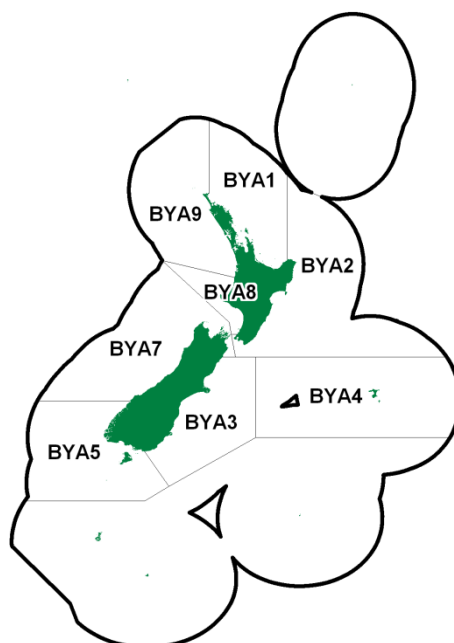


## FRILLED VENUS SHELL (BYA)

*(Bassina yatei)*

## 1. FISHERY SUMMARY

This species is part of the surf clam fishery and the reader is guided to the surf clam introductory chapter for information common to all relevant species.

The Frilled Venus Shell (*Bassina yatei*) was introduced into the Quota Management System on 1 April 2004 with a combined TAC of 16 t and a TACC of 16 t. There were no allowances for customary, recreational or other sources of mortality. These limits have not been changed (Table 1).

**Table 1: Current TAC and TACC for *Bassina yatei*.**

QMA	TAC (t)	TACC (t)
1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
7	9	9
8	1	1
9	1	1
Total	16	16

### 1.1 Commercial fisheries

Landings have been small (all around 1 t or less), from BYA 7 and only reported from 1992–5, 2001–5, 2008–09 and 2011–16. One landing of over 7 t was reported from BYA 1 in 2002–03 (Table 2).

### 1.2 Recreational fisheries

There are no known records of recreational use of this surf clam.

### 1.3 Customary fisheries

Offshore clams such as *B. yatei* are likely to have been harvested for customary use only when washed ashore after storms. Shells of this clam have been found irregularly, and in small numbers in a few middens. There are no estimates of current customary use of this clam.

**Table 2: TACCs and reported landings (t) of frilled venus shell by Fishstock from 1992–93 to 2015–16 from CELR and CLR data. See Table 1 for TACC of stocks not landed.**

	BYA 1		BYA 7		Total	
	Landings	TACC	Landings	TACC	Landings	TACC
1992–93	0	-	0.026	-	0.026	-
1993–94	0	-	0.007	-	0.007	-
1994–95	0	-	0.001	-	0.001	-
1995–96	0	-	0	-	0	-
1996–97	0	-	0	-	0	-
1997–98	0	-	0	-	0	-
1998–99	0	-	0	-	0	-
1999–00	0	-	0	-	0	-
2000–01	0	-	0	-	0	-
2001–02	7.473	-	0.049	-	7.522	-
2002–03	0	-	1.132	9	1.132	-
2003–04	0	1	1.295	9	1.296	-
2004–05	0	1	0.207	9	0.207	16
2005–06*	0	1	0	9	0.036*	16
2006–07	0	1	0	9	0	16
2007–08	0	1	0	9	0	16
2008–09	0	1	0.003	9	0.003	16
2009–10	0	1	0	9	0	16
2010–11	0	1	0	9	0	16
2011–12	0	1	0.350	9	0.350	16
2012–13	0	1	1.174	9	1.174	16
2013–14	0	1	1.106	9	1.106	16
2014–15	0	1	0.931	9	0.931	16
2015–16	0	1	0.134	9	0.134	16

\*In 2005–06 36.4 kg were reportedly landed, but the QMA is not recorded. This amount is included in the total landings for that year.

#### 1.4 Illegal catch

There is no documented illegal catch of this clam.

#### 1.5 Other sources of mortality

There is no quantitative information on other sources of mortality, although this clam is subject to localised catastrophic mortality from erosion during storms, high temperatures and low oxygen levels during calm summer periods, blooms of toxic algae and excessive freshwater outflow (Cranfield & Michael 2001).

### 2. BIOLOGY

*B. yatei* is endemic to New Zealand and is found around the coast in sediments at depths between 6 and 9 m. Maximum length is variable between areas, ranging from 48 to 88 mm (Cranfield & Michael 2002). The sexes are likely to be separate, and they are likely to be broadcast spawners with planktonic larvae. Anecdotal evidence suggests spawning is likely to occur in the summer months. Recruitment of surfclams is thought to be highly variable between years.

### 3. STOCKS AND AREAS

For management purposes stock boundaries are based on FMAs, however, the boundaries of stocks of surf clams are likely to be the continuous lengths of exposed sandy beaches between geographical features (rivers, headlands etc). Circulation patterns may isolate surf clams genetically as well as ecologically.

#### 4. ENVIRONMENTAL AND ECOSYSTEM CONSIDERATIONS

See the introductory surf clam chapter.

#### 5. STOCK ASSESSMENT

##### 5.1 Estimates of fishery parameters and abundance

No estimates of fisheries parameters or abundance are available for this species.

##### 5.2 Biomass estimates

Biomass has been estimated for two sites in the Marlborough Sounds with a stratified random survey using a hydraulic dredge. Estimates are shown in Table 3.

**Table 3: A summary of biomass estimates in tonnes greenweight with standard deviation in parentheses from exploratory surveys of Cloudy Bay (Cranfield et al 1994b and, White et al 2015, respectively), and Clifford Bay, both in Marlborough (Michael et al 1994).**

Area	Cloudy Bay (BYA 7)	Clifford Bay (BYA 7)
Length of beach (km)	11, 11	21
Biomass (t)	123 (50), 193 (72)	0.2 (0.8)

##### 5.3 Yield estimates and projections

Growth and mortality data from Cloudy Bay in Marlborough and the Kapiti Coast in Manawatu (Cranfield et al 1993) have been used in a yield per recruit model to estimate the reference fishing mortality  $F_{0.1}$  (Cranfield et al 1994b). The shellfish working group did not accept these estimates of  $F_{0.1}$  as there was considerable uncertainty in both the estimate and the method used to generate them. The MCY estimates of White et al (2015) used the full range of  $F_{0.1}$  estimates from Cranfield et al (1993) and are shown in Table 4. Estimates of MCY were calculated using Method 1 for a virgin fishery (MPI 2015) with an estimate of virgin biomass  $B_0$ , where:

$$MCY = 0.25 * F_{0.1} B_0$$

The SFWG recommended that MCY estimates are adequate to use to inform management decisions relevant to all surf clam fisheries, with the following caveats: 1) due to the uncertainty in  $F_{0.1}$  values, for all species other than SAE, the MCY estimates should use the  $F_{0.1}$  values toward the higher end of the range, and 2) there is a need to account for any substantial catch that has already come out of any surf clam fishery when estimating MCY, however there was no consensus on the best way to do this.

**Table 4: Mean MCY estimates (t) for *B. yatei* from virgin biomass at Cloudy Bay (BYA 7) from White et al (2015). The two  $F_{0.1}$  values, which are subsequently used to inform MCY, are the minimum and maximum estimates from Cranfield et al. (1993).**

Location	$F_{0.1}$	MCY
Cloudy Bay (BYA 7)	0.25/0.42	12.1/20.3

CAY has not been estimated for *B. yatei*.

The SFWG recommended moving all surfclam fisheries away from an MCY management strategy and towards an exploitation rate management strategy. The SFWG recognised that an exploitation rate approach is more survey intensive, but better allows for the variable nature of biomass for surf clams as it allows greater flexibility in catch (in order to take greater landings from available biomass) whilst keeping catches sustainable.

## 6. STATUS OF THE STOCKS

- BYA 7 - *Bassina yatei*

Stock Status	
Year of Most Recent Assessment	2015
Assessment Runs Presented	Survey biomass
Reference Points	Target: Not defined, but $B_{MSY}$ assumed Soft Limit: 20% $B_0$ Hard Limit: 10% $B_0$ Overfishing threshold:-
Status in relation to Target	Because of the relatively low levels of exploitation of <i>B. yatei</i> , it is likely that the stock is still effectively in a virgin state, therefore it is Very Likely (> 90%) to be at or above the target.
Status in relation to Limits	Very Unlikely (< 10%) to be below the soft and hard limits
Status in relation to Overfishing	Overfishing is Very Unlikely (< 10%) to be occurring
Historical Stock Status Trajectory and Current Status	
Unknown	
Fishery and Stock Trends	
Recent Trend in Biomass or Proxy	Unknown
Recent Trend in Fishing Mortality or Proxy	Landings have averaged 0.44 t between the 2001–02 and 2014–15 fishing years.
Other Abundance Indices	-
Trends in Other Relevant Indicators or Variables	-

Projections and Prognosis		
Stock Projections or Prognosis	-	
Probability of Current Catch or TACC causing Biomass to remain below or to decline below Limits	Fishing is Very Unlikely (< 10%) to cause declines below soft or hard limits in the short to medium term.	
Probability of Current Catch or TACC causing Overfishing to continue or to commence	Very Unlikely (< 10%)	
Assessment Methodology and Evaluation		
Assessment Type	Level 2 - Partial Quantitative Stock Assessment	
Assessment Method	Absolute biomass estimates from quadrat surveys	
Assessment Dates	Latest assessment: 2015	Next assessment: Unknown
Overall assessment quality rank		
Main data inputs (rank)	Abundance and length frequency information	
Data not used (rank)	-	
Changes to Model Structure and Assumptions	-	
Major Sources of Uncertainty	-	

Qualifying Comments
Stock size could fluctuate markedly as a result of catastrophic mortality from a number of causes. There is a need to review fishery parameters for this species. Virgin stock size in areas sampled has been small. It is not known if peak abundances may be outside the surveyed areas.

Fishery Interactions
BYA can be caught together with other surf clam species and non-QMS bivalves.

## FRILLED VENUS SHELL (BYA)

For all other BYA stocks there is no current evidence of appreciable biomass.

## 7. FOR FURTHER INFORMATION

- Beentjes, M P; Baird, S J (2004) Review of dredge fishing technologies and practice for application in New Zealand. *New Zealand Fisheries Assessment Report 2004/37*. 40 p.
- Brierley, P (Convenor) (1990) Management and development of the New Zealand sub-tidal clam fishery. Report of the surf clam working group, MAF Fisheries (Unpublished report held in NIWA library, Wellington). 57 p.
- Cranfield, H; Michael, K P (2001) The surf clam fishery in New Zealand: description of the fishery, its management, and the biology of surf clams. *New Zealand Fisheries Assessment Report 2002/62*. 24 p.
- Cranfield, H; Michael, K (2002) Potential area boundaries and indicative TACs for the seven species of surf clam. NIWA unpublished report to the Ministry of Fisheries. (Unpublished report held by the Ministry for Primary Industries.)
- Cranfield, H J; Michael, K P; Stotter, D R (1993) Estimates of growth, mortality, and yield per recruit for New Zealand surf clams. New Zealand Fisheries Assessment Research Document 1993/20. 26 p. (Unpublished report held in NIWA library, Wellington.)
- Cranfield, H J; Michael, K P; Stotter, D R; Doonan, I J (1994a) Distribution, biomass and yield estimates of surf clams off New Zealand beaches. New Zealand Fisheries Assessment Research Document 1994/1. 17 p. (Unpublished report held in NIWA library, Wellington.)
- Cranfield, H J; Doonan I J; Michael, K P (1994b) Dredge survey of surf clams in Cloudy Bay, Marlborough. *New Zealand Fisheries Technical Report 39*. 18 p.
- Haddon, M; Willis, T J; Wear, R G; Anderlini, V C (1996) Biomass and distribution of five species of surf clam off an exposed west coast North Island beach, New Zealand. *Journal of Shellfish Research 15*: 331–339.
- Michael, K; Cranfield, H; Doonan, I; Hadfield, J (1994) Dredge survey of surf clams in Clifford Bay, Marlborough. *New Zealand Fisheries Data Report, No. 54*.
- Ministry for Primary Industries (2015). Fisheries Assessment Plenary, May 2015: stock assessments and stock status. Compiled by the Fisheries Science Group, Ministry for Primary Industries, Wellington, New Zealand. 1475 p.
- White, W; Millar, R; Farrington, G; Breen, D; Selveraj, S (2015) Stock assessment of surf clams from Cloudy Bay, NZ. *Institute for Applied Ecology New Zealand Report 15/01*, Published by Applied Ecology New Zealand, an Institute of Auckland University of Technology: 34 p.