



Caribbean Freshwater Fish

Fish and Aquatic Conservation Initiative

Caribbean Ecological Services Field Office



Sirajo goby, credit NCSU/P. Cooney



River goby, credit NCSU/A. Engman



Juvenile American eel, credit USFWS/G. Thompson



Postlarvae of Sirajo goby migrating upstream at Cambalache dam, credit NCSU/A. Engman



Red devil cichlid, credit NCSU/A. Engman

Overview

Native freshwater fish assemblages of tropical and subtropical islands are dominated by species that migrate between freshwater and marine ecosystems and depend of the connectivity between riverine, estuarine and marine environments to complete their life cycles. These species are widespread throughout the Caribbean on islands and continental coasts because ocean currents scatter their larvae between nearby islands.

Habitat and Life Cycle

Caribbean freshwater fish inhabit the river's lower reaches and some species can be found in steep mountain streams. The Sirajo goby (*Sicydium* spp.) and River goby (*Awaous banana*) are found at higher elevations because they are capable of climbing up steep surfaces due to their modified pelvic fins that function as a sucker allowing them to move up wet vertical surfaces.

All species have migratory behavior and most of them have a unique life history in which the adults mature and reproduce in rivers and the larvae are transported downstream to estuarine and marine waters where they develop further. Afterwards the postlarvae migrate back upstream.

The American eel (*Anguilla rostrata*) has a reverse life cycle where the adults mature and live usually in rivers, although they might inhabit estuarine and marine environments and then migrate to the sea to reproduce. The American eels found in Puerto Rico are known to be part of a population in which all individuals randomly interbreed.

Native Freshwater Fish

A total of 10 species of freshwater fish have been identified in Puerto Rico and reported also in the U.S. Virgin Islands: 5 species of gobies, 3 species of sleepers, 1 species of mullet and 1 species of eel. The Sirajo goby, formerly *Sicydium plumieri*, was recognized as a species complex of *Sicydium*: *S. plumieri*, *S. buscki*, *S. gilberti*, and *S. punctatum*. Genetic research should be conducted to

gather more detailed information about the species complex of the Sirajo goby present in the Caribbean.

Ecology

The Caribbean freshwater fish occupy different levels in the trophic chain and have a variety of food preferences that include detritivores, herbivores, omnivores and predators. Many fish species are ecologically important because they bring nutrients and biomass input from the marine environment to rivers due to their migration patterns.

In addition, they are culturally and economically valuable because they support local artisanal and recreational fisheries and are an important food source for human consumption. The postlarvae of the Sirajo goby commonly known as the "ceti" are harvested in several rivers of the Island and considered as a local delicacy.

Threats and Conservation Measures

Freshwater fish face a variety of threats due to changes in their environment. Anthropogenic activities result in ecosystem degradation and loss of fauna. Dams, water intakes, river channelization, culverts and other road crossing structures can disrupt the connectivity of the migratory fauna affecting the ecosystem integrity. Land cover and land use due to unsustainable agricultural practices and urban development is a major threat to these species causing alterations in the physicochemical parameters of water, increasing sedimentation, and changing the habitat composition. The Sirajo goby and American eel are considered to be species at-risk in the U.S. Caribbean due to the loss of primary habitat as a result of damming and other anthropogenic activities that pose grave threats to their survival.

The negative impacts of the introduction of invasive/exotic species such as the Jaguar guapote (*Parachromis managuensis*) that was illegally imported to Puerto Rico in the 1990s have been identified by the Puerto Rico Department of Natural and Environmental Resources (PRDNER) as a threat to native fish

fauna and its effects have not been quantified. Additionally, introductions of other cichlids such as the Red devil cichlid (*Amphilophus labiatus*) have affected sport fish recreation at reservoirs in the Island because they predate on the fish produced for sport fish; they pose a threat to native fauna and are of concern due to increasing populations.

The USFWS Fish and Aquatic Conservation Program collaborates with partners to successfully restore aquatic habitats by the removal of physical barriers, replacement of culverts and road crossing structures, construction of fish ladders, and rehabilitation of stream banks for the benefit of the aquatic species. On-going efforts to minimize threats to aquatic ecosystems include the following: development of conservation strategies for high priority species to maintain stable populations, restore and enhance aquatic habitats, control of invasive species, and public outreach to educate the people in the importance of aquatic resources and our conservation mission.

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