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## Diamondback Terrapin Mortality in Crab Pots in a Georgia Tidal Marsh

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**ABSTRACT.** – Recreational and commercial crab pots are considered major threats contributing to recent declines in Diamondback terrapin populations. In a single Georgia tidal marsh, one-hundred thirty-three diamondback terrapin (*Malaclemys terrapin centrata*) carcasses were observed in abandoned crab pots, consisting of more than double the remaining estimated population. We suggest that the potential for a single neglected or abandoned crab pot to significantly deplete a terrapin population, enforcement of explicit soak laws and implementation of a derelict crab pot removal program should be a priority for conservation of diamondback terrapins in Georgia.

The accidental capture of diamondback terrapins in recreational and commercial crab pots has long been documented among biologists. Davis (1942) first described crab pots as a potential threat to diamondback terrapins in 1942 and today, crab pots are considered the primary threat to diamondback terrapin populations throughout their range (Seigel and Gibbons, 1995).

Roosenburg et al. (1997) described two levels of terrapin mortality in crab pots. The first being a “constant background mortality” for crab pots that are regularly fished over a long period of time, while the second includes crab pots that have been lost or abandoned (“ghost” or derelict crab pots). Regularly fished crab pots have the potential to consistently capture small numbers of terrapins over time, while derelict crab pots tend to capture more terrapins over a shorter time period. Although both levels have the potential to negatively affect terrapin abundance; collectively, only baited crab pots have been shown to be detrimental to diamondback terrapin populations, throughout their range (Seigel and Gibbons, 1995; Hoyle and Gibbons, 2000; Roosenburg et al., 1997, Dorcas et al., 2007, Roosenburg, 2004, Wood, 1997).

Less well documented are the effects of unbaited derelict pots on terrapin mortality. Guillory et al. (2001) estimated that 250,000 derelict crab pots are added to the Gulf of Mexico and Atlantic coast annually. Bishop (1983) reported a ghost crab pot in South Carolina that contained the carcasses of 29

terrapins. Roosenburg (1991) found a ghost pot in the Chesapeake Bay, which contained 49 dead terrapins, which he estimated accounted for 1.6-2.8% of the local population.

Though many derelict pots are added to coastal habitats annually, a small subset may pose the greatest risk to terrapin populations depending on their specific location within a marsh. Bishop (1983) noted that ghost pots are frequently transported through tidal current action to shallow waters, and pots in shallow water have a higher probability of capturing large numbers of terrapins during the spring months (March, April and May). Additionally, Roosenburg (1999) observed that larger sized terrapins, generally female, utilize the deep, open water more frequently than the smaller sized males and juvenile females. So, expectations are that abandoned crab pots in shallow marsh habitats have great potential to catch and kill large numbers of male and immature female terrapins during spring periods.

On 4 April 2007, while sampling for *Malaclemys terrapin centrata* in a tidal marsh at low tide near St. Simons Island, Georgia, Glynn, Co., a crab pot was observed just below the water's surface. The water depth was < 1m and a mixture of mud, algal and barnacle growth, and turtle carcasses were visible within the trap. The trap was pulled from the water, revealing the carcasses of 94 (4 April 2007) dead *M.t. centrata* (Fig. 1). On May 4, we observed 23 dead and 1 live *M. t. centrata* in second trap ~100 m from the first trap.

By law, we were prohibited from removing the traps from the water, and during the remainder of our 2 month sampling period we visited this site three additional times. During each additional visit we observed additional dead terrapins in the derelict crab pots. Over 5 visits between 4 April and 30 June 2008, we documented 133 dead turtles among the two derelict crab pots. During each of our visits we were conducting a mark-recapture study, and based on that data, we estimated there were 73 (SE = 15.07) live terrapins still in the creek (White and Burnham, 1999). The number of dead turtles documented was nearly twice the estimated remaining live population. We were able to accurately sex and measure carapace lengths for 97 of the dead terrapins. 83% of dead turtles were male, and carapace lengths ranged

from 74-148 mm (mean = 119 mm). By comparison, 66% of live turtles captured in the creek were male, and sizes ranged from 97-133 mm (mean = 117 mm). Finally, we used carapace measurements to estimate the mass (g) for dead terrapins. Using methods from Congdon et al. (1986), we estimated the terrapin biomass for this particular tidal creek to be 257.02 kg/ha, consisting of 167.06 kg/ha female and 89.96 kg/ha male. Based on these estimates we determined that 91% of the total terrapin biomass in this tidal creek was lost as a result of neglected crab pots.

The Gulf Coast states have recognized the initial threats of derelict crab pots and successfully initiated crab pot cleanup programs, in which they collectively removed 58,611 abandoned ghost pots, from 2002 to 2007 (Perry et al. 2008). On the southeast Atlantic coast, North Carolina is the only state that has established a successful crab pot cleanup program. In 1995, North Carolina began its crab pot removal program by collecting approximately 4,600 crab pots (Guillory et al. 2001). In comparison, in 1996 Georgia attempted to establish a pilot crab pot recycling program which lasted for just four months before being discontinued (Guillory et al. 2001). Georgia needs to reestablish a crab pot recycling program in order to remove derelict crab pots from its coastal waters. Further, Georgia needs to develop a more effective soak requirement to identify derelict commercial and recreational crab pots, and enforce state and federal laws governing reasonable soak times and the discarding of pots in public waters. Currently, Georgia has no requirement for how long a crab pot can soak before being checked (Code of Georgia, 2008), while North Carolina's soak law requires all pots to be checked every 5 days (North Carolina Administrative Code, 2008). Federal law prohibits the discarding of waste, which would include derelict crab pots, in public waters. Providing positive mechanisms to remove derelict crab pots, and developing and enforcing regulations to reduce negligence of crab pots could be a major first step in preventing additional inhumane mortality of terrapins and contributing to the species long term conservation.

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Figure 1. An abandoned crab pot which caused the mortality 94 diamondback terrapins