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SHORT PAPERS AND NOTES

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FIRST CONFIRMED RECORD OF NASSAU GROUPE *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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LITERATURE CITED

- AGUILAR-PERERA, A. J., AND W. AGUILAR-DAVILA. 1996. A spawning aggregation of Nassau grouper *Epinephelus striatus* (Pisces: Serranidae) in the Mexican Caribbean. *Environ. Biol. Fish.* 45:351–361.
- APPELDOORN, R. S., G. S. DENNIS, AND O. MONTERROSA LOPEZ. 1987. Review of shared demersal resources of Puerto Rico and the Lesser Antilles region, p. 36–106. *In: Report and proceedings of the expert consultation on shared fishery resources of the Lesser*

- Antilles region. Mayaguez, Puerto Rico, 8–12 September, 1986. *FAO Fish. Rep.* 383, 278 p.
- BOHLKE, J. E., AND C. C. G. CHAPLIN. 1993. *Fishes of the Bahamas and adjacent tropical waters*. 2d ed. Univ. of Texas Press, Austin. p. 59.
- BOLAND, G. S., B. J. GALLAWAY, J. S. BAKER, AND G. S. LEWBELL. 1983. Ecological effects of energy development on reef fish, ichthyoplankton, and benthos populations in the Flower Garden Banks of the northwestern Gulf of Mexico: Volume III, Ecological effect of energy development on reef fish of the Flower Garden Banks. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Galveston, TX. 466 p.
- BOLDEN, S. K. 2000. Long-distance movement of a Nassau grouper (*Epinephelus striatus*) to a spawning aggregation in the central Bahamas. *Fish. Bull.* 98:642–645.
- BRIGHT, T. J., G. P. KRAEMER, G. A. MINNERY, AND S. T. VIADA. 1984. Hermatypes of the Flower Garden Banks, northwestern Gulf of Mexico: a comparison to other western Atlantic reefs. *Bull. Mar. Sci.* 34:461–476.
- BROWNELL, W. N., AND W. E. RAINEY. 1971. Research and development of deep water commercial and sport fisheries around the Virgin Islands plateau Virgin Islands Ecological Research Station Contrib. No. 3, 88 p.
- COLIN, P. L., W. A. LAROCHE, AND E. B. BROTHERS. 1997. Ingress and settlement in the Nassau grouper, *Epinephelus striatus* (Pisces: Serranidae), with relationship to spawning occurrence. *Bull. Mar. Sci.* 60(3):656–667.
- DENNIS, G. D. III. 1985. Reef fish assemblages on hard banks in the northwestern Gulf of Mexico. MS thesis Texas A&M Univ., p. 164.
- DENNIS, G. D., AND T. S. BRIGHT. 1988. New records of fishes in the Northwestern Gulf of Mexico, with notes on some rare species. *Northeast Gulf Sci.* Vol. 10, No. 1, p. 1–18.
- DOKKE, Q. R., I. R. MACDONALD, J. W. TUNNELL, C. R. BEAVER, G. S. BOLAND, AND D. K. HAGMAN. 1999. Long-term monitoring at the East and West Flower Garden Banks, 1996–1997. OCS Study MMS 99-0005, U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS region, New Orleans, LA. 101 p.
- FISCHER, W. (ED.). 1978. pag. var. *FAO species identification sheets for fishery purposes. Western Central Atlantic (fishing area 31)*. Vol. IV. Rome, FAO.
- GITTINGS, S. R., G. S. BOLAND, K. J. P. DESLARZES, D. K. HAGMAN, AND B. S. HOLLAND. 1993. Long-term monitoring at the East and West Flower Garden Banks. OCS Study MMS 92-0006, U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Regional Office, New Orleans. 206 p.
- , K. J. P. DESLARZES, D. K. HAGMAN, AND G. S. BOLAND. 1992. Reef coral populations and growth on the Flower Garden Banks, northwest Gulf of Mexico. *Proc. 7th Int. Coral Reef Symp.* 1:90–96.
- HEEMSTRA, P. C., AND J. E. RANDALL. 1993. Grouper of the world (Family Serranidae Subfamily Epinephelinae). An annotated and illustrated catalogue of the grouper, rockcod, hind, coral grouper and lyretail species known to date. *FAO Fisheries Synopsis No.* 125, Vol. 16. Rome, FAO. 383 p.
- HOESE, H. D., AND R. H. MOORE. 1977. *Fishes of the Gulf of Mexico: Texas, Louisiana and adjacent waters*. Texas A&M Univ. Press, College Station, 327 p.
- JORY, D. E., AND E. S. IVERSEN. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Florida)—black, red, and Nassau groupers. *U.S. Fish Wildl. Serv. Biol. Rep.* 82(11.110). U.S. Army Corps of Engineers, TREL-82-4. 21 p.
- LINDEMAN, K., R. PUGLIESE, G. T. WAUGH, AND J. S. AULT. 2000. Developmental patterns within a multispecies reef fishery: management applications for essential fish habitats and protected areas. *Bull. Mar. Sci.* 66(3):929–956.
- LUGO-FERNANDEZ, A. 1998. Ecological implications of hydrography and circulation to the Flower Garden Banks, northwest Gulf of Mexico. *Gulf Mex. Sci.* 16(2):144–160.
- , K. J. P. DESLARZES, J. M. PRICE, G. S. BOLAND, AND M. V. MORIN. 2001. Inferring probably dispersal of Flower Garden Banks coral larvae (Gulf of Mexico) using observed and simulated drifter trajectories. *Cont. Shelf Res.* 21:47–67.
- MCGRAIL, D. W., M. CARNES, D. HORNE, T. CECIL, J. HAWKINS, AND F. HALPER. 1982a. Water and sediment dynamics, p. 9–45. *In: Environmental studies at the Flower Gardens and selected banks Final Report to Minerals Management Service, contract AA851-CTO-25, NTIS order no. PB83-101303, p. 103–226.*
- NIELSEN, L. A., AND D. L. JOHNSON. 1983. *Editors. Fisheries Techniques*. American Fisheries Society. Bethesda, MD. 468 p.
- PATTENGILL, C. V. 1998. The structure and persistence of reef fish assemblages of the Flower Garden Banks National Marine Sanctuary. Ph.D. diss. Texas A&M Univ., p. 163.
- RANDALL, J. E. 1983. *Caribbean reef fishes*. 2d ed. TFF Publications, Neptune City, NJ. 350 p.
- REED, C. T. 1941. Marine life in Texas waters. *Tex. Acad. Sci. Publ. Nat. Hist.* Vol 2, 88 p.
- REZAK, R., T. J. BRIGHT, AND D. W. MCGRAIL. 1985. Reefs and banks of the northwestern Gulf of Mexico: their geological, biological and physical dynamics. John Wiley and Sons, New York. p. 259.
- SADOVY, Y. 1997. The case of the disappearing grouper; *Epinephelus striatus*, the Nassau grouper in the Caribbean and western Atlantic. *Proc. Gulf Carib. Fish. Inst.* 45:5–22.
- , AND A. M. EKLUND. 1999. Synopsis of biological data on the Nassau grouper, *Epinephelus striatus* (Bloch, 1792), and the Jewfish, *E. itajara* (Lichtenstein, 1822). NOAA Technical Report 146, FAO Fisheries Synopsis 157.
- THOMPSON, R. W. 1978. Results of the UNDP/FAO Bahamas deep water fisher survey 1972–1975. *In: Proceedings of the 30th Annual Meeting of the Gulf and Caribbean Fisheries Institute*. Cartagena, Columbia, November 1977. p. 44–70. University of Miami, Miami, FL.
- VILLALOBOS, A. 1971. Estudios ecologicos en un arrecife coralino en Veracruz, Mexico. *Symposium on Inves-*

tigations and Resources of the Caribbean Sea and Adjacent regions, UNESCO and FAO, p. 531–545.

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