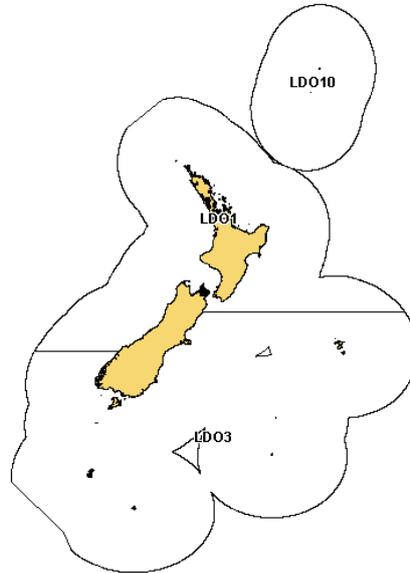


LOOKDOWN DORY (LDO)*(Cyttus traversi)***1. FISHERY SUMMARY**

Lookdown dory was introduced into the Quota Management System (QMS) on 1 October 2004 with the allowances, TACs and TACCs in Table 1.

Table 1: Recreational and customary non-commercial allowances, TACCs and TACs, by Fishstock, for lookdown dory.

Fishstock	Recreational Allowance	Customary non-commercial Allowance	TACC	TAC
LDO 1	0	0	168	168
LDO 3	0	0	614	614
LDO 10	0	0	1	1
Total	0	0	783	783

1.1 Commercial fisheries

Reliable landings data are available from 1989–90 onwards, after the introduction of Catch Landing Returns (CLRs) in the previous year (Table 2). Annual landings are also available from Licensed Fish Receiver Returns (LFRRs), and these agree well with CLR figures in most years (within 10%), but differ by 20–27% in 4 of the 12 years with comparable data (Table 3). Total landings (CLR) have increased steadily from 127 t in 1989–90 to 760 t in 2001–02. Estimated catch as a percentage of recorded landings were moderate in the early 1990s at 60–70%, but subsequently declined to around 30%. Lookdown dory will often not be included within the top five species in a trawl haul, but the reason for the declining percentage of landings recorded as catch is unknown.

Catches increased in 2005–06 but were well below the TACC in LDO 3 (Table 2). This probably reflects the reduction in the size of the trawl fishery on the Chatham Rise where the greatest proportion of lookdown dory has been taken as bycatch. Figure 1 shows the historical landings and TACC values for the main LDO stock, LDO 1.

Table 2: Reported domestic landings (t) of lookdown dory by Fishstock and TACC from 2004–05 to 2007–08.

Fishstock FMA	LDO1 1,2,7,8&9		LDO3 3,4,5&6		LDO10 10		Total	
	Landings	TACC	Landings	TACC	Landings	TACC	Landings	TACC
2004–05	110	168	272	614	0	1	382	783
2005–06	180	168	290	614	0	1	470	783
2006–07	147	168	284	614	0	1	431	783
2007–08	174	168	256	614	0	1	430	783

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Table 3: Reported landings and estimated catch (t) of lockdown dory by fishing year. Also, percentage of landings recorded as catch in the catch effort databases.

Year	Landings (CLR)	Landings (LFRR)	Estimated catch (t)	% of CLR landings recorded as estimated catch
1989–90	127	161	80	63
1990–91	164	182	105	64
1991–92	249	216	177	71
1992–93	275	264	159	58
1993–94	188	226	117	62
1994–95	283	277	125	44
1995–96	260	276	107	41
1996–97	354	426	173	49
1997–98	564	557	265	47
1998–99	625	640	228	36
1999–00	637	605	215	34
2000–01	694	504	157	23
2001–02	760	–	254	33

–, data not available

Lookdown dory is generally caught by bottom trawling in depths of 200 to 800 m as a bycatch in a range of fisheries including hoki, barracouta, hake, ling, scampi and jack mackerel. A small amount of target fishing is reported from FMA 7. Most of the catch has come from FMA 3 (east coast South Island), FMA 4 (Chatham Rise), and FMA 7 (west coast South Island) (Table 4). Landings from around the North Island have been restricted mostly to a few tonnes from FMA 1 and FMA 2 in each year, as well as from FMA 9 in the last three fishing years. In FMA 5 (Southland) and FMA 6 (Sub-Antarctic) landings have been in the order of 10–30 t over the past six years. No landings have been reported from outside the New Zealand EEZ.

The greatest proportion of the estimated catch of lockdown dory is taken as bycatch in the hoki fishery. For all fishing years and FMAs combined, 83% of lockdown dory catch has been bycatch in the hoki fishery, with other fisheries (barracouta 4%, hake 3%, ling 2% and scampi 2%) catching a smaller fraction (Anderson *et al.* 2001).

Table 4: Reported historic landings (rounded to nearest tonne) of lockdown dory by FMA and fishing year 1989–90 to 2003–04.

Year	FMA 1	FMA 2	FMA 3	FMA 4	FMA 5	FMA 6	FMA 7	FMA 8	FMA 9	FMA 10
1989–90	2	1	40	20	12	2	51	-	-	-
1990–91	3	4	46	59	10	11	33	<1	-	-
1991–92	1	2	96	75	17	3	55	-	-	-
1992–93	1	4	63	112	10	2	83	-	-	-
1993–94	<1	2	62	50	4	3	67	-	<1	-
1994–95	1	6	73	108	7	3	85	-	<1	-
1995–96	2	4	99	78	11	3	62	-	<1	-
1996–97	7	10	108	110	11	7	100	<1	<1	-
1997–98	5	8	159	272	11	25	82	-	<1	-
1998–99	3	3	161	295	21	17	124	<1	10	-
1999–00	3	5	161	295	21	17	124	<1	10	-
2000–01	2	6	203	318	24	25	111	<1	4	-
2001–02	10	10	181	331	26	28	170	3	2	-
2002–03	8	8	261	365	48	32	167	1	2	-
2003–04	13	8	135	210	22	24	113	3	1	-

Landings of lockdown dory have been well spread out over the year during the 1989–90 to 2001–02 period, with no clear seasonal pattern. Catches are more dependent on fishing activity in the target fisheries, particularly hoki, where it is taken as bycatch.

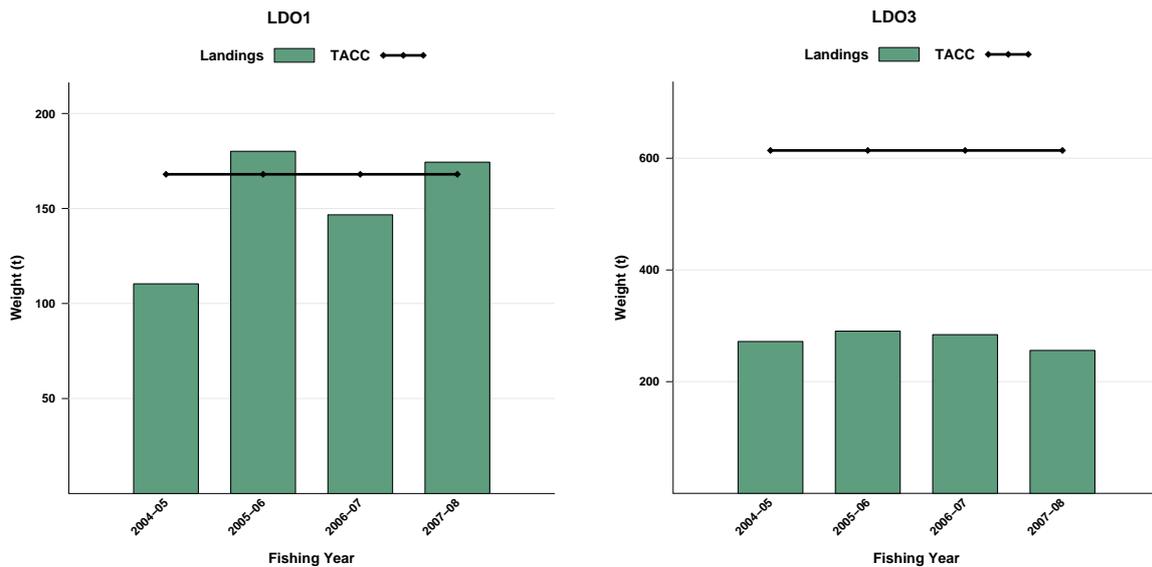


Figure 1: Historical landings and TACC for the two main LDO stocks. Left to right: LDO1 (Challenger, Central, Auckland), and LDO3 (South East Chatham Rise, South East Coast, Sub Antarctic, Southland). Note that this figure does not show data prior to entry into the QMS.

1.2 Recreational fisheries

There is no quantitative information on recreational harvest levels of lockdown dory. Due to the offshore location and depth distribution of lockdown dory recreational catch is thought to be negligible.

1.3 Customary non-commercial fisheries

An estimate of current catch is not available but given the offshore location and depth distribution of lockdown dory customary non-commercial catch is thought to be negligible.

2. BIOLOGY

Lookdown dory (*Cyttus traversi*) belongs to the family Zeidae. This family includes 13 species in seven genera distributed among the Atlantic and Pacific Oceans and the Mediterranean Sea. Lookdown dory also occurs in Australian waters, mostly east and south of Tasmania (where it is known as king dory), and also in South Africa. It is widely distributed throughout New Zealand waters with most records from the Chatham Rise. The geographical and depth distribution of immature (< 33 cm) fish is similar to that of adults (Hurst *et al.* 2000).

It is one of the less abundant members of a loosely associated group of about 23 common species, which together form the upper slope assemblage of New Zealand's continental shelf (Francis *et al.* 2002). The main species in this group are hoki, javelin fish, ling, pale ghostshark, sea perch, hake, and longnose spookfish (chimaerid). It was identified as a key species characterising the demersal fish community 350–550 m on the Chatham Rise (Bull *et al.* 2001).

Juveniles are found in surface waters up to a length of approximately 12 cm (May & Maxwell 1986), at which stage a metamorphosis occurs associated with the transition from a pelagic to a demersal habitat (James 1976). Adults are most common between 400 to 600 m, but have a wide depth range, from 50 to 1200 m (Anderson *et al.* 1998). The main prey of lookdown dory are natant decapod crustaceans, followed by euphausiid, mysid, galatheid, and nephropsid crustaceans, and fish (Clark & King 1989). Lookdown dory is likely to be prey of larger fish and have occasionally been recorded in the stomachs of large ling.

Trawl survey catch distribution across the Chatham Rise is fairly even, with females ranging from 10 to 55 cm total length, and males ranging from 10 to 40 cm. Lookdown dory show early signs of ripening to spawn in the January surveys (Livingston *et al.* 2002).

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Catch distribution across the Sub-Antarctic is more patchy than across the Chatham Rise, particularly during autumn surveys (O'Driscoll & Bagley 2001). The size ranges are similar to those of the Chatham Rise.

Around the North Island, female lockdown dory are known to mature at about 35 cm (May & Maxwell 1986). Ripe specimens are usually seen in autumn and winter but have also been observed in summer (Clark & King 1989). Spent females are more common in winter and especially spring but again have also been recorded in summer and autumn. Although most spawning takes place in autumn and winter it is likely that it is not a discrete event but occurs over much of the year. Research data from other areas are sparse, but show the presence of fish in spawning condition in most months of the year.

Although there are no published studies of age and growth of lockdown dory, preliminary work in Australia suggests this species may live to over 30 years (Stewart & Smith 1992).

3. STOCKS AND AREAS

There is no information on stock structure, recruitment patterns, or other biological characteristics on which to base any fishstock boundaries.

4. ABUNDANCE INDICES

The relative abundance of lockdown dory is measured by hoki trawl surveys of the Chatham Rise and the Sub-Antarctic. Lookdown dory biomass is usually in the top 10 species on the Chatham Rise (Table 5). Biomass estimates have fluctuated over the time series (with low CVs). Lookdown dory are far less abundant in the Sub-Antarctic and biomass estimates have higher CVs (Table 5).

Trends in observed incidental catch of lockdown dory by the commercial fleet on the Chatham Rise from 1989–90 to 1998–99 showed increasing catches of lockdown dory and variable CPUE (t per tow) (Livingston *et al.* 2003).

Table 5: Lookdown dory biomass estimates from *Tangaroa* trawl surveys of the Chatham Rise (January, 200–800 m) and the Sub-Antarctic (summer and autumn series 300–800 m).

	Chatham Rise		Sub-Antarctic		Sub-Antarctic	
	t x 10 ³	CV	t x 10 ³	CV	t x 10 ³	CV
January			Summer		Autumn	
1992	4.80	5.6	1.079	13.0	1.154	40.0
1993	6.44	5.2	1.031	11.0	1.747	44.0
1994	7.66	7.2	0.816	13.0	-	-
1995	4.45	6.7	-	-	-	-
1996	7.54	8.0	-	-	1.042	18.0
1997	6.57	7.6	-	-	-	-
1998	7.02	6.0	-	-	0.489	34.0
1999	7.42	8.2	-	-	-	-
2000	7.65	7.0	0.921	15.2	-	-
2001	7.71	6.5	0.567	19.6	-	-
2002	8.82	11.1	0.446	22.1	-	-
2003	5.90	7.0	0.636	23.7	-	-
2004	6.75	7.7	0.614	28.0	-	-
2005	6.35	9.3	0.707	19.0	-	-
2006	7.82	8.0	0.514	35.0	-	-
2007	5.72	8.0			-	-
2008	5.23	9.3			-	-
2009	7.79	8.7				

5. STOCK ASSESSMENT

There has been no scientific assessment of the maximum sustainable yield for lockdown dory stocks. Relative biomass estimates are available from annual trawl surveys on the Chatham Rise (1992–2008). These estimates show no decline over the time series and have low CVs.

6. STATUS OF THE STOCK

There are no known sustainability concerns in the lockdown dory fishery. Trawl surveys indicate stable abundance in the main fishery. However, it is not known whether recent catches will allow the stock to move towards a size that will support the maximum sustainable yield.

TACCs and reported landings for the 2007–08 fishing year are summarised in Table 6.

Table 6: Summary of TACCs (t) and reported landings (t) of lockdown dory for the most recent fishing year.

Fishstock	FMA	2007–08 Actual TACC	2007–08 Reported landings
LDO 1	Auckland (East) (West), Central (East) (West), Challenger	1,2,7,8&9	168
LDO 3	South east (coast) (Chatham), Southland, Sub-Antarctic	3,4,5&6	614
LDO 10	Kermadec	10	1
Total		783	430

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