

FISHERIES TECHNICAL REPORT

NO.

THE DREDGE FISHERY FOR SCALLOPS, MUSSELS
AND OYSTERS IN GOLDEN BAY AND TASMAN BAY

SURVEY RESULTS 1969 - 1975

D.H. Stead
Ministry of Agriculture and
Fisheries
Fisheries Management Division
Wellington
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OYSTERS

1. Biology

(a) Reproduction

The dredge or mud oyster Ostrea lutaria reproduces from about August to March with the main reproductive phase from November to February. Oysters are mature at about three years. Sexual products are present in the gonad all the year and a variety of sexual phases are represented including hermaphrodite individuals. Fertilisation and early larval development occurs inside the shell cavity and larvae at release are about .4 - .5 mm in length, have twin shells and a prehensile foot. The species is therefore incubatory. Most larvae are released in January and February and most settle and become attached to suitable firm objects on the sea bed within a short time of release. Those larvae which fail to attach or are dislodged may survive in suitable sediments.

(b) Feeding, Growth and Fattening

Oysters filter off fine organic food material in suspension from water passed through the shell cavity.

Growth is fairly rapid in young oysters, especially under favourable conditions. Figures 1-5 show movement of modes representing growth of oysters. In some shallow Stewart Island inlets oysters may reach market size in about eighteen months but in deeper water on sand bottoms in Foveaux Strait and mud bottoms in Tasman Bay and Golden Bay oysters reach takeable size (2 1/2" or 6 cm width) in 2-3 years or more, the Tasman/Golden Bay estimates being based on length frequency data. Large oysters from Tasman Bay and Golden Bay were in fat condition most of the year but condition was best just before spawning in September to November. They were often spent or in poor condition in March. Most large oysters had heavy thickened shells. Figure 6 shows oyster condition.

(c) Movement

Oysters are not capable of movement after they become attached as spat but may be moved by strong tidal currents as in Foveaux Strait.

(d) Predation and Natural Mortality

Mortality of oyster spat may be high on the mud bottoms of Tasman and Golden Bay due to paucity of clean settlement surfaces, burial in soft sediments and attacks by predators. The eleven arm starfish Coscinasterias calamaria which is a known predator of oysters is common in this area. Large quantities of dead oyster shells, often joined at the hinge were taken by the dredge in some areas.

Some oyster gonads were seen infected by the trematode Bucephalopsis sp. and some shells were affected by the yellow boring sponge Cliona sp.

2. Distribution

Oyster distribution is shown on Map 8 with the resource levels in each sample area based on commercial catch per hour during catch sampling or the number of oysters taken during exploratory surveys. Most oysters were recorded over a wide area in northern Tasman Bay. Large individual oysters with thickened shells were seen while diving, embedded in the soft mud, mostly with the curved shell beneath. Oysters were more abundant on firm shelly substrates where more attached juvenile oysters were also seen. Oysters were widely distributed on the sea bed in most observed areas. Map 9 shows the approximate areas in nautical square miles containing oyster grounds sampled during surveys.

3. Estimate of Standing Crop

A tentative estimate of the standing crop of takeable size oysters in the surveyed area was made as follows:-

(a) Dredge Efficiency

Diving and observations of a moving dredge have shown that many oysters are missed by the dredge on uneven bottoms but where the bottom is level mud, more oysters were taken.

In Foveaux Strait many oysters were missed due to the build-up of sandbanks in front of the dredge bit or bar and mean efficiency was only about 10%. With a flexible chain bit on a mud bottom there is not the same build-up of sediments in front of the dredge. Consequently it is estimated that the dredge takes on average about 15% of oysters on the bottom during a haul. Several takeable oysters are lost through the dredge bag when towing and lifting.

(b) Standing Crop - Golden Bay

Mean Catch per hour (Table 2B) - .57 case
At 300 takeable oysters per case - 171 oysters
Area covered by 2 x 8' dredges in 1 hour at 3 knots - 30,000 square yards
(25104 m²)

At 100% dredge efficiency the population in 30,000 square yards would be 171 oysters i.e. .57 cases.

At 15% dredge efficiency the population would be:

$$\frac{100}{15} \times 171 = \underline{1140 \text{ oysters}}$$

$$\text{Mean density} = \frac{30,000}{1140} = \underline{1 \text{ oyster per } 26.3 \text{ square yards (} 21.9 \text{ m}^2\text{)}}$$

For an estimated 14 square nautical miles in Golden Bay the standing crop is therefore:

$$\frac{56,000,000}{26.3} = \underline{2,129,277 \text{ oysters}}$$

(c) Standing Crop - Tasman Bay

Using the same calculations as above.

Mean Catch per hour (Table 2B) - .53 case
At 300 takeable oysters per case - 159 oysters

$$\frac{100}{75} \times 159 = \underline{1060 \text{ oysters}}$$

$$\text{Mean density} = \frac{30,000}{1060} = \underline{1 \text{ oyster per } 28.3 \text{ square yards (} 23.6 \text{ m}^2\text{)}}$$

For an estimated 140 square nautical miles in Tasman Bay the standing crop is:

$$\frac{560,000,000}{28.3} = \underline{19,787,985 \text{ oysters}}$$

Total for Golden Bay and Tasman Bay is:

$$2,129,277 + 19,787,985 = \underline{21,917,262 \text{ oysters}}$$

(d) Fishing Mortality

Following are the total landings for Golden Bay and Tasman Bay. Landings are shown in sacks at approximately 600 oysters per sack.

1969	-	469 sacks x 600	-	<u>281,400 oysters</u>
1970	-	1406 sacks x 600	-	<u>843,600 oysters</u>
1971	-	1358 sacks x 600	-	<u>814,800 oysters</u>
1972	-	2064 sacks x 600	-	<u>1,238,400 oysters</u>
1973	-	4696 sacks x 600	-	<u>2,817,600 oysters</u>
1974	-	1780 sacks x 600	-	<u>1,068,000 oysters</u>
1975	-			

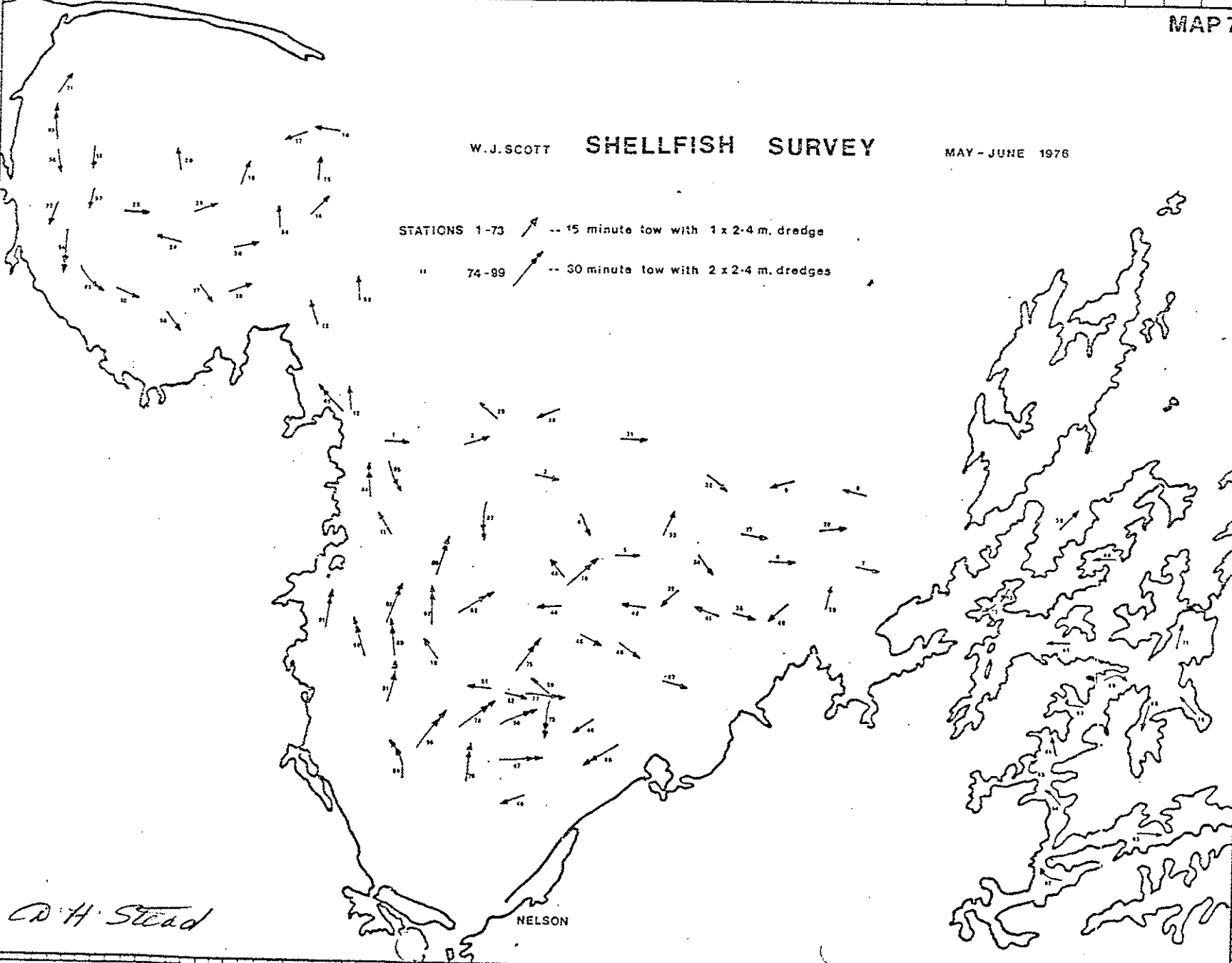
Using these figures the fishing mortalities would be:

1969	-	1.3%	
1970	-	3.8%	
1971	-	3.7%	Expressed as a percentage of the standing crop
1972	-	5.6%	
1973	-	12.8%	
1974	-	4.8%	
1975	-		

W. J. SCOTT SHELLFISH SURVEY

MAY - JUNE 1976

STATIONS 1-73 -- 15 minute tow with 1 x 2-4 m. dredge
" 74-89 -- 30 minute tow with 2 x 2-4 m. dredges



C. H. Stead

NELSON

OYSTER DATA

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MAY - JUNE 1976

$\frac{10}{7}$ - number of oysters in 1 x 2.4m. dredge after 1 x 15 min. tow
 number takeable i.e. over 65mm. in shell height

eg.

⊙ - number of takeable oysters in 2 x 2.4m. dredges after 1 x 30 min. tow

