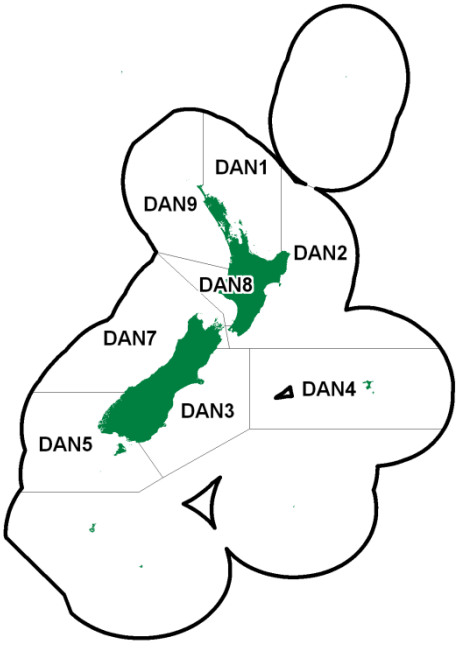
RINGED DOSINIA (DAN)

(*Dosinia anus*)



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.

Ringed Dosinia (*Dosinia anus*) were introduced into the Quota Management System on 1 April 2004 with a combined TAC of 112 t and catches are measured in greenweight. There were no allowances for customary, recreational or other sources of mortality. Biomass surveys in QMA 2 and 3 supported a TACC increase from April 2010. This increased the TACC for DAN 2 from 18 to 61 t and DAN 3 from 4 to 52 t. A subsequent biomass survey in DAN 8 resulted in a TAC increase in April 2013. This increased the DAN 8 TAC from 33 to 236 t and the total TAC to 412 t (Table 1).

Table 1: Current TAC, TACC and allowances for other sources of mortality for *Dosinia anus.*

Fishstock	TAC (t)	TACC (t)	Customary Allowance (t)	Other sources of mortality (t)
DAN 1	7	7	0	0
DAN 2	64	61	0	3
DAN 3	55	52	0	3
DAN 4	1	1	0	0
DAN 5	1	1	0	0
DAN 7	15	15	0	0
DAN 8	236	214	10	12
DAN 9	33	33	0	0
Total	412	384	10	18

1.1 Commercial fisheries

Prior to 2006–07 landings had only been reported in DAN 7 and ranged from about 10 to 300 kg. Small catches (less than 1 t) were reported in DAN 3 for 2006–07, but increased to 1.4 t in 2008–09. From 2002–03 onwards, landings in DAN 7 increased up to a maximum of 2.4 t in 2006–07, but have since varied between 0.2 t in 2008-9 and 2009-10 and 5.3 t in 2011-12 (Table 2).

1.2 Recreational fisheries

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

Table 2: TACCs and reported landings (t) of Ringed Dosinia by Fishstock from 1991–92 to the present day from CELR and CLR data. Fishstocks where no catch has been reported are not tabulated. DAN 1, 2, 4, 5, 8 and 9 have TACCs of 7, 61, 1, 1, 33 and 33 t, respectively.

	DAN 3		DAN 7		Total	
Fishstock	Landings	TACC	Landings	TACC	Landings	TACC
1991–92	0	-	0	-	0	
1992–93	0	-	0.164	-	0.164	-
1993–94	0	-	0.293	-	0.293	-
1994–95	0	-	0.07	-	0	0.07
1995–96	0	-	0.012	-	0	0.012
1996–97	0	-	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	0	-	0	-	0	-
2002–03	0	-	0.114	-	0.114	-
2003–04	0	4.0	0.895	15.0	0.895	112.0
2004–05	0	4.0	1.982	15.0	2.016*	112.0
2005–06	0	4.0	1.095	15.0	1.022*	112.0
2006–07	0.086	4.0	2.464	15.0	2.55	112.0
2007–08	0.768	4.0	0.821	15.0	1.589	112.0
2008–09	1.398	4.0	0.159	15.0	1.557	112.0
2009–10	0.836	4.0	0.209	15.0	1.045	112.0
2010–11	0.768	52.0	2.199	15.0	3.022	203.0
2011–12	0	52.0	5.303	15.0	5.303	203.0
2012–13	0.547	52	3.531	15	4.078	203.0
2013–14	5.483	52	0.729	15	6.212	384.0

*In 2004–05 and 2005–06, 32.4 and 90 kg were reported but the QMA is not recorded. This amount is included in the total landings for these years.

1.3 Customary fisheries

Offshore clams such as *D. anus* 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 (Carkeek 1966). There are no estimates of current customary use of this clam.

1.4 Illegal catch

There is no known 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 probably sometimes taken as a bycatch in inshore trawling. Harvesters claim that the hydraulic clam rake does not damage surf clams and minimises damage to the few species of other macrofauna captured. Surf clam populations also are 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

D. anus is found around the New Zealand coast on sediments in the North Island at depths between 5 and 8 m, and in the South Island between 6 and 10 m. It is larger and rougher than *D. subrosea*, and is usually found on more exposed beaches shallower in the substrate. Maximum length is variable between areas, ranging from 58 to 82 mm (Cranfield et al 1993). The sexes are likely to be separate, and they are likely to be broadcast spawners with planktonic larvae. Anecdotal evidence suggests that spawning is likely to occur in the summer months and spat probably recruit to the deeper water of the outer region of the surf zone. Recruitment of surf clams 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 (such as rivers and headlands). 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 at Cloudy and Clifford Bay in DAN 7 with a stratified random survey using a hydraulic dredge (Table 3).

Table 3: A summary of biomass estimates for *D. anus* in tonnes green weight with standard deviation in parentheses from exploratory surveys of Cloudy Bay (Cranfield et al 1994b), and Clifford Bay, both in Marlborough (Michael et al 1994) as well as on the Manawatu coastline (White et al 2012).

Area	Cloudy Bay (DAN 7)	Clifford Bay (DAN 7)	Foxton Beach (DAN 8)
Length of beach (km)	11	21	46
Biomass (t)	72 (30)	5 (3)	3498 (329)

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, Triantifillos 2008a and 2008b). 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 Triantifillos (2008a and b) and White et al (2012) that use the full range of $F_{0.1}$ estimates from Cranfield et al (1993) are shown in Table 4, but should be interpreted cautiously.

Estimates of *MCY* were calculated using Method 1 for a virgin fishery (Annala et al 2001) with an estimate of virgin biomass B_0, where:

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

Table 4: Mean *MCY* estimates (t) for *D. anus* from virgin biomass at locations sampled around New Zealand (Triantifillos 2008a and b).

Location	$F_{0.1}$	*MCY*
Five sites (DAN 2)	0.25/0.42	52.8/88.7
Ashley River to 6 n. mile south of the Waimakariri River (DAN 3)	0.27/0.54	63.8/127.7
Foxton beach	0.27/0.54	236.1/472.2

CAY has not been estimated for *D. anus*.

6. STATUS OF THE STOCKS

- DAN 2, 3, 7 & 8- *Dosinia anus*

Stock Status	
Year of Most Recent Assessment	2008 for DAN 2 and 3, 1994 for DAN 7 and 2012 for DAN 8.
Assessment Runs Presented	Survey biomass
Reference Points	Target: Not defined, but B_{MSY} assumed Soft Limit: 20% B_0 Hard Limit: 10% B_0

Status in relation to Target	Because of the relatively low levels of exploitation of *D. anus*, it is likely that all stocks are still effectively in a virgin state, therefore they are 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
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	Fishing is minimal in all Fishstocks other than DAN 3 and 7. In DAN 7 fishing has been light with landings averaging 1.1 t since 2002–03.
Other Abundance Indices	-
Trends in Other Relevant Indicators or Variables	-

Projections and Prognosis	
Stock Projections or Prognosis	-
Probability of Current Catch or TACC causing decline below Limits	For all stocks current catches are Very Unlikely (< 10%) to cause declines below soft or hard limits.

Assessment Methodology		
Assessment Type	Level 2 - Partial Quantitative Stock Assessment	
Assessment Method	Absolute biomass estimates from quadrant surveys	
Main data inputs	Abundance and length frequency information	
Period of Assessment	Latest assessment: 2008 for DAN 2 and 3, 1994 for DAN 7, 2012 for DAN 8.	Next assessment: Unknown
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

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

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

7. FOR FURTHER INFORMATION

Annala, J H; Sullivan, K J; O'Brien, C J; Smith, N W McL (compilers) (2001) Report from the fishery assessment plenary, May 2001: stock assessments and yield estimates. 515 p. (Unpublished report held in NIWA library, Wellington.)

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.

Carkeek, W (1966) *The Kapiti Coast*. Reed, Wellington. 187 p.

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.

Cranfield, H J; 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 2001/62*. 24 p.

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 document 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 document held in NIWA library, Wellington.)

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 J; Hadfield, J D (1994) Dredge survey of surf clams in Clifford Bay, Marlborough. *New Zealand Fisheries Data Report* 54: 15 p.

Triantifillos, L (2008a) Survey of subtidal surf clams in Pegasus Bay, November–December 2007. Prepared by NIWA for Seafood Innovations Limited and SurfCo. limited. 43 p. (Unpublished Report available for MPI).

Triantifillos, L (2008b) Survey of subtidal surf clams in Quota Management Area 2, June – August 2008. Prepared by NIWA for Seafood Innovations Limited and SurfCo. limited. 40 p.

White, W; Millar, R; Breen, B; Farrington, G (2012) Survey of subtidal surf clams from the Manawatu Coast (FMA 8), October–November 2012, Report for the Shellfish Working Group Meeting 19th November 2012, 35 p + Addendum.