
Courtesy Mike Yamamoto

Freshwater Fishes

ʻOʻopu ʻalamoʻo

Lentipes concolor

SPECIES STATUS:
IUCN Red List – Data Deficient
Endemic

SPECIES INFORMATION: The endemic ʻoʻopuʻ alamoʻo (*Lentipes concolor*) can be distinguished from Hawaii's other endemic gobies by their extraordinary abilities to climb vertical waterfalls. Male ʻoʻopuʻ alamoʻo can be distinguished from females by their displays of striking sexual dimorphism with a range of color patterns that depend on its activities. Additionally, males are territorial, while females are not. ʻOʻopuʻ alamoʻo are omnivores, feeding on algae and small aquatic animals. Adults feed primarily on small aquatic animals including atyid shrimps and may graze on microalgae while they move. Juveniles feed more on plant material. Additionally, they will swim through the water column to collect drift particles or insects. ʻOʻopuʻ alamoʻo breed in upstream areas from late fall to early spring and are cued by freshets. Nests are made under rocks and in crevices away from the main river channel. Eggs hatch within two to three days of being laid and are carried to the ocean with the current. They have four days to reach the ocean or the larvae will not survive. Postlarvae or hinana remain part of the oceanic plankton for a few months and then recruit indiscriminately to a freshwater source with the incoming tide, usually after sunrise. This recruitment occurs year round but is most prevalent in the spring. They swim directly upstream spending no longer than one day in an estuary. ʻOʻopuʻ alamoʻo travel at speeds of 90 meters (295 feet) per hour. Although they cannot swim up through flowing water and must use a substrate, they are very able climbers using their suction discs to hold on to the surface and their pectoral fins to move them upwards.

DISTRIBUTION: ʻOʻopuʻ alamoʻo has been found in streams on all main islands historically. They are currently found in streams on the island of Hawaiʻi, Kauaʻi, Maui, Molokaʻi, and in seven streams on Oʻahu. Although, not as common, it is very likely that ʻoʻopuʻ alamoʻo exist in more streams on Oʻahu, in areas of high elevation and where habitat is not affected as a result of human population growth and pollution. Previously, thought only to be located on windward streams, ʻoʻopuʻ alamoʻo recently has been discovered in the upper reaches of leeward perennial streams as well. They also can be found above Akaka Falls on the island of Hawaiʻi. Dams and stream obstructions can limit their presence in upper reaches that they previously occupied. Larvae spend time in the ocean as plankton, but not much is known of their oceanic distribution.

ABUNDANCE: Abundance throughout the islands is unknown; however, populations are decreasing on Oʻahu and Maui.

LOCATION AND CONDITION OF KEY HABITAT: ʻOʻopuʻ alamoʻo do best in unobstructed, cool, fast-moving streams. They spend the majority of their life in freshwater in the upper reaches of streams. ʻOʻopuʻ alamoʻo are very well suited to the naturally variable characteristics of Hawaii's streams. However, where natural stream habitat has been altered, including decreases in forest cover, ʻoʻopuʻ alamoʻo populations have decreased. The majority of already degraded key habitat is located on Oʻahu, although 58 percent of the 366 perennial streams in the State have been altered in some way. Interestingly, the amount of plant cover within a stream affects the location of ʻoʻopuʻ alamoʻo in a stream, with fish density being the highest where plant cover is the lowest. For more information on specific stream biota, the Division of Aquatic Resources of the Department of Land and Natural Resources has a database of surveyed streams. Oceanic waters are important to the survival of post-larvae, but little is known of its oceanic distribution or habitat requirements.

THREATS:

- Habitat degradation results from water diversion, stream channelization, dams, pollution, and the introduction of exotic species and parasites. Water diversions, stream channelization, and dams result in habitat degradation through altered stream flows that lead to: the destruction of key water characteristics such as freshets, riffles and runs; higher water temperatures; and lower dissolved oxygen levels. The reduced water flows from water diversions and dams also can limit larvae from reaching the ocean and recruiting back into streams. Channelization leads to a decrease in riparian vegetation that causes a loss of shelter and erosion control;
- Non-point source water pollution such as nutrients, sedimentation, and chemicals may threaten ʻoʻopuʻ alamoʻo; however, the consequence of these pollutants is relatively unknown and needs to be further studied;
- Exotic species such as tilapia are another important threat to the ʻoʻopuʻ alamoʻo. Historical introductions of game fish and more recent unwanted exotic fish from the aquarium trade are both problems. These exotic fishes prey on native fish species, out compete native fishes for food, and spread parasites and diseases.

CONSERVATION ACTIONS: The goals of conservation actions are to not only protect current populations, but to also establish further populations to reduce the risk of extinction. Past actions to restore fish populations have consisted of a ban on gill, drag, draw, and seine netting; stream clean-up efforts, and public outreach. In addition to common statewide and island conservation actions, specific actions include:

- Improve altered or diverted streams;
    - Modify or remove gratings or diversions to allow for instream passage of fish;
    - Restore riparian vegetation to help decrease instream heating and reduce sediment loads;
    - Remove alien species;
    - Create pools in frequently dewatered stretches to provide safe usable habitat between flows.
- Collaborate with the Commission on Water Resources Management and the Land Board to ensure adequate Instream Flow and biological integrity of riparian areas;
- Work to clean streams with significant pollution;
- Continue developing GIS database and making it web-accessible;
- Use science-based management of recreational fishing;

- Increase education and outreach efforts, particularly on issues of water pollution and how to deal with unwanted aquarium pets;
- Continue on-going partnerships focused on environmental and fisheries education and conservation and expand partnerships.

MONITORING:

- Establish survey schedule to determine population size and distribution;
- Monitor number of returning hinana.

RESEARCH PRIORITIES:

- Determine effects of pollution on population;
- Better understand the role of estuaries in species ecology;
- Continue research efforts on marine life stage;
- Initiate research to study source-sink population structure;
- Research impacts and methodologies to deal with alien species;
- Continue researching effects of stream channelization and diversion.

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