



## LAKE EYRE NORTH

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Lake Eyre North occupies an area of 8430 km<sup>2</sup> and can contain 27.7 km<sup>3</sup> of water at —9.5 m AHD and an average depth of 3.3 m. The deepest region of Lake Eyre North is the eastern part of Belt Bay in which bottom levels just deeper than —15.2 m AHD were found - the lowest point on the Australian continent. The floor of the Lake is very flat with bottom slopes in the order of  $2 \times 10^{-5}$ , so the definition of the exact location is rather difficult. The deepest points of Madigan Gulf and Jackboot Bay are —15.2 m and —15.0 m AHD respectively.

The easily recognisable features include the north-south Warburton Groove, 5 km wide and up to 0.6 m deep, and the 3 km wide and 0.2 m deep Kalaweerina Groove, originating at the mouth of Warburton and Kalaweerina creeks, and the Cooper Groove running from the mouth of the Cooper Creek to the north of Brooks Island. Recent satellite photographs reveal a considerable degree of complexity of the Lake Eyre bottom surface, with many probably short-lived alluvial features carved by major or local inflows.

Dulhunty (1982) distinguishes three major zones in Lake Eyre North: *arid saline playa environment* covering the northern two-thirds of the bed; *arid terminal salina environment with hard salt crust* in the southern part; and a 10-15 km wide east-west *slush zone* extending 80 km across the full width of the Lake.

Evidence from the western side of Lake Eyre suggests that the present salina depression is a structural feature formed by downfaulting in the earth's surface about 30 000 years ago which blocked the outlet to the sea. The western margin of the Lake bed is a steep escarpment which is still seismically active, and springs occur along north-south lines in the Lake bed, presumably marking fault zones. About 5 m of sediment have been deposited in the Lake bed since this downfaulting,

and as the climate became more arid, the finer sediments were blown off the Lake surface to form the dunes of the Simpson Desert (Twidale, 1975).

The shores of the Lake are well defined and consist of sand dunes, cliffs of eroded gypseous loam or low rocky escarpments. Dulhunty (1983) reports the occurrence of large sand mounds, 30-48 m high and 1-2.5 km wide along the northern shores, from Koorakarina Creek to Cooper Creek. Bye (1980) notes that the south-eastern coastline, which consists of sand cliffs, is being rapidly cut back, with an erosion rate in the order of 5 m per flooding.

Flanking the Lake on the east and north are generally north-south trending, parallel sand dunes of the Tirari and Simpson deserts. The country to the west is more diversified, and is composed of gibber flats, low hills and a few large sandy ephemeral streams. To the south, gibber plains give way to dune country as the Lake is approached.

A salt crust up to 460 mm thick (Dulhunty, 1977) covers much of Madigan Gulf and Jackboot and Belt bays during dry periods. Beneath the salt crust, groundwater and sediment combine to form muds which have the consistency of thick soup. The 2500 km<sup>2</sup> of crust is virtually floating on this slush (Dulhunty R., 1975). Most of the other small playas have only a thin crust of salt and gypsum covering their surface. The 400 million tonnes of salt deposited in the Lake (Bonython, 1955), equivalent to 80 years of salt production in Australia, dissolves totally in time of major inflows (Dulhunty, 1974, 1977): as a result the filled Lake is deeper than the dry. The distribution of salt changes after major fillings, as can be seen by comparing 1972 SKYLARK photographs (see endpapers) and 1983 LANDSAT photographs (see opposite).

LANDSAT imagery of dry Lake Eyre. 20 December 1983

