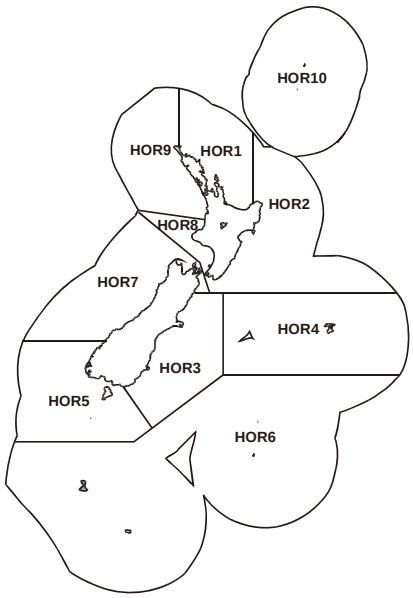
HORSE MUSSEL (HOR)

(*Atrina zelandica*)



1. FISHERY SUMMARY

(a) Commercial fisheries

Horse mussels (*Atrina zelandica*) were introduced into Quota Management System on 1 April 2004, with a combined TAC of 103 t and TACC of 29. Customary and recreational allowances are 9 each, and 56 t was allowed for other sources of mortality. The fishing year is from 1 April to 31 March and commercial catches are measured in greenweight. TACCs have been allocated in HOR 1 –HOR 9. Most reported landings have been from HOR 1, and apart from 1994–95 and 2002–03, when catches of about 5 and 7 t respectively were reported, reported landings have all been small (Table 1). About 90% of the catch is taken as a bycatch during bottom trawling and the remainder is taken as a bycatch of dredge and Danish seine. It is likely that there is a reasonably high level of unreported discarded horse mussel catch.

(b) Recreational fisheries

A. zelandica do not appear in records from recreational fishing surveys (Bradford, 1998; Bradford et al., 1998), but are nevertheless taken from time to time by recreational fishers. There are no estimates of recreational take for this species.

(c) Maori customary fisheries

A traditional food of Maori, although probably underrepresented in midden shell counts because of the fragile and short-lived nature of the shell. There are no estimates of current customary use of this species.

(d) Illegal catch

There is no known illegal catch of this mussel.

(e) Other sources of mortality

There is no quantitative information on other sources of mortality, although widespread die-offs appear to be characteristic of this species. Storm scour, shell damage and subsequent predation, and exceeding carrying capacity have been suggested as possible reasons for this.

Table 1: TACCs and reported landings (t) of Horse mussel by Fishstock from 1989–90 to 2005–06 from CELR and CLR data.

	HOR 1		HOR 2		HOR 3		HOR 4		HOR 5	
Fishstock	**Landings**	**TACC**	**Landings**	**TACC**	**Landings**	**TACC**	**Landings**	**TACC**	**Landings**	**TACC**
1990–91	0	–	0	–	0	–	0	–	0	–
1991–92	0834	–	0	–	0	–	0	–	0	–
1992–93	0	–	0	–	0	–	0	–	0	–
1993–94	0.003	–	0	–	0.016	–	0	–	0	–
1994–95	5.525	–	0	–	0	–	0	–	0	–
1995–96	0	–	0.019	–	0	–	0	–	0	–
1996–97	0.024	–	0	–	0	–	0	–	0	–
1997–98	0	–	0	–	0	–	0	–	0	–
1998–99	0	–	0	–	0	–	0	–	0	–
1999–00	0	–	0	–	0	–	0	–	0	–
2000–01	0	–	0	–	0	–	0	–	0	–
2001–02	0	–	0.002	–	0	–	0	–	0	–
2002–03	7.153	–	0	–	0	–	0	–	0	–
2003–04	0.026	4.0	0	2.0	0	2.0	0	1.0	0	1.0
2004–05	0.217	4.0	0	2.0	0	2.0	0	1.0	0	1.0
2005–06	0.015	4.0	0	2.0	0	2.0	0	1.0	0	1.0

	HOR 6		HOR 7		HOR 8		HOR 9		Total	
Fishstock	**Landings**	**TACC**	**Landings**	**TACC**	**Landings**	**TACC**	**Landings**	**TACC**	**Landings**	**TACC**
1990–91	0	–	0	–	0	–	0	–	0.834	–
1991–92	0	–	0	–	0	–	0	–	0	–
1992–93	0	–	0	–	0	–	0	–	0	–
1993–94	0	–	0	–	0	–	0	–	0.019	–
1994–95	0	–	0	–	0	–	0	–	5.525	–
1995–96	0	–	0	–	0	–	0	–	0.019	–
1996–97	0	–	0	–	0	–	0	–	0.024	–
1997–98	0	–	0	–	0	–	0	–	0.128	–
1998–99	0	–	0	–	0	–	0	–	0	–
1999–00	0	–	0.810	–	0	–	0	–	0.100	–
2000–01	0	–	0.128	–	0	–	0	–	0128	–
2001–02	0	–	0	–	0	–	0	–	0	–
2002–03	0	–	0	–	0	–	0	–	7.155	–
2003–04	0	1.0	0	16.0	0	1.0	0	1.0	0.026	29.0
2004–05	0	1.0	1.017	16.0	0	1.0	0.065	1.0	1.299	29.0
2005–06	0	1.0	0	16.0	0.112	1.0	0.503	1.0	0.630	29.0

2. BIOLOGY

The horse (or fan) mussel, *Atrina zelandica*, is a widespread endemic bivalve that lives mainly on muddy-sand substrates in the lowest inter-tidal and sub-tidal shallows of mainly sheltered waters. Horse mussels are also found in deeper waters (to 50 m) off open coasts The horse mussel is a flattened, emergent, filter-feeding mollusc, particularly conspicuous because of its size and abundance. Although more usually 260–300 mm long (110–120 mm wide) it can reach 400 mm in length and is New Zealand's largest bivalve. Horse mussels often live in groups, forming patches of up to 10 m^2 or more. The shell remains firmly embedded in the substrate by its pointed anterior end, the animal anchored to particles in the sediment by its byssus. The crenellated posterior edge projects a few centimetres above the substrate, keeping the water intake clear of surface deposits and providing attachment for an array of algae and invertebrates such as sponges and sea squirts.

Horse mussels are dioecious broadcast spawners. Although spawning may take place throughout much of the year it is probably mainly during summer There is no information on the size or age at which breeding begins. A pelagic larva is free swimming for several days or weeks but nothing is known of its primary settlement locations, which may not necessarily be within the adult beds. (Some bivalves including soft sediment ones such as pipi settle in one area but later migrate to another where adult beds develop.) Recruitment events can be sporadic and short-lived.

2.2 Age, growth and natural mortality

There is little published information on age,growth and mortality for horse mussels. It appears that *Atrina* grows rapidly for at least the first 2–4 years: shells about 120 mm long in a northern bed increased about 40 mm per year until 166 mm, after which growth slowed dramatically (Hayward,

1999; C. Hay pers. comm. in Hayward et al., 1999). Large shells are at least 5 y and possibly up to 15 y old. Widespread die-offs seem to be a feature of this species (Allan & Walshe, 1984; Grant-Mackie, 1987; Hayward et al., 1999, my pers. obs.). For example, in the Rangitoto Channel, densities of 200-300 per m^2 reduced to 1–35 per m^2 over 2–3 y, with storm scour, shell damage and subsequent predation, and exceeding carrying capacity being possible reasons (Hayward et al., 1999).

2.3 Relationship with other species

Horse mussels have widespread effects on ecosystem structure and function. They provide shelter and refuge for invertebrates and fish, and act as substrata for the settlement of epifauna such as sponges and soft corals. They also affect boundary layer dynamics, and facilitate productivity and biodiversity by depositing pseudofaeces. The horse mussel community in most northern harbours is almost entirely subtidal, in medium to fine muddy, but fairly stable, sand with moderate current velocities and no wave action. Similar communities have been observed in the Hauraki Gulf and Marlborough Sounds. Scallops, dredge oysters, and greenshell mussels are the main commercial shellfish species whose beds sometimes broadly overlap with the horse mussel.

3. STOCKS AND AREAS

For management purposes stock boundaries are based on QMAs, however, there is no biological information on stock structure, recruitment patterns, or other biological characteristics which might indicate stock boundaries.

4. ENVIRONMENTAL AND ECOSYSTEM CONSIDERATIONS

(a) Sea-bed disturbance

Trawling and dredging are likely to damage the sea-bed and reduce biodiversity. Because horse mussels are firmly embedded in the substrate they are particularly vulnerable to damage during capture.

(b) Incidental catch (fish and invertebrates)

Not relevant to horse mussel fisheries as they are incidental catch.

(c) Incidental Catch (seabirds and mammals)

Not relevant to horse mussel fisheries.

(d) Community and trophic structure

Trawling and dredging on beds of *A. zelandica* is likely to locally reduce biodiversity.

(e) Spawning disruption

The effects of trawling and dredging on spawning are unknown.

(f) Habitats of special significance

Habitats of special significance have not been defined for this fishery, however, horse mussel beds are likely to qualify as habitats of particular significance for fisheries management, and are probably particularly vulnerable.

(g) Biodiversity

The long-term effect of fishing for horse mussels on the maintenance and healthy functioning of the natural marine habitat and ecosystems is unknown, however, they have widespread effects on ecosystem structure and function, and are a key ecosystem engineer species.

(h) Aquaculture and enhancement

Not relevant as horse mussel aquaculture or enhancement are unlikely to be economically viable at present.

5 STOCK ASSESSMENT

(a) Estimates of fishery parameters and abundance

There are no estimates of fishery parameters or abundance for any horse mussel fishstock.

(b) Biomass estimates

There are no biomass estimates for any horse mussel fishstock.

(d) Estimation of Maximum Constant Yield (MCY)

There are no estimates of MCY for any horse mussel fishstock.

(e) Estimation of Current Annual Yield (CAY)

There are no estimates of CAY for any horse mussel fishstock.

6. STATUS OF THE STOCKS

There are no estimates of reference or current biomass for any horse mussel fishstock. It is not known whether horse mussel stocks are at, above, or below a level that can produce MSY.

7. FOR FURTHER INFORMATION

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