

Conserving Critically Endangered spotted handfish

Unique and quirky, spotted handfish (*Brachionichthys hirsutus*) are recognisable by their modified fins that resemble human hands. Once common in southern Tasmania's Derwent estuary, spotted handfish experienced a severe decline in the 1980s. In 1996 they became the first marine fish to be listed as Critically Endangered by the IUCN Red List of Threatened Species. They are also listed as Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, and Endangered under Tasmania's *Threatened Species Protection Act 1995*.

CSIRO, University of Tasmania (UTAS), the Tasmanian and Australian governments and the Derwent Estuary Program (DEP) have been working together to conserve spotted handfish since the mid-1990s.

Distribution

Handfish belong to a group of coastal anglerfish with a narrow distribution in south-eastern Australia. There are 14 species with seven endemic to Tasmania and Bass Strait.

Spotted handfish were once prevalent along Tasmania's eastern coast, and were so common that during the 1960s and '70s that they were routinely collected for practical demonstrations at Hobart's university. However, a wide-scale survey in 1996 sighted only a small number of individuals at four sites. More recent surveys have documented local populations at nine small sites in the Derwent estuary, and in 2015 an additional population was discovered in the D'Entrecasteaux Channel.

Habitat and biology

Spotted handfish occur in sheltered coastal bays with soft sediments. They inhabit depths of 1–60 metres but are most abundant



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between 5–15m. Within bays they occupy habitats with more complex features such as depressions in the seabed made by stingrays, or fields of sea-squirts.

Lacking swim bladders, spotted handfish use their modified fins to 'walk' across the seabed rather than swim. Movement studies suggest they only travel small distances: 10m–460m over many months, or an average of 4m a day.

Spotted handfish are ambush predators and, like their close cousins the deep-sea anglerfishes, they have a lure located just above the mouth, perhaps to entice their prey of amphipods, shrimp and worms. Recent observations indicate the lure may also be used in courtship.

Adult spotted handfish have unique identifying spot patterns that allow the growth and movement of individuals to be tracked. They grow rapidly in their first two years, reaching 70–80mm at sexual maturity. Growth rates then reduce dramatically, slowing to a few millimetres a year. The longevity of spotted handfish is unknown, but it is possible they are relatively long-lived, with the largest specimens reaching 140mm.

Breeding

Spotted handfish spawn during September and October and have complex but poorly understood reproductive behaviours. Before the start of the spawning season, the usually-solitary fish aggregate and there is some form of courtship behaviour. Males fertilise the eggs, perhaps internally, immediately before the females lay relatively large eggs (2mm) in egg masses (comprising 80–250 eggs) onto small upright structures on the seabed.

In the Derwent estuary, spotted handfish commonly lay their eggs around the base of stalked ascidians, a type of sea tulip, but egg masses have also been sighted on seaweeds, seagrass and sponges. Adult fish remain with the egg mass for 6–7 weeks until hatching, either guarding their offspring from predators or cleaning and providing water flow. Spotted handfish may not spawn every year, though further study is required to fully understand their life cycle.

Unlike many marine species, which spend the early stages of their life as free-drifting larvae, spotted handfish hatch directly onto the seabed as fully metamorphosed juveniles 6–7mm in length.

After hatching they remain in the general vicinity of their spawning grounds. This reproductive strategy has an important conservation consequence, as it means that handfish are unlikely to be able to easily recolonise areas from which they have disappeared.

Threats

The decline of spotted handfish populations may have started as a result of incidental capture from historic near-shore dredge fisheries for scallops. In more recent times, introduced North Pacific seastars have degraded natural spawning habitat and chains from yacht swing-moorings have destroyed habitats in sheltered bays. As a temperate coastal species on the southern tip of a continent, global warming may also be a major threat.

Research

The National Environmental Programme Marine Biodiversity Hub is working with the Zoo and Aquarium Association, SEA LIFE Melbourne Aquarium, Seahorse World, DEP, the Tasmanian Department of Primary Industries, Parks, Water and Environment, UTAS, CSIRO and NRM South to address threats to the spotted handfish. Activities include creating artificial spawning habitats, deploying eco-moorings and developing a captive breeding program.

Further information

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