

THE CONTINUING PROBLEM OF NON-NATIVE FISHES IN FLORIDA

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EDITOR'S NOTE: What to do about exotic fishes was a principal item of discussion at the 1976 Annual Meeting of the Fisheries Administrators Section. With much of the discussion focused on Florida, your Editor asked Florida Fisheries Division Assistant Director Jerry Banks for an update on the Florida problem. The following report by Paul Shafland is presented in response to that request. His address is P.O. Box 1139, Boca Raton, Florida 33432.

The number of reproducing populations of non-native fishes in Florida continues to increase. In addition to the 20 species and 5 hybrids Courtenay et al. (1974) lists, reproducing populations of *Hoplian malabaricus*, *Tilapia mariae*, *Tilapia zillii*, *Cichlasoma trimaculatum* and *Betta splendens* have recently been verified.

Of all the established populations of non-native fishes in Florida none appears to have the potential to do more harm than *H. malabaricus*, the South American tigerfish. Initial reports indicated that the *H. malabaricus* infestation may have been contained within a renovatable area (Hensley and Moody 1975) but an aerial observation confirmed that the infested area was connected to a hardwood swamp and open marsh covering an approximate 1200 hectares that drains into the Little Manatee River (Ogilvie 1975). *H. malabaricus* superficially resembles the bowfin, *Amia calva*, and reportedly is a voracious piscivore. Specimens collected from the infested area and held in aquaria tend to confirm this latter observation.

The *T. mariae* infestation is presently located within the canal system of Dade County (Hogg 1974). The establishment of a non-native species within the interconnected canal systems of Southeast Florida essentially precludes any possibility of renovation. Barring some unknown phenomena, this species will remain a permanent part of Florida's freshwater fish fauna. The effect of *T. mariae* on the aquatic habitat is unknown. They have been successfully reared in an aquarium with piranha, suggesting that they are a hardy and competitive species.

The population of *T. zillii*, located in a small borrow pit south of Miami, was probably introduced by a local aquarist or retailer. Upon renovation, this roadside borrow pit (0.2 hectares) yielded seven species of exotics in addition to *T. zillii*. These included *T. mariae*, *T. mossambica*, *Hypostomus plecostomus* (sucker catfish), *Corydoras* sp., *Danio malabaricus* (giant danio), *Capoeta tetrazona* (tiger barb) and *Carassium auratus* (goldfish). Of a total weight of 236.8 kilograms harvested, 75% was *T. mariae*, 21% *T. zillii* and only 1.7% native fishes (gar, bullheads and bream).

A remnant population of *C. trimaculatum* probably exists in the Tampa area after an attempted renovation, as the *C. trimaculatum* had access to saltwater (Ogilvie 1975) and this species was later found to be euryhaline. Although the reproducing population of *Betta splendens* (Siamese fighting fish) appears to be confined within a relatively small geographical area in Dade County, dense vegetation and a maze of interconnected drainage ditches makes renovation impractical if not impossible.

The rate at which non-native fishes are becoming estab-

lished in South Florida is indicative of its environmental instability. This instability is due primarily to the physical alteration of water flow patterns along with other forms of aquatic pollution. This and South Florida's subtropical climate have created ideal habitats for many exotics. Coupled with these factors is the irresponsibility of a few tropical fish farmers who have been primarily responsible for releasing the exotics now established in Florida (Courtenay et al. 1974). The continuous dumping of exotics adds to the aquatic instability, and not until these introductions cease and other preventative steps are taken will the establishment rate of non-native fishes decrease.

LITERATURE CITED

- COURTENAY, WALTER R., JR., HARRY F. SAHLMAN, WOODWARD W. MILEY II, and DAVID J. HERREMA. 1974. Exotic fishes in fresh and brackish waters of Florida. *Biol. Cons.* 6(4):292-302.
- HENSLEY, DANNIE A., and DERRILL P. MOODY. 1975. Occurrence and possible establishment of *Hoplias malabaricus* (*Characoidei; Erythrinidae*) in Florida. *Fla. Sci.* 38(2):122-128.
- HOGG, R.G. 1974. Environmental hazards posed by fish species newly established in Florida. *Env. Cons.* 1:176.
- OGILVIE, VERNON E. 1975. Monthly report: October. *Fla. Game & Fresh Water Fish Comm.* Mimeo.

OTTAWA ACTS TO IMPROVE FISH HEALTH

Tighter control on the movement of cultivated live fish to prevent spread of fish disease is planned by Canada's Fisheries and Marine Service. Fish Health Regulations that go into effect January 1, 1977, call for inspection and certification of fish to be shipped alive for breeding or stocking purposes. This inspection is required at the production site of the fish stock prior to entering Canada or crossing provincial boundaries. The regulations apply only to salmonid fishes and their hybrids (which include trout, salmon, char, and whitefish) and cover twelve diseases that infect fish. Products made from fish harvested at fish farms and other culture establishments will continue to require a certificate showing an absence of Egghead and Whirling disease, neither of which is found in Canada.

Designated officials within each province will be authorized to issue permits to allow the importation of fish. These permits will be issued only on receipt of evidence of satisfactory health conditions within the establishment producing the fish. The Government of Canada will provide diagnostic services to Canadian producers shipping out of province.

A National Registry of Fish Diseases is being established within the Fisheries and Marine Service at Ottawa. The Registry will maintain lists of Canadian and foreign officials approved to serve as Fish Health officials for the purpose of certification.

The Commission also agreed to Total Allowable Catches of harp and hooded seals at levels recommended by Canadian, Danish, and Norwegian scientists, permitting an increase in the populations of both species.