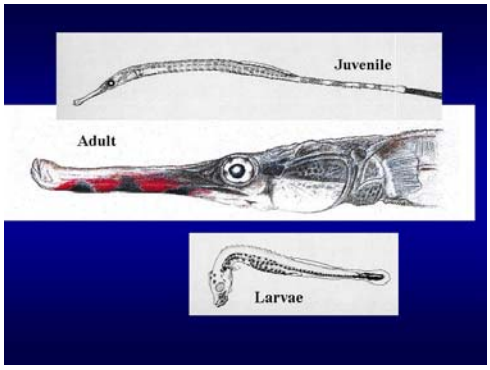
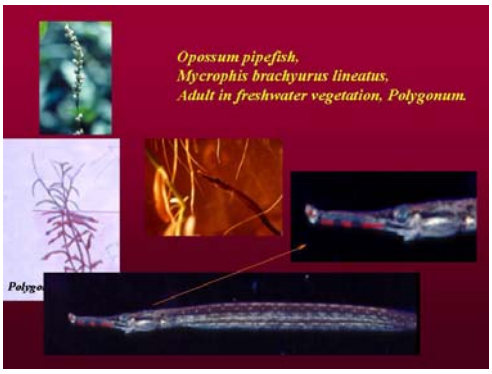
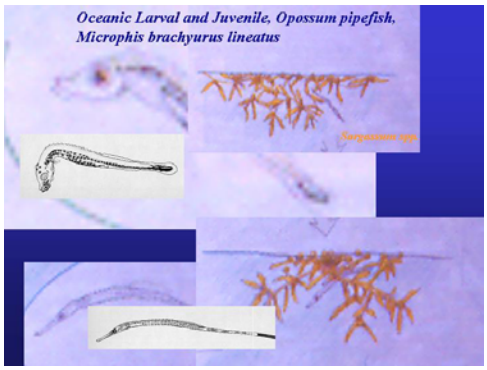
Common Name: **Opossum pipefish**
Scientific Name: *Microphis brachyurus lineatus*
Area of Concern: SE Florida and the Rio Grande River (Rio Bravo), Texas. A circumtropical species, subspecies *M. b. lineatus* limited to the tropical western Atlantic.
Year First Listed as a "Species of Concern": 1991







Brief Species Description:

The opossum pipefish is a relatively large pipefish, reaching a standard length of 194 mm (7.64 in). It is the only western Atlantic pipefish with a combination of confluent lateral trunk and inferior tail ridges, 17-234 pectoral and 9 caudal-fin rays. It is also the only North American pipefish in which the males bear the brood pouch on the trunk rather than the tail (Subfamily Doryrhamphidae). The snout is long (1.5-2.0 in head length), trunk rings 16-21, tail rings 20-26. The color of the opossum pipefish is distinctive, particularly in breeding adult specimens: upper snout, posterior half of head and body is sienna brown with a series of dark red blotches on each lateral trunk ring forming a red stripe between lateral and superior trunk ridges; silver stripe on mid-side between lateral and inferior trunk ridges, silver edge on inferior trunk ridge; lower half of snout bright red with a variable number of black vertical bars, caudal also red with central dark stripe. Juveniles are not as colorful as they are either nearly transparent or light brown with widely spaced dark vertical bars. Juveniles characteristically have well developed spines on each vertical ridge (scutellum) separating all body and trunk ridges. These scutellar spines are reduced in adults.

Although opossum pipefish have been recorded from the Carolinas and northern Gulf of Mexico (Dawson and Vari 1982), they have not been known to over-winter in the warm temperate (Carolinian) portion of their range. Year round captures indicating permanent populations have only been made in southeastern Florida tributaries. The smallest juvenile opossum pipefish (< 70 mm TL) have only been captured in oceanic, *Sargassum* rafts, or coastal marine environments, while adults only occur in freshwater tributaries (Gilmore and Hastings 1982; Gilmore and Gilbert 1992). In Florida, juveniles migrate into

freshwater tributaries during the dry season, December to May, a period of minimum freshwater flow. Maturation, mating and larval release occurs in freshwater during the wet season, June to November, under conditions of maximum water flow. Age at maturation and longevity is unknown.

Males incubate up to 953 eggs in the abdominal pouch, making *O. brachyurus lineatus* one of the most fecund pipefishes in North America (Dawson and Vari 1982); range of 35 to 734 eggs, mean 383 eggs/male (Gilmore 1999); 10-953 eggs; mean 409 eggs/male (Maranda-Marure, et al., In press). Eggs are incubated for 5-10 days before larvae hatch and are released by the male and can receive at least two different sequential egg batches from females (direct mating behavior and egg deposition observations by Frias-Torres in Gilmore 1999; Frias-Torres 2002; Maranda-Marure, et al. In press). Newly released larvae must have brackish oligohaline-mesohaline conditions (18 ppt salinity) to survive, indicating a physiology adapted for downstream transport to estuarine and marine environments during the wet season (Frias-Torres 2002). Multiple spawnings are possible by females with asynchronous oocyte development (Maranda-Marure et al. In press). Breeding adults associate with specific species of emergent freshwater vegetation, *Panicum* spp, and *Polygonum* spp. (Gilmore and Hastings 1982; Gilmore 1999; Gilmore and Frias-Torres 2000). Long distance upstream migration has been documented in the St. Lucie River, Florida, and Panama Canal (Dawson and Vari 1982; Gilmore and Gilbert 1992). No more than a dozen or so breeding pairs have been captured at a single location. Distribution in local stream systems appears to be very patchy and associated with clumps of emergent vegetation (relatively unshaded portions, no large tree canopy) of the tributary. Opossum pipefish are carnivorous, preying on crustaceans and small fish as ambush predators in dense vegetation (Teixeira and Perrone. 1998; Frias-Torres 2002).

Rationale for "Species of Concern" Listing:

Demographic and Diversity Concerns:

Genetic studies have not been conducted on populations of opossum pipefish anywhere within their range. It is assumed that the oceanic transport of larvae and juveniles may result in considerable genetic exchange with Caribbean and South American populations. It is also possible that the Florida populations represent a self recruiting disjunct metapopulation separated from the primary Caribbean gene pool, with extremely rare waifs from southern sources recruiting during exceptional recruitment periods. Nothing is known about annual variation in population size. A maximum of 25 individuals has been captured at a single location. The remnant breeding populations of this pipefish have been mapped via principal habitat type. It is estimated that only a few hundred individuals still breed in tributaries to the Indian River Lagoon system of Florida. Information on longevity and recruitment rates is lacking.

Threats:

The major threats to the opossum pipefish are habitat destruction, declining water quality, and an increase in disease. These factors have been documented within the primary ecosystems occupied by opossum pipefish. The dependency of opossum pipefish breeding pairs on specific freshwater vegetation species targeted for herbicide treatment in Florida threatens their survival. Vegetation elimination destroys adult pipefish breeding and feeding habitat. Seawall and rip rap construction also destroys habitat. Poor water quality, unnatural water flow rates, and significant atypical freshwater release (wrong season, exceptional water volume) are typical of the principal riverine system where the pipefish occurs in Florida, the St. Lucie River. Major fish disease outbreaks have occurred after St. Lucie River/Canal freshwater releases were made from Lake Okeechobee. Recent increases in destruction rates of important habitat and declines in water quality indicate that the remaining opossum pipefish populations are vulnerable.

Status Reviews/Research Completed or Underway:

A status review was conducted in 1998-2001, supported by a NOAA/NMFS' Office of Protected Resources grant to Ocean, Estuarine and Coastal Sciences, and a National Fish and Wildlife Foundation grant to Dynamac Corporation. These studies determined reproductive condition and behavior in east Florida populations, conducted preliminary experiments on optimum salinities for larval survival, and isolated principal breeding and feeding habitats, as well as impacts on population survival (Gilmore 1999; Gilmore and Frias-Torres 2000; Frias-Torres 2002).

For further information on this Species of Concern, or on the Species of Concern Program in general, please contact Ms. Marta Nammack, NMFS, Office of Protected Resources, 1315 East West Highway, Silver Spring, MD 20910, (301)713-1401, Marta.Nammack@noaa.gov *; or Jennifer Jacukiewicz, NMFS, Southeast Region, Protected Resources Division, 9721 Executive Center Drive, St. Petersburg, FL 33702, (727)570-5312,* Jennifer.Jacukiewicz@noaa.gov.

Salient Web Links:
http://www.nmfs.noaa.gov/prot_res/species/fish/opossum_pipefish.html
http://www.nmfs.noaa.gov/prot_res/readingrm/ ESABiennial/bien98.doc

References:

Frias-Torres, S. 2002. Oceanic transport and life history of the tropical western Atlantic opossum pipefish, *Microphis brachyurus lineatus*. Ph.D. Diss. , Fla. Inst. Tech., Melbourne, FL, USA. 188 pp.

Dawson, C.E. and R.P. Vari. 1982. Fishes of the western North Atlantic: Part Eight, Order Gasterosteiformes, suborder Syngnathoidei. Memoir Sears Found. Mar. Res., No. 1: 198 pp.

Gilmore, R.G. and S. Frias-Torres. 2000. Life history and critical habitat/environment of opossum pipefish, *Mycrophis brachyurus lineatus*: A population viability analysis status report**.** Final Report to Protected Resources Division, National Mar. Fisheries Service, Washington, D.C.

Gilmore, R.G. 1999. The opossum pipefish, *Mycrophis brachyurus lineatus:* A candidate for NOAA/NMFS endangered marine species designation. Final Candidate Report to Protected Resources Division, Natl. Mar. Fish. Service, Washington, D.C.

Gilmore, R.G. and C.R. Gilbert. 1992. Threatened: Opossum pipefish, *Microphis brachyurus lineatus,* Family Syngnathidae, Order Syngnathiformes, pp. 73-78, In C.R. Gilbert (ed.). Rare and Endangered Biota of Florida: Volume Four, Fishes. Univ. Presses of Florida. 247 pp.

Gilmore, R.G. and P.A. Hastings. 1983. Observations on the ecology and distribution of certain tropical peripheral fishes in Florida. Florida Scientist 46: 31-51.

Miranda- Marure., M.E., J. A. Martinez-Perez., N. J. Brown-Peterson. In press. Reproductive biology of the opossum pipefish, *Microphis brachyurus lineatus*, in Tecolutia estuary, Veracruz, Mexico. Gulf and Carib. Sci.

Teixeira, R.L. and E.C. Perrone. 1998. Reproductive and feeding biology of freshwater and estuarine populations of the opossum pipefish*, Oostethus lineatus* from southeastern Brazil. Boletin of the Museu de Biologia (Bol. Mus. Biol.) Mellow Leitao (N. Ser.) 8: 3-12.