



Photo credit: NMFS.

Brief Species Description:

Oculina varicosa ranges from Cape Hatteras, North Carolina through the Gulf of Mexico and Caribbean, though the main population of concern is off east-central Florida (Figure 1) where it forms unique thicket-type structures in 70-100 m (230 to 330 ft) depth known as the *Oculina* Banks. Colonies are arborescent, with highly clumped, irregular bushy branches; branches average one-fourth inch (6 mm) in diameter and colonies can be 4 to 5 feet (1.5 m) tall. Corallites are distributed in a spiral around the branches, and each corallite is approximately 0.1 inch (2-3 mm) in diameter. Deep water colonies are lavender to white in color and have thinly tapered branches with widely spaced corallites. Colonies of *O. varicosa* are found to depths of 500 feet (152 m) on limestone rubble, low-relief limestone outcrops, and high-relief, steeply sloping prominences. Colonies are semi-isolated, patchy and low-growing in shallow water, or they form larger, massive coalescing aggregates (thickets) with substantial topographic relief in 160 to 330 feet (50-100m) depth. Shallow water colonies are golden to brown due to symbiotic algae, and have shorter, stout branches with closely-spaced corallites. Deeper individuals (> 200 feet or 60 m) do not have symbiotic algae (zooxanthellae). The deeper individuals have a growth rate that is about 50% faster than shallow individuals (Reed 1981). Shallow colonies differ anatomically in being stouter, shorter, and producing thicker branches (Reed 1980).

Oculina filter feed planktonic organisms. Over 300 species of invertebrates have been found living in the branches of *O. varicosa* (Reed 2002), so it serves as an important keystone species and habitat. Koenig (2001) found a relationship between the abundance of economically valuable fishes (e.g., grouper, snapper, sea bass, amberjack) and the condition (dead, sparse, and intact) of *Oculina* coral. These *Oculina* coral reefs off Florida have been identified as essential fish habitat for Federally-managed species. The species reproduces sexually by broadcast spawning. Spawning is believed to occur during July and August in the shallow populations, and during September in the deep populations, with no obvious relationship to lunar or tidal phase (Brooke and Young, 2003; Brooke and Young, 2005). Larvae settle after about three weeks in laboratory conditions (Brooke and Young, 2003). The

KEY INFORMATION

Areas of Concern

Oculina banks (east Florida).

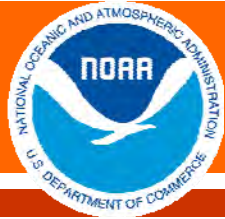
Year Identified as “Species of Concern”
1991

Factors for Decline

- Habitat destruction from fishing gear
- Sedimentation
- Disease
- Environmental variability

Conservation Designations

IUCN: Not Evaluated



Species of Concern

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taxonomy of the *Oculina* genus is unclear and there is debate whether the deep water and shallow-water forms are the same species.

Rationale for “Species of Concern” Listing:

Demographic and Genetic Diversity Concerns:

“Species of Concern” listing rationale is based on well-documented declines in the *Oculina* Banks area. Banks containing partially dead colonies of *Oculina* were first observed in the late 1970s by Reed (1980). In 1980, over 50 sites between 230 and 330 feet (70-100 m) were identified with low-density populations of *Oculina*, while ~15 sites had extensive thickets of contiguous colonies. Only 15 out of 135 hard ground sites examined did not contain live *Oculina* (Reed, 1980). Extensive submersible surveys performed from 1995 to 1997 indicate that extensive habitat damage existed throughout the area, and only one site, Jeff’s reef, still contained extensive thickets. This documented species decline is coupled with an apparent lack of sexual recruitment in the *Oculina* Banks habitat as well as adjacent shallow water habitats in central Florida. Asexual fragmentation may provide for the establishment of some new colonies but habitat alteration from trawl damage yields a rubble substrate which is not conducive to coral recruitment of any sort. Little information is available concerning *O. varicosa* population status and trends in other areas.

Factors for Decline:

The known and documented threat in the *Oculina* Banks area is damage from mechanical fishing gear, including dredges, bottom long lines, trawl nets and anchors despite supposed habitat-based protections (see below). Koenig et al. (2005) estimated that as of 2001, only 10% of *Oculina* coral habitat remained intact. In the 1970s fisheries efforts targeted bottom reef fish using roller trawls; they cause significant damage to the habitat and coral species on hard bottoms. Other sources of mortality may occur, but have not been documented in the deep *Oculina* Banks habitat. Colonies may be influenced by bottom currents, upwelling of cold-water masses, sediments, and red tides.

Status Reviews/Research Underway:

Current research is focusing on clarifying the uncertain taxonomy of this species. Given that the species concern is based on population trends and habitat alteration in the *Oculina* Banks region, it is important to determine if this population in fact represents a separate species from the widely distributed shallow water forms with other names (*O. diffusa*, *O. arbuscula*, *O. robusta*, etc.). Nuclear genetic markers are being developed as a means to determine rigorous species boundaries for *Oculina*. Systematic monitoring of the *Oculina* Banks Experimental Research Reserve began in 2005. Mapping is also ongoing.

Data Deficiencies:

Better data is needed on the levels of recruitment for both deep and shallow populations as are any sort of population data from different geographic areas (besides Central Florida).

Existing Protections and Conservation Actions:

In 1984, the South Atlantic Fishery Management Council established the 122 mi² (315 km²) *Oculina* Habitat Area of Particular Concern (HAPC), the world’s first protection granted specifically to a deep



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coral habitat. In 2000 the South Atlantic Council expanded the *Oculina* HAPC to 397 mi² (1029 km²) and prevented trawling in the area. The South Atlantic Council is currently reviewing and evaluating options for gear regulations and new coral HAPCs to protect four very large deep coral habitats as part of a Comprehensive Fishery Ecosystem Plan Amendment.

Ivory Bush Coral SOC Range

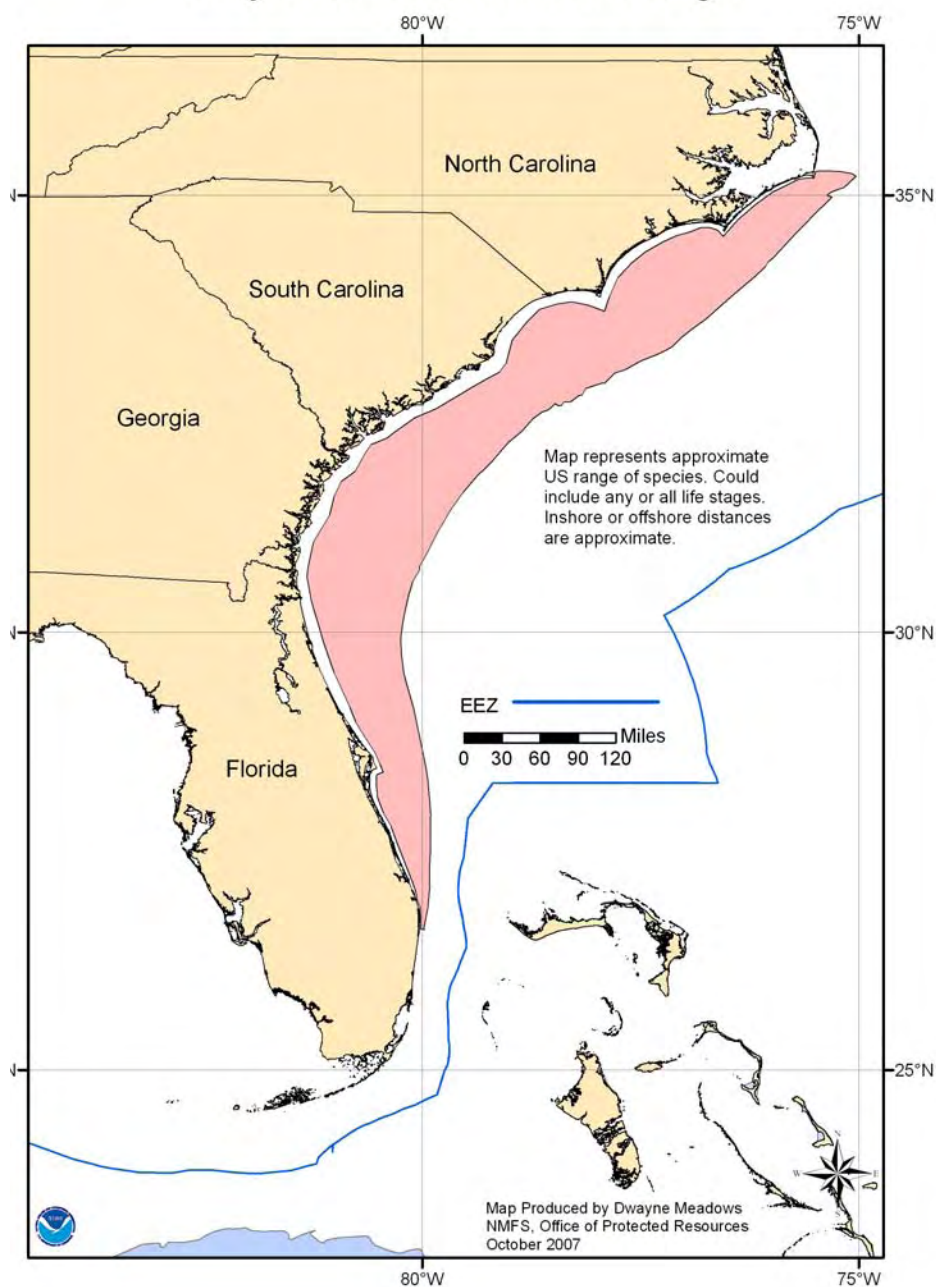


Figure 1. Range of the Ivory bush coral species of concern in the U.S.



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References:

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- Reed, J.K. 2002. Deep-water *Oculina* coral reefs of Florida: biology, impacts, and management. *Hydrobiologia* 471:43-55.

Point(s) of contact for questions or further information:

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