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First Confirmed Record of Nassau Grouper *Epinephelus striatus* (Pisces: Serranidae) in the Flower Garden Banks National Marine Sanctuary

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SHORT PAPERS AND NOTES

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FIRST CONFIRMED RECORD OF NASSAU GROUPEP *EPINEPHELUS STRIATUS* (PISCES: SERRANIDAE) IN THE FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY.—The first photographed and confirmed sighting of Nassau grouper, *Epinephelus striatus*, a species of concern according to the National Marine Fisheries Service, was reported in the Flower Garden Banks National Marine Sanctuary (FGBNMS) in September 2006 during a collaborative research cruise involving the National Oceanographic and Atmospheric Administration's Biogeography Branch and sanctuary staff. The primary goal of this mission was to conduct a robust spatial and quantitative characterization of the benthic fish community within the sanctuary using a stratified random sampling design. The random site selection process covered the entire array of habitats (<110 feet) at the FGBNMS, increasing the likelihood of encountering rare and previously unreported species. Three prior sightings of *E. striatus* have been documented in the FGBNMS (at mooring buoys and West Flower Garden flats) by novice divers of Reef Environmental Education Foundation, but these have remained unconfirmed because sanctuary policy requires photographic evidence to add a new species account to the official species' list.

E. striatus was reported on East Flower Bank (27°54'42.76"N 93°36'5.679"W) at a depth of 36 m and visually estimated to be approximately 55 cm TL (Fig. 1) Nielsen & Johnson (1983). It was sighted with four tiger grouper (*Myctoperca tigris*) beneath the plated edge of a large *Montastrea* sp. colony overlying a narrow sand channel and was easily identified by the distinct black saddle on the caudal peduncle and the barred pattern along the face and body.

Epinephelus striatus was once one of the most common and valuable commercial fishing species throughout tropical Atlantic and Caribbean waters (Randall, 1983; Appeldoorn, et al. 1987; Sadovy, 1997). Its known range extends from Bermuda to south of Florida in the western Atlantic; within the Caribbean Sea from the Virgin Islands in the east to Cuba in the west; and throughout the Yucatan Peninsula south to Venezuela (Bohlke and Chaplin, 1993; Heemstra and Randall, 1993). The species is reported from the southern Gulf of Mexico (Fisher, 1978)

and more specifically on the Bank of Campeche along the north coast of the Yucatan Peninsula (latitude: 22.00, longitude: -87.00, www.fishbase.org, Jory and Iverson, 1989; Heemstra and Randall, 1993), making this sighting approximately 500 km north of existing records.

The FGBNMS is located within the northwestern Gulf of Mexico, approximately 180 km southeast of Galveston, TX and is colonized by the northernmost coral reefs on the North American continental shelf. The banks originate from seafloor uplift, forming salt domes supporting over 20 species of tropical hermatypic corals (Bright et al., 1984; Rezak et al., 1985; Gittings et al., 1992). Impacts to the FGBNMS from coastal processes are minimized because of their great distance from shore, which may be promoting healthy coral growth and an abundant reef fish population.

The predominant current flow is easterly, originating in the Yucatan Channel and moving clockwise around the gulf before exiting via the Florida Straits. Cyclonic events, however, can cause occasional westerly gyres that are retained within the northwest region of the basin (McGrail et al., 1982a; Lugo-Fernandez et al., 2001). Circulatory patterns in the gulf could result in new larval influx for this species from coral reefs in the Bay of Campeche at Cabo Rojo, Mexico (Villalobos, 1971; Rezak et al., 1985). In addition, local drifter studies during coral spawning events illustrated self-seeding capabilities in the FGBNMS as the drifters passed near the banks 24–30 d after deployment (Lugo-Fernandez et al., 2001). Larval settlement potential is also enhanced with the presence of oil platforms that potentially serve as settlement sites for larvae, thereby encouraging the regional connectivity of the FGBNMS to the greater Gulf of Mexico (Dennis and Bright, 1988; Lugo-Fernandez et al., 2001). The combination of periodic shifts in current flow, new oil platforms, and deep scattered banks may have enhanced regional connectivity in the gulf and resulted in new species introductions through adult migration or larval dispersion.

Like most grouper, *E. striatus* is commonly reported over high-relief coral habitat or rocky substrate, on both natural and artificial reefs to depths of at least 90 m, with the depth range primarily dictated by presence of hard structure (Fischer, 1978; Sadovy and Eklund, 1999). Studies have tracked adults traveling over great distances to reach spawning aggregations



Fig. 1. Photo of Nassau grouper, *Epinephelus striatus*, at East Flower Garden Bank.

(>200 km) (Aguilar-Perera and Aguilar-Davila, 1996; Bolden, 2000) and to depths <110 m from trap reports in the Bahamas (Thompson, 1978). Brownell and Rainey (1971) report that while fishermen in the Leeward Island fish the species to 130 m, the catches are most commonly reported within 52–60 m. Although the sanctuary provides ideal habitat within the depth range of this species, the >90 m depths of the soft sediment habitat and lack of hard substrate surrounding the banks is likely a deterrent for migration between banks. The findings of Lugo-Fernandez et al. (2001) support this theory, as coral larvae settled on only 10 of 19 outer shelf banks sampled in the region because of depth and substrate limitations.

Although there is limited information available on *E. striatus* larval biology, it is known to develop in oceanic waters and settle on deep banks (Colin et al., 1997). Although not commonly reported in offshore waters, the larvae remain pelagic for an average of 42 d (Colin et al., 1997; Lindeman et al., 2000). Larval influx from western reefs is the most plausible explanation for this introduction to the FGBNMS, on the basis of prevailing current patterns. Local current patterns favor larval transport from western source reefs, but that is not to dispel the possibility of larval exchange to or from

Caribbean reefs or the Florida Keys (Lugo-Fernandez, 1998).

Although there have been studies conducted in the past on the local fish communities of the FGB (see Boland et al., 1983; Dennis, 1985; Gittings et al., 1993; Pattengill, 1998; Dokken et al., 1999), this is the first confirmed observation of this grouper species. Although the occurrence of *E. striatus* may be related to transient movement, it provides additional data that can aid investigations regarding connectivity to the sanctuary.

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