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New Zealand Fisheries Assessment Research Document 88/43

Stargazer

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December 1988

MAFFish, N.Z. Ministry of Agriculture and Fisheries

This series documents the scientific basis for stock assessments and fisheries management advice in New Zealand. It addresses the issues of the day in the current legislative context and in the time frames required. The documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

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## I. INTRODUCTION

## (a) Biology

Stargazers (genus Kathetostoma, family Uranoscopidae) are found throughout New Zealand waters, but are most plentiful in waters of 50-300 m around the east and south of the South Island, including the Chatham Islands. They occupy sandy or muddy substrates in which they bury themselves.

It has become apparent recently that there are two species within the Kathetostoma fishery in New Zealand. <u>Kathetostoma giganteum</u> (stargazer) predominate, but the undescribed Kathetostoma sp. (banded giant stargazer) are also caught (Tate 1987).

In addition spotted stargazer <u>Genyagnus monoptergius</u> is estimated to make up between 5-10% of the total catch in the Challenger FMA (M. Anderson pers. comm.) and almost all the catch in the Auckland FMA (V Wilkinson pers. comm.).

Little is known of the biology of these species. <u>Kathetostoma giganteum</u> from the Chatham Rise were observed to have maturing or running-ripe gonads in June-July 1985 (Livingston and Berben 1986), which supported the findings of Tait (1987) that they spawn in winter. Stargazers are an intermediate stage host in the life cycle of <u>Bucephalus</u>, a fluke parasite of oysters. Stargazer planktonic eggs have been identified by Robertson (1975) and general observations and identification guides contained in Graham 1936, Ayling and Cox 1982 and Clement and Winch 1987.

(b) Description of Present Fishery

The reported catch since 1970 is given in Table 1, and landings by domestic fishing return area for 1983-86 are shown in Fig 1.

Stargazers are caught principally around the South Island, and they are an important by-catch of the domestic trawl fisheries targetting on red cod, flatfish and barracouta. The main fisheries are the west coast South Island, the Canterbury Bight, Pegasus Bay, and Kaikoura. They are also a deepwater by-catch of foreign licensed vessels and New Zealand chartered vessels, particularly on the Chatham Rise and the Snares Shelf.

There is an important domestic stargazer target fishery located off Cod Fish Island just west of Stewart Island. This fishery is particularly important to trawlers from Bluff where stargazer comprises over 30% of the inshore trawl landings.

### (c) Present Management

There is no minimum size limit on stargazer.

The fish stocks and 19870-88 TACs are given below.

	Fish Stock	1987-88 TAC
Auckland	1	20.0
Central		
- east	2	31.3
- Egmont	8	20.0
Challenger	7	456.9
South-East		
- Coast	3	562.9
- Chatham Rise	4	2000.0
Southland	5)	1060.0
Sub Antarctic	5)	
Kermadec	10	10.0

# II. REVIEW OF THE FISHERY

### (a) Recent Trends

Table 1 gives recorded landings of stargazer. Domestic catches have been relatively stable between 1981-86 probably reflecting the stability of effort in the red cod, flatfish and barracouta fisheries.

#### (b) Review of Research

#### Estimation of Maximum Constant Yield (MCY)

The abundance of stargazers has been estimated from several trawl surveys. Surveys have covered the Chatham Rise (FMA 4), the Snares and Puysegur Shelf (FMA 5), and the Aucklands and Sub-Antarctic Shelf (FMA 6). No allowance was made for foul or unsurveyed areas; biomass was calculated from the mean of door and wingspread estimates; escapement = 0, catchability = 1.

There have been three surveys on the Chatham Rise. They have been analysed to include only the area within FMA 4. This stock is assumed to be a virgin recruited biomass.

The average of the three surveys gives a biomass estimate of 12500 t.

Assuming M = 0.2 then MCY = 0.25 M. Bo = 625 t.

There have been six surveys in FMA 5 and 6, Southland and Sub-Antarctic areas. However, only two surveys have included the area inside the 12 nm territorial sea to 50 m of depth. Only these two surveys were used to estimate MCY. The average of the two surveys gives a biomass estimate of 10720 t. Then MCY = 0.5 MB= 1070 t

Elsewhere MCY = cY. The landings data from 1981-87 inclusive was chosen as being relatively stable in terms of effort. Because effort and catch was stable c = 1.

For FMA 3, South-East Coast,  $MCY = 1.0 \times 514 = 510 t$  approx.

For FMA 7, Challenger,  $MCY = 1.0 \times 367 = 370$  approx.

## (c) Maori and Recreational Fisheries

There is no known traditional fishery for stargazers. They are not the target of any bait fishery, nor are they sought by amateurs.

## **III. PRESENT RESEARCH**

There is no current research on these species.

### **IV. MANAGEMENT IMPLICATIONS**

Insufficient information is available on which to assess any management implications.

#### V. SUMMARY

The reported catch for 1986-87 and allocated TACs (t) for 1987-88 are given below.

	Fish Stock	86-87 Catch	Estimated MCY	1987-88 TAC
Auckland	1	10	20	20.0
Central				
- East	2	31	30	31.3
- Egmont	8	7	20	20.0
Challenger	7	487	370	456.9
South-East				
- Coast	3	645	510	562.9
- Chatham Rise	4	69	625	2000.0
Southland	5)	736	1070	1060.0
Sub Antarctic	5)		·	
Kermadec	10	0	0	10.0
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	Domestic	Charter	Licensed	Total
1970	367			
1971	249			
1972	214			
1973	190			
1974	273			
1975	219			
1976	540			
1977	438			
1978	426	7	64	497
1979	387	155	159	701
1980	723			
1981	1010	314	84	1416
1982	902	340	283	1525
1983	1189	329	465	1983
1983-84	1463	525	360	2348
1984-85	1027	321	178	1536
1985-86	1304	386	142	1832
1986-87	*1985 (19	982)	-	

TABLE 1: Recorded Catch (t) of stargazers, 1970-87

\*Sum of Quota Monitoring Returns. (Licensed Fish Receivers)

÷					Estimated	1
	Vessel	Date	Biomass	C.V. (%)	yield (10%)	Source §
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ham Rise and S-E Coast (1)	Shinkai Maru	Mar 1983	21 940	18	2 194	а
ham Rise (1)	Shinkai Maru	Nov 1983	11 270	24	1 127	a
ham Rise and S-E Coast (1)	Shinkai Maru	Jul 1986	18 957	19	1 896	b
ham Islands (2)	Akebono Maru No. 73	Dec 1984	770	14	77	с
ham Islands (2)	Akebono Maru No. 73	Dec 1985	1 440	15	144	ď
es and Aucklands Shelf (1)	Shinkai Maru	Feb 1981	3 300	15	330	a
es and Sub-Antarctic Shelf (1)	Shinkai Maru	Mar 1982	2 660	17	266	а
es and Aucklands shelf (1)	Shinkai Maru	Apr 1982	6 780	35 ·	678	а
es and Sub-Antarctic Shelf (1)	Shinkai Maru	Oct 1983	3 830	23	383	a
es and Puysegur Shelf (2)	Shinkai Maru	Jun 1986	15 400	35	1 540	d
es and Puysegur Shelf (2)	Akebono Maru No. 3	Nov 1986	3 800	10	380	d
es and Sub-Antarctic Shelf (1) es and Aucklands shelf (1) es and Sub-Antarctic Shelf (1) es and Puysegur Shelf (2) es and Puysegur Shelf (2)	Shinkai Maru Shinkai Maru Shinkai Maru Akebono Maru No. 3	Mar 1982 Apr 1982 Oct 1983 Jun 1986 Nov 1986	2 880 6 780 3 830 15 400 3 800	35 23 35 10	1 5	266 578 383 540 380

TABLE 2: Summary of biomass and yield estimates (t) of stargazers from trawl surveys, 1983-86\*

\* No allowance was make for foul or unsurveyed areas; biomass was calculated from the mean of door and wingspread estimates; escapement = 0; catchability = 1; yield = 10% of estimated biomass (some data sources reported yields based on 15% productibity; these were recalculated).

+ (1) outside territorial waters; (2) includes inside and outside territorial waters

§ Sources:

a, Hurst and Fenaughty (1985) (recalculated); b, M.E. Livingston pers. comm.; c, Hurst and Bagley (1987) (recalculated); d, R.J. Hurst pers. comm.; e, R.J. Hurst notes for 1987 TAC meeting (recalculated).