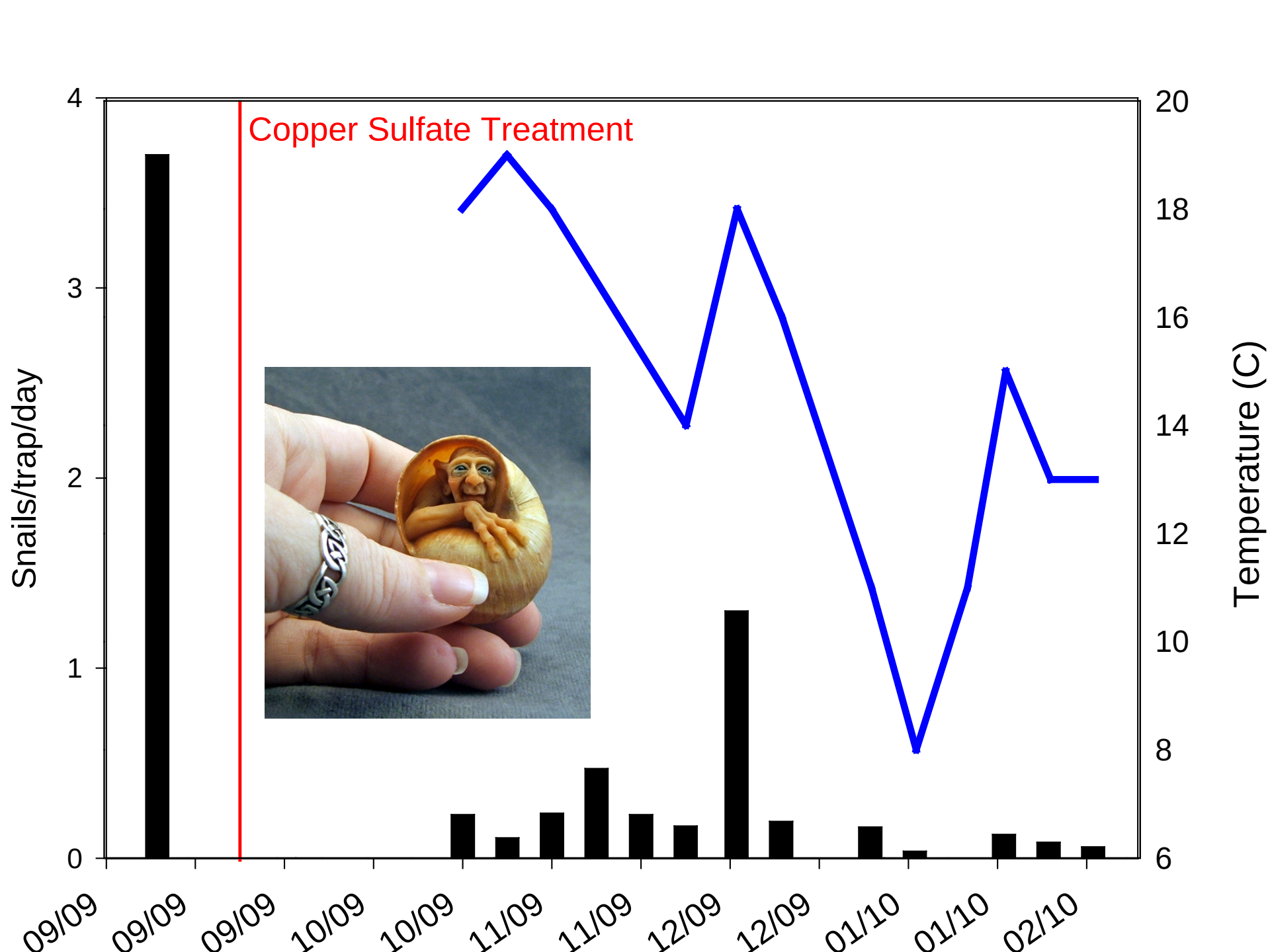
2009

Snail killer

Mobile AL

Then Plan

Step 4: Reaccess the population


Copper Sulfate Treatment
Snails/trap/day
Temperature (C)
0
1
2
3
4
6
8
10
12
14
16
18
20
09/09
09/09
09/09
10/09
10/09
11/09
11/09
12/09
12/09
01/10
01/10
02/10

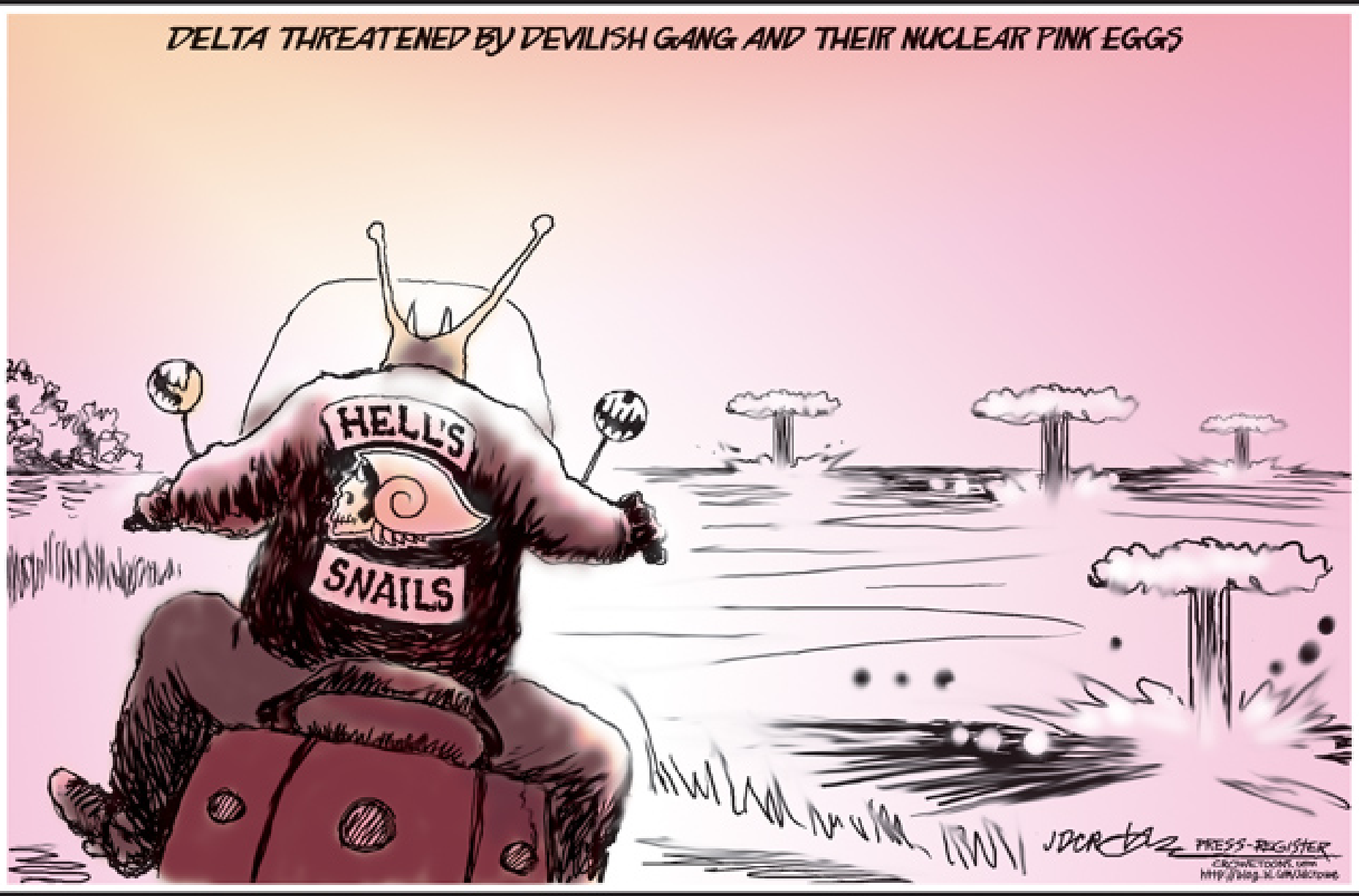
How did we do?

- Sentinel traps indicated mortality rates as high as 62%.
- Some areas we probably did a little better some a little worse.
- We knew we wouldn't get all the snails and it would be a project that would last years.

What Next?

1. Emergent Vegetation Management
2. Egg Scrapping
3. Control of Adults
4. Monitoring

Public Relations Success



4 specimens collected since last meeting
(July, August, September and November)

Other ANS