

1971/18

43

DEPARTMENT OF FISHERIES AND FAUNA - WESTERN AUSTRALIA

REPORT TO FISHING INDUSTRY RESEARCH COMMITTEE

Project: Preliminary Investigation of the Rock Lobster Potential of the South Coast of Western Australia between Point Malcolm and Eucla.

Stage I - A survey to determine the extent of suitable rock lobster habitat, between the two positions mentioned, to distances of twenty miles offshore.

Subsequent to the time when application was made for funds to assist in the investigation, further consideration was given to the importance of the need for high accuracy position fixing in relation to bottom topography and coastline; as a result of this consideration the decision was made to alter the original plan of operations with respect to purchase of equipment to be used for position fixing and echo sounding by Departmental officers, and this section of the work was subcontracted to a highly qualified firm of marine surveyors. (Amalgamated Decca Surveys Pty. Ltd. was the firm which was awarded the contract from the list of tenderers).

Hire of the professional services, instruments and gear of the subcontractor increased the initial estimated cost of the investigation from \$16,556 to \$24,000.

The Fishing Industry Research Trust Account contributed \$11,056 toward the cost of the investigation.

Operations Outline: The chartered vessel "Ca-Den" LFB G.420 was outfitted, prior to the commencement of hire, by Decca Surveys Pty. Ltd. with transit sonar, Atlas Survey Sounder and "Hi Fix" positioning equipment. The vessel departed Fremantle on 10/10/1971 and arrived in Esperance on 12/10/71. The actual survey commenced from Point Dempster (Israelite Bay) on 15/10/71, and completed on 30/10/71. Vessel charter ceased on 4/11/71.

Fifty five (55) **traverse lines** were worked; 28 at right angles to the coast to 20 miles offshore and 27, of 10 miles length, parallel to the coast (Fig)

The vessel's position was plotted every 5 minutes whilst on traverse and the echo sounding chart was marked and annotated appropriately at each time interval

Two systems of position fixing were used because of the configuration of the coastline - (a) the hyperbolic system, covering the area from Point Dempster to Twilight Cove (b) the two range system, covering the area from Twilight Cove to Eucla.

The ship's transceiver was not used when operating in the latter system because (1) interference due to High Fix transmissions which made communication impossible and (2) very expensive delays to recover "lane count" marker buoys would have been necessary if the Hi-Fix transmitter had been shut down and lane count lost.

Bottom samples were collected with a Van Veen grab, at three positions along the offshore traverses - inshore, 10 miles and 20 miles offshore. These samples were analysed in the laboratories of the Geology Department of the University of Western Australia.

Surface temperature was measured and a salinity sample was collected at most of the bottom sampling stations.

One fishing test, using 20 rock lobster pots, with a high protein solubles

product from whale reduction used as bait, was made in a position about 12 miles east of Twilight Cove in about $4\frac{1}{2}$ fathoms of water.

All traverses were terminated within one or two miles of the coast except in the area between longitude $128^{\circ} 20'$ E and longitude $129^{\circ} 00'$ E where longshore traverse lines paralleled the coast at distances ranging between three and five miles in observance of warnings given in Australia Pilot No.1.

Amalgamated Decca Surveys Pty. Ltd. fulfilled the terms of the contract and the Department has been supplied with complete, legible, neat and permanent sets of original field notes, records of observation, computer print outs of data and final cartographic charts of the area surveyed.

The charts are scaled at 1:300,000 at mid latitude $29^{\circ} 75'S$.

The coastline shown in these charts is copied from charts AUS 339, 340A, 340B and is more accurately positioned than in the precedent Admiralty Chart 1059.

Soundings have not been corrected for tidal variations which, in this area range from 0.2 metres to 1.5 metres.

RESULTS

Bottom Topography -

Profiling of the plotted surveyed depths ^(fig. 2) shows, in general, that the area surveyed is monotonously "flat" in all regions except:

(a) At the western end of the surveyed area where along traverses 1 and 3 the uneven bottom is apparently associated with the Eastern Group islands complex.

(b) A small area along traverse 8 centred at latitude $33^{\circ} 03.5'S$ and longitude $124^{\circ} 16.5'E$ which appears to be a smooth ridge 5-7 metres high and which trends seaward for an unknown distance.

(c) The coastwise area between longitude $126^{\circ}E$ and $128^{\circ}E$ where between 4-5 miles offshore the bottom slope attains a gradient varying from 1:463 (line 43) to 1:92 (line 25) and then flattens to a gradient of about 1:3000. However these steeper gradients were uniform and in sounder trace detail showed no irregularity in bottom contour.

Bottom Samples -

Detailed examination of the bottom samples is in progress.

On-board macroscopic examination of samples collected indicates that much of the area surveyed is composed of hard-compacted fine sand. Some samples showed coarse-grained loosely compacted sand with small live bivalves and occasionally there were samples with fine coral growth, broken shell and sponge.

No differentiation of bottom type was discernable on the sounder chart between the 30KHz and 240KHz signals during sampling operations, indicating a well compacted bottom with little or no silt overlay.

One casual observation only was made on the substrate in shallow water (about 2 metres and less) at a position approximately 12 miles east of Twilight Cove (longitude $126^{\circ} 02' E$). The bottom was reported to be partially covered by flat limestone rocks of various sizes with some growth of unidentified weed.

Surface Temperatures and Salinities -

Surface temperatures ranged between $14.9^{\circ}C$ and $17.7^{\circ}C$, and salinity values ranged between 35.7‰ and 36.3‰. The salinity values indicate a belt of high salinity water lying near to the coast and appeared to be increasing in width at the eastern end of the area surveyed. These high values are similar to those

found by C.S.I.R.O. Division of Fisheries and Oceanography on cruises through this area in previous years.

Fishing Test -

The test was carried out during the period when changeover from the hyperbolic to two range mode systems position fixing was effected.

This test was made in a position about 12 miles east of Twilight Cove where the water depth was about 9 metres. The pots were baited with a whale "soluble" product and were set where the bottom appears to be uneven. The pots were lifted after 48 hours and no rock lobsters were caught. All bait had been leached from the bait containers.

No further fishing tests were attempted because -

- (a) no ground, which could be considered likely to form rock lobster habitat was seen on the sounder.
- (b) weather conditions were poor.
- (c) budget limits were being approached.

Fish Schools -

One hundred and eleven traces of fish schools were noted on the sounder rolls used. This is a minimum number because phasing of the echo sounder on to greater depth scales prevented the near surface schools from being recorded.

CONCLUSIONS

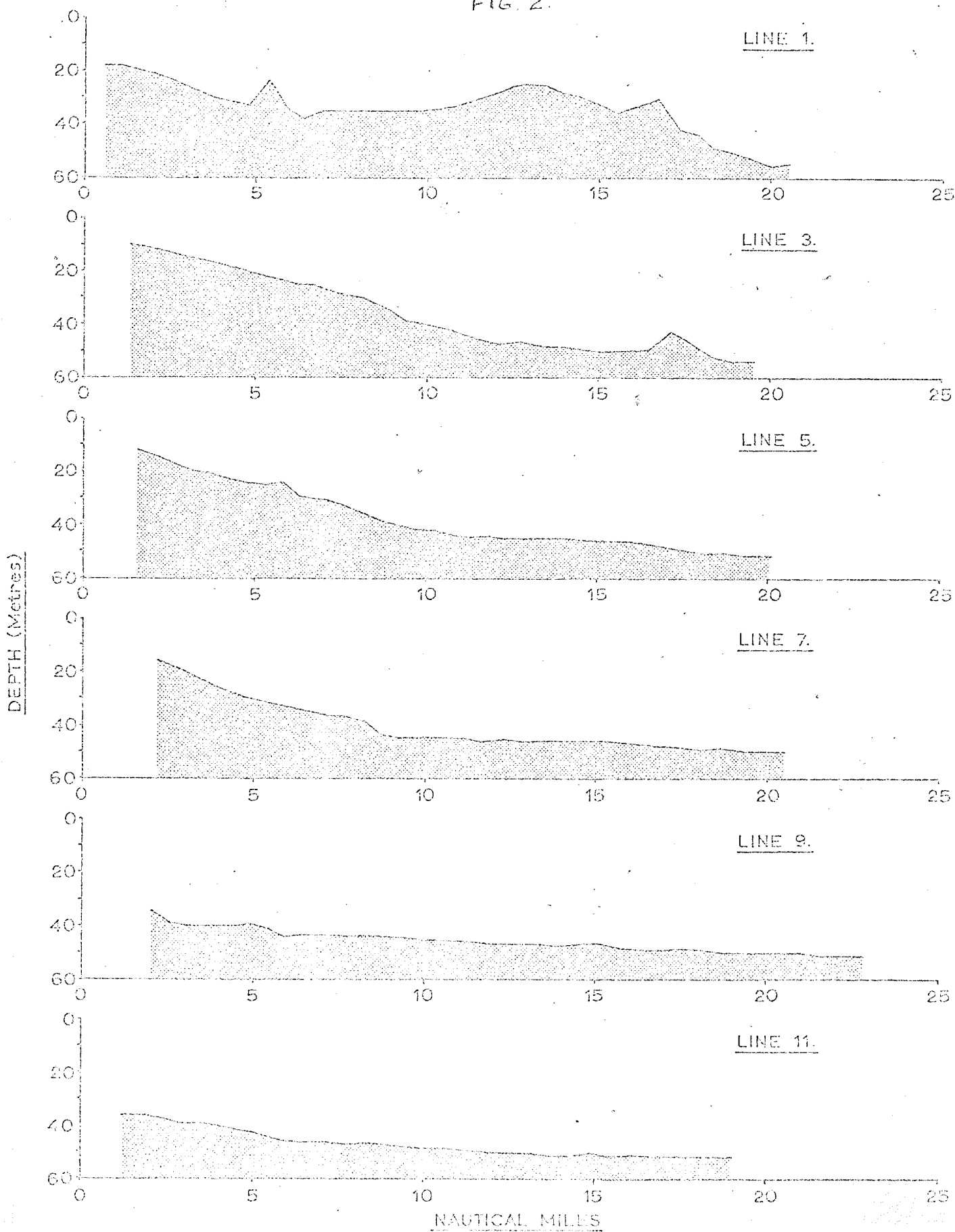
- (1) The survey showed that in this area there was limited ground which may form suitable habitat for southern crayfish. This ground lies to the north of the Eastern Group islands.

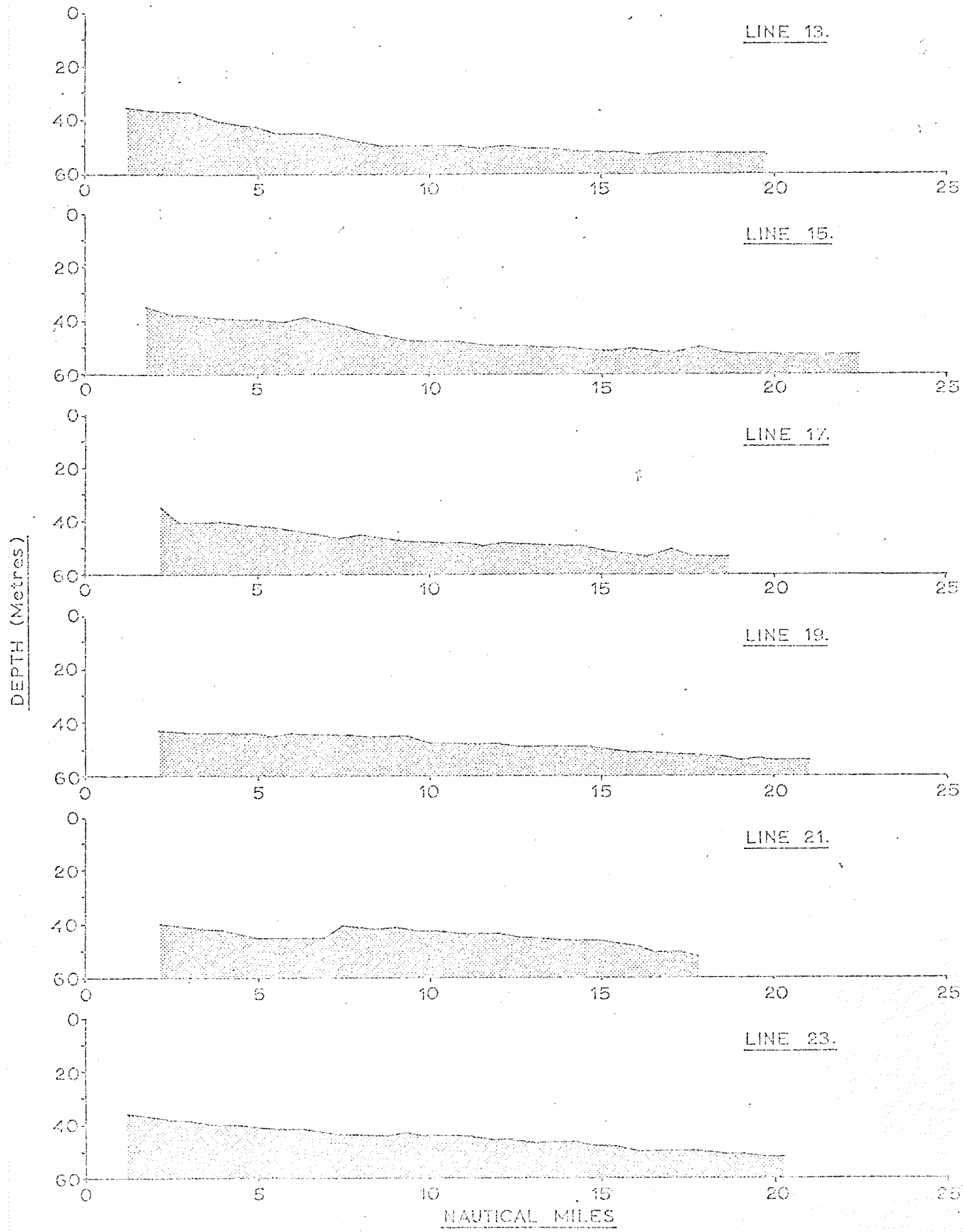
It is possible that the unsurveyed area from Twilight Cove to Eucla (i.e. within one to two miles of the coast) may have a habitat suitable for southern rock lobsters

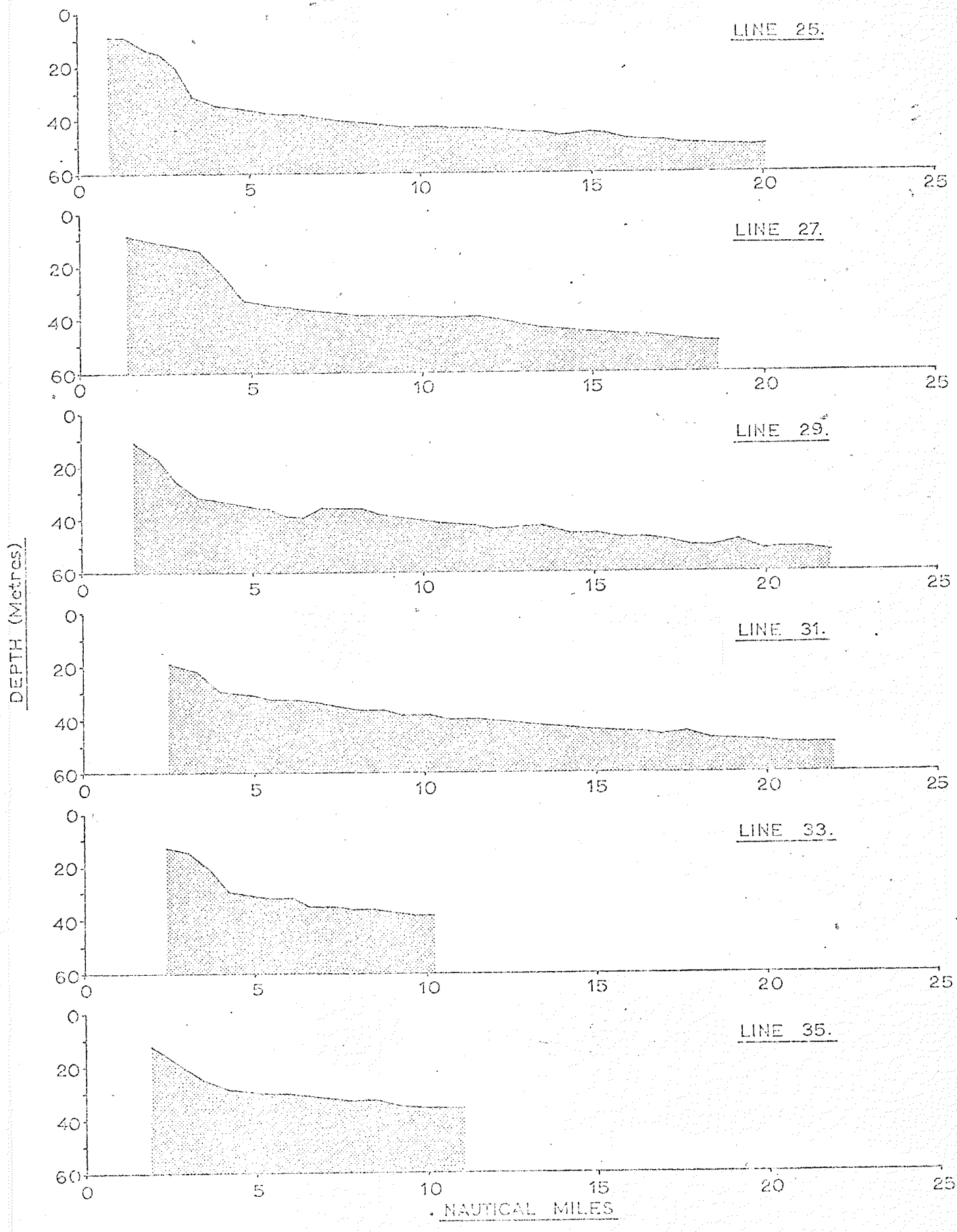
- (2) Practically all the area except that mentioned in (1) appears to be trawlable.

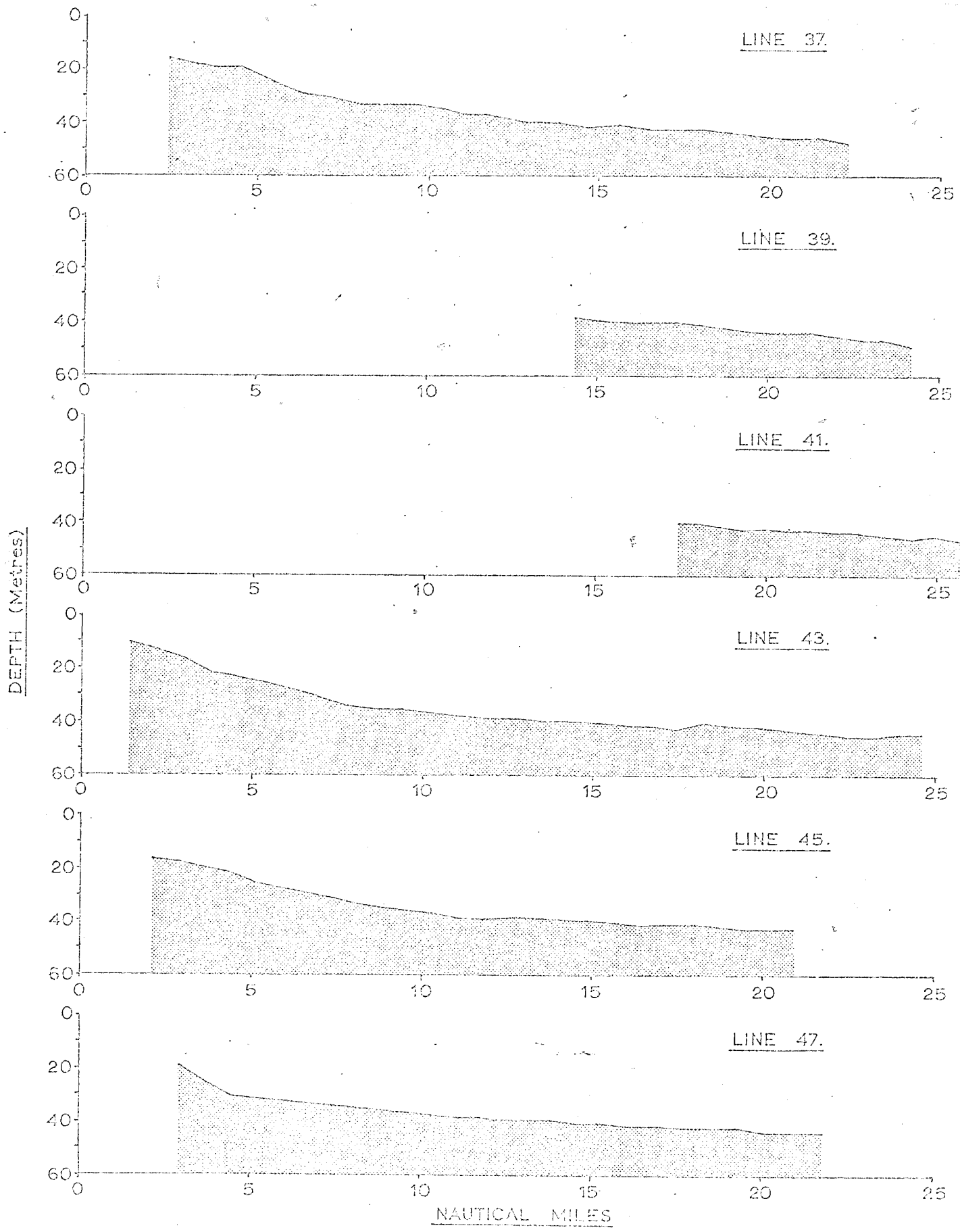
BOTTOM PROFILES

FIG. 2.

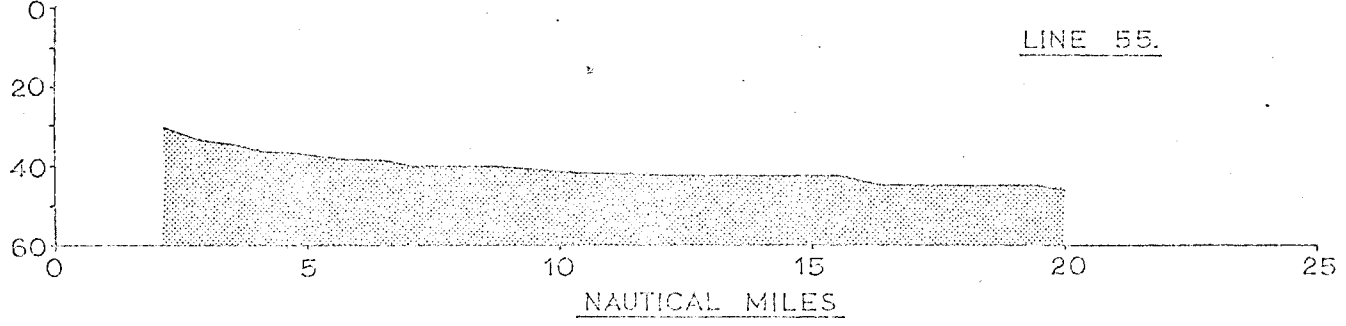
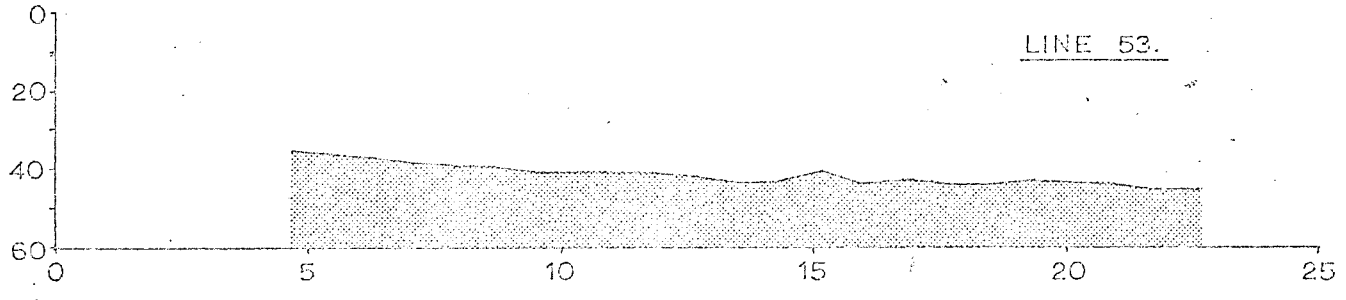
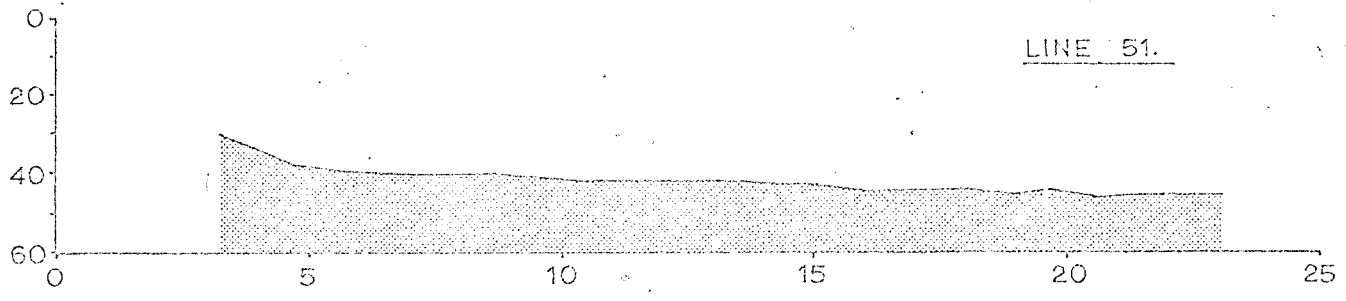
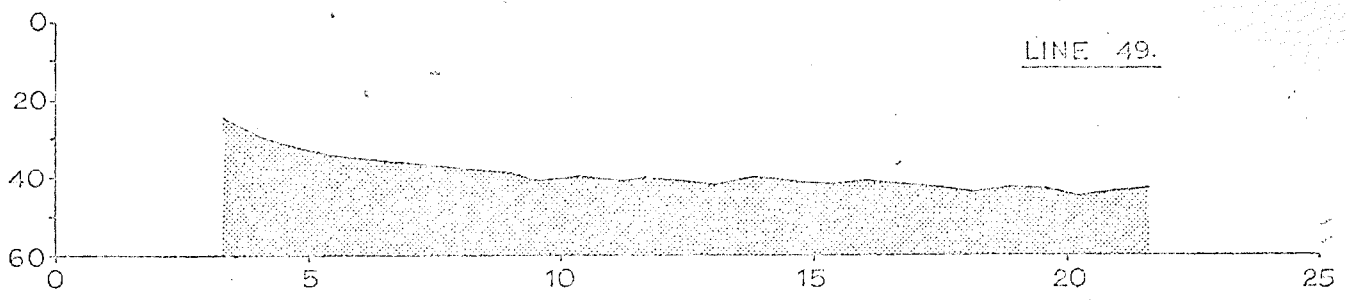




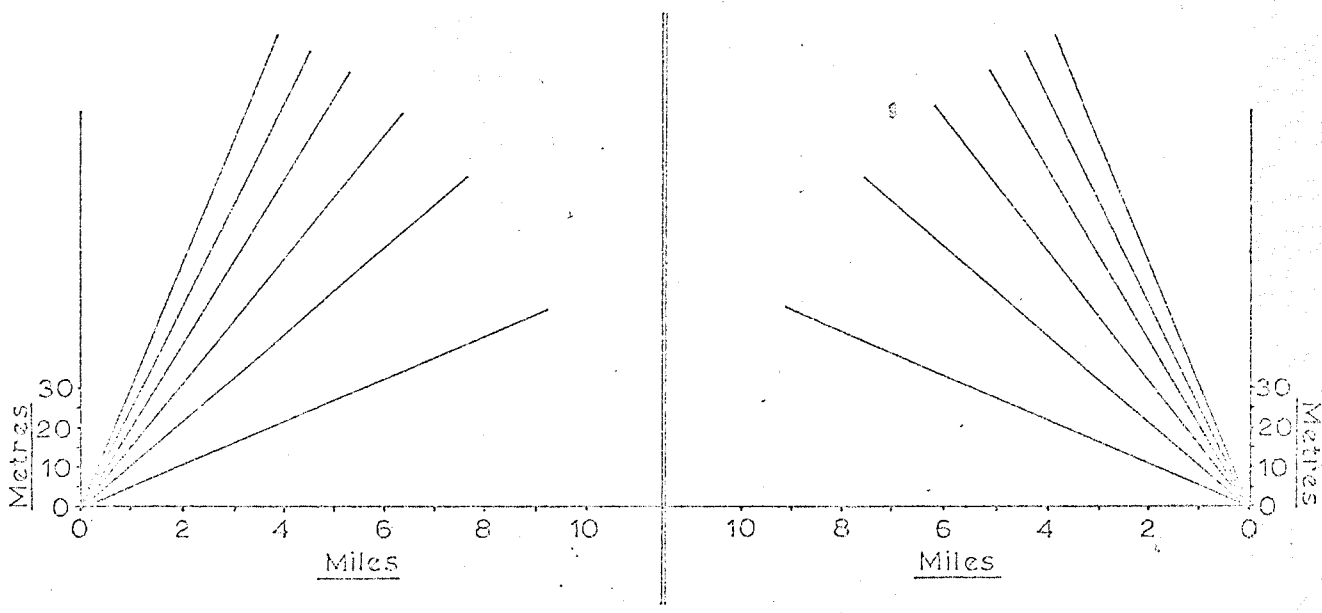




DEPTH (Metres)



Slope Scale



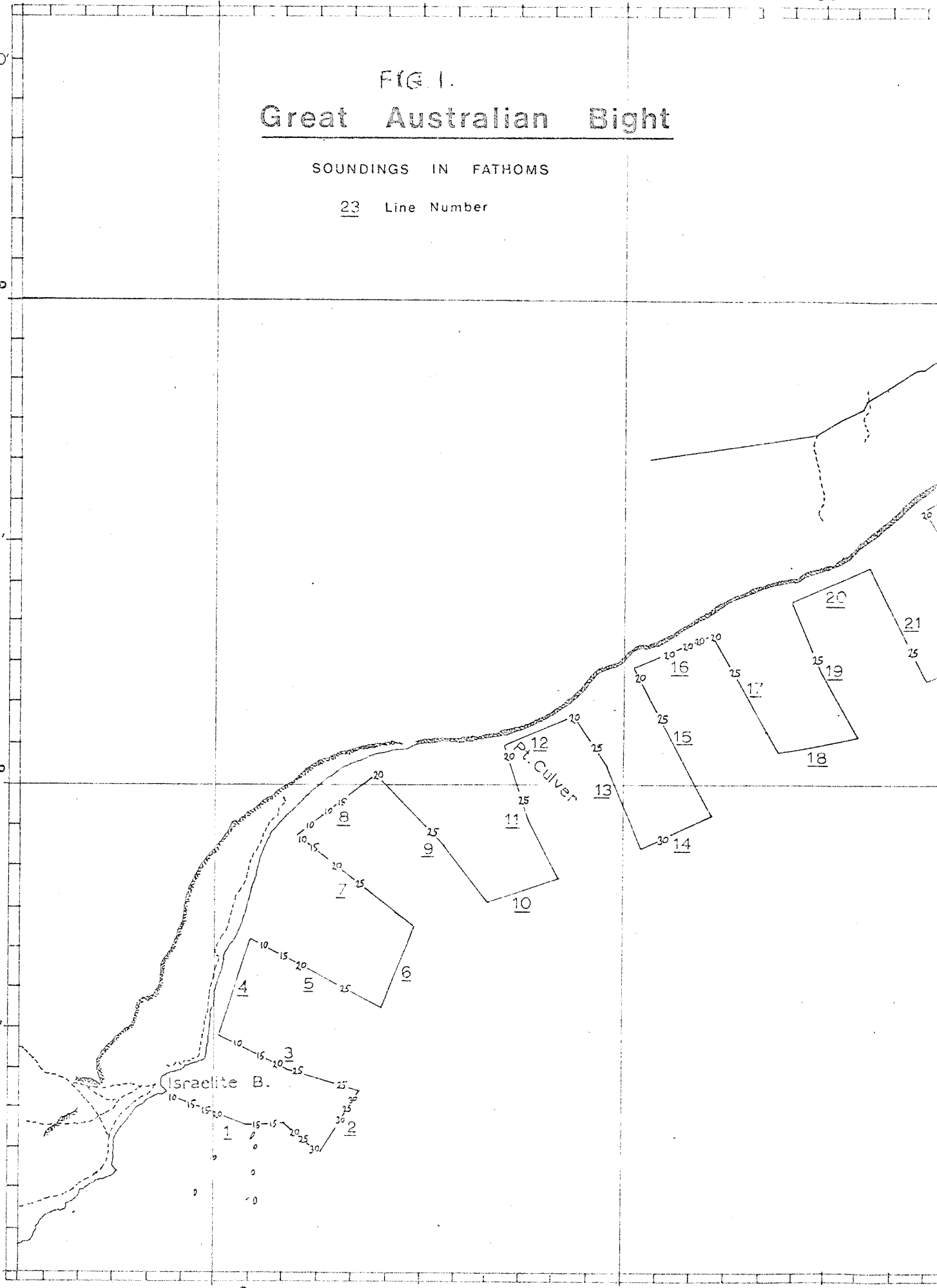
124° 30' 125° 30'

FIG. 1. Great Australian Bight

SOUNDINGS IN FATHOMS

23 Line Number

30'
32°
30'
33°
30'



124° 30' 125° 30'

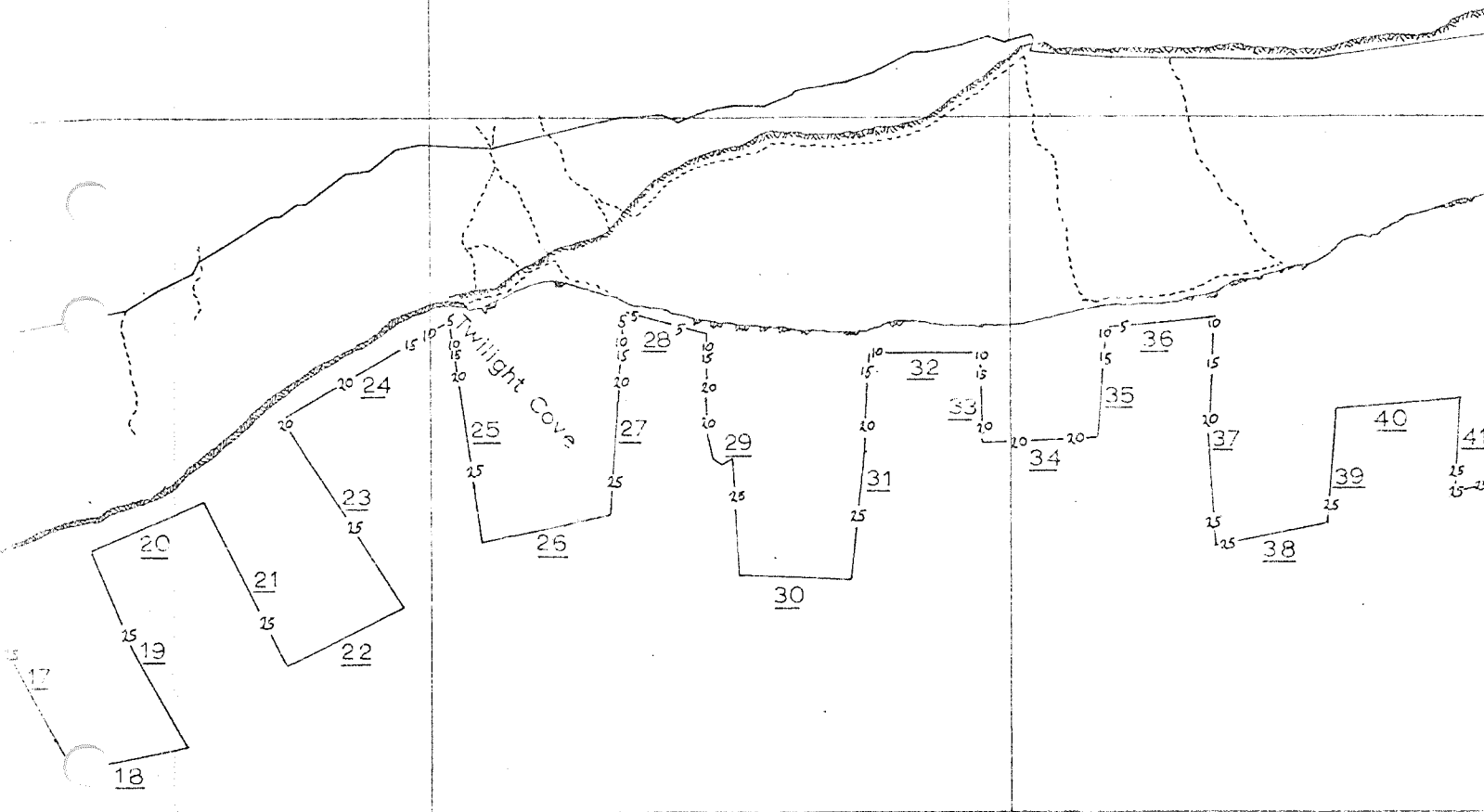
30'

126°

30'

127°

30'



30'

126°

30'

127°

30'

