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Cover: The spotted salamander (here lying atop an eastern tiger salamander) is a rare resident of the Cedarburg Beech Woods State Natural Area in central Ozaukee County, Wisconsin. These animals are from adjacent Washington County. Photograph by Gary S. Casper.

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Notes on Husbandry of the Elephant Trunk Snake, *Acrochordus javanicus*

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Elephant trunk snakes, *Acrochordus javanicus*, are found in brackish to fresh coastal waters throughout much of Indonesia and Malaysia, reaching China, Thailand and Cambodia. Although air-breathing, these snakes are completely aquatic and nearly helpless on land. They are heavily harvested for the commercial trade in snakeskins (Lillywhite, 1991; Shine et al., 1995). This is a fairly large species, reportedly reaching a length of 8 ft.

In 2006 I received a trio of neonate elephant trunk snakes. These snakes have now reached snout-vent lengths of 20-21 in, an increase of more than a foot in the past 6 months. Although I keep a variety of herps in my home collection, I seem to be attracted to herps with interesting behaviors and what could be more interesting than an entirely aquatic snake from some of the most remote areas on earth! If kept in the proper set-up, these snakes thrive and can live well into their 20s and beyond.

Feeding time is my favorite time as these snakes exhibit very interesting predatory behavior. Their skin is rubbery in texture and their unique scalation (the skin looks like sandpaper) allows them to get a good hold on a fish when they seize it. They throw a coil or two around the fish to immobilize it while swallowing. When not hunting, they spend a lot of time motionless underwater, surfacing every 5-10 minutes to take a big breath of air (the head, with upward pointing eyes and nostrils, resembles that of the anaconda, another highly aquatic snake). At no time do I ever handle these snakes; they are strictly a "look, but don't touch" snake to keep.

There is a lot of conflicting advice on various Internet forums regarding the husbandry of elephant trunk snakes. Contrary to popular opinion, this snake can do quite well in a captive environment as long as certain specific needs are met.



Looking down at a neonate elephant trunk snake, *Acrochordus javanicus*, in its densely vegetated artificial habitat. Photograph by the author.

After speaking to several individuals and institutional keepers who have had long-term success, I decided on the following protocol:

- **Enclosure:** the trio are kept together in a 40-gallon breeder tank (36" × 18" × 18"). The tank is filled with 6 in of purified water, with pH levels in the habitat ranging from 6.5 to 7.2. Although I have never observed these snakes attempt to leave the water, a tight-fitting screen top is used to prevent escape. This also allows for a light to be placed on top.
- **Lighting:** a ZooMed Compact Fluorescent provides a 12/12 photoperiod and is attached to a household timer. This light is placed over one end of the cage, providing darker areas which the snakes seek out. If the ambient temperature is cool, I suggest using an incandescent bulb to boost background temperatures.
- **Set-up:** The tank is choked with both live aquarium plants and plastic plants. For ease of maintenance, the bottom is kept bare and a scoop net is used to retrieve fecal matter, uneaten food and dead plant material. The filter does the rest. The snakes spend considerable time hiding in the tangle of plants. Submerged reptile hide-caves provide additional hiding/ambush areas for the snakes. Other hide areas could include PVC pipes.
- **Aeration:** A standard airstone attached to a small pump provides plenty of aeration in the water. This allows for a healthy aquatic environment and is a critical to the long-term health of the snakes. There should be almost no odor coming from the tank if kept properly.
- **Filtration:** A Fluval 2 submersible filter provides both mechanical and biological filtration. Filter media are rinsed once a week with distilled or purified water.
- **Water:** Purified and aged water is provided as the water in the tank evaporates. Water is treated with "Stress Coat," which can be purchased at a pet store. Water temperature is maintained at 80°F by a standard submersible heater. Although this is considered a brackish species, I keep them in fresh water and they have never had any of the fungal problems one reads about in the literature. Should white spots appear, presumably adding a little sea salt will help.
- **Diet:** Once a week, two dozen medium to large minnows are placed in the aquarium (the minnows are kept in a plastic bag of their original water to allow them to acclimate before being dumped into the snakes' cage). Diet can also be supplemented with tadpoles but they seem to prefer fast-moving fish.

Acknowledgments

I thank Mark Robertson, a Florida herpetoculturist and rep for Bio-Con Labs, for providing excellent husbandry advice

based on his many years of experience in working with this species. The City of Lake Forest Parks and Recreation provided the opportunity for me to work with these unusual animals. Pine Tree Pet Store in Libertyville has been my source

for high quality husbandry equipment to give these animals the best in care. The Corner Store in Diamond Lake has been my source for high quality feeder minnows to keep my snakes in tip-top shape.

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The Introduced Mediterranean Gecko (*Hemidactylus turcicus*) in North-central New Mexico

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The Mediterranean gecko (*Hemidactylus turcicus*) is an Old World lizard that has become widely established in the United States since the early 1900s. The species is almost exclusively associated with human dwellings, which has facilitated its introduction to new locations. Geckos or their eggs are frequently transported as stowaways in cargo, although the intentional release of specimens also has occurred at many sites; both means of introduction are examples of jump dispersal via human intervention (Locey and Stone, 2006). Most populations in the United States are in the southeastern part of the country, particularly along the Gulf Coast (Conant and Collins, 1991). However, *H. turcicus* is also known from other sites as far west as southern California and southern Nevada (Stebbins, 2003), southern and northwestern Arizona (Brennan and Holycross, 2006), and western Texas (Conant and Collins, 1991; Price, 1980). The species also has been reported as far north as eastern Kansas (Hare, 2006).

In New Mexico, the Mediterranean gecko was first discovered at Las Cruces, Doña Ana County in 1991 (Painter et al.,

1992), and may be expanding its range within that city (Degenhardt et al., 1996). Small populations were subsequently found in two other cities in southern New Mexico: Truth or Consequences, Sierra County in 1999 (Sias and Humphrey, 2002); and Alamogordo, Otero County in 2001 (Murray and Painter, 2003). The purpose of this note is to document the presence of *H. turcicus* at two sites in Albuquerque, Bernalillo County, which is currently the northernmost verified location for this species in New Mexico.

One of the authors (M. Byers) first observed *H. turcicus* in fall 2004 on the stucco exterior walls of his home in the north-eastern quadrant of Albuquerque (UTM coordinates: 13S 0361201, 3884690). Geckos were not seen during the previous eight years that he was resident at the house. He and family members have made at least eight observations of geckos at this location over a two-year period; the most recent was a hatchling found on 31 October 2006. Most of the observed individuals appeared to be juveniles (20–30 mm snout-vent length [SVL]; based on size information in Degenhardt et al., 1996), although one adult or subadult (> 40 mm SVL) was also captured and temporarily held in captivity in 2006 (M. Byers, personal observation). In June 2006, J. Stuart examined a recently captured subadult specimen (ca. 40 mm SVL) from the Byers home, and also examined a white, hard-shelled gecko egg that was discovered within a stack of bricks in the corner of the garage. A second egg was present but accidentally broken when the nesting site was discovered earlier in June. A juvenile gecko (ca. 25 mm SVL), captured at the residence in late September 2006, is illustrated in Figure 1. The source of this *H. turcicus* population is not known.

A second known occurrence of *H. turcicus* is at a residence in the northwestern quadrant of Albuquerque (UTM coordinates: 13S 0350356, 3888276; D. Sias, personal observation). Geckos at this site are apparently descended from several small introductions, the most recent being of four specimens released



Figure 1. A juvenile *Hemidactylus turcicus* (circa 25 mm SVL) from northeastern Albuquerque, New Mexico. One-cent coin provided for scale. Photograph by M. McKinley.

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in September 1999. All of the released geckos were obtained from the established population in Truth or Consequences, New Mexico. Although this Albuquerque site has not been closely monitored, geckos apparently have persisted there for about seven years, an indication of successful reproduction. The most recent sighting of *H. turcicus* at this location was of a large adult (> 120 mm total length) that was observed by D. Sias on an exterior wall of the residence for about three hours on the evening of 18 July 2006. The gecko had a large, thick tail and appeared to be in good physical condition.

Both Albuquerque sites are in long-established suburban neighborhoods with many nearby buildings that presumably also offer suitable habitat. However, we have no evidence that geckos have migrated beyond these single residences through the process of diffusion dispersal (i.e., movement into nearby and unoccupied suitable habitat without human intervention). Based on a recent study of *H. turcicus* in Oklahoma, the diffusion dispersal rate in this species is very low and colonization of new areas occurs almost exclusively by jump dispersal with

human assistance (Locey and Stone, 2006).

Albuquerque regularly experiences subfreezing temperatures in winter; therefore, it is likely that geckos at both locations use refugia on or inside buildings to survive cold weather. The elevations at the two Albuquerque locations (1700 m at the northeast site; 1504 m at the northwest site) are probably higher than any other place where *H. turcicus* occurs in the United States, including the three locations in southern New Mexico, which range from approximately 1200 m (Las Cruces mean elevation) to 1480 m (Truth or Consequences mean elevation). It is possible that the high-elevation climate in north-central New Mexico could limit future dispersal of this species in the Albuquerque metropolitan area.

Acknowledgments

We thank Maggie McKinley for the photograph in Figure 1, and Charles W. Painter for confirming our identification of *H. turcicus* from photographs.

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Recent Sale of the Most Spectacular Herpetological Medal Produced by the U.S. Mint

David Chiszar¹, Hobart M. Smith² and W. Douglas Costain³

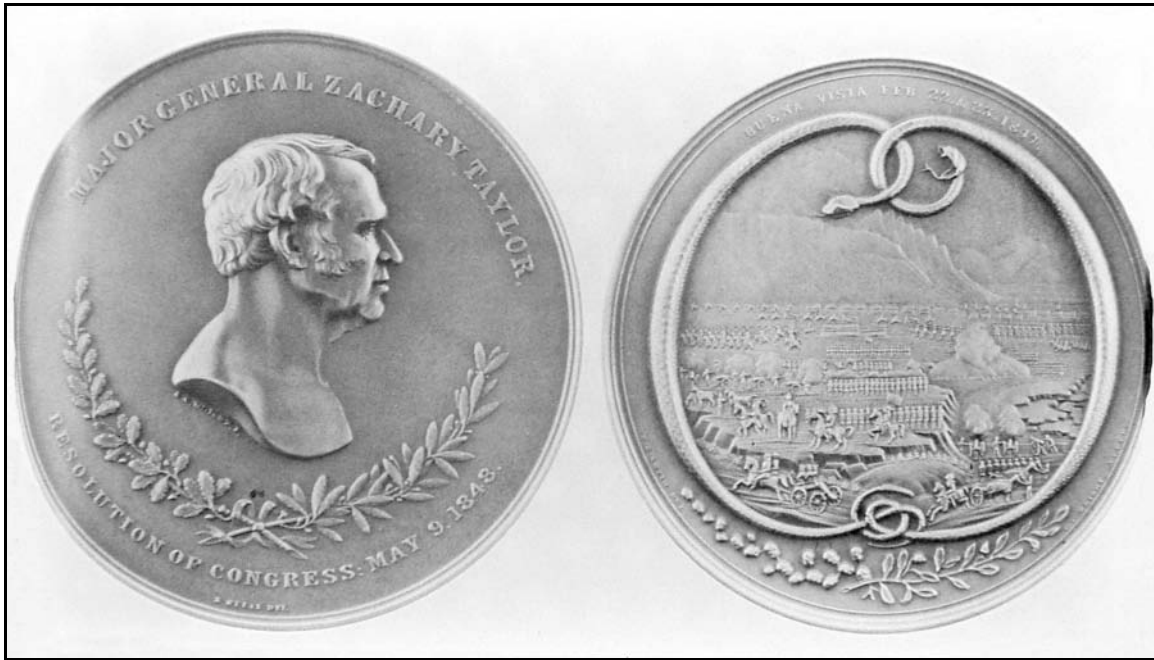
Chiszar and Smith (2005) described herpetological medals produced by the U.S. Mint, and we illustrated one in particular that was awarded by Congress to Major General Zachary

Taylor in 1848 (actually presented in 1849) for his service in the war with Mexico at the Battle of Buena Vista (February 1847). We had seen only a bronze specimen of this medal (see

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This medal, illustrated in Chiszar and Smith (2005), was awarded to Major General Zachary Taylor for his service in the war with Mexico. The reverse shows the American rattlesnake vanquishing its noncrotaline Mexican counterpart. The piece awarded to Gen. Taylor contained 20 ounces of California gold.

Figure 3 in Chiszar and Smith [2005]) but the one presented to General Taylor was gold (20 troy ounces, 90 mm diameter), and it is the only known gold specimen. Furthermore, it is one of the largest congressional gold medals. Winfield Scott received a medal of the same size, also for service in the war with Mexico, and Ulysses S. Grant received a slightly larger one for his civil war victory at Vicksburg. The latter two medals currently reside in the Smithsonian Institution, whereas Taylor's medal is in private hands. It was recently (November 7–8, 2006) offered in an auction held in Baltimore, Maryland, by Stack's/American Numismatic Rarities, as lot 2254. A bronze version of the same medal was offered as lot 2255.

In connection with the S/ANR auction some new information came to light regarding the gold specimen. Taylor's victory against a Mexican army vastly larger than his own and under the command of General Santa Anna led to the eventual conquest of Mexico City and to the successful conclusion of the war. These factors predisposed the cession of California and considerable other southwestern lands to the U.S. through the treaty of Guadeloupe Hidalgo in February 1848. Gold was discovered at Sutter's Mill on the American River in California on January 24, 1848, and we infer this was not known to the diplomats at Guadeloupe Hidalgo. During December of that year several gold shipments were made from the "digs" in California to the Philadelphia Mint, and the first of these arrived on December 8, carried personally by prospector David Carter. Mint documents reveal that Taylor's medal was struck from this deposit, and is the only mint product that can be unambiguously associated with this first batch of California gold.

The dies for the medal were cut by Charles C. Wright in June 1849 and the medal was struck on July 4. President Taylor died in office just one year later. Apparently the gold medal as

been in the Taylor family until recently.

The gold medal realized \$460,000 at the S/ANR auction which closed on November 8, 2006. Considering the current bullion value of the gold content of the medal—approximately \$12,800—the realized value clearly represented a substantial premium based partly on the human pedigree of the piece and partly on the fact that the medal quite literally symbolizes the great California Gold Rush.

The bronze medal realized \$2,990. It was the usual practice of the mint to make bronze copies of gold medals, some as presentation pieces and some for sale to the public. DC recently acquired two such bronze medals, one honoring Alexander Hamilton and the other honoring Andrew Jackson, at the going price of \$20 each. We may hypothesize that the realized value of the Zachary Taylor bronze was somewhat inflated by its juxtaposition with the gold original.

Readers of Chiszar and Smith (2005) will recall that the obverse of the Zachary Taylor medal shows his bust facing right, whereas the reverse contained a battle scene surrounded by two snakes—a rattlesnake (right), symbolizing the U.S., vanquishing a non-crotaline snake (left), symbolizing Mexico. The great anachronistic irony here is that the snake in the grip of the eagle in the current national emblem of Mexico is a rattlesnake, but this has been so only since December 30, 1969 (Chiszar and Smith, 1996). Between 1824 (shortly after Mexican independence from Spain) and 1969, the snake in the national emblem of Mexico was a colubrid, possibly *Thamnophis eques eques* (Reuss) (Cope, 1900; Chiszar and Smith, 1996; Rossman et al., 1996). Throughout the 18th and 19th centuries, rattlesnake imagery was more closely associated with the United States of America and her army than with Mexico and her army. These points of national emblematic evolution

add considerably to the historical significance of the Zachary Taylor medal.

The usual interpretation of the 1969 change in Mexican coinage and in the national emblem is that Mexico wished to honor pre-Columbian artistic representations, and that rattlesnake imagery was more consistent with this genre than was colubrid imagery. The work of Diaz Bolio (1964) leaves no doubt about the importance of rattlesnake imagery in pre-Columbian Mexico, as would a visit to the National Museum of Anthropology in Mexico City. Another hypothesis is possible; namely, that the rattlesnake now in the grip of the Mexican

eagle represents the United States, just as it did in the Zachary Taylor medal, and the current Mexican emblem therefore projects a hopeful inversion in the relationship between the two nations. These two interpretations are not mutually exclusive, and it is also possible that the second one has arisen subconsciously among post-moderns, whereas it was not part of the thinking (conscious or unconscious) of earlier generations. In any case, we consider the study of herpetological imagery to be almost as interesting as the study of the animals themselves, although testing hypotheses about the former may be more difficult than the latter.

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On the Herpetofaunal History of the University of Wisconsin-Milwaukee Field Station (Ozaukee County, Wisconsin)

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Abstract

Two recently published articles (Kapfer, 2006; Kapfer and Muehlfeld, 2006) on the herpetofauna of the University of Wisconsin-Milwaukee Field Station (UWMFS), in west-central Ozaukee County, Wisconsin, suggested the beginning of a series on the herpetology of this natural area. I here provide a more thorough summary of the herpetology of the UWMFS. I then provide a checklist of the amphibians and reptiles of the UWMFS, and comment on future inventory and monitoring needs. It is hoped that the herpetological history of the UWMFS will be better represented with the inclusion of this information.

Introduction

Attempts to determine the amphibian and reptile species occupying any discrete geographic area (the study area) are usually begun by collating available data from a somewhat broader geographic region within which the study area in question is contained. The collection and review of these data, often historical, produces a working list of species likely to occur based on available records (both verified and not). Records from nearby may also suggest the presence of undocumented species where required habitats are available in the study area. The resultant species list is useful in determining inventory needs, and for designing monitoring protocols if desired. In this case, the study area is the UWMFS properties, and the Cedarburg Bog and Cedarburg Beech Woods State

Natural Areas (for full description see Reinartz [1985, 1986]). The UWMFS and the natural areas occupy approximately the southwestern quarter of Saukville Township (Tier 11 North, Range 21 East).

Methods

To begin a record search, the Wisconsin Herp Atlas is a ready source of herp distribution data. For this exercise, I chose to query the database for records from the following townships: Tier 10 North, Range 20 East; Tier 10 North, Range 21 East; Tier 11 North, Range 20 East; and Tier 11 North, Range 21 East. This search returned all specimen, photographic, literature, and observational records included in the database, within an approximately 10 km radius of the

UWMFS. I also reviewed the literature for references to herp research at the UWMFS. Throughout this review and checklist I follow Crother (2000) and supplements (Crother et al., 2001, 2003) for both scientific and standard common nomenclature, and I use the subspecies known from the geographic area in question where they are unequivocal.

Results

The first review of the herps of the UWMFS was provided by the prominent ornithologist Charles M. Weise (1986), who listed “reptiles and amphibians that have been observed or recorded at the Field Station or in the adjacent Cedarburg Bog or adjoining woods and farms since the Field Station was founded in 1965.” He mentioned that a few sporadic collections had been made, but that generally the “abundance status” is poorly documented, and the list should be considered provisional, with future changes expected. No collectors or voucher specimens were mentioned. His list included the following species (modern names and subspecies added where possible): blue-spotted salamander, eastern tiger salamander, central newt, eastern American toad, western chorus frog, northern spring peeper, gray treefrog (not differentiated between *Hyla versicolor* and *H. chrysoscelis*), northern green frog, northern leopard frog, wood frog, eastern snapping turtle, Blanding’s turtle, painted turtle (subspecies not given), northern ring-necked snake, eastern milksnake, common gartersnake, midland brownsnake, and northern red-bellied snake.

A number of amphibian and reptile studies have been conducted at the UWMFS. Inventory and surveys were begun in 1987. Casper and Katona (1987) obtained the first Ozaukee County occurrence documentation for six herp species through surveys at the UWMFS (see checklist), and they emphasized that the Cedarburg Beech Woods State Natural Area harbored four species of salamanders utilizing vernal pools (spotted, tiger, and blue-spotted salamanders, and central newts). Surveys by Casper (1988) captured 54 amphibians of four species by pitfall trapping, and 11 additional species by visual searches. Seventeen voucher specimens were preserved, and a calling frog survey was also run. Thirteen blue-spotted salamander specimens from the Byer ponds adjacent to the Cedarburg Beech Woods State Natural Area were shipped to L.A. Lowcock at the Royal Ontario Museum for ploidy and genome determination using flow cytometry and starch gel electrophoresis. The presence of triploid females (formerly *Ambystoma tremblayi*) was confirmed. At least ten species of amphibians were documented to be using the vernal pool complex in and adjacent to the Cedarburg Beech Woods State Natural Area. Additional snake specimen vouchers were collected in 1992 (Casper, 1992). These surveys resulted in several new county records for herps from the UWMFS (Casper, 1996a), and a statewide review of amphibian status was published in 1998 (Casper, 1998).

Additional survey studies were conducted as undergraduate projects. Hoyer (1988) surveyed amphibians at the UWMFS and surrounding areas by drift fences, calling surveys, and visual searches. She detected nine species: eastern tiger salamander, blue-spotted salamander, central newt, wood frog,

northern spring peeper, western chorus frog, northern green frog, northern leopard frog, and eastern American toad. Jastrow-Larson (1988) surveyed herps at the UWMFS using snake boards, turtle traps, and visual searches (including road cruising). She recorded 21 eastern gartersnakes, seven Butler’s gartersnakes, five northern red-bellied snakes, two eastern milksnakes and two painted turtles.

The Wisconsin Frog and Toad Survey (WFTS) performs annual monitoring based on a calling frog protocol (Mossman et al., 1998). Route 461 has ten stops north of STH 33, which is immediately north of the UWMFS. As of a 1998 analysis (op. cit.) Route 461 had detected eight species of anurans: wood frog, western chorus frog, northern spring peeper, northern leopard frog, eastern American toad, gray treefrog, northern green frog, and American bullfrog.

Kapfer (2006), and Kapfer and Muehlfeld (2006), supplement previous survey work with two days of survey effort in each of two years (2004, 2006). Their methods were search and seize visual surveys, cover objects, drift fences with pitfall traps, aquatic hoop net traps, aquatic funnel (minnow) traps, and frog calling surveys. They reported detecting seven amphibian species (blue-spotted salamander, central newt, eastern American toad, gray treefrog, northern spring peeper, northern green frog, northern leopard frog, wood frog), and four reptile species (eastern milksnake, Butler’s gartersnake, common gartersnake, eastern snapping turtle, Blanding’s turtle, and midland painted turtle). The Blanding’s turtle represented the first confirmed county record (Casper et al., in press).

Herp studies with more research oriented objectives are ongoing at the UWMFS. Work on snakes has focused mainly on gartersnakes, including reproductive isolation in the Butler’s gartersnake (Rossman et al., 1992). Burghardt et al. (1997) report on a multi-disciplinary study on the conservation status, distribution and taxonomy of the Butler’s gartersnake in Wisconsin. Paul Nys began ecological studies of gartersnakes at the UWMFS in 1995, with the objectives of comparing wetland habitat utilization and population dynamics of Butler’s and common gartersnakes (Nys, 1996). While never completed, this study collected measurements and data on temperature ecology on at least 48 Butler’s gartersnakes. Burghardt and Casper (2004) are studying Butler’s gartersnake systematics, genetics and morphology rangewide. Joppa and Temple (2003, 2004, 2005) examined use of upland habitat by the Butler’s gartersnake, including at the UWMFS. Placyk et al. (2004) examined post-glacial recolonization pathways into the Great Lakes region by the common gartersnake inferred from mtDNA sequences.

Other research projects have utilized herps at the UWMFS. Seale and Jones (1991) examined density effects of wood frog tadpoles on primary productivity in ponds. Seale and Sontag (1997) examined the effects of predation by wood frog tadpoles on phytoplankton community structure. Sontag (1996) performed manipulations of microcosm community structure to determine the impact of wood frog tadpoles on phytoplankton community structure. Yoder (1994, 1996, 1997, 1998a, b) reported on his work on parasites of UWMFS amphibians, including the helminth parasites of northern spring peepers and

wood frogs (Yoder and Coggins, 1996) and northern green frogs (Yoder et al., 2000, 2001). Sternard (1988) characterized the acoustic structure of anuran calls using a Kay Sonagraph. Molecular phylogeography of the spotted salamander was examined by Savage and Zamudio (2000). Casper (2003a, 2003b) developed a technique for using presence-only distribution data to analyze herp distributions.

The Wisconsin Herp Atlas query returned 891 records for 29 species for the study area. For the UWMFS, eleven species are documented with specimen vouchers, eight species are documented only with photographic vouchers, and two species are only represented by observational records. Records for an additional eight species are available regionally, but considered hypothetical as part of the UWMFS herpetofauna. These data are incorporated into the checklist accounts below.

An Annotated Checklist of the Amphibians and Reptiles of the UWMFS

“Region” means the following four townships: T10N, R20E; T10N, R21E; T11N, R20E; T11N, R21. Voucher specimens are listed where known. Acronyms: INHS—Illinois Natural History Museum; MPM—Milwaukee Public Museum Herpetology Collection; MPM-P—Milwaukee Public Museum Herpetology Photo Collection; TULA—Tulane University; WHA—Wisconsin Herp Atlas; UMMZ—University of Michigan Ann Arbor; UWGB—Richter Museum, University of Wisconsin-Green Bay; UWZ—University of Wisconsin Madison Zoology Museum.

Anura—Frogs and Toads (8 species)

Bufo Laurenti, 1768—Toads

B. americanus Holbrook, 1836—American Toad

B. a. americanus Holbrook, 1836—Eastern American Toad

Regional records date back to 1959 (“Cedarburg”) for this common species. First recorded at the UWMFS in 1986 by M. Ficken (WHA FICK 103), it was considered present by Weise (1986), and has been reported on numerous occasions since. A “Cedarburg” voucher series at MPM (9769-76) is described as “missing” in the museum catalog, and one additional “Cedarburg” voucher is at UWZ (17405). No voucher specimens are known from the UWMFS, but the species was most recently noted in 2004 and 2006 surveys (Kapfer, 2006; Kapfer and Muehlfeld, 2006). Staff and visiting students most likely encounter eastern American toad annually on the UWMFS grounds.

Hyla Laurenti, 1768—Treefrogs

H. versicolor LeConte, 1825—Gray Treefrog

Gray treefrogs are common regionally where forests remain, and are regularly seen and heard at the UWMFS. They were first reported regionally in 1987, and Weise (1986) included “gray treefrogs” (presumably *H. versicolor*), in his UWMFS list. Their presence is supported regionally with photographs and audio recordings (MPM-P 181) from the Pleasant Valley Farm (T10N, R20E, Sec. 5), and from the UWMFS with photographs and call descriptions (MPM-P 534) from 1992. They were also found in 2004 and 2006 surveys

(Kapfer, 2006; Kapfer and Muehlfeld, 2006).

Pseudacris Fitzinger, 1843—Chorus Frogs

P. crucifer (Wied-Neuwied, 1838)—Spring Peeper

P. c. crucifer (Wied-Neuwied, 1838)—Northern Spring Peeper

First reported regionally by H. Suzuki in 1948 from Cedarburg (MPM 2870). S. Borkin, A. Brower and K. Marsa collected additional specimens from the UWMFS in 1986 (MPM 22538-40), and Weise (1986) included it in his UWMFS species list. Many reports have been made since, both regionally and at the UWMFS, where it is a common frog. They were most recently found in 2004 and 2006 surveys (Kapfer, 2006; Kapfer and Muehlfeld, 2006).

P. triseriata (Wied-Neuwied, 1838)—Western Chorus Frog

This small frog was first reported regionally from Cedarburg in 1960 (UWZ 17404), and W. H. Huibregste collected one at the UWMFS in 1968 (MPM 22524). Chorus frogs were in Weise’s (1986) list for the UWMFS, and C. Fuller documented another record west of Pleasant Valley Farm in 1988 (T10N, R20E, Sec. 5; MPM-P 182). Numerous records are available since. This is considered to be a common frog regionally and at the UWMFS. They were predictably found in 2004 and 2006 surveys (Kapfer, 2006; Kapfer and Muehlfeld, 2006).

Rana Linnaeus, 1758—True Frogs

R. catesbeiana Shaw, 1802—American Bullfrog

Regionally a specimen was collected in 1996 on Jackson Drive, ca. 0.25 miles south of CTH NN (MPM 30270; T10N, R20E, Sec. 5 NW1/4). In 1987 a specimen was photographed at the UWMFS along the boardwalk in the Cedarburg Bog (MPM-P 49), representing the first record for Ozaukee County (Casper and Katona, 1987). No other records are available. This frog is locally common in the region, and probably expanding its range (personal observation). Weise (1986) did not include them in his 1986 UWMFS species list.

R. clamitans Latreille, 1801—Green Frog

R. c. melanota Rafinesque, 1820—Northern Green Frog

This common frog is known regionally from many records, as early as 1924, when C. L. Turner collected a specimen from the Milwaukee River, 2.5 miles south of Newburg (UMMZ 59222). In 1925, T. E. B. Pope and W. E. Dickinson collected eight more specimens from Grafton (MPM 1974-79, 1904-5). The first observations from the UWMFS on record are from 1986 by M. Ficken (WHA FICK 104, 107) and Weise (1986). From 1986 forward UWMFS observations have continued, including from 2004 and 2006 surveys (Kapfer, 2006; Kapfer and Muehlfeld, 2006). Oddly, no voucher specimens are available from the UWMFS for this common frog.

R. pipiens Schreber, 1782—Northern Leopard Frog

The first regional record for the northern leopard frog was from the UWMFS in 1968, when W. H. Huibregste collected a specimen (MPM 22523). Weise (1986) included them in his UWMFS species list, and G. Ludwig collected four tadpoles from the UWMFS in 1972 (MPM 13717). They have been regularly reported since (WHA records), including 2004 and 2006 surveys (Kapfer, 2006; Kapfer and Muehlfeld, 2006).

This species has experienced declines (Mossman et al., 1998), and its complex life history, with multiple habitat requirements (Rorabaugh, 2005), make it a prime candidate for monitoring of population trends as an indicator of overall ecosystem health.

R. sylvatica LeConte, 1825 — Wood Frog

W. H. Huibregste collected nine specimens of this forest species from the UWMFS in 1968 (MPM 22525-33). Weise (1986) included them in his UWMFS species list, and they have been regularly reported since (WHA records), including from 2004 and 2006 surveys (Kapfer, 2006; Kapfer and Muehlfeld, 2006).

Caudata—Salamanders (4 species)

Ambystoma Tschudi, 1838 — **Mole Salamanders**

A. laterale Hallowell, 1856 — Blue-spotted Salamander (includes polyploid unisexual complexes)

Blue-spotted salamanders were first recorded from the region (“Cedarberg”) in 1960 (UWZ 17398), and W. H. Huibregste collected two specimens in 1968 (MPM 22521-2) from what would become the Cedarburg Beech Woods State Natural Area. Another series was collected from the same location in 1988 (MPM 23368-78). They were listed by Weise (1986), and there are numerous more recent records. This species is regionally common. Blue-spotted salamanders were found in 2004 and 2006 surveys (Kapfer, 2006; Kapfer and Muehlfeld, 2006), and polyploid unisexuals are present at the UWMFS (Casper, 1988).

A. maculatum (Shaw, 1802) — Spotted Salamander

This regionally rare species (probably less than 10 extant populations in Washington and Ozaukee counties combined, WHA records) was first documented regionally by David Borneman from Riveredge Nature Center (T11N, R21E, Sec. 7 SE1/4 of NE1/4) in 1986 (MPM 22699). Weise (1986) did not include them in his 1986 UWMFS species list, but a population was discovered and documented at the UWMFS in 1987 and 1989 (MPM-P 61, 62, 244), in vernal ponds of the Cedarburg Beech Woods State Natural Area (Casper and Katona, 1987). No additional records have been reported since 1989. Spotted salamanders are not easily detected, however, being fossorial and nocturnal. Given this lack of recent reports, the status of the spotted salamander at the UWMFS should be reconfirmed.

A. tigrinum (Green, 1825) — Tiger Salamander

A. t. tigrinum (Green, 1825) — Eastern Tiger Salamander

A number of records for this species are available from the 1980s, both regionally and at the UWMFS (MPM-P 52-4). They were included in the UWMFS list by Weise (1986). The first record for Ozaukee County was from the UWMFS (Casper and Katona, 1987). It is regionally common.

Notophthalmus Rafinesque, 1820 — **Eastern Newts**

N. viridescens (Rafinesque, 1820) — Eastern Newt

N. v. louisianensis Wolterstorff, 1914 — Central Newt

Central newts were included in the UWMFS list by Weise (1986), and first documented there in 1987. Reports continue through 2000 (MPM-P 55, 122; MPM 31791). The first record for Ozaukee County was from the UWMFS (Casper and

Katona, 1987; note that MPM-Photo 63 referring to a newt specimen is a misprint, correct photo specimen numbers are given here). No other regional observations are known, but central newts are easily overlooked. Three individuals were found at the UWMFS in a limited 2006 survey (Kapfer and Muehlfeld, 2006).

Squamata—Snakes (6 species)

Lampropeltis Fitzinger, 1843 — **Kingsnakes**

L. triangulum (Lacépède, 1789) — Milksnake

L. t. triangulum (Lacépède, 1788) — Eastern Milksnake

Eastern milksnakes were first reported regionally in 1895 by T. H. Hartwig (Cedarburg, MPM 460, 580), in 1935 by J. Lutzen (Cedarburg, MPM 2520), and in 1986 (Newburg, MPM 22557; Weise, 1986). In 1980 a specimen was collected at the UWMFS by M. Ficken (MPM 22517), followed by additional UWMFS specimens through 1992 (MPM 23348, 23349, 23351, 26190-1). They are a regionally common snake and are regularly observed at the UWMFS, with recent reports available (Kapfer, 2006; Kapfer and Muehlfeld, 2006).

Nerodia Baird and Girard, 1853 — **North American Watersnakes**

N. sipedon (Linnaeus, 1758) — Northern Watersnake

N. s. sipedon (Linnaeus, 1758) — Northern Watersnake

In 1987 J. Reinartz found a specimen at Mud Lake (MPM-P 50-1). This was the first record for Ozaukee County (Casper and Katona, 1987). No other records are known from the region or the UWMFS, and they are considered rare. Weise (1986) did not include them in his 1986 UWMFS species list.

Storeria Baird and Girard, 1853 — **North American Brownsnakes**

S. dekayi (Holbrook, 1836) — DeKay’s Brownsnake

S. d. wrightorum Trapido, 1944 — Midland Brownsnake

Midland brownsnakes were first reported from the UWMFS in 1968 by P. E. Matthiae (MPM 22514), with two additional specimens collected by M. Plonczynski in 1978 (MPM 22515-6). Weise (1986) included them in his UWMFS species list, but noted they were rarely seen. Another observation was made in 1987 by L. Katona and C. Fuller (WHA KALA 27), and three additional regional observations are available (WHA records). None were found in limited 2004 and 2006 snake surveys (Kapfer, 2006; Kapfer and Muehlfeld, 2006).

S. occipitamaculata (Storer, 1839) — Red-bellied Snake

S. o. occipitamaculata (Storer, 1839) — Northern Red-bellied Snake

The few regional records available for northern red-bellied snakes are mostly from the UWMFS, with one photo voucher (MPM-P 75). Weise (1986) included them in his UWMFS species list, but noted they were rarely seen. The first record for Ozaukee County was from the UWMFS (Casper and Katona, 1987). WHA records are all from the late 1980s. They were also found in 2004 and 2006 surveys (Kapfer, 2006; Kapfer and Muehlfeld, 2006).

Thamnophis Fitzinger, 1843 — **North American Gartersnakes**

T. butleri (Cope, 1889) — Butler’s Gartersnake

This state Threatened Species was first reported from the

UWMFS in 1987 (WHA KALA 10) by L. Katona and C. Fuller, and documented the same year by G. S. Casper (MPM-P 56-60, MPM 23206). These were the first records for Ozaukee County (Casper and Katona, 1987). Additional specimens from the UWMFS are available (MPM 23350, 23353, 30263), and additional regional and UWMFS observational records have been reported since 1987 (MPM 28288-9, WHA records, personal observations). They were also found in 2004 and 2006 surveys (Kapfer, 2006; Kapfer and Muehlfeld, 2006). Several studies have been conducted on this snake at the UWMFS (see above). Weise (1986) did not include them in his 1986 UWMFS species list, even though these snakes are commonly visible around the UWMFS lab buildings. It is possible that earlier workers may have mistaken Butler's gartersnakes for common gartersnakes, or assumed that all gartersnakes seen were common gartersnakes. Alternatively, it is possible Butler's gartersnakes were introduced to the UWMFS, as they were commonly kept as pets before listing protections were instituted in 1997. For example, a Milwaukee individual is known to have released many Butler's gartersnakes captured in central Milwaukee County (near Capitol Drive and Interstate 43) at Daly Lake, just north of the UWMFS, in the 1980s (personal observation). The reason given was that he was "saving" the snakes from local boys who frequently killed them for fun. This individual claimed to have moved at least 300 snakes from Milwaukee to Daly Lake in Ozaukee County, Menomonee Falls in Waukesha County, and the North Kettle Moraine State Forest (presumably in southeastern Fond Du Lac County).

T. sirtalis (Linnaeus, 1758)—Common Gartersnake

T. s. semifasciatus Cope, 1892—Chicago Gartersnake

T. s. sirtalis (Linnaeus, 1758)—Eastern Gartersnake

Eastern gartersnakes were first reported regionally and at the UWMFS in 1986 by G. S. Casper and M. Ficken (WHA CAGS 64, FICK 100), and by Weise (1986). A specimen was collected in 1986 by K. Yurske at Riveredge Nature Center (MPM 22558), and another at the UWMFS in 1992 by M. Ficken (MPM 26189). Numerous observations are available regionally and at the UWMFS (WHA records; Kapfer, 2006; Kapfer and Muehlfeld, 2006). Most specimens are referred to the subspecies *T. s. sirtalis*, but occasionally individuals appear exhibiting characters more suited to *T. s. semifasciatus* (personal observation).

Testudines—Turtles (3 species)

Chelydra Schweigger, 1812—**Snapping Turtles**

C. serpentina (Linnaeus, 1758)—Snapping Turtle

C. s. serpentina (Linnaeus, 1758)—Eastern Snapping Turtle

In 1968, W. H. Huibregste collected three hatchling specimens (MPM 22518-20) from the Cedarburg Beech Woods State Natural Area. Weise (1986) reported them in his UWMFS species list. Another hatchling found on Hwy 33 between Blue Goose and Birchwood Roads was collected in 1988 (MPM 23366) - no other vouchers are known. It is regionally common and has been reported regularly at the UWMFS through 2006 (Kapfer and Muehlfeld, 2006). Snapping turtles are common residents of Mud Lake and other permanent and semi-

permanent waters of the region.

Chrysemys Gray, 1844—**Painted Turtles**

C. picta (Schneider, 1783)—Painted Turtle

C. p. marginata Agassiz, 1857—Midland Painted Turtle

Painted turtles were first reported from the UWMFS in 1986 (Weise, 1986), and photographs are available (MPM-P 21-2). The subspecies present at the UWMFS was recorded as the midland painted turtle by Kapfer (2006), and eastern Wisconsin is considered to be a region of intergradation of two subspecies (Casper, 1996b). I have not examined available Ozaukee County material to determine which subspecies characters are prevalent (at least eight Ozaukee County specimens are available in three museums: MPM 1725, 26387; TULA 856-8; UWGB 306, 339, 372). A robust trapping interval could capture a series sufficient to answer this question. Painted turtles are frequently observed and are regionally common in permanent and semi-permanent waters.

Emydoidea Gray, 1870—**Blanding's Turtles**

E. blandingii (Holbrook, 1838)—Blanding's Turtle

Observations of this state Threatened Species are available regionally beginning in the 1980s, including a report of one individual crossing St. Augustine Road north of Mud Lake in 1984 (WHA CUNJ 13), and one photo-documented adult individual (WHA PLGI 1) on the south side of Cedar Sauk Road east of Covered Bridge Road (T10N, R21E, Sec. 3 NW quarter of NE quarter), in 1999. Weise (1986) reported them in his UWMFS species list. More recently, Kapfer (2006) reported a juvenile found on the UWMFS grounds in 2004 by J. Reinartz, and Kapfer and Muehlfeld (2006) trapped one adult in Mud Lake, representing the first documentation of the species in Ozaukee County (INHS herp photo 2007a; Casper et al., in press). Kapfer and Muehlfeld (2006) also reported "anecdotal sightings from the last several years *vide* J. Reinartz." Based on these observations, it appears that Blanding's turtles are a rare resident of Mud Lake and its environs, with successful reproduction reported.

Hypothetical Species

Anura—Frogs and Toads

Acris Duméril and Bibron, 1841—**Cricket Frogs**

A. crepitans Baird, 1854—Northern Cricket Frog

A. c. blanchardi Harper, 1947—Blanchard's Cricket Frog

While this state Endangered Species could have been present at UWMFS in the early 1900s, a substantial range retraction has since eventuated (Casper, 1996b), and it is not present at this time. Weise (1986) did not include them in his 1986 UWMFS species list, and there are no vouchers or observational records known from Ozaukee County.

Hyla Laurenti, 1768—**Treefrogs**

H. chrysoscelis Cope, 1880—Cope's Gray Treefrog

This species is rare regionally and there are no confirmed records from Ozaukee County. One regional report from 1996 at Riveredge Nature Center is unverified (WHA STCH 115). Based on the survey work noted above, there is as yet no evidence that Cope's gray treefrogs are present at the

UWMFS. Appropriate habitat is present, however.

Rana Linnaeus, 1758 — **True Frogs**

R. palustris LeConte, 1825 — Pickerel Frog

There are two records for pickerel frogs, a species easily confused with *R. pipiens*. One observation from Mud Lake in 1986 is unverified (WHA CUNJ 9), and one tadpole from Riveredge Nature Center is difficult to determine to species (MPM 23014). It is plausible that this species could inhabit streams and lake shores in Ozaukee County, but there is no confirmed evidence of occurrence at this time. Weise (1986) did not include them in his 1986 UWMFS species list.

Caudata — Salamanders

Hemidactylum Tschudi, 1838 — **Four-toed Salamanders**

H. scutatum (Temminck and Schlegel in Von Siebold, 1838) — Four-toed Salamander

Four-toed salamanders are known from Fond Du Lac and Sheboygan counties (Casper, 1996b) and northeastern Illinois (Phillips et al., 1999). They prefer mature hardwood forests, and breed in ephemeral or semi-permanent ponds with mossy shorelines, or ponded moss hummocks. Such conditions were presumably present in the study area presettlement, and remain to a lesser extent today. It is possible four-toed salamanders are present but overlooked, as this smallest of Wisconsin salamanders is difficult to detect except through dedicated nesting surveys. Alternatively, they could have been extirpated from the region with the deforestation, agriculture, and other land use and habitat changes which have taken place since settlement. Weise (1986) did not include them in his 1986 UWMFS species list.

Necturus Rafinesque, 1819 — **Waterdogs and Mudpuppies**

N. maculosus (Rafinesque, 1818) — Mudpuppies

N. m. maculosus (Rafinesque, 1818) — Common Mudpuppy

A regionally uncommon species, a 1908 specimen from the Milwaukee River in Grafton is listed as “disposed of” (MPM 815). Found throughout Wisconsin in larger lakes and streams, including Lake Michigan, it is not likely to occur at the UWMFS. Mudpuppies prefer deep, permanent waters, with hard bottom substrates, rather than the soft, muck bottoms typical of Mud Lake and Cedar Creek in the study area. They require relatively large submerged stones or debris for nesting. Weise (1986) did not include them in his 1986 UWMFS species list.

Plethodon Tschudi, 1838 — **Woodland Salamanders**

P. cinereus (Green, 1818) — Eastern Red-backed Salamander

L. Katona and C. Fuller reported finding one individual near Byer’s Pond at the UWMFS in 1987, but no documentation was obtained, and no other reports are available for the UWMFS or the region. This wholly terrestrial species is a forest obligate, and was probably common regionally presettlement, when old growth hardwood forests dominated by maple, basswood, and beech covered most of Washington and Ozaukee counties. Eastern red-backed salamanders are fairly easily detected in forests by turning logs, and therefore should have been detected, if present, by the survey activities already completed at the UWMFS. They are considered hypothetical as

part of the regional herpetofauna at this time. Weise (1986) did not include them in his 1986 UWMFS species list.

Squamata — Snakes

Diadophis Baird and Girard, 1853 — **Ring-necked Snakes**

D. punctatus (Linnaeus, 1766) — Ring-necked Snake

D. p. edwardsii (Merrem, 1820) — Northern Ring-necked Snake

There is one 1987 report of two individuals observed “during [the] past 10 years” near a local residence (WHA CUNJ 2; T11N, R21E, NE quarter of Section 31), but no documentation was obtained. Weise (1986) included them in his UWMFS species list, with no elaboration. There are old records from Sheboygan and Milwaukee counties (Casper, 1996b). Northern red-bellied snakes have light yellow spots in the neck region, and in individuals where these spots are large and sometimes fused, they can appear as a neck ring, and result in mistaken identification as ring-necked snakes, emphasizing the need for independent verification and/or voucher photos or specimens. Northern ring-necked snakes are most often found in grassy openings along forest edges. Their main prey is eastern red-backed salamanders, which they hunt in forests, and which also appear to be absent from the study area. Given the lack of any confirmed records, and the failure to be detected on any regional snake surveys to date, the species remains hypothetical.

Elaphe Fitzinger, 1833 — **Ratsnakes**

E. vulpina (Baird and Girard, 1853) — Western Foxsnake

A few regional observations of this large species have yet to be supported with documentation. They feed on small mammals and birds, and are common in rural settings elsewhere in eastern Wisconsin (Door, Kenosha and Racine counties; Casper, 1996b). There is abundant appropriate habitat in Ozaukee and Washington counties, but western foxsnakes have not been detected on any regional snake surveys to date, and remain hypothetical.

Regina Baird and Girard, 1853 — **Crayfish Snakes**

R. septemvittata (Say, 1825) — Queen Snake

A specimen of this state Endangered Species was collected by N. A. Euting from Cedarburg in 1928 (MPM 2225), but queen snakes are now considered extirpated from Ozaukee County. In 2005 surveys in Pigeon Creek and its confluence with the Milwaukee River in Grafton were negative (Casper, unpublished surveys). They are an aquatic species preferring medium sized, cobble bottomed, streams, or rocky lake shores, and feed exclusively on crayfish. In Wisconsin, they are associated only with clean, cobble bottomed streams, and have probably declined where siltation from agricultural runoff has buried cobble bottoms. There is no appropriate habitat available at the UWMFS.

Thamnophis Fitzinger, 1843 — **North American Gartersnakes**

T. sauritus (Linnaeus, 1766) — Eastern Ribbonsnake

T. s. septentrionalis Rossman, 1963 — Northern Ribbonsnake

A state Endangered Species, northern ribbonsnakes were mentioned by Casper (1988) as a candidate for occurrence, based on a population in similar bog habitat in Sheboygan

County. No records are known from the Cedarburg Bog. However, habitat is suitable, and it is possible they have been overlooked. Northern ribbonsnakes may complete their entire life cycle within wetlands, where they utilize bog mats and marsh and shrub-carr shorelines. They are difficult to detect except through intensive visual encounter surveys within these habitats, which can be challenging to traverse (especially floating vegetative mats). They remain hypothetical at the Cedarburg Bog.

Testudines — Turtles

Apalone Rafinesque, 1832 — North American Softshells

A. spinifera (Lesueur, 1827) — Spiny Softshell

A. s. spinifera (Lesueur, 1827) — Eastern Spiny Softshell

While there are no records available for eastern spiny softshells in Ozaukee County, aquatic habitats in the study area appear to be suitable, including the Mud Lake complex. It is possible they could be detected if additional turtle trapping were conducted.

Sternotherus Gray, 1825 — Musk Turtles

S. odoratus (Latreille, 1801) — Stinkpot

Jon Nelson observed many stinkpots, also known as common musk turtles, in Wallace Lake (T11N, R20E, Sec. 6; ca. 11 km northwest of the UWMFS) in 1992 (WHA NEJO 1). This species is highly aquatic and nocturnal, hence often overlooked. No other records are available for the region. The aquatic habitats in the study area appear to be suitable, including the Mud Lake complex. It is possible stinkpots could be detected if additional turtle trapping were conducted.

Future work

There are many opportunities for advancement of the herpetology of the UWMFS. Two reptiles with Wisconsin Threatened Species status are present: Butler's gartersnake and Blanding's turtle. Both would benefit from more intensive studies on population biology and viability. The vernal pond complex within the Cedarburg Beech Woods State Natural Area supports an exceptional amphibian community, including polyploid salamanders, and represents a natural laboratory for a variety of ecological and conservation biology opportunities. The status of spotted salamanders should be investigated there. The turtle community in Mud Lake has only barely been sampled, and this system provides opportunities for research into ecological and community dynamics.

The UWMFS herptile checklist now includes 8 species of frogs and toads, 4 species of salamanders, 6 species of snakes, and 3 species of turtles. Herptile inventory at the UWMFS is not complete, and more survey work is warranted for several species, especially those on the hypothetical list. The objective of inventory work is simply the detection and documentation of species present, and appropriate survey methods and effort must be used to avoid false negatives. Photographic vouchers are sufficient for documenting presence, but specimen vouchers are much more useful when they can be obtained. The establishment of specimen voucher series is also recommended for common species, where no population level impacts would be expected. Voucher series would serve to document species in

perpetuity, and provide material for future workers to assess parasite loads, morphology, diet, disease, chemical contaminants, taxonomy, and other aspects of species biology and systematics. Species entirely unrepresented by specimen vouchers to date are: eastern American toad, gray treefrog, American bullfrog, northern green frog, spotted salamander, eastern tiger salamander, northern watersnake, northern red-bellied snake, midland painted turtle, and Blanding's turtle; as well as any new species which might be discovered. Other species represented by only a few voucher specimens, which could be supplemented, are: northern spring peeper, western chorus frog, northern leopard frog, wood frog, central newt, eastern milksnake, midland brownsnake, Butler's gartersnake, common gartersnake, and eastern snapping turtle. Collection of series from each of these species would have lasting value, but is not recommended for the rare northern watersnake, nor the protected Butler's gartersnake and Blanding's turtle.

Monitoring of herptiles at the UWMFS is another area of opportunity. Monitoring programs should begin as soon as possible to document the influence of climate change already underway. Owing to its threatened status, there is also keen interest in monitoring the Threatened Butler's gartersnake to obtain data on population size, reproduction, and survivorship - but data are similarly lacking for all herptile species for the study area. Such data are only obtainable through long-term mark-recapture studies. To date the only regional monitoring program is the Wisconsin Frog and Toad Survey, which is useful for occupancy models, but probably not for population level trends. Monitoring programs can be designed to detect trends in either occupancy or number of individuals over time, and require long term commitments.

Contrary to Kapfer and Muehlfeld's (2006) suggestion, quantitative methods for sampling herptiles are already well known (Genet and Sargent, 2003; Heyer et al., 1994; Karns, 1986), with methods available for detecting herptiles to determine occupancy, and for capturing herptiles for mark-recapture studies which can be used for population modeling. Standardization of methods is ongoing, and the development of detection probability statistics for use in data analyses is still needed. Kapfer and Muehlfeld (2006) do not distinguish between inventory and monitoring objectives and methods, nor do they discuss the differences in methodology and approach that would be necessary for applying occupancy vs. population level analyses, in their discussion of future survey work. The limited sampling effort typical of surveys to date is not sufficient for comparisons of relative abundance, unless standard methods and effort are used, and detection probability statistics are available for the methods, effort, and species being tracked (MacKenzie et al., 2005). Without attention to such design standards, sampling is only useful as non-comparable, individual survey data, and while such effort may contribute to building species inventory lists, it will not contribute significantly to any long term monitoring objectives.

Studies are currently underway through the Ozaukee Washington Land Trust to test herptile sampling methods in Ozaukee and Washington counties, and to obtain detection probability statistics for common species and methods in the region (2005

Great Lakes Watershed Restoration Program grant, U.S. Environmental Protection Agency). Upon completion, these data will be useful in designing regional monitoring programs by providing standard methods and effort with associated detection probabilities, which can be used to apply correction factors to programs where effort does not meet detection probability standards.

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What You Missed at the January CHS Meeting

by John Archer
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He was hard to miss. Wearing a baseball cap, long pony tail, short beard and mustache, and a t-shirt with pictures of salamanders, he was holding an African house snake in his left hand which was slowly exploring what to the snake must have seemed a small mountain, an impression which I shared with the snake. He was constantly grinning and seemed, in spite of his height, approachable as he affably explained to Steve Sullivan that he regretted no longer having the time to keep animals. He obviously was enjoying the snake. I was drawn into a conversation and while discussing his current ecological studies of the effects of agricultural herbicides on amphibians, I discovered that he was Dr. Robert Brodman, our January speaker. All good speakers are enthusiastic about their subject. Dr. Bob is enthusiastic about life. His presentation was entitled "Dr. Bob's Wild Herping Adventures in Africa." It would be difficult to imagine a boring herping adventure with Dr. Bob.

His talk grew from a trip to South Africa in June of 2005 to attend the Fifth World Congress of Herpetology. He took two field trips through western South Africa associated with that event, and was good enough to share some of his experiences. The first was a nine day trip from the Cape of Good Hope along the west coast to the Kalahari desert and back, and the second was a shorter trip to the Grootvandersbosh Nature Preserve in central South Africa. Bob's talk was energetic and anecdotal, and my highlights won't convey that, but I'll try.

The leader of the nine day trip was Marius Burgen, a well-known South African herpetologist who was conducting the South African Reptile Conservation Assessment. Marius reminded Bob of Steve Irwin because of his enthusiasm and the way he handled venomous snakes. As a picture of Marius holding a boomslang (*Dispholidus typus*) in much the same manner I hold a milksnake flashed on the screen, Bob said that such events would inevitably be accompanied by Marius saying, "We're XX kilometers from a hospital and antivenom, and if this snake bit me I would probably die, but it probably won't bite me because it's too cold." Most of the herpers on this trip were Australian, and Bob showed us pictures of them bundled up and complaining that the mild June winters of South Africa (highs 50-60s; lows 30-40s) were the coldest on earth and pushed human endurance. Bob was shown wearing a short-

sleeved t-shirt.

He showed pictures of bizarre landscapes where single mountains would randomly jut from rolling plains, and vegetation consisted of fynbos (shrubby cover) and quiver trees (*Aloe dichotoma*). Bob treated us to photos of gorgeous birds, including ostriches (*Struthio camelus*) and secretary birds (*Sagittarius serpentarius*), and the amazing nests of weaver birds. The subtropical African penguins (*Spheniscus demerus*) were extirpated from the mainland decades ago, and could be found only on offshore islands. Then about fifteen years ago a few pairs made their way to a beach on the mainland. The government quickly made the beach a national park, and now thousands of nesting penguins serve as a tourism basis for the local economy. We viewed the antelopes and boks of South Africa, from elands (*Taurotragus oryx*) to steenboks (*Raphicerus campestris*). As we stepped through each species, Bob mentioned which species could be found on local menus and rated the ones he had eaten. Baboons (*Papio ursinus*) are so common that the bus driver would refuse to stop so the group could photograph them. The pictures Bob had were taken when the bus had to stop for a herd of goats crossing the road. In spite of warning signs, the group counted thirty-two carcasses of bat-eared foxes (*Otocyon megalotis*) littering one stretch of road. Fortunately, Bob had some nice photos of live ones. And, of course, he had pictures of lions (*Panthera leo*), which Bob says, are the reason you keep body parts inside the bus and the windows rolled up while driving through the Kalahari.

Bob was known as the big-rock turner in the group, and you knew you were seeing pictures of herpers when herds of African mammals grazing in the background were being totally ignored by a group of people looking under rocks in the foreground. Most of the herps were found by flipping rocks, though the puff adder (*Bitis arietans*) was spotted coiled under a bush. Most herps were small. A little frog called the bronze caco frog (*Cacosternum nanum nanum*) would flip on its back when frightened, exposing its white belly. Bob wasn't sure why it did this, but it was a great picture. The clicking stream frog (*Strongylopus grayii*) is South Africa's spring peeper, in that it's the earliest frog to call in the spring. Tadpoles are usually identified simply as tadpoles by South Africans, but the

cape ghost frog (*Heleophryne purcelli*) has a distinctive tadpole which lives in streams and sucks to the underside of rocks. The search image at night for the desert rain frog (*Breviceps macrops*) is a marshmallow, and the photo did look like a marshmallow with eyes.

Lizards were the most common herp found on the trip, and a dwarf chameleon in the *Bradypodion pumilium* complex was the primary objective on the second trip. It's suspected of being a distinct species in the Karoo area, and the group's goal was to find and tail-clip specimens in the area for DNA studies. Unfortunately, only one specimen of the target species was found. One of the party tripped, caught himself, and found himself nose-to-nose with the prey. Fortunately, lots of other lizards were found, including Bob's favorite, the armadillo lizard (*Cordylus cataphractus*), which enthralled Bob by rolling into a spiky little ball and biting its tail as a defensive measure. Four or five other cordylids, several skinks (*Trachylepis* spp.) and many geckos (*Pachydactylus* spp.) were flashed on the

screen. The group only saw angulate tortoises (*Chersina angulata*) representing the Chelonians, but Bob had nice pictures of both hatchlings and adults of that pretty tortoise. The snakes found were mostly small with great names like the common slug eater (*Duberria lutrix*), but in addition to the boomslang and puff adder, two species of cobra (*Naja* spp.) were found.

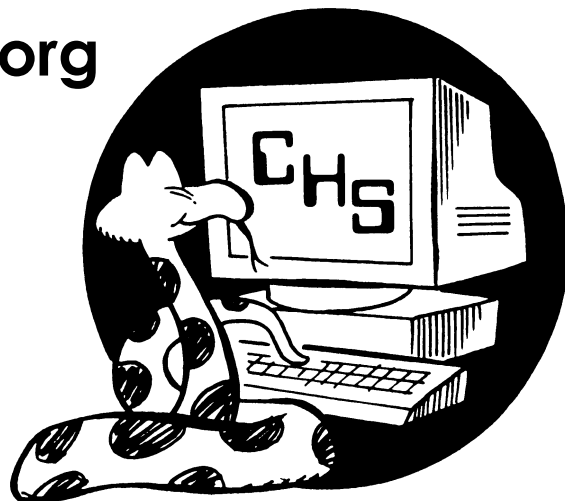
It is impossible for me to convey Bob's enthusiasm, but two things he said can sum up some of his feelings. He told the children in the audience that he never expected a career in science would open up such rich travel experiences, and he had a few slides showing what he thought were the real jewels of Africa: a little armadillo lizard coiled in the shape of a bracelet, a blind snake (*Rhinotyphlops* sp.) intricately wrapped around a finger like a ring, and a gecko biting someone's ear and hanging on as an earring. That was an easy metaphor to sell to our crowd.

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HerPET-POURRI

by Ellin Beltz

Lizards without borders

According to the *Arkansas Democrat-Gazette* (January 15, 2007), the U.S. “homeland security secretary waived environmental rules to clear the way for a 37-mile-long fence to be built along Arizona’s border with Mexico . . . [although] small openings will be made in the fencing to allow the flat-tailed horned lizard to continue crossing. [from Bill Burnett]

A great idea

I wish I could reproduce the photograph which accompanied this caption; you’ll just have to imagine a 50-year-old, three-legged spur-thighed tortoise which has had a missing rear leg replaced with a shock absorber and suspension system connected to a pneumatic tire. A top model maker designed the 4x4-style wheel and mount which permits her to maneuver around her home at a Wiltshire Safari Park. “Tina” may be one of the oldest tortoises at the park, but she’s reportedly also “one of the fastest,” according to the *London Daily Mail*, October 18, 2006, from Bill Burnett’s Aunt Peggy]

Say the headline out loud

“The £21,000 Newt. . . Saving colony of 15 adds £300,000 to road project . . . as part of a £51 million project. . . . There are an estimated 18,000 great crested newt colonies in Britain. But the species is in such a serious decline that it is illegal to disturb any newt’s habitat [without] . . . special license. “These are not the most expensive newts ever. In January [2005] the builder of 22 retirement homes . . . was forced to spend 50,000 pounds rehousing a single newt,” according to the *London Daily Mail*, November 11, 2006, from Bill Burnett’s Aunt Peggy]

Dumb and Dumber

A 15-year-old boy and his 35-year-old mom were caught the day after stealing a red-tailed boa from a pet shop when they returned to the same store, dressed in the same clothes, to ask for care advice. [*Cleveland Plain Dealer*, January 5, 2007, from Bill Gehrmann and *Arkansas Democrat-Gazette*, January 7, 2007, from Bill Burnett]

Once bitten, twice shy?

A snake handler at Tarpon Springs Aquarium was bitten on the hand by a 14-foot Burmese python during a daily educational presentation. When police arrived, visitors were escorted out and the snake was Tasered until it let go. It was either that or kill it said the local police sergeant. [Leesburg, FL *Daily Commercial*, January 1, 2007, from Bill Burnett]

More New Frogs

Science Magazine [November 26, 2006] reports: “A 3-centimeter tree frog that resembles a splotch on a leaf. . . [was] named *Litoria richardsi* after one of its discoverers, Stephen Richards, [an Australian academic herpetologist]. . . . It was found near a swamp in Papua New Guinea, . . . [is] one of only two such frogs found, . . . lives high in the rain-forest canopy and probably glides through the air using its highly webbed feet. [Wes von Papineäu]

Welcome to Global Warming

- “An official with South Carolina’s Department of Natural Resources said wildlife officials plan to introduce legislation next year that would allow a limited alligator hunting season, adding that . . . [they] are studying how Georgia, Florida and Louisiana allow such hunts.” [*Arkansas Democrat-Gazette*, December 27, 2006, from Bill Burnett]
- The landscape formerly known as New Orleans has acquired a long list of resident fauna due to the general absence of human activity since the devastation of Hurricane Katrina about a year and a half ago. The list includes: Alligators in swimming pools, possums in houses everywhere, coyotes eating rabbits and nutria in the middle of the street, foxes in the airport — and then there’s the usual snakes, spiders, palmetto bugs, flies, roaches and mosquitos. Rat populations have soared too due to piles of rotting debris still left over from the storms. [*Arkansas Democrat-Gazette*, October 15, 2006, from Bill Burnett]
- A 7½-foot-long crocodile was captured in the Rio Grande by Mexican fishermen and taken to an animal shelter. Officials are speculating it was a released pet. [*Honolulu Advertiser*, October 9, 2006, from Ms. G. E. Chow]

Rebuilding done!

An early morning fire completely destroyed part of Orlando’s 56-year-old Gatorland attraction where people walked through the open mouth of an alligator statue to get to a gift shop and the animal pens. Two pythons and a crocodile died in the fire, the cause of which is under investigation. [*Arkansas Democrat-Gazette*, November 7, 2006, from Bill Burnett] The place was back up and running by late November.

Released by clueless owners, or . . .

“Biologists look to bag pythons before species takes over Everglades. Officials say snakes likely were pets that outgrew their owners.” Some wildlife biologists spend their time working on species conservation; now many of them are a thin khaki line on the front lines against an invading wave of giant constrictors in southern natural areas. But is the assumption that all the loose constrictors are due to releases, true? Consider these data on Burmese pythons captured by year in the Florida Everglades: 2000 — 2; 2001 — 3; 2002 — 14; 2003 — 23; 2004 — 70; 2005 — 95; 2006 (Nov. 30) — 154 [Sources: Honolulu Zoo; Everglades National Park]

Pythons are naturalized in Florida, chowing down on raccoons, possums, muskrats and native cotton rats, house wrens, pied-billed grebes, white ibis and limpkin birds. In the wild, pythons grow to more than 20 feet and up to 200 pounds; strong enough to overcome a full grown man and even good sized alligators. [Lansing, MI *State Journal*, December 18, 2006, and from other publications; from Marty Marcus, Bill Burnett, Wes von Papineäu, Ms. G. E. Chow and Eloise Mason]

Released by Hurricane Andrew?

- In 1992, Hurricane Andrew devastated the southern end of Florida. Back then, this column reported that “Florida state inspectors contacted about half of the 240 dealers, breeders and importers who held exotic-animal permits in Dade County and compiled a list of what those people said they had lost during the storm. One reptile dealer reported 60 boa constrictors missing, while others have lost reticulated and Burmese pythons. Lizards are also on the loose, from geckos to monitors to tegus. And the list doesn’t include people who lost pets. Some of these animals may establish themselves as did the south American cane toads, the infamous *Bufo marinus*, which live and breed in Florida after hopping away from a broken shipping crate in Miami Airport during the 1950s. [Orlando Sentinel, September 13 and September 20, 1992, contributed by Bill Burnett.]” And eight years later, naturalized pythons were being caught in the Everglades.

- “Andrew’s release of all sorts of exotics in south Florida made a very big impression. . . . It spawned the now-legendary cobra incidents, in which a substantial number of cobras were released during the hurricane, making snake catching somewhat risky for years afterwards (I still regularly get warned not to travel into the Everglades back-country due to the cobras living there, but I know of no recent credible sightings; they seem to have died out). Hurricanes are a fact of life for Floridians. So much so that the Florida Wildlife Commission (FWC) has regulations requiring, in some cases, that animal holding facilities be robust enough to withstand hurricanes. This is a bit expensive, but not prohibitive. Guam has a lot of experience with this problem, and it is very solvable. In the last decade we have had several storms with steady winds over 165 mph, and no significant residential damage has occurred to houses built to code (required roof must be 6-inches-thick concrete). That requirement has kept Guam from having any measurable number of human fatalities from the 53 hurricanes since WWII. So, it can be done. Furthermore, the FWC is well aware of this problem and has considered the merits of requiring such hurricane proofing for commercial animal holding facilities. With regard to the extent to which Florida’s exotic herp populations are due to accidental release consequent on hurricane-associated failures versus intentional release by dealers (to stock exotics locally and bypass importation costs and restrictions) versus negligent disposal of stock by failing enterprises versus unthinking release by ill-equipped pet owners versus intentional release by fanciers enthralled with the merits of a particular species, it is hard to say. There is probably some truth on all sides. In the particular case of pythons in the Everglades, the initial colonization appears to have occurred at the far end of the dead-end road at Flamingo. It seems highly unlikely that either hurricane releases in town or intentional stocking by dealers could explain that situation. In the case of the boa constrictors, I am unaware of any evidence one way or the other. In the case of iguanas on Key Biscayne, I believe the evidence is fairly firm that the population was resident in the old zoo before it moved on. We need also to keep in mind that for many of these species, multiple releases are possible and in some cases even likely. One legitimate fear that the Park Service has is that people will choose to

dump their Burmese Pythons in the Everglades because the owners know that their snakes will have conspecific company there. It would only magnify the tragedy if the National Parks were to become the favored dumping ground for irresponsible pet owners. This is a problem that needs tackling on many fronts. Cheers, Gordon Rodda”

Now there are three

In 2004, this column reported that “since 1999, the U.S. has imported more than 144,000 Burmese pythons from Vietnam and other parts of Southeast Asia. Only two known U.S. deaths are blamed on large constrictors: an 8-year-old girl in Pittsburgh and a Colorado man. Both deaths occurred in 2002.” [South Florida, *Sun-Sentinel*, May 13, 2004, from Alan Rigerman] Now, comes the sad news that “A 13-foot boa constrictor strangled its owner in his home in Symmes Township, Ohio. . . . The snake was still wrapped around the man’s neck when deputies arrived. . . . Medics tried unsuccessfully to revive . . . the 48-year-old man.” *USA Today*, December 18, 2006, from Bill Burnett]

La Vida Hotel California

Biologists and zookeepers from around the world hopped to the call of Panamanian biologists to collect and sequester a representative group of that nation’s frogs just as the deadly chytrid fungus swept down the isthmus behind them. The frogs of many species including Panama’s famed golden frog are being housed in a fungal sequestration in the hopes that they or their offspring can be released after the deadly fungus has done its thing. But how long that will take is unknown. Male golden frogs lead “la vida loca.” They amplex froggyback with females for up to 80 days! According to the *Honolulu Advertiser* [November 19, 2006] “as many as 120 species of amphibians in Central America . . . [have] already been wiped out [by chytrid],” but it doesn’t cite species names or a source for that remark. [from Ms. G. E. Chow] Meanwhile, a *Chicago Tribune* story states that “A third of the world’s nearly 6,000 amphibian species are threatened. . . [and] a variety of factors already have combined to cause more than 120 amphibian species to vanish forever since 1980. . . . [Chytrid fungal deaths were] identified in 1998 and [the disease] is not well understood. As it moves around the globe, it has caused massive amphibian die-offs in Australia and . . . in the Rocky Mountains. . . . How the chytrid fungus got around the world so swiftly is uncertain. It could have been carried by human travel or by the global movement of ballast water and invasive species. [April 26, 2006, from MaryBeth Trilling]

La Vida Muerta

- The October 9, 2006, *Honolulu Advertiser* reports that “Wild chickens [may be the] latest hope for controlling coqui frogs.” A researcher has been studying the situation to see if chickens really do eat the introduced and unwanted Puerto Rican amphibians. Recent feeding studies found one interesting factoid: of rats, mongoose and cane toads studied for their last meals only the mongoose eat coqui. Perhaps it takes an introduced species to have a taste for another introduced species.

- In Hawai'i, Manuka State Park was closed for coqui eradication with citric acid solution from a helicopter. Humans are being kept out of the area during the spraying which reportedly reduces the frogs "almost 100 percent" according to the invasive species coordinator for DLNR Division of Forestry and Wildlife. So-called "native" species will be monitored to see what effect low pH mist has on them. [*West Hawaii Today*, December 14, 2006] Remember, of course that nothing including bacteria is "native" to Hawai'i—all that state's islands were born from hot magma erupted from deep within the earth.
- "Australian environmentalists are asking the military to aid in the war against cane toads. The amphibians, which were introduced from Hawaii in 1935 in a failed bid to control native cane beetles, have multiplied across northern Australia to more than 200 million . . . [leading] to dramatic declines of native snakes, goannas and quolls." [*USA Today*, December 28, 2006, from Bill Burnett]

Missing Links

- I don't know how I missed these stories the first time, but a fossil was found in Argentina that "revealed a two-legged creature that's the most primitive snake known, a discovery that promises to fire up the scientific debate about whether snakes evolved on land or in the sea." The specimen fossilized lived on land in Patagonia about 90 million years ago at about the time the dinosaurs were evolving and becoming dominant. It was about a meter (3 feet) long. Unlike modern snakes, it has a bone called a sacrum which supports the pelvis. How the burrowing snake used its tiny and relatively useless hind limbs is unknown. The exquisite specimen is on display at the University of São Paulo in Brazil. [*Chicago Tribune*, April 20, 2006, from Mike Rafter]
- Two new plesiosaurs, long-necked marine reptiles that lived in the dinosaur era, have been found from specimens collected over the last 30 years from an Australian opal mine, hence the names. *Umoonasaurus* was described as the "killer whale equivalent of the Jurassic," even though it was less than 8-feet-long. *Opallionectes* grew to 19 feet or so and ate squid and small fish. Both provide information on plesiosaur development between formerly known Jurassic specimens from England 170 million years ago and those from Patagonia and Antarctica which lived right about the time the dinosaurs went extinct—65 million years ago. [July 29, 2006: *Tacoma News Tribune* from Marty Marcus and *Orlando Sentinel* from Bill Burnett]

Happy Hatch Day

Five baby Komodo Dragons hatched out of eggs laid at the Chester, England, zoo by "Flora" who has never been exposed to a male. Parthenogenesis has been known in about 70 reptile species. Both snakes and lizards reproduce asexually, but this birth and another litter hatched at the London Zoo in April, 2006 are the first documented in the pugnacious king lizard of Indonesia. "Veritable dragons," they were called by their first discoverers in 1910. Baby dragons are 16 to 18 inches long and weigh about as much as four first class letters. [*Arkansas Democrat-Gazette*, January 25, 2007]

Alligator facts

- Speed—up to ten miles per hour in water, but only nine miles an hour bursts on land.
- Eyesight—superb on both sides and in front; slight blind-spot on the rear and rear quarter panels.
- Climbing—yes, surprisingly they can get over four foot fences with ease.
- Feeding—don't. They have massive jaws and will have to be destroyed if they associate humans with food.
- Swimming in alligator infested waters—is a big no-no, especially for small dogs and children.
- Mating season—mid-April to May.
- Nesting season—May to September. Females guard their nests from all species.
- Pet value—zero and illegal to boot.
- Food—"frogs, birds, fish, turtles, snakes, other gators, deer, wild hogs or people's pets," according to the Leesburg, Florida, *Daily Commercial* [January 6, 2007, from Bill Burnett's Mom "Hilda."]
- Recreational drug use—Don't get naked, smoke crack cocaine and pass out on a beach with a lake full of alligators. A 45-year-old man was injured, suffering a broken arm and bites to his butt and legs after doing just that. He said he had no idea how he got on the beach, removed his clothes, and or arrived in the gator's mouth. The gator was destroyed. [*Orlando, FL Sentinel*, December 1, 2006, from Bill Burnett]

Thanks to everyone who contributed this month and to those folks who are even thinking about sticking a page of newspaper with a cool story about reptiles or amphibians in an envelope and sending it to: Ellin Beltz, POB 1125, Ferndale, CA 95536. I have a half-inch of paper in the file folder now—not enough to do another column. So send something!



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Herpetology 2007

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

AMPHISBAENIAN SYSTEMATICS

R. Vaconcelos et al. [2006, *Amphibia-Reptilia* 27(3):339-346] note that the evolutionary relationships of amphisbaenians of the genus *Blanus* have long been controversial. Presently two species are recognized for Morocco—*Blanus tingitanus* and *B. mettali* and one for Iberia—*B. cinereus*. Using mitochondrial and nuclear DNA sequences, 25 samples from Portugal, Spain and Morocco were analyzed. Both markers indicate the existence of three well-separated clades: one for the northern Moroccan samples, corresponding to *B. tingitanus*, and two to the *B. cinereus* samples. One sample from Taza, Morocco, was identical to specimens from one of the Iberian forms. These results point to the necessity of a systematic revision. These new groups reinforce the need for broader geographic sampling accompanied by morphological studies to fully determine the phylogenetic history of this species complex.

CLAW LENGTH IN RED-EARED SLIDERS

D. A. Warner et al. [2006, *Chelonian Conservation and Biology* 5(2):317-320] examined variation in claw length of hatchling and adult red-eared slider turtles (*Trachemys scripta elegans*). Hind claw length of adult females was greater than that of adult males, and the authors suggest that increased hind claw length in females (a previously unrecognized sexually dimorphic trait) may serve as an adaptation for nest construction. In addition, front and hind claws of hatchlings newly emerged from their eggs were longer than the front and hind claws of hatchlings that were captured during their migration toward aquatic habitats; relatively long claws could aid hatchlings in their escape from nests and migration to aquatic habitats.

YUCATAN PENINSULA SEA TURTLE NESTING

R. Xavier et al. [2006, *Amphibia-Reptilia* 27(4):539-547] note that the Yucatan Peninsula nesting hawksbill turtle population (*Eretmochelys imbricata*) is the biggest in the Caribbean and fourth in the world; within the Ria Lagartos Biosphere Reserve, at El Cuyo beach both hawksbill and green turtles (*Chelonia mydas*) nest. Nesting trends and reproductive output of both species during three consecutive nesting seasons (2002–2004) were evaluated. Night patrols from mid-April to September allowed the collection of data on number of nests, nest location and size of females. The number of hawksbill and green turtle nests decreased over these seasons. No differences were found in mean length of female turtles of both species between nesting seasons. Both species showed high nest site fidelity with average distance between nests of 3 km for hawksbill and 1.8 km for green turtles. The correlation between size and fecundity was significant ($p < 0.05$) for both species. The spatial variation of laid nests was also analyzed revealing that both species nested mainly on the dune zone. Predation has risen on El Cuyo beach, affecting mostly hawksbill nests. Hurricane Ivan destroyed the majority of green turtles nests in 2004.

PRAIRIE RACERUNNERS IN WISCONSIN

J. M. Kapfer and M. J. Pauers [2006, *Herpetological Review* 37(4):420-423] note that in several upper Midwestern states, the prairie racerunner (*Aspidoscelis sexlineata viridis*) is considered a "Species of Greatest Conservation Need," uncommon, or declining (e.g., Wisconsin, Illinois, Minnesota). Despite this, very little empirical information regarding its ecology, including habitat and environmental temperature selection, exists for this region. Furthermore, because this species is often reported from prairie or savanna-type habitats that are managed via controlled burns, knowing the breadth of their activity period may reduce the risk of management-related mortality. Therefore, the authors conducted random visual encounter surveys for prairie racerunners three days per week in eleven available habitats from April to October 2004–2005 at a site in Sauk County, Wisconsin. During this time, surface soil temperatures were also recorded at locations where racerunners were witnessed prior to flight (N= 36). Results were: (1) racerunners were found primarily in oak savannas (58.9% of locations) and open grasslands (38.4% of locations); (2) open overstory canopies and sparse understory vegetation were preferred; (3) sandy soils were selected almost exclusively. Furthermore, individuals were found in association with high surface soil temperatures that differed significantly between preferred habitats (i.e., 34.7°C in oak savannas and 39.2°C in open grasslands). Finally, the length of activity period observed during this study was longer than those proposed for states within this region by past sources. Although several hypotheses can be put forth to explain the results and how they vary from other reports, these data are of value to wildlife biologists who manage racerunner habitat within this region.

NESTS OF THE RINGED MAP TURTLE

R. L. Jones [2006, *Chelonian Conservation and Biology* 5(2): 195-209] investigated reproduction and nesting in the ringed map turtle (*Graptemys oculifera*) in the Pearl River of west-central Mississippi in 1995 and 1996. Nesting occurred from mid-May until mid-July but peaked in mid-June. Minimum carapace length of females at sexual maturity was 130 mm, but mean size at maturity was between 130 and 140 mm. Mean and modal clutch sizes (CSs) were 3.7 and 3. Larger females were gravid earlier than smaller ones and both egg and CS declined as the nesting season progressed. CS was positively correlated with both female carapace length and body mass. Mean egg length, width, and mass were 38.8 mm, 22.7 mm, and 11.8 g, respectively. Hatchlings averaged 35.5 mm carapace length and 8.9 g in mass. Annual clutch frequency may range from 0.96 to 1.42, and a minimum of ca. 60% of females reproduced on an annual basis. Predators destroyed an average of 86% of nests each year. Major vertebrate nest predators were armadillos, raccoons and fish crows. Invertebrate egg predators destroyed an additional 24% of known-fertile eggs.

SIX NEW CHAMELEON SPECIES

C. J. Raxworthy and R. A. Nussbaum [2006, *Copeia* 2006(4): 711-734] report that as a result of their recent herpetological surveys conducted in Madagascar, important new collections of large occipital-lobed *Calumma* chameleons have been made. These collections allow the recognition of six new *Calumma* species: *C. amber*, *C. crypticum*, *C. jeju*, *C. peltierorum*, *C. hafahafa* and *C. tsysorne*. Five of the new species were located at specific montane regions, and one is broadly distributed in mid-altitude forest within the interior of the island. As previously reported for *Brookesia* dwarf chameleons, species richness in this *Calumma* group is greatest in northern Madagascar. An identification key is given for all 12 (six new plus six previously recognized) species and a new description provided for *Calumma brevicorne*, a species that has been confused with several other species. Previously described taxonomic uncertainties associated with this species are resolved, including the problematic status of the *Calumma brevicorne tsarafidyi* holotype, which we consider to represent the nominate form and unlikely to have been collected at Tsarafidy. Sexual dimorphism (including hemipenis development), biogeography, and conservation issues are also discussed for the group. The Bemanevika Lakes region of Southwest Tsaratanana harbors a new *Calumma* species not currently recorded for any protected area, and forest of this region is suggested for inclusion within a future reserve.

ABUNDANCES OF LOUISIANA HERPETOFAUNA

J. G. Himes and L. M. Hardy [2006, *Herpetological Natural History* 10(1):71-76] trapped reptiles and amphibians in northern Louisiana during 1995–96 to determine relative abundances and seasonal activity patterns. Four hundred sixty-three captures and 29 species were recorded. *Agkistrodon contortrix*, *Anolis carolinensis*, *Aspidoscelis sexlineatus*, *Coluber constrictor*, *Masticophis flagellum*, *Scaphiopus holbrookii*, *Sceloporus undulatus* and *Sistrurus miliarius* were most frequently trapped. Trapping levels of most species were low during the summer and fall of 1995 (July–October) and early spring (March–April) of 1996, and were high during the late spring (May–June) of 1996. Only *A. carolinensis*, *M. flagellum* and *S. miliarius* exhibited a bimodal pattern of seasonal activity, with higher trapping levels in late spring/early summer and fall than in summer.

POLYMORPHISM IN A POISON DART FROG

K. C. Wollenberg et al. [2006, *Copeia* 2006(4):623-629] report that a molecular phylogeny based on a fragment of the mitochondrial 16 S rRNA gene and morphological comparisons suggests that only one polymorphic species of large *Dendrobates*, commonly assigned to *D. tinctorius*, occurs on the eastern Guiana Shield and its vicinities. The oldest available name for this taxon is *D. tinctorius* (Schneider, 1799). The authors place *D. azureus* Hoogmoed, 1969 as its junior synonym. Data for *D. machadoi* Bokermann, 1958 are not available, but the authors suspect that this name has to be treated in the same way. *Dendrobates tinctorius* exhibits numerous variants differing in color and pattern.

A POPULATION MODEL FOR HAMILTON'S FROGS

M. D. Tocher et al. [2006, *Herpetological Journal* 16(2): 97-106] developed a stage-structured population model to predict which of nine hypothetical translocation scenarios was likely to produce the best outcome for the rare Hamilton's frog (*Leiopelma hamiltoni* McCulloch). This frog species may once have been relatively widespread in New Zealand, but is now present only on Stephens Island (in the Cook Strait at the top of New Zealand's South Island). Model outcome was measured in terms of population growth rate and probability of extinction. Only females were modeled. The model predicted that moving at least 20 female adult frogs was the best strategy, and moving subadult frogs alone or no frogs at all was the worst in terms of mean growth rate of both populations combined. When the new population was considered separately, introducing subadults alone was the worst strategy in terms of mean growth rate and extinction probability. Extinction of the donor population was most likely when 40 adult females were removed, and the extinction risk was reduced when only 20 were removed. The authors think the most reasonable management strategy—confirmed by the modeling and supporting qualitative data—is the translocation of 20 adult and 20 subadult female frogs (with the concurrent translocation of 40 males). This scenario provides a balance between risk of extinction in the donor population and probability of success in the translocated population.

MODEL OF A SNAKE COMMUNITY

L. Luiselli and E. Filippi [2006, *Amphibia-Reptilia* 27(3): 325-337] statistically modeled a Mediterranean community of snakes, inhabiting a hilly area in central Italy (Monterano, Tolfa Mountains) to investigate whether: (i) it shows non-random structure as predicted by competition theories, (ii) there are proximate elements of the landscape that may predict the presence/absence of the various snake species at the study area, and (iii) the snakes select “resting sites” which are relatively simple or relatively complicated in landscape structure. To investigate issue (i) the authors used co-occurrence pattern analyses and Monte Carlo simulations. To investigate issue (ii) they used logistic regression analysis on presence/absence data of 11 “proximate landscape” variables around sites of presence for the snakes and around random (= absence) sites at the same study area. To investigate issue (iii), they used expected-versus-observed χ^2 to test whether snake presences were associated more often than random with a combination of variables, i.e., with at least four different variables for each point of presence. The snake community comprised eight species, but only the five commonest species (i.e., *Coluber viridiflavus*, *Elaphe longissima*, *Elaphe quatuorlineata*, *Natrix natrix*, and *Vipera aspis*) were included in the models. These modeling and simulation analyses suggested that: (i) the community structure was not competitively structured both in terms of habitat resource and in terms of “proximate landscape” variables influencing snake presences; (ii) all five snake species were positively influenced by at least two of the eleven variables considered in the logistic regression model; (iii) four out of five species clearly selected sites with complicated structure, the only exception being *Coluber viridiflavus*.

NOSE-HORNED VIPERS

L. Tomovic [2006, *Herpetological Journal* 16(2):191-201] analyzed geographic variability of the nose-horned viper (*Vipera ammodytes*) multivariate techniques in order to clarify the taxonomic status and geographic ranges of the subspecies. Analyses included samples ranging from central northern Italy and southern Austria to easternmost Turkey, Georgia and Armenia, and hence, all described taxa. In total, 14 morphometric, five meristic and nine qualitative traits of 922 specimens (451 males and 471 females) were recorded and analyzed using different multivariate statistics. The results showed the validity of four subspecies: one inhabiting the western and central parts of the species' range (from Italy, via Austria, to the western and central parts of the Balkans), the second occurring in the southernmost part of the Balkan peninsula, the third distributed from the southern and eastern Balkans to western Turkey and the fourth inhabiting eastern Turkey, Georgia and Armenia.

WHAT MAKES A SPECIES CRYPTIC?

U. Fritz et al. [2006, *Amphibia-Reptilia* 27(4):513-529] describe variation of the Sicilian pond turtle, *Emys trinacris*, based on morphological data of more than 200 adult and immature turtles and mtDNA sequences of 31 new known-locality specimens. *Emys trinacris* is morphologically more variable than thought before. There exist pronounced population-specific differences. Adults are barely distinguishable from *Emys orbicularis galloitalica*. Hatchlings of *E. trinacris* are, however, significantly different in pattern, allowing immediate species determination. Moreover, hatchlings of *E. trinacris* seem to be on average smaller and lighter than hatchling *E. orbicularis*. This could be related to differing reproductive strategies. Coloration polymorphism of adult Sicilian pond turtles comprises fair part of variation known in *E. orbicularis*. Thus, adult *E. trinacris* might have preserved the whole array of variation of the last common ancestor with *E. orbicularis*. The authors hypothesize that similarity of certain southern *E. orbicularis* subspecies and *E. trinacris* on one hand and pronounced differences in size, coloration and pattern of northern *E. orbicularis* subspecies on the other result from stabilizing selection in the north. While dark coloration and large body size seem to be beneficial in the north, light coloration and small size could be simply not disadvantageous in the south, allowing coloration polymorphisms in *E. trinacris* and southern *E. orbicularis* subspecies. Further, the term "cryptic species" and its meaning in regard to species concepts and bar-coding is discussed. It is concluded that species delineation based on mtDNA barcoding requires application of a Phylogenetic Species Concept. Under the Biological Species Concept, animal mtDNA is not always an ideal tool for delineating species boundaries because taxa with monophyletic mitochondrial gene trees are neither necessarily genetically isolated nor must represent the same Biological Species. Cryptic species are nothing special in nature because difficulties with their identification are due to deficits in cognitive abilities of man. This is illustrated by the fact that distinct live stages of "cryptic species" may differ to various degrees from similar species, as is the case in hatchlings and adults of *E. trinacris* and *E. o. galloitalica*.

TAILED FROG DISPERSION

M. P. Hayes et al. [2006, *J. Herpetology* 40(4):531-543] note that the coastal tailed frog is one of the best studied headwater amphibians in the Pacific Northwest, yet very little is known about either its seasonal movements or its distribution within and among headwater basins. During August through October 2000-2002, coastal tailed frogs were studied in 81 headwater basins from managed forests in the Stillman Creek watershed in southwestern Washington State. A significant association was found between tailed frog life stage and their locations along the stream axis: older life stages were located higher in the basin than younger life stages. Data from eight streams sampled in early and late summer 2002 support the hypothesis that adult *Ascaphus truei* move upstream several hundred meters during the low-flow period probably after having moved downstream to breed. Little evidence was found of tailed frog reproduction in small non-fish-bearing basins, which supports the hypothesis that breeding habitat in those basins may be limiting. To test these two hypotheses, the authors examined *A. truei* occupancy in 65 non-fish-bearing headwater basins ranging in size from first to fourth order in 2003 and 2005. Occupancy increased with basin order, and no evidence of reproduction (eggs, larvae, or metamorphs) was found in first-order non-fish-bearing basins. The length of the dominant stream thread in nearly all first-order basins was shorter than the distance adult *A. truei* moved between early and late summer. The authors suggest that a headwater stream must remain watered for several hundred meters during the dry season to meet tailed frog breeding requirements. Tailed frogs probably do not reproduce in most first-order non-fish-bearing basins in the Stillman Creek watershed because those basins are too small to reliably provide habitat suitable for oviposition and rearing of their early life stages.

PINESNAKE MOVEMENTS

G. W. Gerald et al. [2006, *J. Herpetology* 40(4):503-510] examined movement patterns and activity ranges in a small population of northern pinesnakes (*Pituophis melanoleucus melanoleucus*), a rare species inhabiting a variety of habitat types. Information was obtained by implanting nine individuals with radio transmitters and monitoring them over a two-year period. Telemetered snakes exhibited a bimodal activity pattern with snakes moving more often during spring and late summer to early autumn. Snakes traveled an average of 273 m per move. Males moved greater distances than females during spring and movements during the autumn months were shorter than movements during spring or summer for all snakes. Northern pinesnakes traversed large activity ranges averaging 59.9 ha with core centers of activity averaging 7.9 ha. Snakes made long movements across less suitable habitats (late successional forest habitats) to get to preferred areas (early successional field habitats). The mosaic of habitats comprising the study area may be responsible for large movement distances and activity ranges observed in individuals from this population. Telemetered snakes traveled longer distances to and from widely separated areas, resulting in this population needing more extensive, contiguous areas to support their biological needs under the current management regime.

Unofficial Minutes of the CHS Board Meeting, January 19, 2007

Linda Malawy called the meeting to order at 7:31 P.M. Board member Erik Williams was absent.

Officers' Reports

Recording Secretary: Kira Geselowitz read the minutes of the December 15 board meeting. Minor adjustments were made and the minutes were accepted.

Treasurer: Andy spoke about a bill for advertising in *Reptiles* magazine and discussed moving the society's checking account to a new bank to avoid unnecessary fees. There was an overall loss for 2006, and it was larger than 2005. It was agreed that changes need to be made regarding the society's expenditures.

Membership Secretary: The board discussed the gradual but persistent decrease in membership that has taken place over the past ten years. It was suggested that members (especially those on the board) need to be better ambassadors of the society and try to get more people interested. Membership cards and static clings or magnets were suggested. Cindy and Jason will look into price quotes

Vice President: Speakers are looking good! Jason and Josh suggested possibilities for Steve Sullivan to look into.

Corresponding Secretary: There was discussion of who gets which calls. It was mentioned that the time is right to get rid of the second (773 area code) phone number for the society.

Publications Secretary: Erik Williams was not present. Jason brought up having an internet forum since it has been overlooked. He will work with Erik on putting one together.

Sergeant-at-arms: Attendance was about 54 at the December holiday meeting. There were a lot of new people and the feeling was that we should do it again this year.

Committee Reports

Shows:

- Jenny Vollman passed out copies of a great calendar!
- The new contract with the Notebaert was brought up; there was talk about guidelines for shows there (such as being more professional and clean) and insurance perhaps being an issue. The contract was agreed upon and signed.
- The CHS will have a table, courtesy of *Oaklee's Guide* magazine, at the Chicagoland Kid's Expo in Schaumburg, March 10-11, 10 A.M. - 5 P.M. It will be free for us and good advertising for ReptileFest. Offering a package of a family membership and t-shirt for \$30 was considered.
- There will be Peggy Notebaert shows on February 3-4.
- The CHS will be at the Springbrook Nature Center on January 21.

ReptileFest: We need to try and get out more electronic advertising. Everybody should look around to find websites that may be good for advertising. Steve Sullivan is putting a ReptileFest video on YouTube.

Monthly Raffle: Josh Chernoff needs more raffle items. Cindy will send out requests for donations.

Library: Marybeth is doing a great job. We possibly spent too much on books last year; better advertising of the books we do have may be a good idea. Mike Dloogatch moved to put a limit of \$500 on library spending per year. The motion passed unanimously. Steve is working on getting the plaque done.

Adoptions: We will be getting some more animals in soon and also getting the payments/expenses sorted out. We finished the year ahead financially with adoptions.

General Meetings: Herp of the Month and other short presentations need to be brought back. Several board members are willing. Rich will do one in January and Deb will present in February.

Grants: Twelve eligible proposals were submitted. Mike Dloogatch moved to allocate \$2,000 for grants in 2007. The motion passed unanimously.

Chicago Wilderness: CW requests dues from its member organizations based on their annual operating budgets. For the CHS in 2006 dues were \$50. A motion was made and passed to remit the \$50.

Awards: Awards for 2006 were handed out to two persons who had missed the December general meeting. Jason Hood received the President's award and Kira Geselowitz received the Merit Award. [Recording Secretary note: Kira is very grateful and incredibly glad to be a part of the society!]

Old Business

Shedd Aquarium Tour: Jason Hood has organized a tour for CHS members only on February 3. Members will have a few hours to enjoy the aquarium before receiving a private after-hours tour of the Lizards exhibit. This event, advertised on the CHS Yahoo! discussion group, has attracted many new members and should be great fun.

Spot Cartoon Book: Jenny Vollman and Don Wheeler have been working on it and are moving ahead quickly; it may even be ready for ReptileFest. Jenny moved that we allocate \$5-6 per book for 200 books to be printed. The motion passed unanimously.

Membership Brochure: A check must be issued to compensate the graphics designer who worked on it.

New Business

Calendar: We will skip the April board meeting because of ReptileFest. Using more private residences instead of the North Park Village building should be an aim for this year. This will cut back on expenses and it's fun.

Swap: The Chicagoland Animal Hobbyist Expo has offered us a free table, and it was agreed that we should try to attend it and promote education.

Exchange Publications: Jason Hood offered to take charge of them this year.

Zoo trip: Linda suggested a 2- or 3-day trip to the Kentucky

Reptile Zoo and the Louisville Zoo sometime between August and October. Kira will help plan it.

Round Table

• Deb Krohn didn't go to the Holiday meeting because her dog was sick, but he's okay now!

• Bob Bavirsha thanked the 2006 board members for a great job.

The meeting was adjourned at 10:18 P.M.

Respectfully submitted by Kira Geselowitz

Advertisements

Feeder Roaches: *Blaptica dubia*, all sizes, meaty and nutritious. Free samples to CHS members, or buy a starter colony to make your own. Superior to crickets in every way. This non-flying, slow moving, non-climbing species is very easy to breed and easy for your reptiles to catch. One starter colony of 100+ mixed sizes, \$25. If you don't know about roaches as feeders, read up on them; you'll never need to deal with the hassles of crickets again. Email: aasagan@msn.com

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For sale: herp books. *Simply Snakes*, deals with elementary identification of Australian snakes, and *The Real Crocodile*, author's attitudes and experiences with Australian crocs. Both published in 1993, are 24 pp., and contain many b&w photos. The author is Rob Bredl who, together with his fellow herpetologist father, Joe, have operated fauna exhibits in Australia for many years. Both softbound and \$15 each. *Reptiles of Australia* by Charles Barrett, 1950, 168 pp., many b&w photos, figs., drawings, no DJ, hardbound, \$80; *Australian Tropical Rainforest Life* by Clifford and Dawn Frith, 1987 (1983), 70 pp., one or two excellent color photos on every page (some full page size), plants, insects, amphibians and reptiles (14 pp.), birds and mammals, reptiles include 3 species of pythons, 2 of geckos plus many other species, a well done book, softbound, \$14. All books in excellent condition. \$2.50 for postage and handling for orders under \$25, free for \$25 or more. William R. Turner; 7395 S. Downing Circle W., Centennial CO 80122, (303) 795-5128; e-mail: toursbyturner@aol.com

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Line ads in this publication are run free for CHS members — \$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to: Michael Dloogatch, 6048 N. Lawndale Avenue, Chicago IL 60659, (773) 588-0728 evening telephone, (312) 782-2868 fax, E-mail: MADadder0@aol.com

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News and Announcements

2007 CHS GRANT RECIPIENTS

The CHS Grants Committee has chosen the CHS grant recipients for 2007. The committee consisted of Michael Dloogatch, Kira Geselowitz, Jason Hood, Deb Krohn, Linda Malawy, Amy Sullivan and Steve Sullivan. This year we received 13 applications, as usual far exceeding the number of grants that could be awarded based on available funds. After a difficult decision process, six grants were awarded, in varying amounts, as follows:

- Bill Flanagan, Grand Valley State University. “Using Ecological Niche Modeling to Evaluate the Michigan Distribution of the Western Lesser Siren (*Siren intermedia nettingi*),” \$250.
- Chris Lechowicz, Florida Gulf Coast University / Sanibel-Captiva Conservation Foundation. “Population Characteristics and Possible Hybridization of *Graptemys* Species in the Choctawhatchee River Drainage,” \$500.
- Diana Lutz, Michigan State University. “Behavioral and Ecological Study of *Clemmys guttata* (Schneider),” \$250.
- William E. Peterman, University of Missouri, Division of Biological Sciences. “Road Effects on Southern Appalachian Salamander Assemblages,” \$500.
- Beth Pettitt, University of Minnesota, Department of Ecology, Evolution, and Behavior. “Acoustic Communication and Parental Care in Two Species of Neotropical Frogs,” \$500.
- Cindy Rampacek, Small Scale Reptile Rescue. “Reptile Management in Shelter Environments,” \$150.

REPTILE RAMPAGE 2007

Reptile Rampage is a live reptile exhibition hosted each year by the Lake Forest Wildlife Discovery Center. This year it will take place Sunday, March 4, 10 A.M. – 4 P.M., at the Lake Forest Recreation Center Gym, 400 Hastings Road, in Lake Forest, Illinois. A \$5 donation per person is requested, with proceeds going to help Guatemalan beaded lizards. For more information contact Rob Carmichael, Curator, at (847) 615-4388 or carmichr@cityoflakeforest.com.

NWRA SYMPOSIUM

The National Wildlife Rehabilitators Association annual symposium will be hosted this year March 13–17 by the Willowbrook Wildlife Center and will take place at the Indian Lakes Resort in Bloomingdale. Reptile programs and speakers at this event include: “Turtle Husbandry for Wildlife Rehabilitators” and “Turtle Case Studies,” Harriet Forrester, Turtle Rescue of New Jersey; “The Illinois Herpetofauna—Richness and Diversity in the Land of Corns and Beans,” Mike Pingleton; “Basic Reptile Handling, Husbandry and Rehabilitation Techniques” and “Advanced Turtle and Tortoise Rehabilitation Techniques,” Chris Tabaka, DVM, Detroit Zoological Society. For details on this event visit the NWRA website at <http://www.nwrawildlife.org/home.asp>.



UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, February 28, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. **Whitney Banning**, a graduate student at the University of Illinois and 2005 CHS grant recipient, will speak to us on her work with Blanding's turtle conservation.

The program at the March 28 meeting will be given by **James Harding** of the Michigan State University Museum, speaking on "Can the Wood Turtle Survive and Prosper?"

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum — the **Peggy Notebaert Nature Museum**. This beautiful new building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the March 16 board meeting, to be held at the North Park Village Administration Building, 5801 North Pulaski Road, Chicago. To get there take the Edens Expressway, I-94, and exit at Peterson eastbound. Go a mile east to Pulaski, turn right and go south to the first traffic light. Turn left at the light into the North Park Village complex. At the entrance is a stop sign and a guardhouse. When you come to a second stop sign, the administration building is the large building ahead and to your left. There is a free parking lot to the left and behind the building.

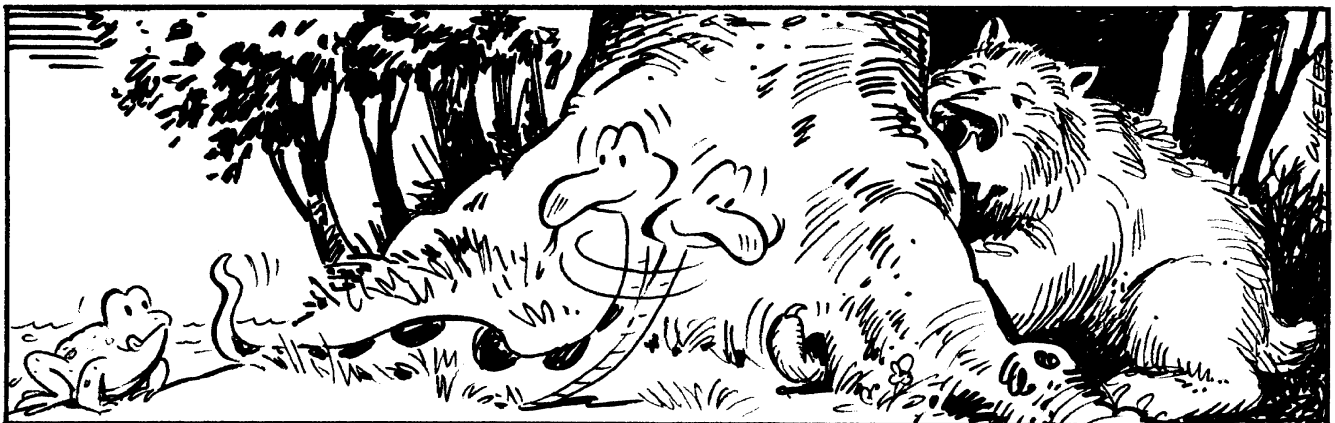
The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info call Lisa Koester, (773) 508-0034, or visit the CTC website: <http://www.geocities.com/~chicagoturtle>.

2007 SALAMANDER SAFARI

This year, the annual CHS Salamander Safari will be held on Saturday, March 24, 10 A.M. – 3 P.M., beginning at the Plum Creek Nature Center at Goodenow Grove Forest Preserve in Will County. Goodenow Grove is south of Crete, Illinois, 1¼ miles east of the intersection of Route 1 and Route 394 on Goodenow Road. If you need directions to get to this area, call Deb Krohn at the nature center, (708) 946-2216. From Plum Creek we will drive to other Forest Preserve District of Will County sites to search for amphibians. Species found or heard calling in previous inventories include spotted salamanders, blue-spotted salamanders, gray treefrogs, spring peepers, chorus frogs, bullfrogs, green frogs, and northern leopard frogs. Species not yet found but possibly occurring (or occurring at preserves nearby) include newts and wood frogs. As in past safaris, CHS members are encouraged to bring interesting amphibians from their personal collections for photography and display purposes. Coffee, juice and donuts will be provided, and a good time will be had by all!

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