

the concentrations of pelagic fishes in the area around Nue, but the resources are thought to be small. The visit of SPC's skipjack tagging vessel Hatsutori Maru in 1980 may provide some information.

Nearly every Nuean considers himself a fisherman. This popular interest in fishing, plus the sound advice and leadership of the Fisheries Division, offers the best hope for increased catches in the near future.

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## REPORT ON A DEEP-WATER FISHERIES SURVEY IN THE NEW HEBRIDES (31 July - 4 August 1978)

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In October 1977, the ORSTOM<sup>1</sup> research vessel Vauban carried out a survey of deep-water fishery resources around the Torres Islands on behalf of SPC. From 31 July - 4 August 1978 a second cruise for SPC was made by the Vauban, this time to the central islands of the New Hebrides. Participating in this cruise were research scientists P. Fourmanoir and P. Rancurel of ORSTOM and R. Grandperrin, SPC Fisheries Adviser.

The initial intention was to carry out trial fishing with bottom longlines on deep-water sea mounts. These sea-mounts, isolated by great surrounding depths, are situated near the islands of Efate and Erromango. Three plateaus shown on the chart "New Hebrides Geological Survey" - ORSTOM (Efate - Erromango) were chosen for investigation. One of these (18°25'S, 168°30'E) is at a mean depth of 100 m with depths of 1000 m around it; the other two (18°12'S, 168°45'E and 18°50'S, 168°24'E) are more limited in area and have depths over them of 300 and 400 m. Another sea-mount (22°29'S, 168°03'E) marked on chart No. 4844 of the Marine Hydrographic Service was also to be investigated.

These sea-mounts, situated close to inhabited areas, were considered interesting not only biologically, but also from the practical aspect, as they could have significant potential for commercial fishing.

### EQUIPMENT

Three kinds of lines were used:

- (1) A standard longline consisting of a backbone (mainline) of 6 mm tarred rope, 120 m long, carrying a spliced eye every 2 m; 50 cm snoods of monofilament nylon or steel wire were clipped into the eyes at the time of shooting the line. Size 4 or

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5 circle hooks were used. Each end of the line had a 10 - 15 kg weight attached, and one end had a buoy line.

(2) Japanese type longline consisting of a backbone of 6 mm kuralon kept 20 m from the sea bed by 11 floats placed every 30 m; from these 20 m vertical nylon lines with 1 kg weights were attached. Four or five nylon snoods, 80 cm long with terminal hooks, were attached to each vertical line, starting 1 m from the bottom. This line is recommended for use in areas of uneven bottom.

The lack of 11 floats and their replacement by 4 1 floats made this line inefficient during trials carried out in 200 m depth off Efate.

(3) Vertical longlines. These consisted of a line buoyed at one end and kept in contact with the sea-bed by a chain at the other. The end of the line carried a series of steel wire snoods with No. 4 circle hooks attached.

## RESULTS

The sea-mounts at a depth of 390 m shown on the Hydrographic Service chart could not be located despite a zig-zag search lasting almost two hours. It would appear that their positions are doubtful.

A decision was taken to conduct a trial with the standard longline in 350 m on hard bottom off Undine Bay, to the north-west of Efate. Night fishing between 2100 and 0500 hours yielded an hourly catch of only a few small deep-water sharks (Centrophorus, Squalus). After 0600 these sharks were abruptly replaced (still in the same fishing spots) by the deep snappers Etelis oculatus and E. carbunculus. Considerable numbers of these were caught (23 on one 80-hook line).

The sea-mounts between Efate and Erromango were searched for and found on the second day of the cruise. Unfortunately unfavourable weather and the state of the sea near the sea-mounts did not permit any fishing. One line which was shot was carried away by the current and waves but was fortunately retrieved. The vessel was forced to return to a more sheltered fishing area to the north-west of Efate without carrying out any fishing.

A series of trials with the standard longlines and the Japanese longlines was made on a slope to the west of Moso Island, at depths of 200-450 m. Small deep-water sharks (the same kinds as at Undine Bay) were caught in large numbers through the night and up until dawn. The most common species caught at night, Centrophorus scalpratus, is notable for the large size of its squalene-rich liver. On the other hand no Etelis spp. were observed during the morning fishery.

It is interesting to note that numerous remains of skipjack, Katsuwonus pelamis, and of Decapterus were recorded from the stomachs of the small sharks caught. This shows that skipjack occurs on the bottom, and that this active fish has as one of its predators a small, apparently slow-moving shark. Hexanchus vitulus caught in the same depths also contained skipjack in their stomachs.

Fishing in shallower depths (200 m) by day, using the Japanese longline, yielded three species of Pristipomoides, (P. multidentis, P. flavipinnis, P. filamentosus) and two species of Paracaesio.

Deteriorating weather conditions obliged the vessel to return to the shelter of Emau Island, in Undine Bay, where a trench 400 m deep extends along the south-west coast. Lines fished on the edges of this trench in 350-385 m yielded numerous Etelis. The sea bottom was much more uneven and rocky than that to the south of Moso, which probably explains the different population.

In spite of the change to the programme because of weather this short exploratory cruise showed:

- (1) That there is an abundant population in rocky, uneven bottom areas of the two Etelis spp. caught during day fishing.
- (2) That there is a considerable population of Centrophorus scalpratus on both rocky and soft bottom areas, available to night fishing. A fishery for this species, as in Australia, could be directed to exploiting both its flesh and its liver oil (squalene).

The lines used in this survey were intentionally simple; they could be made up and used locally at a very low cost.

Table 1: Kinds and numbers of fishes caught

<u>Etelis oculatus</u>	17	<u>Mustelus manazo</u>	5
<u>Etelis carbunculus</u>	34	<u>Galeorhinus</u> sp.	2
<u>Centrophorus scalpratus</u>	50	<u>Hexanchus vitulus</u>	2
<u>Squalus megalops</u>	13	<u>Pristipomoides</u> spp	11
<u>Squalus</u> sp.	21	Others	9

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#### POPULATION ECOLOGY OF COMMERCIAL BECHE-DE-MER (ECHINODERMATA: HOLOTHURONDEA) IN FIJI

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#### DISTRIBUTION AND ABUNDANCE

Surveys were carried out by the author on several barrier reefs near Suva in order to learn more about the habitat requirements of commercial species of beche-de-mer. It was hoped in this way to understand why some reefs are rich in commercial beche-de-mer, whereas on other reefs, the commercial species are rare.

Methods: The survey was carried out by free-diving along the lagoon edge of the reefs between low-water mark and a depth of 10 m (mean water). Deeper areas were not examined because the study was designed to survey beche-de-mer stocks accessible to local villagers, who lack formal diver training and are usually unable to dive deeper than 5 m.