Freshwater Fishes

ʻOʻopu nākea

Awaous guamensis

SPECIES STATUS:
IUCN Red List – Data Deficient

SPECIES INFORMATION: The indigenous ʻoʻopu nākea (*Awaous guamensisi)* is the largest of Hawaii's indigenous gobies, reaching a length of up to 36 centimeters (14 inches). It is also the most common. They are omnivores feeding on benthic algae, aquatic insects and insect larvae, worms, and crustaceans, but not fishes. They may feed on suspended food particles in the water column as well. ʻOʻopu nākea display sexual dimorphism and elaborate courtship rituals. Spawning occurs from August to November when annual spawning runs to the stream mouths are triggered by freshets. Large spawning aggregations are formed at the first riffle before the estuary. This is the only goby that migrates downstream to spawn. Males make and guard nests in crevices of the stream bed where an attracted female will lay her eggs. Females probably produce one clutch a year and also help guard nests. Eggs are one millimeter (0.04 inches) in diameter and tens of thousands make up a nest. Eggs hatch in one day, travel to the ocean over four days and spend five to six months at sea. Post-larvae or hinana are indiscriminately recruited back to streams between December and July. They can be found in schools just after recruitment to estuaries. Adult ʻoʻopu nākea are relatively good climbers and swimmers, and post-larvae use tidal inundation to move upstream. The ʻoʻopu nākea will often burrow under rocks leaving only its eyes showing.

DISTRIBUTION: Historically, ʻoʻopu nākea were found on all the Main Hawaiian Islands. Today, they are found in streams on the island of Hawaiʻi, Kauaʻi, Molokaʻi, Maui, and Oʻahu. ʻOʻopu nākea usually are found in the middle to lower reaches of streams, with a larger range in larger streams. Post-larvae are found in oceanic waters, but little is known of its oceanic distribution.

ABUNDANCE: Abundant on Kauaʻi. Populations reduced on Oʻahu.

LOCATION AND CONDITION OF KEY HABITAT: ʻOʻopu nākea are primarily found in the middle and lower reaches of streams. If a river has steep waterfalls, they cannot climb these and thus will only be found in the lower reaches. Areas of slow, deep waters with gravel or fine sediment are key habitat for them. Riffles at stream mouths are critical spawning grounds. 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. Specific areas that can also be considered degraded due to water diversions are streams such as Waikolu on Molokaʻi and ʻĪao on Maui. In free flowing streams, such as Pelekunu on Molokaʻi or larger rivers such as Hanalei, Waimea, and Wainiha on Kauaʻi, ʻoʻopu nākea habitat is in a more stable condition. For specific information on 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 the ʻoʻopu nākea. 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 ʻoʻopu nākea. Historical introductions of game fish and more recent unwanted exotic fish from the aquarium trade are both problems. These exotic fishes prey on native fishes, out compete native fishes for food, and spread parasites and diseases;
- Fishing could be come a more severe threat in combination with the above threats, because ʻoʻopu nākea are abundant in Kauaʻi rivers and are fished during their spawning migration.

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;
- Use science-based management of recreational fishing;
- Continue developing GIS database and making it web-accessible;
- Increase education and outreach efforts, particularly on issues of fishing-related life history, 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;
- Monitor number of fish taken in recreational fishing each year.

RESEARCH PRIORITIES:

- Determine effects of pollution on populations;
- 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;
- Research effect of fishing on total population size and distribution.

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