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THE ONES THAT GET AWAY: HARMFUL EXOTIC FISHES SPREAD AND CAUSE INCREASED ENVIRONMENTAL CONCERN

A few summers ago, the American public was willingly terrorized by a single fictional shark. Meanwhile--in the real world of the scientist--concern has deepened about the destructive potential of increasing numbers of foreign fishes swimming in U.S. waters, especially since some species have a capacity for environmental devastation more threatening than any celluloid creature.

Like the fabled "Jaws," the specter of the razor-toothed piranha stripping flesh from bone in red-tinged waters easily captures the public's imagination. But the Nation's water systems are really facing a greater threat: biological pollution by lesser-known species released by accident, ignorance, or well-meant efforts to solve environmental problems and develop new game fish.

Eighty-four exotic fish species have been found in U.S. waters. Of these, 39 have established breeding populations--with 8 showing rapid or major expansion in the past 6 years--according to a recent survey contracted by the U.S. Fish and Wildlife Service's National Fishery Research Laboratory at Gainesville, Florida.

"Although introductions can be beneficial, the survey warns that some foreign fishes are cause for serious concern," says Galen L. Buterbaugh, the Service's Associate Director for Fishery Resources. He cites the brown trout as one beneficial introduction. This European import is popular with millions of U.S. fisherman.

While some introductions have been useful under certain circumstances, Buterbaugh and other Service officials agree there is no substitute for intensive research to foretell the impacts of future imports. The Service's goal, they emphasize, is not to indiscriminately stop introductions, but to assure that new imports won't have a harmful effect on U.S. water systems.

The stakes are high: once undesirable species are released and prosper in an alien habitat, eradicating them is difficult, if not impossible. -

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This bleak fact isn't news to Floridians. At least 18 exotic species are firmly entrenched in this state where an intricately woven network of waterways gives fish great mobility. The ornamental fish industry is based in Florida, with over 450 fish farms and importers supplying about 80 percent of hobbyists' demands for some 1,000 species. Over 132 million foreign fish are brought into this country each year; some 40 percent of them are South American tropicals which mostly come through Miami International Airport. Florida's fish farmers grow and ship millions more to dealers.

The accidental release of the walking catfish from outdoor holding ponds of Florida dealers is now considered one of the most harmful introductions into North America. This airbreathing fish "walks" overland on its pectoral fins to invade new river systems, sometimes stopping traffic as hordes wriggle across highways. It has a voracious appetite and competes with natives like the largemouth bass and bluegill in freshwater communities.

Neither in demand for food or sport, nor in danger from natural predators, the walking catfish is spreading unchecked, with no practical means of control. The pest, which grows up to 2 feet in length, is thriving in 22 Florida counties, and may invade other counties and states, since it is showing signs of adapting to colder climates.

The grass carp, introduced from the Orient into several states by Federal, State, and private agencies on an experimental basis for aquatic vegetation control, is now present in at least 34 states. This effective forager is established in the central Mississippi River area, and could have a severe impact on migratory waterfowl and/or the river's commercial fisheries that rely on wetland vegetation.

Could such a species possibly be beneficial? In this case, it depends on where it satisfies its appetite. The hearty vegetarian, which can measure up to 3 feet in length and weigh 65 pounds, is useful in ridding clogged irrigation ditches of thick vegetation, and is used in parts of the Midwest to clear recreational ponds for better sport fishing.

Among the exotic immigrants that have dramatically increased in numbers are four tilapia species, colorfully patterned African natives that are both adaptable and prolific: 6 years after the initial release of blue tilapia in one Florida lake, the species made up 93 percent of all its fish. While being studied for potential food and sport value, the gray-blue fish was helped into open waters by overzealous fishermen who transplanted them and even broke into research facilities for specimens. Now, it is outcompeting popular basses and native sunfishes where it is well established.

Other tilapia species are showing typically aggressive traits in both fresh and marine waters. The redbelly tilapia is spreading into the Southwest, devouring vegetation essential to other species. The Mozambique tilapia has numerous breeding populations in Florida, and has reached the Banana River estuary, where it could even spread around the tip of Florida into the Gulf of Mexico. This same fish is also found in Arizona, Texas, the lower Colorado River, and the lower California coast. Yet another species, the spotted tilapia, has the reputation of being one of the fastest expanding foreign fishes in Florida.

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The Mozambique, blue, and blackchin tilapias are appearing in Florida fish markets, and it remains to be seen whether they will have significant economic value.

Although two rapidly spreading South American imports--the oscar and the black acara--are not considered highly destructive, they are competing with native species for food and nesting sites, and their potential impact is unknown. The black acara, an escapee from an ornamental fish farm, is widespread in the Everglades, and is aggressively territorial. The oscar has sport value to some Floridians. Both of these species are highly popular with fish hobbyists.

While the full impact of established exotics may not be known for years, many have not proved hazardous for various reasons. Some are ill-suited to an alien habitat and die. Others thrive without posing a problem, which is true of many tropicals. The most common exotic in the U.S., the ubiquitous goldfish, is established in every state, but it is not a real pest in spite of reaching a size of 10 inches or more once free of a confined environment.

In contrast, its Asian relative, the common carp, is a classic case of an undesirable out of control. First imported in the 1830s by private interests who sought to capitalize on German immigrants' fondness for the cultivated food fish, it was so enthusiastically received that fines were levied on people who destroyed carp. The adaptable fish, an ocean away from its natural predators, swam through interstate drainage systems to become the Nation's second most widespread exotic. With specimens weighing up to 50 pounds, the bottom-feeding carp is highly disruptive to other fish. When feeding, it raises clouds of silt that disrupt other species' eating habits, shut out sunlight essential to underwater vegetation, and smother incubating eggs.

The ease with which exotic species can be introduced complicates the increasingly serious possibility of harmful species spreading in U.S. waters. The pike killifish, a Yucatan import, was dumped by researchers into a Miami area canal at the end of a medical experiment. An efficient predator of the mosquitofish (which eats mosquito larvae), the killifish has impaired a natural form of pest control.

"We're concerned about the introduction of each new foreign species without adequate research because of the possible ways they can affect healthy water systems," says Dr. James A. McCann, who directs the Gainesville lab's activities. "They may prey on native fish, compete for food, hybridize, carry new parasites and disease, and alter the natural environment so that native species cannot thrive. Some species pose a direct danger to humans."

While Hollywood has overdramatized the ferocity of the piranha, the small carnivores have been known to attack livestock and humans if hungry. Although no species of piranha is now established in U.S. waters, a few released "pets" have been found in Michigan, Ohio, Pennsylvania, and Florida, where a 12-inch female red-bellied piranha heavy with eggs was caught last spring in a Boca Raton swimming hole. It is hard to gauge the possibility of the species' survival in remote waters: an established breeding population of white piranhas reportedly survived for 15 years in Florida before being discovered by state officials.

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Scientists are concerned lest, through ignorance, new and dangerous species should appear in open waters. The venomous lionfish, now in thousands of saltwater home aquariums, is a potential threat (if introduced into tropical saltwater environments), as is the electric eel, which can shock unwary swimmers. It is against most state laws to dump exotic species into open waters, but some misguided owners do so rather than destroy their pets.

The Service's growing concern for the impact of exotic fish species in American waters was underscored when it identified the problem as one of its top priorities for action in the months and years to come. The Gainesville lab was established in 1977 to assure, through intensive research, that new imports will not be destructive to water systems, and to study species already established to determine whether they are likely to spread over major geographic areas.

The Service's activities follow the direction of an Executive Order on Exotic Organisms issued by President Carter on May 24, 1977, which emphasized the prevention of exotic species introductions into this country's ecosystems, unless such introductions would have no adverse effect.

Service officials are confident that, with specialized research to make possible informed decisions on admitting new imports, negative impacts on the environment can be greatly reduced.

As for the walking catfish, common carp, and other unwelcome immigrants, it remains to be seen if the environmental damage can be undone.

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