Diamondback Terrapin Population Distribution and Nesting Areas in Coastal Georgia


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INTRODUCTION

Diamondback terrapins are the only North American turtle to prefer brackish water habitats and have a narrow range from Cape Cod all the way to Corpus Christi (Ernst and Lovich 2009). That environment makes terrapins one of the first species to be vulnerable to sea level rise (Woodland et al. 2017). They also face other anthropogenic challenges such as drowning in crab traps (Chambers and Maerz 2018) and shoreline hardening (Maerz et al. 2018).

One of the primary goals of the main conservation body of terrapins, The Diamondback Terrapin Working Group (www.dtwg.org), is to identify the remaining terrapin nesting locations and populations so they can be appropriately managed and studied in the future (Butler et al. 2006). The overarching goal of our current project is to survey the entire coastline of Georgia for the presence of diamondback terrapins and their nests.

Little is known about terrapin populations and nesting habitats in coastal Georgia. Northernmost populations along the Savannah River, including sites at Ft. Pulaski and Tybee Island, have been studied and several nesting sites identified (Jordan Gray, unpublished data). In the southern part of the state, The Georgia Sea Turtle Center along with graduate students from the University of Georgia have documented extensive terrapin road mortality on the Jekyll Causeway for more than a decade (Crawford et al. 2013a and 2013b). Grosse et al. (2011) recognized 138 creeks on the Georgia coastline they considered to be diamondback terrapin habitat; they chose 29 creeks to study the effects of road mortality and crab trapping on terrapin populations. This leaves 109 creeks unstudied in relation to terrapins.

The UNF Terrapin Team believes the lack of data on Georgia's terrapins is due to the habitat being sparsely populated with humans and much of the area being accessible only by boat. We hypothesize that if we search by boat in the proper places, we will locate terrapin populations and nesting areas.

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METHODS

Study Area. We are collecting data along the Atlantic Coastline of Georgia from the Savannah River south for nearly 250 km to the St. Mary's River. The western limit of our search is roughly Interstate 95; at that point, creek waters will usually be less influenced by tidal intrusion thus being less attractive to terrapins.

Approaches. Since our goal is simply to determine if terrapins are present in an area, we need not actually capture them, however we sometimes do when females have come ashore to nest. In those cases we record the sex, weight, and measurements and release them at the capture site. Such incidents sometimes provide the opportunity to find and record intact nests, which also indicate terrapin presence. In the absence of capture, one technique to determine presence is recording terrapin heads as they surface periodically for air (Harden et al. 2009). Also, when terrapins deposit nests, if raccoons are present, they will dig up most of the nests, eat the eggs, and leave the excavated hole with eggshells nearby. When we locate habitats that could support terrapin nesting we conduct walking surveys and search for these "depredated nests" (Butler et al. 2018). Further, if raccoons encounter these nesting females they often kill them and we can find terrapin carcasses and bones (Butler and Heinrich 2013).

We record all our findings in the field on an Ipad with an external GPS receiver and use the ArcGIS Collector App, which allows us to create maps in real time. Our research trips are planned to favor periods when tides are rising for most of the daylight hours, which occurs about every two weeks.

RESULTS

Since 2015 we have surveyed about 80% of the Georgia coastline and we anticipate completing the study in the Savannah area during the 2020 season (Fig. 1). Of our nearly 1400 terrapin records over half have come in the form of depredated nests (Table 1). We almost abandoned head counts after the first two years because they seemed quite inefficient. However, during our 3rd and 4th years they accounted for over 30% of our records.
Finding terrapin remains is usually a more consistent and reliable method for determining terrapin presence than head counts. Capturing nesting terrapins and finding intact nests were truly serendipitous events. Similarly, recording crawls provided little evidence of terrapin activities.

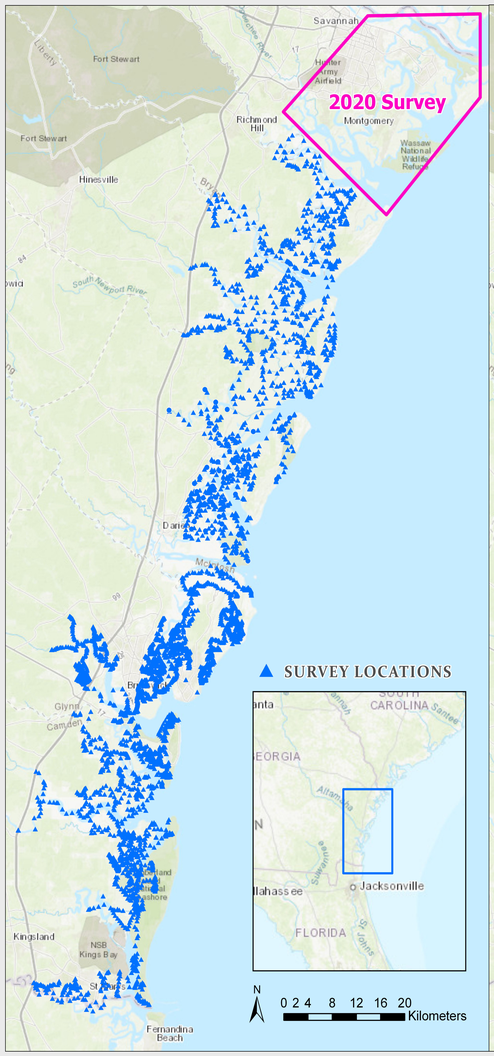

Fig. 1 All survey locations searched in coastal Georgia from 2015 to 2019.

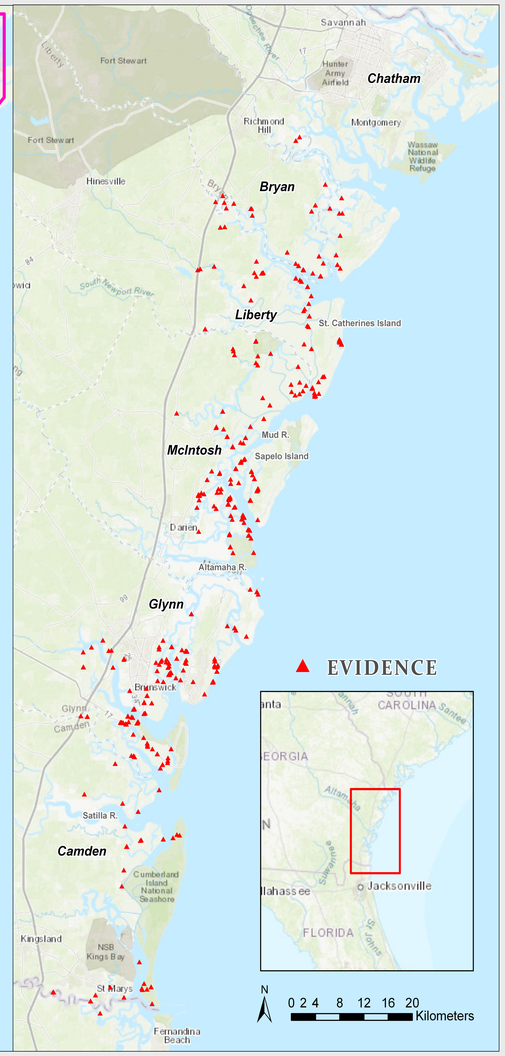

Fig. 2 Locations where evidence of diamondback terrapins has been recorded.

Table 1. Records of diamondback terrapin evidence collected in coastal Georgia from 2015 through 2019.

Survey Year	Counties	Intact Nests	Heads	Live Terrapins	Crawls	Terrapin Remains	Depredated Nests	Total
2015	Bryan Chatham Liberty	0	1	2	0	72	229	304
2016	Liberty McIntosh	0	1	2	6	55	161	225
2017	McIntosh	1	168	0	21	28	239	457
2018	Glynn	3	91	8	16	62	131	311
2019	Camden	0	5	1	5	12	68	91
Totals		4	266	13	48	229	828	**1388**

DISCUSSION

It is clear that terrapins thrive along most of the Georgia saltmarshes however in several areas our data are lacking (Fig. 2). The Altamaha River originates far inland at the confluence of several fresh water rivers, and by the time it approaches the coast it is less influenced by tidal flow than most water bodies. It appears that salinities are low enough to preclude terrapin presence. Conversely, just to the north of the Altamaha in McIntosh County we recorded the highest evidence counts of the entire project. Also, just south of the Altamaha, the Brunswick area (Glynn County) also provided much evidence of terrapin activity. It may be that terrapin populations are divided by the freshwater Altamaha River, and it would be interesting to determine if the northern and southern groups intermingle.

Several other areas offer little terrapin evidence. The Satilla River, although heavily influenced by tidal fluctuations, is very fast-flowing making it difficult to see surfacing heads, plus there are few places for nesting to occur. However, the concentrated marshlands would likely offer attractive habitat for terrapins, but our techniques failed to detect them. Something similar may be the case for the Mud River, to the northwest of Sapelo Island. We recorded an abundance of terrapin evidence on the river's western shoreline, but nothing on its eastern shore. Finally, the southernmost county, Camden, provided little evidence of diamondback terrapin presence. There are areas around Kings Bay Naval Station where we were unable to survey. It would be valuable to know the effects of such a facility on terrapin populations.

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