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REPORT ON BATHYMETRIC SURVEY OF NEARSHORE ZONE, THE SOUTH END OF LAKE TE ANAU

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INTRODUCTION

From 22-29 April 1970 a detailed survey of the lake edge from Lagoon Point on the east shore around the south end to Brod Bay on the west shore, was carried out.

EQUIPMENT AND METHOD

Using a 14ft clinker built wooden boat powered by a 5 h.p. outboard motor, traverse lines were run out at right angles to the general line of the shore.

From aerial photographs a reference object was first chosen and described for each line and the distance from this to the shore line determined. The boat then proceeded on a known bearing out from the shore. Lead line soundings to the nearest one-quarter foot were taken at one-quarter chain intervals along the traverse until a depth of 20 feet was reached.

As tension was kept on the line from the boat to the shore, the boat moved at very slow speed, this and the clarity of the water (down to about 25 ft) made it possible to note the bottom cover as the boat moved out from the shore.

LAKE LEVEL

During the survey the lake level rose from 662.4 ft a.s.l. Deep Cove datum, to 664.0 ft a.s.l. and corrections for level variations were made twice daily. The

Table 1. Area in acres below 663.0 ft (average lake level) and 650.0 ft or 653.6 ft contours.

| Sheet No. | 663.0 ft - 650.0 ft | 663.0 ft - 653.6 ft |
|-----------|---------------------|---------------------|
| 1 | 46.5 | 38.0 |
| 2 | 32.1 | 27.4 |
| 3 | 143.0 | 129.9 |
| 4 | 75.4 | 65.8 |
| 5 | 20.8 | 18.3 |
| | <u>317.8</u> | <u>279.4</u> |
| Totals | 320 acres | 280 acres |

object of the survey was to determine the 653.6 ft level, the depth of this contour varying between 8.8 ft on 21 April 1970 and 10.4 ft on 29 April 1970.

SOUNDING TRAVERSES

From Lagoon Point to Tui Bay on the east side of the lake adjacent to Te Anau town, traverses from the shore were run out at 4-5-chain intervals. From Tui Bay around the south end to the Waiau River, traverses were run at intervals of 10-12 chains. In this area the 10 ft contour was up to 22 chains from the shore with many dangerous rocks close to the surface. In anything but perfectly calm weather the sandy mud of the bottom becomes disturbed making these dangers to a small boat impossible to see.

On the west side of the lake from the mouth of the Waiau River to the north end of Dock Bay traverses were run at 6-8-chain intervals. North from Dock Bay to Brod Bay, because of the rocky nature of the shore causing difficulty in working a small boat close inshore, the traverse lines were spread to intervals of 10-12 chains to suit clear areas of shore line.

Several traverses were made north of Brod Bay on the west side and north of Lagoon Point on the east side.

BOTTOM SAMPLING

Eight representative bottom samples were obtained on the east side from Lagoon Point to Tui Bay and five from the south side. Six samples were obtained on the west shore. On any one traverse the nature of the bottom often changed up to three times and the bottom descriptions best indicate the nature of the bottom cover.

Figs 1-5. Lake Te Anau shoreline survey 22-29 April 1970. Sketch outline. Lake shore as shown is the approximate outline at average lake level (663.0 ft a.s.l.). Terrestrial detail is approximate only and is from aerial photography and NZMS1 sheets S149/3 and S140/9. All heights above sea level are in terms of Deep Cove Datum. The grid shown is the National Yard Grid. Contours shown : 660.0 ft, 655.0 ft, 653.6 ft and 650.0 ft a.s.l. Sounding traverses shown by dotted lines (.....) and numbered. Key to bottom cover : S sand; g gravel; m mud; b boulders (small); b/m boulders (medium); B boulders (large); w weed; patches of weed, sand etc. w/p; s/p.

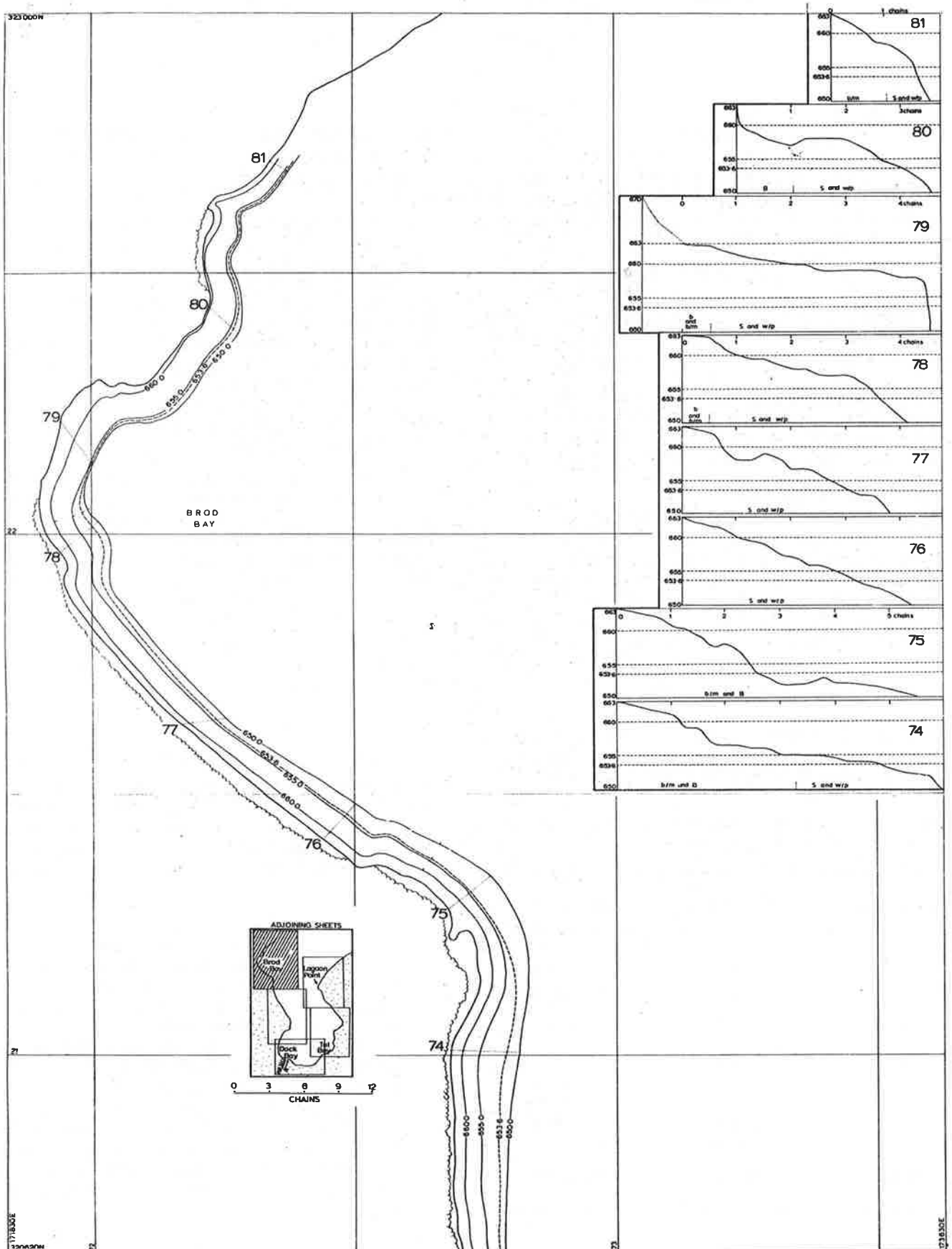


Fig. 1. Lake Te Anau sheet 1.

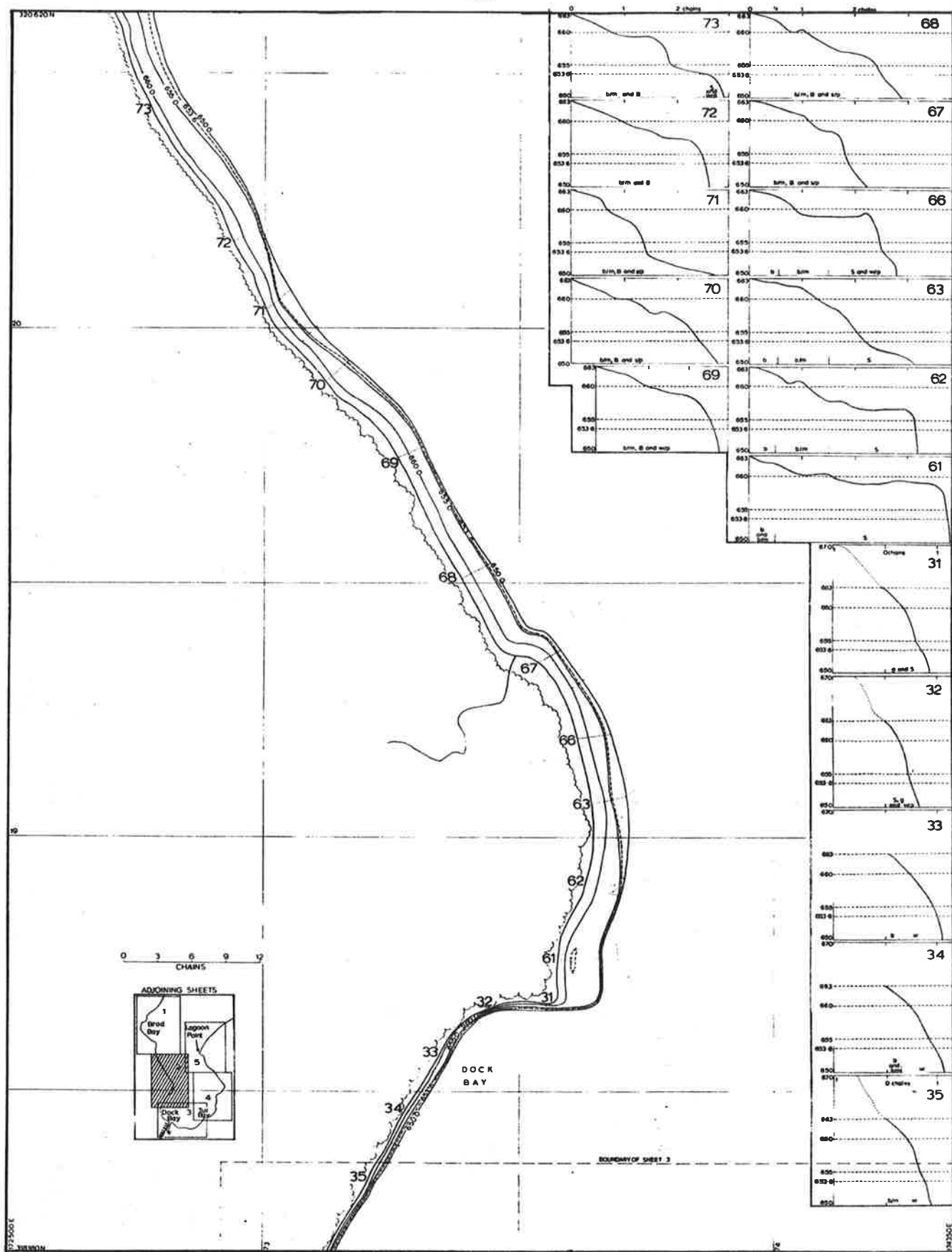


Fig. 2. Lake Te Anau sheet 2.

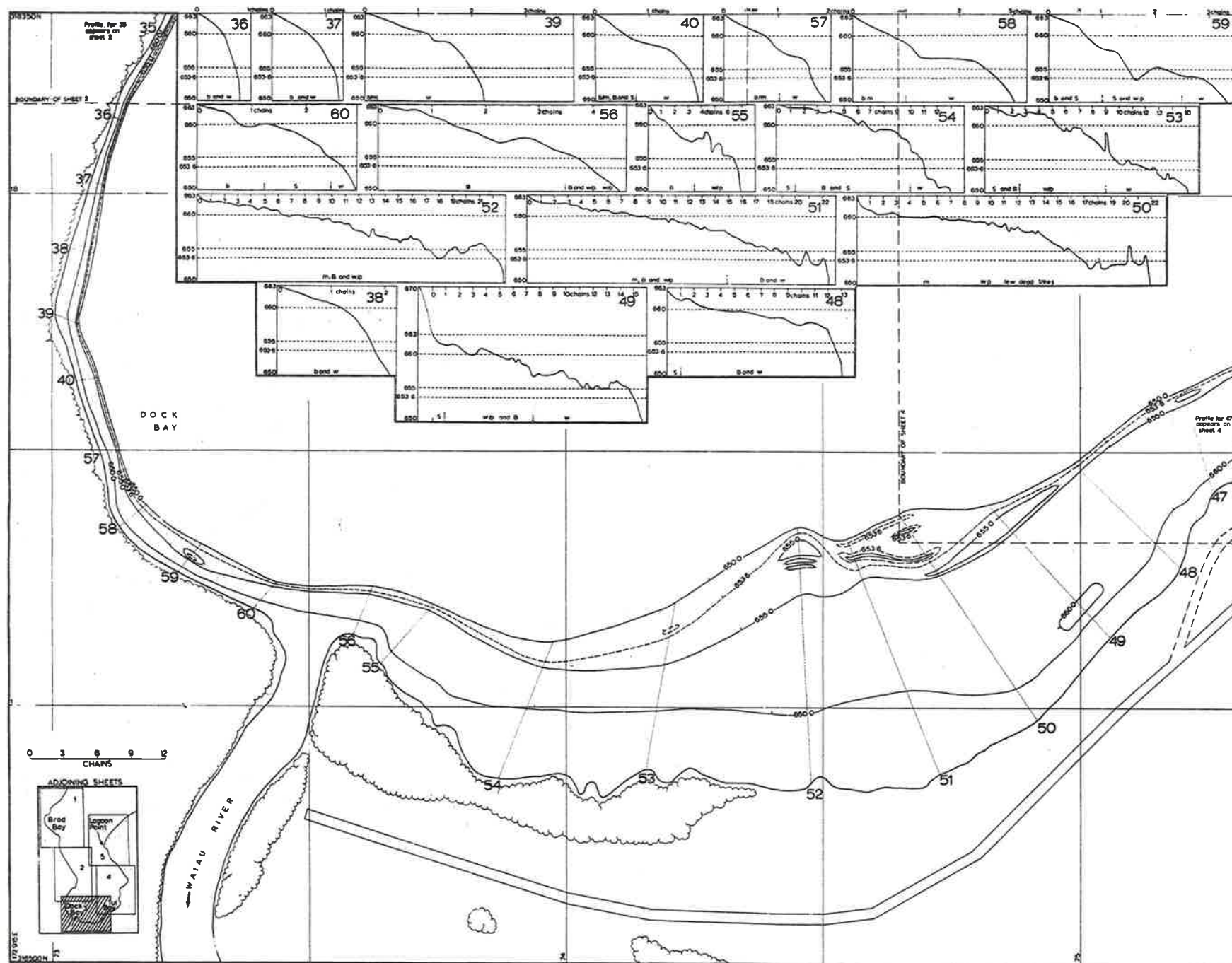


Fig. 3. Lake Te Anau sheet 3.



10

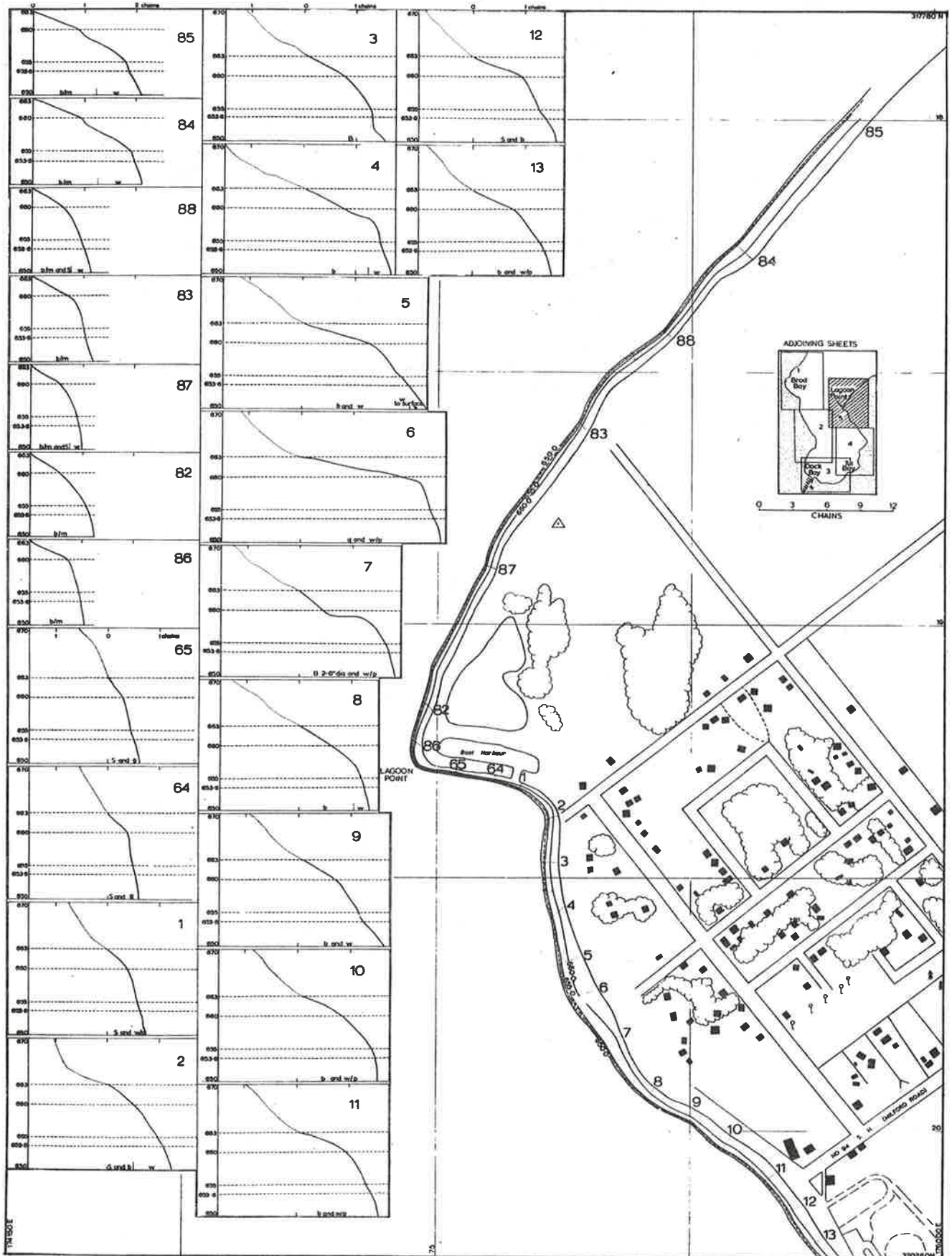


Fig. 5. Lake Te Anau sheet 5.

RESULTS

Location of Contours

The approximate location of the 663.0 ft a.s.l. shore line, the 653.6 ft contour, and the 655.0 ft and 650.0 ft contours are shown on five sheets (Figs 1-5).

Underwater Slopes

The underwater marginal gradients from 663.0 ft to 650.0 ft can be placed in three classes -

- (a) Steep - from 70 chains north of Lagoon Point to 20 chains south of Fiordland National Park Headquarters on the eastern shore (the north end of Tui Bay).

From 30 chains north of Waiau River to north end of Dock Bay on the western shore.

- (b) Intermediate - from north end of Dock Bay to north end of Brod Bay.

From Waiau River for 30 chains north of this point (i.e. the remain-western shore).

- (c) Low - the southern shore. From Waiau River to traverse 26 at north end of Tui Bay.

The underwater slope is benched above 660.0 ft and steepens sharply below this level. The variation in width of classes (a) and (b) is dependent on the width of this sloping bench.

The marginal slopes are steepest overall along the length of the Boat Harbour and off the beach at the north end of Dock Bay.

The underwater bench at the southern end extends down to 655.0 ft and the bench is significantly wider (approximately 20 chains).

Areas

The total area that would be exposed between 663.0 ft and 650.0 ft from traverses 85 to 81 is 320 acres. Similarly the total area to 653.6 ft is 280 acres (Table 1).

Table 2. Area in acres which would be exposed in each class of underwater gradient.

| Class | 663.0 ft - 650.0 ft | 663.0 ft - 653.6 ft |
|-------|---------------------|---------------------|
| a | 37 | 33 |
| b | 86 | 73 |
| c | 197 | 174 |
| | <u>320 acres</u> | <u>280 acres</u> |

The total areas exposed to 650.0 ft and 653.6 ft in the three gradient classes are shown in Table 2.

Nature of Bottom

Bottom cover from 70 chains north of Lagoon Point to the north end of Tui Bay on the east side is predominantly small to medium size boulders with weed patches. The weed cover is greatest at distances of over one chain from shore. There is sand and shingle cover off the Boat Harbour and off Steamer Beach (lines 22-25).

The south shore bottom cover from the north end of Tui Bay to the Waiau River is sandy mud with many large boulders out to about 10 chains from shore and weed from this point to the 650.0 ft contour.

On the west shore, bottom cover in Dock Bay and north to Brod Bay is small, medium and large boulders and sand patches with short weed beds which occur mainly at the outer ends of the lines. Bottom cover off the beaches at the north end of Dock Bay and at Brod Bay is sand and shingle with weed patches at the outer ends of the lines.

ACKNOWLEDGMENTS

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