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NEW ZEALAND MARINE DEPARTMENT

**FISHERIES TECHNICAL REPORT
NO. 47**

“SEAWEED” SURVEY - OAMARU

FEBRUARY 1969

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WELLINGTON, NEW ZEALAND

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"SEAWEED" (PYURA PACHYDERMATINA) - OAMARU
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"SEAWEED" SURVEY - OAMARUFEBRUARY 1969INTRODUCTION

In April 1968 during several days of strong N.E. winds and heavy seas, large quantities of the stalked ascidian Pyura pachydermatina (the "sea-tulip" or "kaeo") and algae were deposited in heaps up to about 20' high on Oamaru beaches northwards from the North Mole of the harbour for about two miles. (Figure 1).

After several days these deposits began to decompose, causing a foul smell and attracting flies. Pyura pachydermatina, the principal component of the deposit, is an animal, and the smell caused by its decomposition is extremely unpleasant. Removal of the deposits was extremely difficult as the "sea-tulip" stalks were attached to a bolus of shingle which considerably increased the weight of the deposits, and shingle washed ashore by the heavy seas had partly covered the material.

Eventually, bulldozers were used to push the beach deposits into the sea, where they were dispersed by wave and tidal action.

A similar occurrence took place in 1962 after a period of strong N.E. winds and these deposits were eventually dispersed by wave and tidal action.

After the 1968 occurrence it was decided that the Marine Department should carry out a survey to locate offshore 'weed' areas and assess Pyura densities so that suitable control measures for future use could be formulated.

The survey was carried out from 17 to 26 February 1969.

METHODSBoat Charter

The 32' long, diesel-powered "Delphis", owned by Mr J. Graham of Oamaru, was chartered for ten days. (Plate 1).

Diving

The original intention to carry out the survey by diving in areas where the main 'weed' beds were thought to lie was discarded due to nil visibility at the first five diving stations (Fig. 1).

The dredge (shown in Plate 2) was towed for three minutes at each station. The dredge mouth was 2' x 1' and the container was of 1" rigid steel mesh.

To obtain samples of the bottom sediments, a section of steel pipe 9" x 2" internal diameter, with one end sealed off, was attached to the bridle in front of the dredge.

The numbers, sizes, and attachment of the Pyura, and data on other species (Plate 3) and type of sediment in each dredge haul were recorded, together with the depth.

The position of the boat was fixed at each station by cross bearings on known land marks, a sextant being used when necessary.

Figure 1 shows the station positions (and a reference grid) in the inshore areas, and stations further offshore are shown in Figure 2.

RESULTS

Distribution and Density of Pyura

No Pyura were found at the diving stations.

The numbers of Pyura dredged at each station are shown in Figures 1 and 2. Pyura were widely distributed in the sample area, with some high concentrations within 2-3 nautical miles N.E. of Oamaru.

Very few Pyura were dredged close to the beach in water shallower than three fathoms, but more were present in 3-6 fathoms (Figure 1). There was no evidence that a large 'weed' bed extended north from the breakwater as previously believed.

The efficiency of the dredge is not known, but catches indicated that Pyura were sparsely distributed.

Most Pyura taken were fairly small, (average "head" length of 2" and stalk length of 8").

As some stations e.g. station 83, some small specimens less than 4" total length were dredged. At station 38 - a large clump of about 70 large (up to 19" total length) Pyura was dredged. The entwined stalks and cylindrical shape of the mass suggested that it had been rolling on the seabed (a 'tumbleweed' effect).

Attachment

Most dredged Pyura were single individuals, with the holdfast enclosing a ball of gravel and shingle. At some stations, (mainly to the north-east) Pyura were attached to the holdfasts, stalks and fronds of large, laminate, red algae. Very small Pyura were found attached to large stones, algae, and the stalks of larger Pyura.

Sediment

The sediment at each station is shown in Figures 1 and 2. From the shore out for about five cables the bottom was firm sand with a very sparse benthic epi-fauna. Further out, shingle and stones occurred and more Pyura were found on this substrate. The shingle and stones were mainly smooth, rounded greywacke, with few attached marine organisms other than Pyura and algae. The seabed was fairly level, without ridges or deep depressions. Mud occurred at some stations as shown.

Other Species

Little benthic fauna was dredged at most stations. Patches of the edible green mussel Perna canaliculus were found at stations 36, 41 and 55 and a few oysters, Ostrea lutaria, were also taken at some stations. Flesh quality of oysters and mussels was good, but most oyster shells were small and misshapen.

DISCUSSION

Fishermen stated that large Pyura are trawled in 8-15 fathoms to the north-east, east and south of the areas shown in Figures 1 and 2.

This suggests that large Pyura occur further out to sea than the area dredged during the survey.

The Pyura washed ashore in April 1968 were similar in size to those dredged, which suggests that they originated on the inshore areas rather than from the population of larger Pyura occurring offshore. During the survey small quantities of Pyura and algae were washed ashore after two days of fresh north-east winds.

The harbour at the southern end of the bay would collect any Pyura in shallow water dislodged by heavy seas and swept ashore by north-east winds. The largest 'weed' deposits on Oamaru Beach occurred in the first mile north of the harbour. During the April 1968 gales relatively small quantities of Pyura were washed ashore on the beach south of Oamaru.

CONCLUSIONS

The information available suggests that the Pyura and weed deposited on the Oamaru foreshore in April 1968 came from a wide area within the ten fathom line, the bulk of the material having originated from north-east of Oamaru, up to two to three miles out.

The possibility that there was originally a large 'bed' of Pyura close inshore cannot be entirely discounted, although survey data suggest that this was not the case.

The deposits were almost certainly caused by wave action during several days of unusually strong gales which dislodged the ascidians and weed in shallow water regions and deposited them on the beach.

RECOMMENDATIONS

Some suggestions for dealing with a future occurrence of the problem are examined as follows:

1. Prevention

It is doubtful if temporary barriers or nets, erected to prevent deposition of 'weed' on the shore, could withstand the weight of material under the influence of heavy seas. The cost, and other factors would also be prohibitive.

Removal of the offshore Pyura and weed by dredging operations would be impractical due to the wide distribution and low densities of Pyura and would also be expensive.

Cutters, such as that shown in Figure 3, towed at speed over the seabed, would sever the Pyura 'heads' from the 'stalks'. The buoyant 'heads', on floating to the surface, would be dispersed by offshore winds and possibly by the ebb tide, but if washed ashore would be more easily handled than whole Pyura attached to shingle. Cutting, if feasible, could be done regularly throughout the year.

2. Beach Deposits(a) Chemical Treatment

Consideration should be given to the use of chemicals to hasten the breakdown of the material, but the cost of treating large masses of 'weed' may be prohibitive. Chemical treatment would be more effective if the shore deposits were spread thinly over a wide area, thus exposing the maximum surface area to chemicals and the drying effects of sun and wind.

(b) Utilisation

The material might be useful as an agricultural fertiliser if handling problems could be overcome, but the infrequency of the deposits would probably make this impractical.

(c) Removal of Deposits

In view of the difficulties in handling Pyura attached to shingle, the most effective means of control may be:

(i) To anticipate deposits of Pyura and weed on the beaches after prolonged gale force easterly winds.

(ii) To push the deposits into the sea using bulldozers on a falling tide with an offshore wind, preferably before decomposition occurs.

(d) Future Investigations

If underwater visibility permits, a future diving survey would be of value to:

(i) Examine Pyura attachment, distribution and densities in different areas.

(ii) Assess sample dredge efficiency.

(iii) Attach coloured plastic tags to Pyura in different areas to indicate the origin of future beach deposits.

Dredging in areas further offshore would be useful to locate beds of mature Pyura, though local fishermen have offered to mark on the chart any Pyura areas discovered while fishing.

ACKNOWLEDGEMENTS

I wish to thank the following:

Mr J. Graham of Oamaru, owner-skipper of the "Delphis", and Mr K. Graham, for assistance during the survey.

Captain H.J. McLean, Oamaru Harbourmaster, for fixing the boat's position during the survey, and for providing useful background information.

Dr D. Eggleston, Fisheries Division, Marine Department, for criticism of the manuscript.

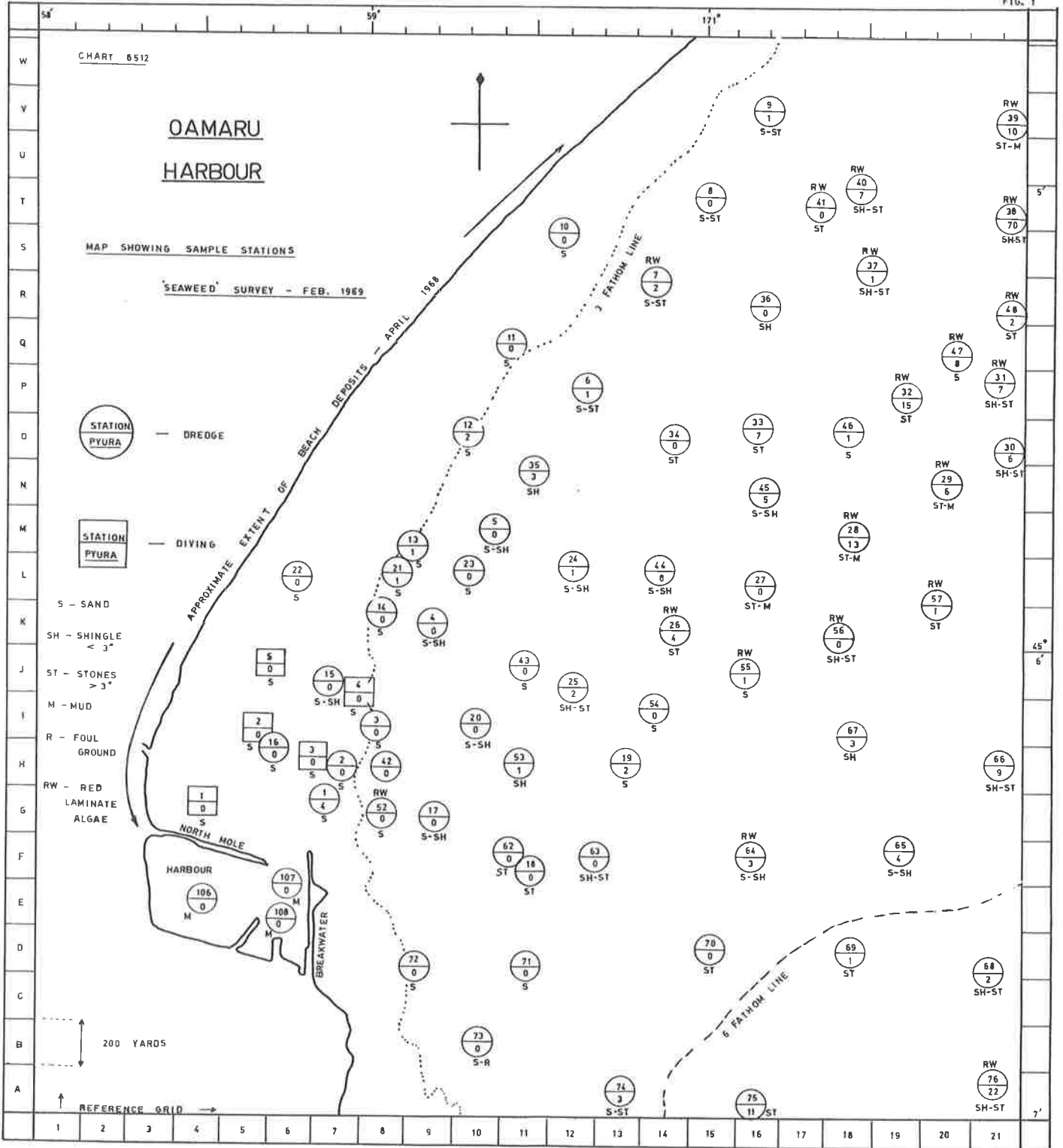




PLATE 1

Survey Vessel "Delphis"

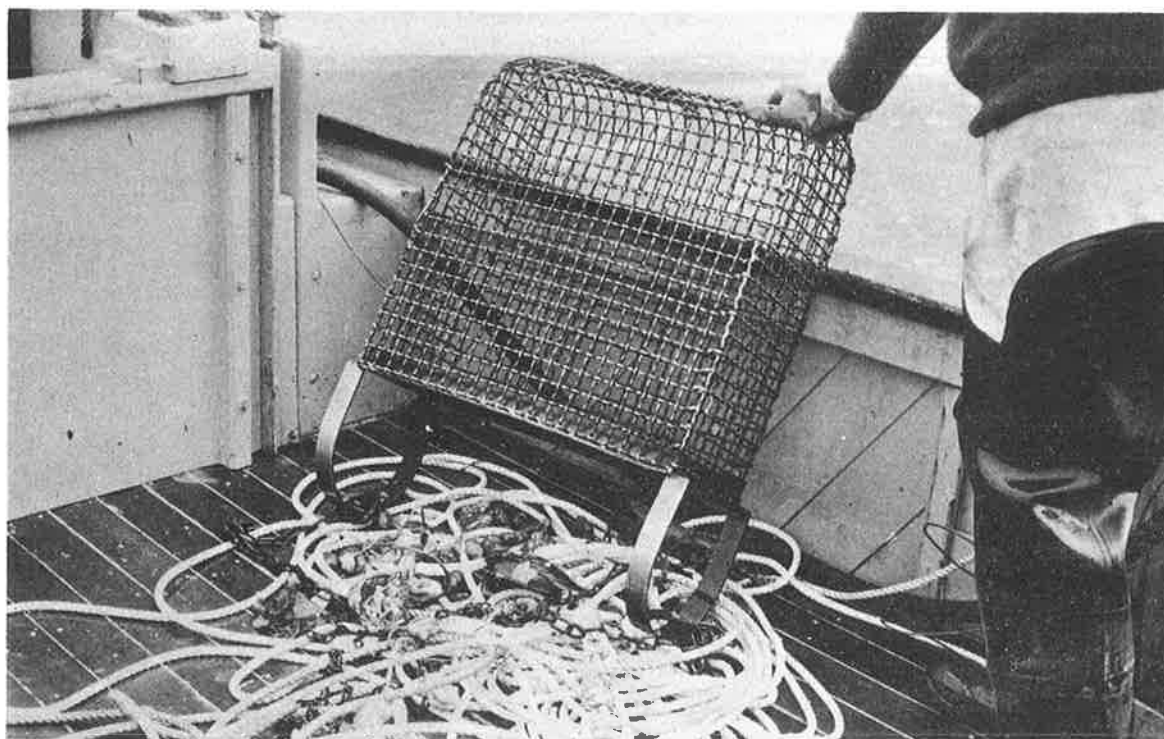


PLATE 2

Sample dredge and small catch

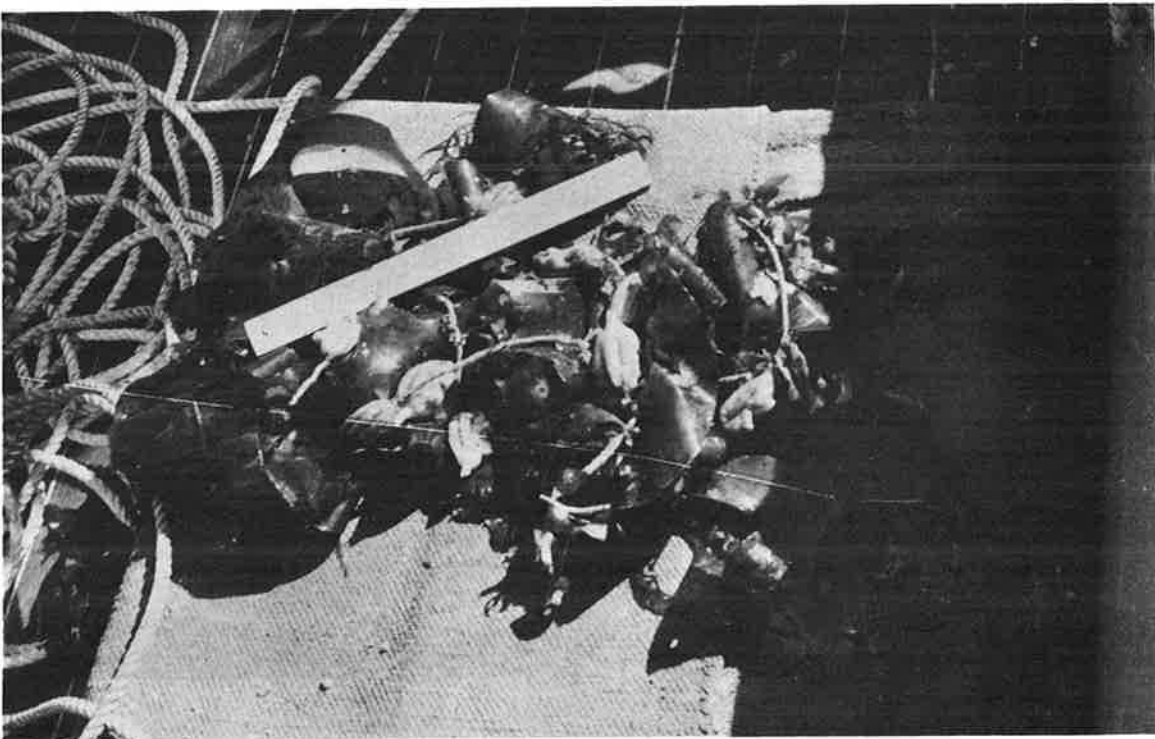
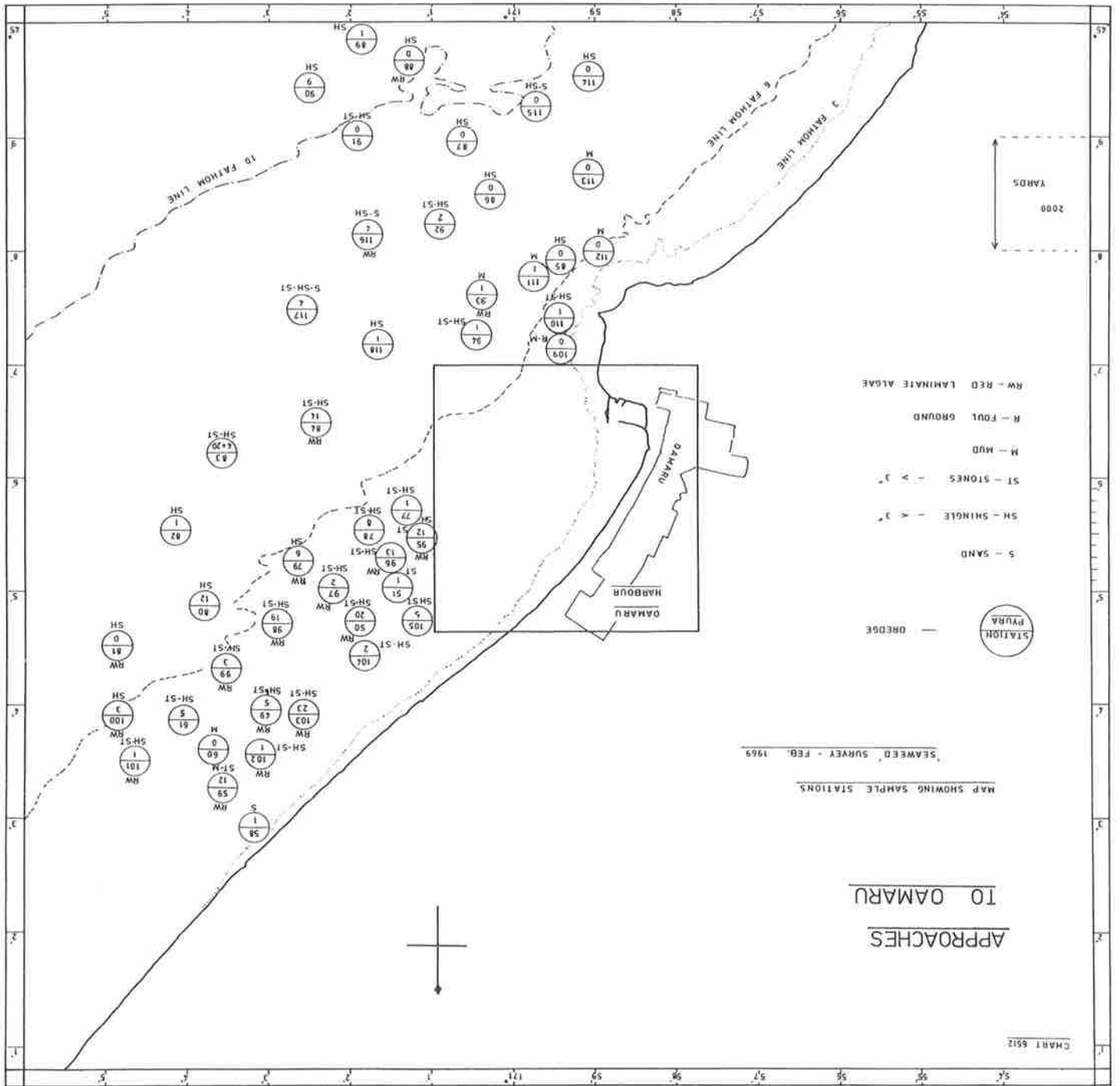
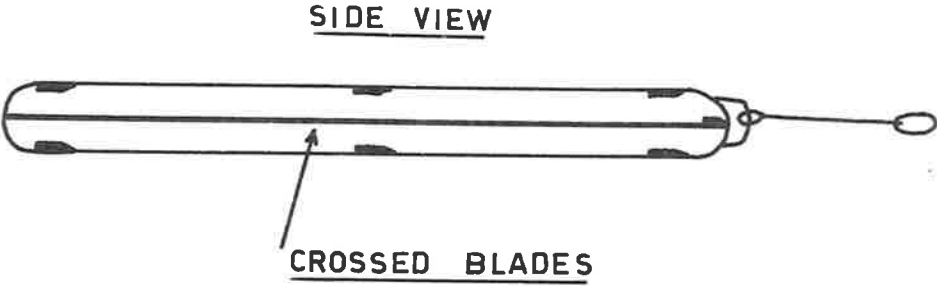


PLATE 3

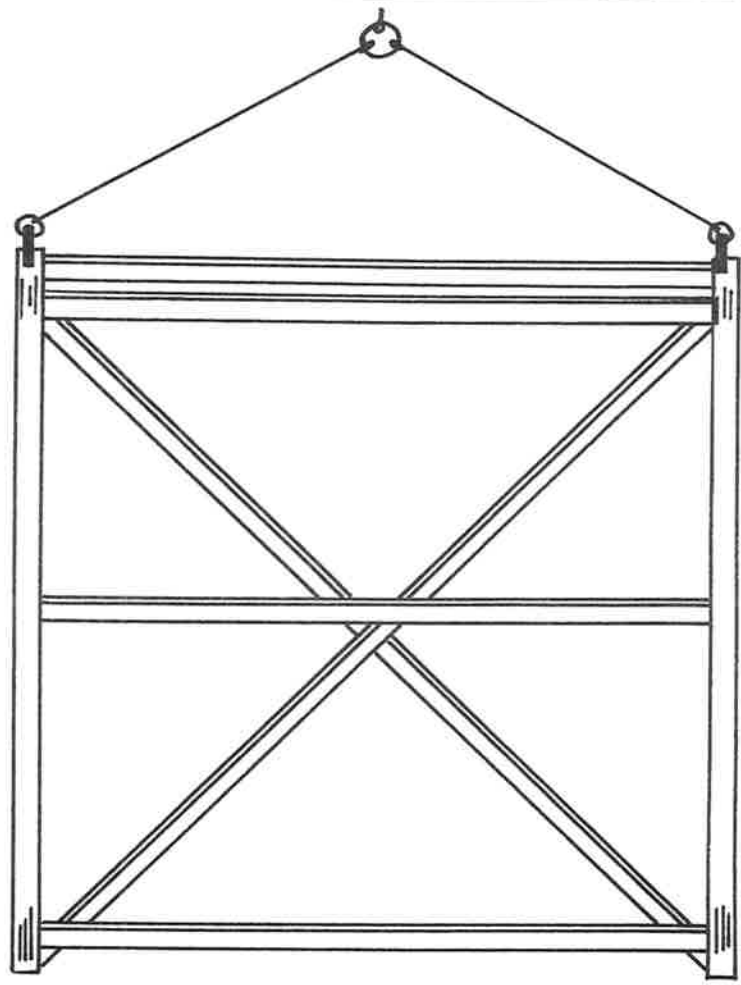
Typical small dredge catch at station 31
Pyura and red weed. 15" rule.



SUGGESTED DESIGN FOR A PYURA-WEED CUTTER



SCALE : 1 CM. = 1 FOOT



TOP OR BOTTOM VIEW

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