Port Phillip Bay sand flathead stock assessment

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Last year, Fisheries researchers conducted a sand flathead Stock Assessment Workshop at Primary industry Research Victoria's (PIRVic) Queenscliff marine science facility. As well as PIRVic researchers and Fisheries Victoria managers, the workshop was attended by research diaries from Beaumaris, Albert Park and Geelong, along with a VRFish representative.

This was the first stock assessment of sand flathead in Port Phillip Bay since March 2000. Since then, the angler diary program has added to the ongoing information base provided by PIRVic’s commercial fishery monitoring, creel survey and annual Port Phillip Bay trawl survey programs.

The workshop’s purpose was to review information on the state of the Bay sand flathead stock, and factors affecting the stock, to: (i) provide advice on whether the fishery is sustainable at the current level and under current management arrangements; and (ii) identify environmental or other factors impacting on sand flathead requiring Fisheries Victoria to approach other agencies to ensure continued productivity of the stock and health of the fishery.

The workshop involved a review of the biology, ecology and previous assessment of sand flathead in the Bay, followed by an examination of recent trends from commercial and recreational fishing, and trawl survey data.

**Biology of sand flathead**

In the 1970’s, female sand flathead reached legal size (27cm) in 3 years and males in 7 years, but growth rates have slowed, particularly in the first four years of life. Today, females take 4 years and males up to 12 years to reach legal size. In fact, while both sexes may live to 23 years, many males never reach 27cm (and few live to reach 30cm) while females may reach 35cm. As a result, retained catches, especially of flathead above 30cm, are dominated by females, while the population of sub-legal sized flathead is dominated by males. The slow growth rates and small sizes in the Bay contrast with sand flathead growth in Bass Strait, where they have been recorded as large as 60cm. There is no evidence of flathead moving in or out of the Bay.

Both sexes reach maturity at 19-21cm. They spawn between August and December, with larvae occurring in midwater before settling on the bottom at 2.1cm in length. Spawning success varies, with strong year-classes being recorded in 1989, 1995, 2000 and 2004. Flathead feed on bottom-dwelling marine worms, crustaceans, molluscs and, increasingly as they grow, fish.

**Decline in flathead numbers**

The workshop examined three main sources of information on trends in flathead numbers: commercial fishery statistics, recreational fishing survey and angler diary data, and annual trawl surveys. The commercial fishery data show a marked decline in sand flathead landings, from 22 tonnes in 1978/79 to 4 tonnes in each of the past three years. This is largely the result of reduced commercial meshnet and line-fishing effort, although the annual catch rates are lower than during the 1980s, indicating reduced abundance. Anecdotal information from anglers agrees with creel survey data in indicating a decline in flathead abundance over a long period. The National Recreational Fishing Survey indicated that anglers retained 2.2 million and released 1.8 million sand flathead in the Bay in 2000/01.

The best insight into the flathead population in the Bay came from PIRVic’s systematic trawl surveys conducted in all but two years since 1990. Trawls were conducted at fixed sites at 7, 12, 17 and 22 m depths on five transects around the Bay. These indicated that sand flathead occur in greatest numbers in the deeper central areas of the Bay. Population estimates from these surveys indicate a marked decline in numbers from as many as 20 million in the early 1990s to around 5 million in 2007. Comparison with estimates from the 1970s shows that flathead numbers may have fallen by around 80%.

Annual estimates from trawl survey data showed a particularly sharp drop in flathead numbers occurring around 2000, coinciding with Pacific seastar (Asterias) numbers reaching their peak, also in the central part of the Bay. In fact, PIRVic estimated that the biomass (total live weight) of Asterias reached more than 2000 tonnes, exceeding the combined biomass of all bottom fish, including rays, in the deeper waters. The rise in Asterias numbers has coincided with observed declines in numbers of several fish species that depend on bottom communities for food in the deeper Bay waters. These include spiky globefish, eagle rays and banjo sharks, as well as sand flathead. In the same period, since 2000, numbers of spiky globefish have increased in shallower waters.

While circumstantial, all indications are that Asterias has out-competed several species for food. Some fish species, including sand flathead, have compensated at least in part by turning to pelagic food sources, such as anchovies, which are most abundant in the central part of the Bay. The workshop participants noted that it is possible that, like other exotic species such as the tube-worm Sabella, Asterias may reach equilibrium at a reduced level of abundance. If so, this could be accompanied by recoveries in bottom communities, including sand flathead.

On the other hand, workshop participants could not rule out the possibility that decades of fishing, removing the faster-growing flathead, may have reduced the population’s reproductive capacity and altered its genetic make-up, favouring slow growth.

**Fishery implications**

For now, the fact that the annual catches of flathead are relatively high while the growth rate of flathead is slowing and their numbers are...
declining, gives reason for concern.

Creel survey estimates of the recreational take of sand flathead averaged 240 tonnes between 1989 and 1994. At the time, the impacts of commercial and recreational fishing were considered to be minor compared to environmental influences on recruitment, growth and survival. However, given the continuing decline in the Bay population (down around 70% since 1990), it is questionable whether or not recreational catches at recent levels (360 tonnes in 2000/01) are sustainable.

While Fisheries managers consider the need for a management response, what is clear is the need for continuing close monitoring of the recreational fishery (by creel, angler diary and other surveys), and of the sand flathead population in the Bay (by the annual trawl survey). In the area of research, we need a clearer picture of the relative importance of environmental and fishery influences on the sand flathead stock in the Bay. Are the occasional successful spawns producing year-classes that are as strong in numbers as in the past? Or is the Bay’s capacity to support flathead decreasing? Modelling of the interactions between key species in the bottom communities may help to explain observed shifts in relative abundance and distribution of sand flathead, Asterias, globefish, etc. This may help to predict changes and indicate mediation possibilities.

Images

A big gob and a penchant for a wide variety of baits make flathead of all sizes easy to catch.
The rigs for catching a feed of sand flathead couldn’t be simpler.

A good bag – despite the drop in their numbers sand flathead continue to be the bread-and-butter species for Bay anglers.

Where there’s one there are bound to be more – so big bags of sand flathead are often caught.
One kilo of boneless flathead fillets – is this the best seafood to come from the Bay?

Camouflaged on the sand, a flathead waits for a passing feed.

Hobsons Bay provides some of the best sand flathead fishing.