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A New Live Trap for Capturing Alligators

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Numerous methods exist to capture alligators and crocodiles (Chabreck 1963; Hines et al. 1968; Hutton et al. 1987; Jones 1965; Walsh 1987; Webb and Messel 1977; Webb and Manolis 1989). Small crocodilians are often captured by hand, and larger specimens by use of snares or nooses placed over the animal's head. Use of harpoons, tongs, hand nets, drop nets and rope traps have been used successfully (Webb and Messel 1977). For large wary crocodilians steel traps may be most efficient (Walsh 1987; Webb and Manolis 1989).

We often attempt to catch adult female alligators (*Alligator mississippiensis*) in nest attendance to obtain blood samples for DNA studies. Generally we search numerous nest sites and can easily capture female alligators which sometimes aggressively defend their nests (see sampling procedure in Davis et al. 2001). However, female alligators are not usually seen at the nest site; Joanen (1969) found only 9.2% of females (29 females at 315 nests) attempted to protect the nest when visited by researchers. Many female alligators can be seen at nest sites, but remain wary and preclude capture.

In order to improve our capture rate at nests, we designed a live trap to be used at nest sites. Other researchers have used the "walk-in" trip snare (Murphy and Fendley 1973) to catch alligators at nests (J. Wiebe, pers. comm.). We were concerned this method might cause injury or drowning as the alligator moves into a suspended snare and nooses itself around the neck. Also, this type of snare should be checked daily. On occasion, emergency schedule changes or inclement weather might prohibit us from checking a trap on the day after it is set, although daily checks are desirable. We herein describe a trap we designed for use on alligators, which is somewhat similar to the steel live traps used in Australia for crocodiles (Walsh 1987; Webb and Manolis 1989). Because of marked tidal fluctuations in water levels in Australia, some traps used there have floats to allow the trap to maintain proper positioning at high or low tide. Such floats are not necessary with the minor tidal changes in water level in coastal Louisiana.

The trap's frame is constructed of angle aluminum and is 243.8 cm long x 61.0 cm wide x 101.6 cm high (Fig. 1). The frame is covered by 2.54 cm x 5.08 cm vinyl-coated fencing wire held in place by electrical cable ties. An aluminum sliding trap door (106.7 cm high) is positioned at the entrance and propped open by a peg in the center of its lowest surface. A cable runs from the end of this peg along the top center of the trap through a chute (213.4 cm long). The other end of the cable drops into the interior of the trap, and the bait is suspended from this end by the cable threaded over a pulley. Thus, when the alligator enters the cage and takes the bait, the cable pulls the peg from beneath the door, which then falls shut, trapping the alligator inside. Four rings were welded to the upper part of the frame, so wooden stakes could be placed inside these to anchor the trap in position (Fig. 1).

This prototype trap was built in a single day by a crew of five people, with much improvisation and experimentation. With the benefit of hindsight and advance planning, future models could be built more efficiently. Estimated cost of supplies for construction totaled less than US $400. The trap weighs approximately 120 pounds (54.5 kg) and can easily be transported in an outboard or airboat, or carried by two people. As we were attempting to catch adult females at nests we placed the trap so the entrance would open in a trail indicating a possible path between the alligator nest and the female's den, usually within a pond adjacent to the nest (Fig. 1). The trap should be positioned so that much of the upper portion is above the water level, to allow a captured alligator access to fresh air, but the lower portion is below water to allow the alligator to fully submerge. We use chicken for bait, as it tends to remain moist relative to other baits (beef, fish, etc.).

The trap was tested on Rockefeller Wildlife Refuge, a 32000 ha coastal marsh in southwestern Louisiana. The refuge boundaries and predominant vegetation were described by Joanen (1969) and the trap was tested in the Superior Canal system where our DNA study is ongoing (see Davis et al. 2001 for map).

The trap was first set on the afternoon of 29 July 2002. When checked the following morning a 233.7 cm female had been captured. The female appeared calm and had only a slight abrasion on the nose; similar to what may occur during standard capture meth-

FIG. 1. Alligator trap set at alligator nest site. Note alligator nest in foreground (lower left). Trap door is open and bait suspended above the water.

ods. That afternoon the trap was moved and set at another nest site. When checked on the morning of 1 August 2002, the water was calm and clear and the bait appeared minimally disturbed. When we began to pull up the anchoring stakes, we realized the trap contained a female alligator with a total length of 248.9 cm.

The trap was not set again until 7 August 2002, at a new nest site. When checked on 8 August, we found the bait had fallen off the suspending cable. It was rebaited and checked the next day. The door had fallen closed (perhaps bumped by the alligator or as a result of gusty winds), and the bait appeared untouched. The trap was moved and next set on 21 August 2002. The female was observed when placing the trap at the nest site, and despite minor disturbance (photography) for some 20 minutes, the female (201.9 cm) was captured overnight, again caught apparently without injury.

The trap was moved to a new nest site on a floating marsh, with an unstable foundation. When checked on 23 August we found it had fallen over slightly sideways, having been inadequately anchored into position on the unstable marsh or bumped by the alligator at the site. This was the final opportunity to test the trap for this nesting season.

Of note, in Joanen's study (1969) of alligator nesting, data from movement recorders placed at four nests indicated over half of 66 nest visits recorded occurred in the first three weeks of incubation (approximately mid-June through first week of July). Nest visits were rare until the ninth/final week of incubation in late August, when 27.3% of nest visits occurred (Joanen 1969). We believe our trap was very successful, in that the first two alligators were captured during the 6th-7th week of incubation, when only one nest visit of 66 was noted in the four nests Joanen (1969) monitored.

We also measured plasma corticosterone levels from the blood sample we took after removing the alligators from the trap. These measured 5.07, 5.03, and 3.29 ng/ml for the three alligators captured. The second alligator trapped (for which we were unable to check the trap until the second day after it was set) had no higher stress hormone level than the first one, caught and bled the next day after the trap was set. We do not know however when the alligator entered the trap after it was set. For comparison, five adult alligators bled immediately upon capture had average plasma corticosterone levels of 0.8 ng/ml, which rose to an average of 12.6 ng/ml after four hours of restraint stress (Elsey et al. 1991). The slightly elevated corticosterone levels in our trapped alligators may have resulted from being contained within the trap, or due to the acute stress of being removed from the trap prior to blood sampling. It took ca. 10–15 minutes to remove the anchoring stakes, move the trap to a relatively dry spot in the marsh (Fig. 2), remove the alligator from the cage, secure the jaws, and obtain the blood sample. Our normal procedure of snaring aggressive females generally takes about 5 minutes from initiation of capture until the blood sample is obtained.

We believe this prototype trap was very successful in our limited testing. In every case when we caught an alligator, the alligator was extremely calm resting on the bottom beneath the water, and did not appear to have struggled within the trap. This trap is advantageous in that it allows for capture of wary adults, and although preferred, does not have to be checked on a daily basis as the alligator does not have a snare around its neck (possibly causing injury/drowning). Trapped alligators are also protected from fighting/cannibalism from other alligators that might attack an alligator caught in a "walk-in" snare system. The trap could be very useful in situations where nuisance alligators need to be live captured and removed, as it may be socially problematic to harvest the alligator in question. We also did not capture any non-target species. A disadvantage is hormone analyses may be altered due to restraint time/mild stress effects (Elsey et al. 1991), as we prefer to collect blood samples immediately after capture, with minimal disturbance.

FIG. 2. Captured alligator (201.9 cm total length) within trap, being moved to high ground for processing. Note door in closed position and trap transported with reasonable ease by two persons.

Improvements could be made by designing an easier way to remove a captured alligator from the trap (we had to open the door, noose the alligator by the neck, and physically pull it out of the entrance). Also, if large male alligators are targeted, the trap may need to be enlarged.

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RECENT POPULATION CHANGES

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Distribution of *Bufo boreas* in Utah

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The Western Toad (*Bufo boreas*) has undergone severe reductions in population sizes and distribution in much of its geographic range (Carey 1993; Colorado Division of Wildlife 1997; Corn et al. 1989; Livo and Yeakley 1997). In the southern Rocky Mountains, which include portions of the states of Colorado, Wyoming, and New Mexico, *B. boreas* is a candidate species for federal listing under the United States Endangered Species Act. Federal listing is "warranted but precluded," however, because there are other species presently in greater need (Federal Register 2002). Because of declining populations, the states of New Mexico and Colorado listed *B. boreas* as endangered in 1976 and 1993, respectively (Colorado Division of Wildlife 1997). In Utah, *B. boreas* is considered a species of special concern because of declining populations (State of Utah Rule R657-48) and lack of knowledge on current distribution (Ross et al. 1995).

Only 70 *B. boreas* localities were documented in Utah prior to 1995 (Fig. 1). These localities were based on museum records, various databases, and survey efforts, however, it was not known how many historical sites still supported *B. boreas* or how well these sites represented the distribution of the species in the State of Utah. Ross et al. (1995) reported that the majority of the historical records for *B. boreas* in Utah were concentrated in northern Utah and a large number of these locations were in the Wasatch Mountains between Salt Lake City and Provo (Fig. 1). This distribution pattern may reflect increased survey effort in this part of the state. Between 1980 and 1994, *B. boreas* records were scattered and typically consisted of the presence of one to several adults. Twenty-six localities were documented during this timeframe and reproduction was observed at only five of these localities (Ross et al. 1995).

We report the results of surveys since 1995 by the Utah Division of Wildlife Resources (UDWR) to better determine the current distribution of *B. boreas* in Utah and determine the extent of occupancy in areas with detections. This effort has consisted primarily of daytime visual encounter surveys (Crump and Scott 1994) during the breeding season. Surveys were generally systematic as initial surveys were completed statewide at or near pre-1995 localities and expanded to suitable habitat near detection points to

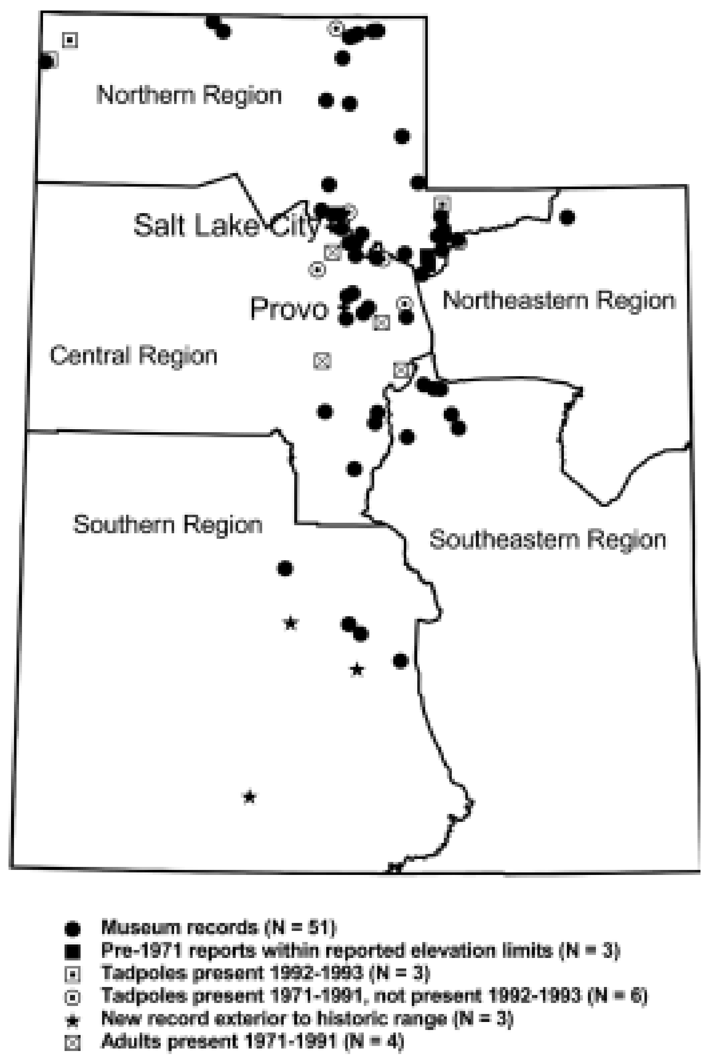

FIG. 1. Pre-1994 distribution of *Bufo boreas* in Utah (adapted from Ross et al. 1995).