Range extension: occurrence of the finetooth shark (*Carcharhinus isodon*) in Florida Bay

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Summary

Carcharhinus isodon (finetooth shark) is a migratory shark found in coastal waters of the southeastern United States and is well documented in the waters of north Florida in both the Gulf of Mexico and the Atlantic Ocean. The southernmost reports along Florida's Gulf coast are from Lemon Bay (27° N), just north of Charlotte Harbor, and from Port Salerno (27° N) on Florida's Atlantic coast. Four *C. isodon* were captured on bottom set longlines in Florida Bay, just north of 25° N latitude, during routine sampling for *Pristis pectinata* (smalltooth sawfish). These captures extend the southern range of *C. isodon* in Florida to approximately 25ºN and increase the likelihood of exchange between the Atlantic and Gulf.

Introduction

Carcharhinus isodon is a moderate-sized species of shark found in shallow U.S. coastal waters from North Carolina to Florida and in the northern Gulf of Mexico (Bethea et al. 2004, Carlson et al. 2002, Castro 1993). Compagno (1988) reports *C. isodon* occurs from New York south to Florida, Cuba, the Gulf of Mexico to Texas and Mexico, also Guyana and southern Brazil. Castro (1983) described the species as inhabiting the Atlantic coast of North America from New York to Florida and the Gulf of Mexico. *C. isodon* inhabits the western Atlantic from North Carolina to Brazil and is common off the southeastern United States, where it spends the summer off Georgia and the Carolinas and winters off Florida (Castro 1993). The species is known to migrate southward in early fall as water temperatures decrease (Carlson and Brusher 1999, Castro 1993). There are few records from the Caribbean and south Atlantic and no valid records of this species from Cuba (Castro 1993). In Florida *C. isodon* have been reported in the Florida panhandle (Bethea et al. 2004, Carlson et al. 2003), Port Salerno (Springer 1950), Lemon

Bay (Clark and von Schmidt 1965), Melbourne Beach (Dodrill 1977), and Daytona Beach (Castro 1993). Therefore, the range of *C. isodon* in Florida has been previously documented as north of 27°N, the latitude of Port Salerno on the Atlantic coast and Lemon Bay on the Gulf of Mexico coast. However, we captured four specimens just north of 25°N in Florida Bay, which represents an extension to the southern range of this species in the United States.

Methods

Longline sets targeting *P. pectinata* have been carried out since 2000 from Tampa Bay to the outer Florida Keys. Longlines consisted of an 800 m bottom set mainline of 8 mm braided nylon rope anchored and marked with buoys at each end. Gangions were constructed of 1 m of 5 mm braided nylon cord and 1 m of stainless steel wire leader. Mustad tuna circle hooks (12/0 to 16/0) were baited with frozen mullet (*Mugil cephalus* or *M. curema*). The date, time and location of each set were recorded. Physical parameters (water temperature, salinity and dissolved oxygen) were recorded at each sampling location midway between the surface and bottom using a YSI 85 water quality meter.

Sharks caught during surveys were identified and sexed. Four measurements of length to the nearest 0.5 cm were taken when possible: precaudal (PCL), fork (FL), total (TL) and stretched total length (STL). Locations of longline sets and *C. isodon* captures were plotted using a Geographic Information System (ArcView 3.3).

Results and Discussion

During 1,233 longline sets from Tampa Bay to Key West, four *C. isodon* were captured in Florida Bay (Fig. 1). Three were captured on 12 February 2003 just south of East Cape Canal

(25° 7’ 24” N 80° 3’ 59” W) and the fourth on 10 February 2005 near Curry Key (25° 7’ 54” N 80° 57’ 48” W) west of Flamingo. The first three were caught at a depth of 1.3 m and the fourth at 1.1 m. Despite extensive year-round sampling, the four *C. isodon* were all captured in February in water temperatures of 22.2 and 23.5°C. The two male *C. isodon* were 111 and 130 cm TL and the two females were 115 and estimated 100 cm TL.

The water temperatures and timing of the *C. isodon* captures were consistent with reports by Castro (1993) who stated that these sharks leave the Carolinas in early fall and migrate southward as the surface water temperature decreases below 20°C. Dodrill (1977) reported the species is found off Melbourne Beach from November to April. Similarly, Carlson and Brusher (2004) reported that young of the year and juveniles remain in Apalachicola Bay in the Florida Panhandle until fall, when they emigrate offshore into the Gulf of Mexico. It is unknown if the four *C. isodon* captured in Florida Bay are from the Gulf of Mexico or Atlantic Ocean populations; however, the timing of the captures coincides with the southward winter migration of both populations.

Given that differences in reproductive biology have been reported between *C. isodon* occurring in the Atlantic and Gulf of Mexico, it is possible that there is little or no interaction between these two stocks. Castro (1993) reports males reach maturity at about 130 cm and females 135 cm TL for animals from the western Atlantic Ocean. Carlson et al. (2003) reported males reach maturity between 100 and 129 cm TL and females 118 to 124 cm TL in the northern Gulf of Mexico. This separation of the Atlantic and Gulf stocks may be mediated by thermal preference, which restricts this species from reaching the Florida Keys where interaction may occur. The occurrence in Florida Bay at the southern tip of Florida increases the likelihood that

there is greater movement or interaction between these two stocks than indicated by previous information on their distribution.

The results of this study extend the southern range of *C. isodon* in Florida to approximately 25ºN and increase the likelihood of exchange between the Atlantic and Gulf stocks. The low level of catch, despite extensive sampling in southwest Florida, suggests that their incidence in southern Florida is rare and only occurs when water temperatures are low during winter. Further research on the movements of this species, both in the Gulf of Mexico and along the Atlantic coast, will be required to further understand the seasonal movement patterns and extent of their southern movements.

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Figure 1. Locations of 1233 longline sets (x) and three *Carcharhinus isodon* captured 12 February 2003 (A) and one captured 10 February 2005 (B).