

Pātiki mohoao – black flounder

UNDERSTANDING FRESHWATER FISHERIES IN AOTEAROA



9 Pātiki Mohoao (Black flounder)

Family: Pleuronectidae

Species: *Rhombosolea retiaria*

The black flounder (Figure 69), pātiki mohoao (*Rhombosolea retiaria*), is the only member of the flatfish family, or Pleuronectidae, that is a truly freshwater species. Other members of the family, such as the yellow-belly flounder (*Rhombosolea leporina*), occasionally wander into the lower reaches of rivers, but do not usually stay there. As their name implies, the flatfishes are indeed flat, and have adopted a habit of laying on their sides down on the substrate. Both eyes are on their dorsal or upper side to improve their field of view. Because of their shape, flounders are unlikely to be confused with other fish species except other flatfishes. The black flounder is easily distinguished from other flatfishes by its colouration; the top of the fish is usually dark-coloured with numerous, obvious brick-red spots. Flounders can grow to about 450 mm in length, although 200–300 mm fish are most common.

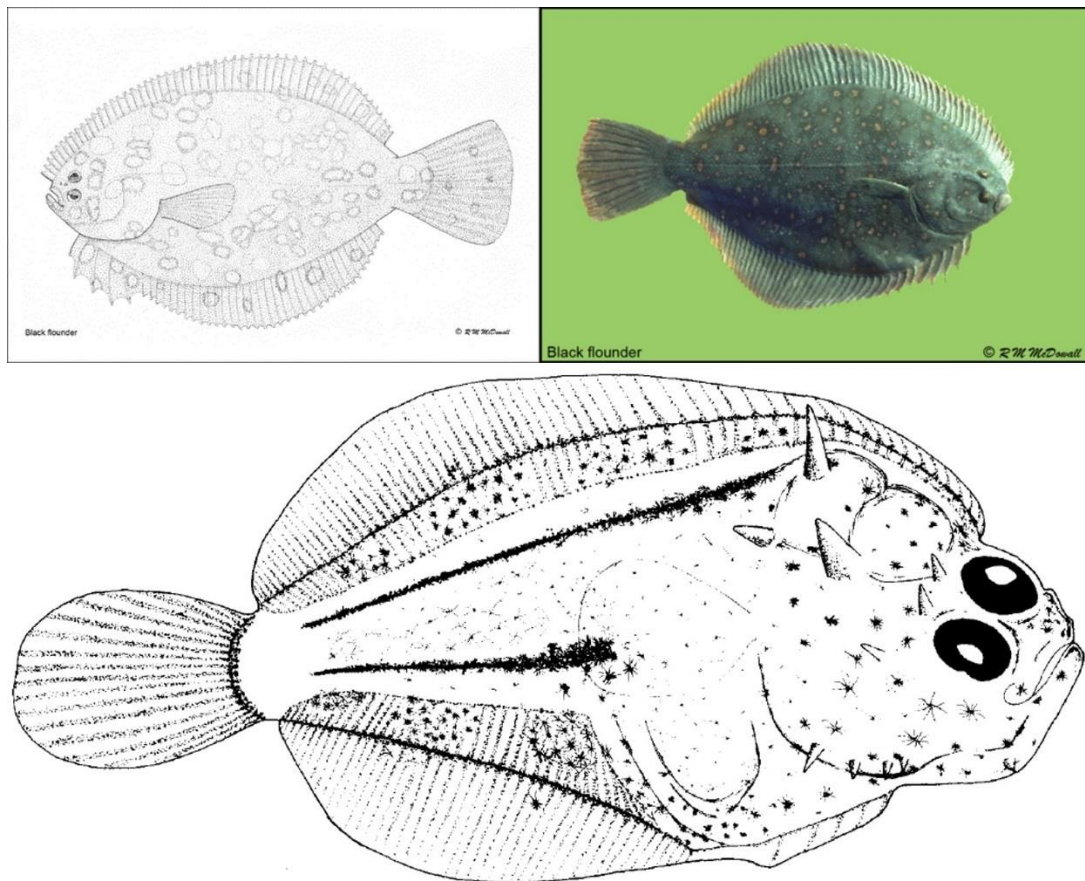


Figure 1: (Top) The adult black flounder (*Rhombosolea retiaria*); and (Bottom) Juvenile black flounder, c. 10 mm in length. (Sources: [Top] Bob McDowall; [Bottom] Roper [1979] in Eldon & Smith [1986]).

The black flounder is found throughout Aotearoa-NZ and is unique to this country. They are primarily a coastal species, although they can penetrate well inland if the river gradient is not too steep and specimens have been recorded more than 100 km inland in some river systems. Black flounder are a carnivorous species and probably eat a variety of bottom dwelling insects and molluscs. They are also known to feed on whitebait during the spring migration.

9.1 Life Cycle

Little is known about the life cycle of the black flounder. The larvae are undoubtedly marine, but where and when spawning takes place is not known. Site-specific knowledge has increased for the timing of black flounder spawning and recruitment. Although estuaries may play a minor and temporary role in the lives of black flounder, they are an essential habitat in their life histories that must be considered in management (McDowall 1976).

Black flounder appear to mature more rapidly than other flatfish, with nearly mature fish known to congregate in some habitats in July and August (Crow & Bonnett 2013). In general, adults probably mature and migrate to sea during winter (June/July) (McDowall 1995) and newly metamorphosed larval flounder recruit into fresh waters during spring (October to December) (McDowall 1995, Jellyman 2012). Most Aotearoa-NZ research on black flounder has been conducted in Te Waihora because it supports a significant commercial fishery and evidence suggests that spawning in fresh water is due to fish not achieving full ripeness in the lake as well as the observation of large between-year fluctuations in the annual catches of juveniles (Crow & Bonnett 2013). To the best of our knowledge, spawning and recruitment periods for black flounder are known for some South Island locations (e.g., Te Waihora, Waimakariri Lagoon, Waitaki River, and Rakaia River lagoon) but have not been recorded for other locations around Aotearoa-NZ.

9.2 Distribution

Black flounder are more commonly recorded in the South Island than in the North Island (Figure 70). They have not been reported from Chatham Islands or Stewart Island. Black flounder are more common in colder waters, and are seldom seen in the upper North Island. This species is located in lowland areas that are difficult to sample, which may account for the low numbers of observations in the NZFFD. The Canterbury and Otago coast lines contain most of the black flounder observations in the South Island, while coastlines in Hawke's Bay and the South Taranaki Bight contain most of the North Island observations (Figure 70).

9.3 State and Trends in Abundance

Black flounder state and trends in abundance were unable to be assessed by Crow et al. (2016). There is very little information on the abundance and distribution of this species in Aotearoa-NZ estuaries and rivers.

Black flounder is thought to be widespread, but with relatively few records from northern areas (McDowall 2000), probably due to its preference for cooler waters. Abundance fluctuates from year-to-year in some areas owing to mouth closure of systems (e.g., Te Waihora), which may prevent entry to fresh water by small juveniles (McDowall 2000). Given the short lifespan of this species (which is also typical of other flounder species) there are only a few year classes in the population. This means that natural fluctuations in year-class strength (typical of all marine spawning fish) results in highly variable adult populations. Such variations would be worsened by mouth closures in lakes like Te Waihora (David et al. 2014).

Historically, a commercial fishery for black flounder operated in Lake Wairarapa, but came to an end as catches declined to uneconomic levels. This ecosystem connects to the sea via the Ruamāhanga River which flows into Lake Ōnoke; this whole system is intermittently closed to the sea by a coastal bar, which may limit the supply of larvae/juveniles into the system from the sea. Lake Wairarapa has also been subjected to significant environmental degradation, and has water control gates at its southern end that are sometimes closed (there is a small opening for fish passage). Juvenile black flounder of 2–7 cm length have been found in Lake Ōnoke, up in shallow tidal channels on the north-western side of the lake (M. Morrison, pers. obs.).



Figure 2: Locations of NZFFD records where black flounder are present (black circles) and absent (grey circles).

9.4 Threat Rankings

The latest New Zealand Threat Classification System assessment classified black flounder as being 'Not Threatened' (Goodman et al. 2014). In 2014, the IUCN ranked black flounder as being 'Data Deficient' expressing that very little is known about the population of this species (Table 14).

Table 1: Threat rankings for Aotearoa-NZ black flounder according to the New Zealand Threat Classification System and IUCN. (see Section 2.3 for more information about these assessment methods).

Species	DOC Ranking	IUCN Ranking
Black flounder (<i>Rhombosolea retiaria</i>)	Not Threatened	Data Deficient (Population trend unknown) ¹

9.5 Pressures on Populations

Pressures on black flounder populations include poor water quality, disconnection between river and sea, water flows, and introduced/exotic species (e.g., Minns 1990). The hydrological values in waterways and estuaries must be maintained so that migration is not hindered, or prevented; and so that pollution and habitat modifications which affect the movements of fishes are kept to a minimum (McDowall 1976). Downstream-upstream linkages are crucial to guarantee a full, reproductive life cycle for migratory fish like black flounder. Other pressures may include increased sediment and contaminant inputs into waterways and the construction of barriers to fish passage (e.g., Tempero 2013). Additionally, drought can strike Aotearoa-NZ rivers at almost any time of the year, and depending on the severity (e.g., in association with water abstraction) can be an issue for these fisheries, and requires informed river flow management (McDowall 1995).

Most of the regional councils recognise the use of coastal drains by fish and wildlife, and usually avoid maintenance during spawning, nesting, and migration periods (Hudson & Harding 2004). However, these key periods of activity are not known for black flounder, therefore potentially limiting the protection to these fish. Further knowledge of black flounder habitats, migration, and impacts (natural and anthropogenic) are required to guide improved fisheries management.

9.6 Management

Black flounder is managed as part of the 'flatfish' group, which includes eight species in total, rather than having species-specific management. These are: the yellow-belly flounder, *Rhombosolea leporina* (YBF); sand flounder, *Rhombosolea plebeia* (SFL); black flounder, *Rhombosolea retiaria* (BFL); greenback flounder, *Rhombosolea tapirina* (GFL); lemon sole, *Pelotretis flavilatus* (LSO); New Zealand sole, *Peltorhamphus novaezeelandiae* (ESO); brill, *Colistium guntheri* (BRI); and turbot, *Colistium nudipinnis* (TUR) (MPI 2017).

Although black flounder is included in the QMS, the data available are not representative of the total catch because the black flounder data are grouped with other flatfish (FLA) species that are marine-based. In the commercial fishery, TACC's have been set for all five FLA (Figure 71); however, this does not include black flounder caught in fresh waters. Flatfish are shallow water species, and commercially these fish are mainly taken by targeted inshore trawl and Danish seine fleets around the South Island. Important fishing areas for black flounder are located within the Canterbury Bight, which sits within the much larger fisheries management area, FLA3, and only the New Zealand sole (*Peltorhamphus novaezeelandiae*) status is reported separately for this zone (MPI 2017).

¹ <http://www.iucnredlist.org/details/197304/0>

Recreational and customary allowances have been set for flatfish in FLA1 but not the other four FLA areas (FLA2, 3, 7, and 10) (Ministry of Fisheries 2007). Within the recreational fish regulations, there is a size limit, maximum daily limit per fisher, and a minimum net mesh size.

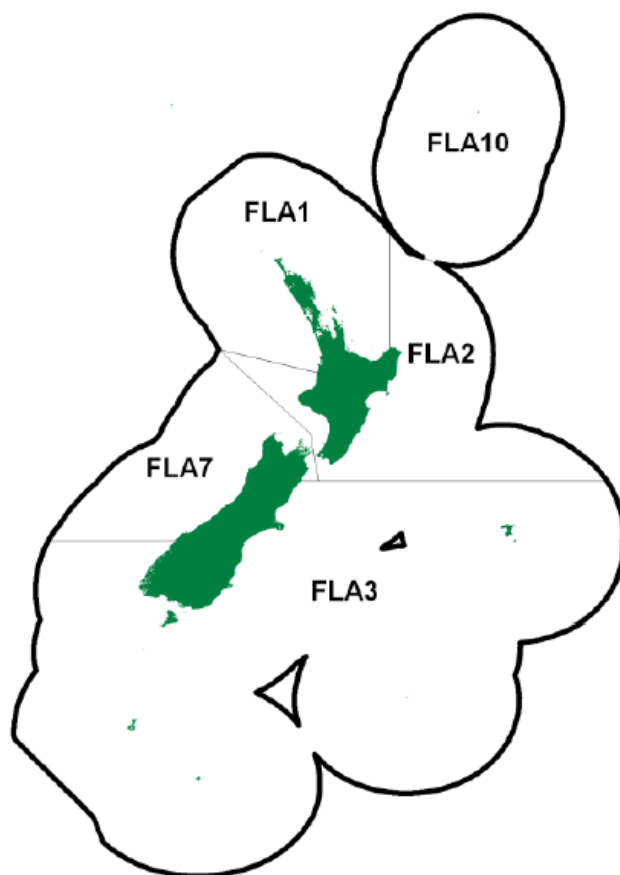


Figure 3: Commercial fish stock areas for “flatfishes”. This includes *Colistium nudipinnis*, *Peltorhamphus novaezelandiae*, *Colistium guntheri*, *Rhombosolea retiaria*, *Rhombosolea plebeia*, *Rhombosolea leporina*, *Rhombosolea tapirina*, and *Pelotretis flavilatus* (Source: MPI 2017).