Australian Tide Recorders

By B. V. Hamon

Division of Fisheries and Oceanography
Technical Paper No. 15

Commonwealth Scientific and Industrial
Research Organization, Australia
Melbourne 1963

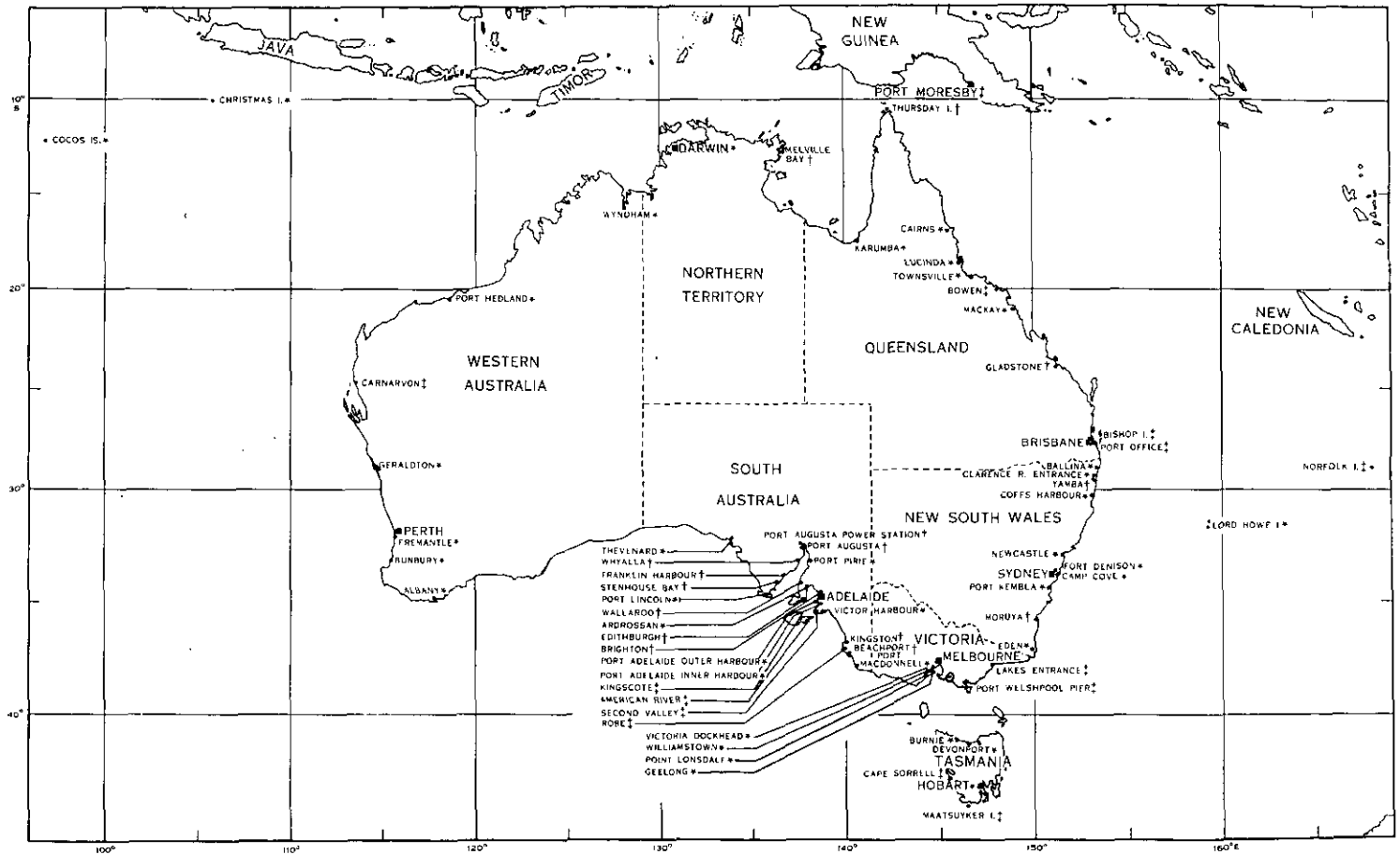

Fig. 1.—Locality map. *Permanent installation. †Temporary installation, either operating at present, for a short period, or has operated in the past. ‡Details not available.

AUSTRALIAN TIDE RECORDERS

By B. V. HAMON*

[*Manuscript received May* 24, 1963]

Summary

Tide recorder stations within the Commonwealth of Australia and its Territories are listed and brief details are given of each tide gauge and its datum.

The aim of this publication is to make available a list of stations within the Commonwealth of Australia and its Territories at which tide recorders are being or have been operated, together with some information on each installation.

Most of the information presented was obtained from replies to a questionnaire circulated in October 1962 by the Hydrographer, Royal Australian Navy. The main part of this report is a reproduction, with slight editing and some additional comments, of the replies to this questionnaire.

Stations are listed in alphabetical order. A map showing station positions is included (Fig. 1). The questionnaire included space for a sketch showing the position of each gauge (in relation to jetties, harbour entrances, etc.), but it has been decided not to include these sketches. An attempt has been made to give some of the information from the sketches under the heading "Site".

All the tide gauges listed are float-operated and record by means of a pen, pencil, or stylus on paper driven at constant speed by clockwork. Gauges used mainly for river-height recording have not been included. These gauges are listed in the publication "Australian Stream Gauges", issued by the Department of National Development (Canberra 1960).

It is planned to issue supplements to this report from time to time. It would be appreciated if any errors or omissions were reported to this Division or to the Hydrographer, Royal Australian Navy, Garden Island, Sydney.

*Division of Fisheries and Oceanography, C.S.I.R.O., Cronulla, N.S.W.

Details of Tide Gauge

Station (locality)	Albany, W.A.
Latitude 35°2′S.	Longitude 117°53′E.
Owner	Public Works Department, W.A.
Operator	Harbour and Lights Department
Period of operation	Apr. 1951, continuing
Periods for which continuous tidal records are available	Apr. 1951 to present
Frequency of accuracy checks (time and height)	Daily
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	W. H. Bailey and Co. Ltd., Manchester
Time scale (hr/in) 13·71	Height scale (ft/in) 1
Range of gauge	7 ft
Diameter of float	15 in.
Environmental effects on gauge	Winds
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	F-281. On granite rock about 1 ch E. of deep-water jetty
Height of bench mark above gauge zero	12·85 ft
Frequency of checking this height	As required
Relationship between bench mark and land levelling system	Local water supply and sewerage work based on zero of tide gauge (low-water mark, Albany)
Stability of bench mark (including frequency of checking)	Granite rock
Value of mean sea-level above zero of gauge	2·454 ft
Method of computing mean sea-level	Summation of 2-hourly ordinates over period of 13 lunations (1961-62)
Site	On jetty

Details of Tide Gauge

Station (locality)	Ardrossan, S.A.
Latitude 34°25′30″S.	Longitude 137°55′30″E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	Sept. 1950 — Oct. 1954
Periods for which continuous tidal records are available	As above
Frequency of accuracy checks (time and height)	Every 2 days
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	E. Esdaile and Sons, Sydney
Time scale (hr/in) 2	Height scale (ft/in) 2
Range of gauge	−1 ft to +13 ft
Diameter of float	3 in.
Environmental effects on gauge	SE. winds affect, not seriously
Period of intended operation of gauge and future plans	No further records

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Arrow, north corner of bar doorstep, Royal Hotel
Height of bench mark above gauge zero	68·12 ft
Frequency of checking this height	Every 2 yr
Relationship between bench mark and land levelling system	Local datum
Stability of bench mark (including frequency of checking)	Slate doorstep. 10 yr
Value of mean sea-level above zero of gauge	5·8 ft
Method of computing mean sea-level	Hourly heights for the periods Sept. 1950, Dec. 1952, Liverpool Tidal Institute
Site	On jetty

Details of Tide Gauge

Station (locality)	Richmond River entrance, Ballina, N.S.W.
Latitude 28°52′30″S.	Longitude 153°35′E.
Owner	Department of Public Works, N.S.W.
Operator	Department of Public Works, N.S.W.
Period of operation	Aug. 1947, continuing
Periods for which continuous tidal records are available	Owing to faults in recording system, records available only for short periods
Frequency of accuracy checks (time and height)	3 Times a week
Method of checking accuracy of recorded heights	Against visual gauge
Maker's name	Department of Public Works
Time scale (hr/in) 2	Height scale (ft/in) 1
Range of gauge	12 ft
Diameter of float	9 in.
Environmental effects on gauge	Affected by river flows
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. No. 1 arrow on step, Post Office, Ballina
Height of bench mark above gauge zero	9·68 ft
Frequency of checking this height	About 5-yr intervals
Relationship between bench mark and land levelling system	B.M. No. 1 not accurately connected to New South Wales Standard Datum
Stability of bench mark (including frequency of checking)	No changes since 1947 survey. Approx. 5-yr intervals
Value of mean sea-level above zero of gauge	2·60 ft
Method of computing mean sea-level	Harmonic analysis of 2 or more periods of 29 days' tide recordings
Site	On north bank of Richmond River, near Ballina Post Office

Details of Tide Gauge

Station (locality)	Beachport, S.A.
Latitude 37°30′S.	Longitude 140°01′E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	Sept. 1917 — June 1932
Periods for which continuous tidal records are available	As above
Frequency of accuracy checks (time and height)	
Method of checking accuracy of recorded heights	
Maker's name	Hydro Chronograph
Time scale (hr/in) 7·2	Height scale (ft/in) 1
Range of gauge	−3 ft to +12 ft
Diameter of float	4½ in.
Environmental effects on gauge	SE. winds affect gauge
Period of intended operation of gauge and future plans	No further records

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Arrow on slate doorstep of Harbour Master's residence
Height of bench mark above gauge zero	15·43 ft
Frequency of checking this height	Every 3 yr
Relationship between bench mark and land levelling system	Mt. Gambier–Beachport railway
Stability of bench mark (including frequency of checking)	Slate doorstep. 3 yr
Value of mean sea-level above zero of gauge	1·9 ft
Method of computing mean sea-level	Hourly heights for period 1927–31, Liverpool Tidal Institute
Site	On jetty

Details of Tide Gauge

Station (locality)	Brighton, S.A.
Latitude 35°1'S.	Longitude 138°31'E.
Owner	South Australia Harbours Board
Operator	Local resident
Period of operation	Nov. 1951—Oct. 1954
Periods for which continuous tidal records are available	As above
Frequency of accuracy checks (time and height)	Every 2 days
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	E. Esdaile and Sons
Time scale (hr/in) 2	Height scale (ft/in) 2
Range of gauge	−1 ft to +13 ft
Diameter of float	3 in.
Environmental effects on gauge	W. and SW. winds can be fairly rough
Period of intended operation of gauge and future plans	No further records

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Iron rail set in concrete near fountain entrance to jetty
Height of bench mark above gauge zero	17·99 ft
Frequency of checking this height	
Relationship between bench mark and land levelling system	Port Adelaide railway datum
Stability of bench mark (including frequency of checking)	Considered stable
Value of mean sea-level above zero of gauge	4·7 ft
Method of computing mean sea-level	Hourly heights year 1952, Liverpool Tidal Institute
Site	On end of Brighton jetty

Details of Tide Gauge

Station (locality)	Bunbury, W.A.
Latitude 33°18'51"S.	Longitude 115°38'22"E.
Owner	Bunbury Harbour Board
Operator	Bunbury Harbour Board
Period of operation	From 1930, continuing
Periods for which continuous tidal records are available	Aug. 1930 to present
Frequency of accuracy checks (time and height)	Weekly
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	W. H. Bailey and Co. Ltd., Manchester
Time scale (hr/in) 14	Height scale (ft/in) 1
Range of gauge	−1 ft to +6 ft
Diameter of float	20 in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Bench mark on basalt at Clifton beach
Height of bench mark above gauge zero	1 ft
Frequency of checking this height	3-yr intervals
Relationship between bench mark and land levelling system	Reduced level 13·97 ft
Stability of bench mark (including frequency of checking)	Bench mark on basalt outcrop. No variation
Value of mean sea-level above zero of gauge	
Method of computing mean sea-level	
Site	Bunbury jetty

Details of Tide Gauge

Station (locality)	Cairns Harbour No. 1 Wharf, Qld.
Latitude 16°55′25″S.	Longitude 145°46′50″E.
Owner	Cairns Harbour Board
Operator	Cairns Harbour Board
Period of operation	Nov. 1933, continuing
Periods for which continuous tidal records are available	1939 to present
Frequency of accuracy checks (time and height)	Each alternate day
Method of checking accuracy of recorded heights	Tide board is fixed to wharf structure at permanent survey level mark, cut into concrete, and height registered on same is checked against automatic gauge
Maker's name	Alfred J. Amsler and Co., Switzerland
Time scale (hr/in) 1 3/5	Height scale (ft/in) 5/6
Range of gauge	13 ft
Diameter of float	9 in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Cairns City Council B.M. on SW. side of Koch's monument, Abbot St.
Height of bench mark above gauge zero	14·11 ft
Frequency of checking this height	Only rarely
Relationship between bench mark and land levelling system	10·17 above State bench mark, Brisbane
Stability of bench mark (including frequency of checking)	Situated on solid base of monument in main city street. Occasionally
Value of mean sea-level above zero of gauge	4·40 ft
Method of computing mean sea-level	Given in Admiralty and Harbours and Marine tide predictions
Site	No. 1 wharf

Details of Tide Gauge

Station (locality)	Camp Cove, Port Jackson, Sydney
Latitude 33°50′26″S.	Longitude 151°16′45″E.
Owner	Maritime Services Board of New South Wales
Operator	Maritime Services Board of New South Wales
Period of operation	From Mar. 1916, continuing
Periods for which continuous tidal records are available	Mar. 1916 to present
Frequency of accuracy checks (time and height)	Bi-weekly
Method of checking accuracy of recorded heights	Recorded height is checked against a direct well reading
Maker's name	Harrison
Time scale (hr/in) 1	Height scale (ft/in) 1
Range of gauge	− 1 ft to + 8 ft
Diameter of float	18 in.
Environmental effects on gauge	Only under very extreme weather conditions
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Permanent mark No. 83
Height of bench mark above gauge zero	9·65 ft
Frequency of checking this height	
Relationship between bench mark and land levelling system	Standard datum
Stability of bench mark (including frequency of checking)	Set in concrete by Survey Co-ordination Branch of Lands Department of New South Wales. None, not required
Value of mean sea-level above zero of gauge	2·91 ft
Method of computing mean sea-level	Harmonic analysis carried out by Liverpool Tidal Institute
Site	Camp Cove, tide gauge house on south side of jetty

Details of Tide Gauge

Station (locality)	Christmas Island, Indian Ocean
Latitude 10°0′S.	Longitude 105°40′E.
Owner	C.S.I.R.O. Division of Fisheries and Oceanography, Cronulla, N.S.W.
Operator	British Phosphate Commissioners
Period of operation	June 1, 1962, continuing
Periods for which continuous tidal records are available	*June 1, 1962, to present*
Frequency of accuracy checks (time and height)	Every 8 days
Method of checking accuracy of recorded heights	
Maker's name	E. Esdaile and Sons, Sydney
Time scale (hr/in) 8	Height scale (ft/in) 1
Range of gauge	10 ft
Diameter of float	3 in.
Environmental effects on gauge	Open sea conditions
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	
Height of bench mark above gauge zero	
Frequency of checking this height	
Relationship between bench mark and land levelling system	
Stability of bench mark (including frequency of checking)	
Value of mean sea-level above zero of gauge	2·91 ft
Method of computing mean sea-level	*Computed from 1-yr records*
Site	North arm cantilever

Details of Tide Gauge

Station (locality)	Clarence River entrance, N.S.W.
Latitude 29°25′30″S.	Longitude 153°23′E.
Owner	Department of Public Works, N.S.W.
Operator	Department of Public Works, N.S.W.
Period of operation	Sept. 1956, continuing
Periods for which continuous tidal records are available	Sept. 1956 to present
Frequency of accuracy checks (time and height)	3 Times a week
Method of checking accuracy of recorded heights	Against visual gauge
Maker's name	Department of Public Works, N.S.W.
Time scale (hr/in) 2	Height scale (ft/in) 1
Range of gauge	12 ft
Diameter of float	9 in.
Environmental effects on gauge	Affected by river flows
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. No. 2
Height of bench mark above gauge zero	12·6 ft
Frequency of checking this height	5-yr intervals
Relationship between bench mark and land levelling system	B.M. No. 2 is not accurately connected to New South Wales standard datum
Stability of bench mark (including frequency of checking)	5-yr intervals
Value of mean sea-level above zero of gauge	3·12 ft
Method of computing mean sea-level	Mean values obtained by complete harmonic analysis
Site	On river side of northern retaining wall approx. 3000 ft from seaward end of wall

Details of Tide Gauge

Station (locality)	Cocos (Keeling) Islands, Indian Ocean
Latitude 12°8′S.	Longitude 96°49′E.
Owner	C.S.I.R.O. Division of Fisheries and Oceanography, Cronulla, N.S.W.
Operator	Meteorological Office
Period of operation	October 24, 1961, continuing
Periods for which continuous tidal records are available	October 24, 1961, to present
Frequency of accuracy checks (time and height)	Every 2 days
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	E. Esdaile and Sons, Sydney
Time scale (hr/in) 2	Height scale (ft/in) 1
Range of gauge	10 ft
Diameter of float	3 in.
Environmental effects on gauge	Open sea conditions
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	
Height of bench mark above gauge zero	1·3 ft
Frequency of checking this height	On installation
Relationship between bench mark and land levelling system	Not calculated yet
Stability of bench mark (including frequency of checking)	Earthenware cemented pipe
Value of mean sea-level above zero of gauge	2·06 ft
Method of computing mean sea-level	Computed from 1-yr records
Site	Jetty on West Island

Details of Tide Gauge

Station (locality)	Coffs Harbour, N.S.W.
Latitude 30°20′S.	Longitude 153°00′E.
Owner	Department of Public Works, N.S.W.
Operator	Department of Public Works, N.S.W.
Period of operation	Aug. 1951, continuing
Periods for which continuous tidal records are available	Aug. 1951 to present
Frequency of accuracy checks (time and height)	Every 2 days
Method of checking accuracy of recorded heights	Against visual gauge
Maker's name	*Department of Public Works, N.S.W.*
Time scale (hr/in) 2	Height scale (ft/in) 1
Range of gauge	12 ft
Diameter of float	9 in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. No. 1. Bolt set in concrete
Height of bench mark above gauge zero	21·45 ft
Frequency of checking this height	Approx. 5-yr intervals
Relationship between bench mark and land levelling system	B.M. No. 1 not accurately connected to New South Wales standard datum
Stability of bench mark (including frequency of checking)	Has been stable for more than 30 yr. Approx. 5-yr intervals
Value of mean sea-level above zero of gauge	2·81 ft
Method of computing mean sea-level	Mean sea-level has been taken from a 12 months' analysis of hourly heights obtained by automatic recorder. Period of record was Aug. 1951—July 1952
Site	About half-way along north side of jetty

Details of Tide Gauge

Station (locality)	Darwin Harbour, N.T.
Latitude 12°28′S.	Longitude 131°51′E.
Owner	Water Resources Branch, Darwin
Operator	Hydrographic Section Personnel
Period of operation	May 1955, continuing
Periods for which continuous tidal records are available	May–Oct. 1955; Mar. 1956—Apr. 1957; July 1957 to present
Frequency of accuracy checks (time and height)	Twice a week
Method of checking accuracy of recorded heights	Sprocketed, graduated float tape, reading recorded on inspection
Maker's name	Leupold and Stevens, U.S.A.
Time scale (hr/in) 2½	Height scale (ft/in) ½
Range of gauge	−4 ft to +34 ft
Diameter of float	10 in.
Environmental effects on gauge	In spite of gauge being in an estuary, river discharges have little effect on tidal variations
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Northern Territory Administration B.M. No. 100
Height of bench mark above gauge zero	32·74 ft
Frequency of checking this height	On installation
Relationship between bench mark and land levelling system	Reduced level 29·49 ft on town datum
Stability of bench mark (including frequency of checking)	NW. abutment on wharf approach. In 1959 a variation of 0·03 ft was found. Last check by Lands and Survey Department was in 1959
Value of mean sea-level above zero of gauge	13·5 ft
Method of computing mean sea-level	1-yr records. Central day: Nov. 1, 1954. Liverpool Tidal Institute
Site	Darwin Harbour, facing east arm of river

Details of Tide Gauge

Station (locality)	Devonport, Tas.
Latitude 41°11′2″S.	Longitude 146°21′46″E.
Owner	Devonport Marine Board
Operator	Devonport Marine Board
Period of operation	From 1954, continuing
Periods for which continuous tidal records are available	1954 to present
Frequency of accuracy checks (time and height)	Weekly
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	E. Esdaile and Sons, Sydney
Time scale (hr/in) 2	Height scale (ft/in) 2
Range of gauge	−1 ft 6 in. to +12 ft 6 in.
Diameter of float	1½ in.
Environmental effects on gauge	Winds and river discharges
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Bench mark cut in concrete wall
Height of bench mark above gauge zero	12·15 ft
Frequency of checking this height	Periodically
Relationship between bench mark and land levelling system	Reduced level of bench mark is 17·93 ft, 5·42 ft above river bench mark
Stability of bench mark (including frequency of checking)	Records show no change in the period of 15 yr. Periodically
Value of mean sea-level above zero of gauge	5·3 ft
Method of computing mean sea-level	
Site	On right-hand corner of wharf opposite to a concrete wall

Details of Tide Gauge

Station (locality)	Eden, N.S.W.
Latitude 37°5′S.	Longitude 149°59′E.
Owner	C.S.I.R.O. Division of Fisheries and Oceanography, Cronulla, N.S.W.
Operator	Harbour Master
Period of operation	July 13, 1957, continuing
Periods for which continuous tidal records are available	July 13, 1957, to June 1962; Dec. 23, 1962, to present
Frequency of accuracy checks (time and height)	Every 2 days
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	E. Esdaile and Sons, Sydney
Time scale (hr/in) 2	Height scale (ft/in) 1
Range of gauge	10 ft
Diameter of float	3 in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	A-8415
Height of bench mark above gauge zero	
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Local bench mark connected to Lands Department P.M. No. 2398 adjacent to Shire Office at Eden
Stability of bench mark (including frequency of checking)	Concrete post
Value of mean sea-level above zero of gauge	2·73 ft
Method of computing mean sea-level	Records for a year
Site	At end of Cannery Wharf

Details of Tide Gauge

Station (locality)	Edithburgh, S.A.
Latitude 35°5′S.	Longitude 137°45′E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	Oct. 1946—Jan. 1953
Periods for which continuous tidal records are available	As above
Frequency of accuracy checks (time and height)	Every 2 days
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Negretti and Zambra
Time scale (hr/in) 1	Height scale (ft/in) 1
Range of gauge	−3 ft to +13 ft
Diameter of float	4½ in.
Environmental effects on gauge	SW. winds cause waves
Period of intended operation of gauge and future plans	No further records

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Bolt set in concrete near Harbour Master's doorstep
Height of bench mark above gauge zero	32·53 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Local datum
Stability of bench mark (including frequency of checking)	Assumed stable. Bolt set in concrete
Value of mean sea-level above zero of gauge	3·4 ft
Method of computing mean sea-level	Hourly heights for period Oct. 1946—Dec. 1962, Liverpool Tidal Institute
Site	On jetty

Details of Tide Gauge

Station (locality)	Emu Bay, Burnie, Tas.
Latitude 41°03'S.	Longitude 145°55'E.
Owner	Marine Board of Burnie
Operator	Marine Board of Burnie
Period of operation	From 1952, continuing
Periods for which continuous tidal records are available	1952 to present
Frequency of accuracy checks (time and height)	*No height check prior to Apr. 1963*
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Gents of Leicester, England
Time scale (hr/in) 9	Height scale (ft/in) 1
Range of gauge	12 ft
Diameter of float	19 in.
Environmental effects on gauge	Winds
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Bench mark in pavement on approach to Jones Pier
Height of bench mark above gauge zero	21·39 ft
Frequency of checking this height	
Relationship between bench mark and land levelling system	Bench mark 6·02 ft below State datum
Stability of bench mark (including frequency of checking)	Solid ground, no history of earth movement. No check
Value of mean sea-level above zero of gauge	6·2 ft
Method of computing mean sea-level	From Admiralty tide tables
Site	At entrance of Jones Pier

Details of Tide Gauge

Station (locality)	Fort Denison, Port Jackson, N.S.W.
Latitude 33°51'23"S.	Longitude 151°13'34"E.
Owner	Maritime Services Board of New South Wales
Operator	Maritime Services Board of New South Wales
Period of operation	From May 1866, continuing
Periods for which continuous tidal records are available	May 1866 to present
Frequency of accuracy checks (time and height)	Daily
Method of checking accuracy of recorded heights	Recorded height checked against tide pole
Maker's name	*Harrison*
Time scale (hr/in) 1	Height scale (ft/in) 1
Range of gauge	−1 ft to +8 ft
Diameter of float	18 in.
Environmental effects on gauge	Only under very extreme weather conditions
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Permanent marks 101 and 102
Height of bench mark above gauge zero	21·81 ft for P.M. 101; 21·78 ft for P.M. 102
Frequency of checking this height	3-yr intervals
Relationship between bench mark and land levelling system	Standard datum
Stability of bench mark (including frequency of checking)	Set in concrete by Survey Co-ordination Branch of Lands Department of New South Wales. None, not required
Value of mean sea-level above zero of gauge	2·93 ft
Method of computing mean sea-level	Harmonic analysis carried out by Liverpool Tidal Institute
Site	Fort Denison, near light tower

Details of Tide Gauge

Station (locality)	Franklin Harbour, S.A.
Latitude 33°42′S.	Longitude 136°57′E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	Nov. 1934—Feb. 1941
Periods for which continuous tidal records are available	As above
Frequency of accuracy checks (time and height)	
Method of checking accuracy of recorded heights	
Maker's name	Hydro Chronograph
Time scale (hr/in) 7·2	Height scale (ft/in) 1
Range of gauge	−3 ft to +12 ft
Diameter of float	4¼ in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	No further records

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Arrow, slate doorstep on Post Office
Height of bench mark above gauge zero	14·48 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Local
Stability of bench mark (including frequency of checking)	Assumed stable, slate doorstep
Value of mean sea-level above zero of gauge	3·3 ft
Method of computing mean sea-level	Hourly heights for period 1935–39, Liverpool Tidal Institute
Site	On jetty near No. 9 Jetty light

Details of Tide Gauge

Station (locality)	Fremantle, W.A.
Latitude 32°3′13″S.	Longitude 115°44′9″E.
Owner	Fremantle Harbour Trust
Operator	Fremantle Harbour Trust
Period of operation	Prior to 1955, continuing
Periods for which continuous tidal records are available	Prior to 1955 to present
Frequency of accuracy checks (time and height)	Daily
Method of checking accuracy of recorded heights	Sounding at fixed datum
Maker's name	W. H. Bailey and Co. Ltd., Manchester
Time scale (hr/in) 14	Height scale (ft/in) 1
Range of gauge	−1 ft to +6 ft
Diameter of float	1 ft 6 in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Concrete floor slab of tide gauge cabin
Height of bench mark above gauge zero	13·29 ft
Frequency of checking this height	
Relationship between bench mark and land levelling system	Zero on tide gauge is 0·00 ft for the State land levelling system. The nearest State land survey system bench mark at the adjacent slipway has a value of 11·97 ft
Stability of bench mark (including frequency of checking)	Concrete floor slab
Value of mean sea-level above zero of gauge	2·40 ft
Method of computing mean sea-level	Average of monthly mean tide level for 1955–62
Site	Harbour

Details of Tide Gauge

Station (locality)	Yarra Street Pier, Geelong, Vic.
Latitude 38°8′45″S.	Longitude 144°21′57″E.
Owner	Geelong Harbour Trust Commissioners
Operator	Geelong Harbour Trust Hydrographic Surveyor
Period of operation	From 1951, continuing
Periods for which continuous tidal records are available	Unreliable records from 1951. Reliable from Aug. 26, 1960, to present
Frequency of accuracy checks (time and height)	Weekly
Method of checking accuracy of recorded heights	Measured with steel tape and plumb from bench mark situated within 20 yd of gauge house
Maker's name	R. W. Munro Ltd., London
Time scale (hr/in) 1	Height scale (ft/in) 0·33
Range of gauge	−2 ft to +6 ft
Diameter of float	18 in.
Environmental effects on gauge	Affected slightly by winds
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Bench mark cut in step of Geelong Custom House
Height of bench mark above gauge zero	30·358 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Geodetic value for this bench mark is 28·722 ft levelled from Geodetic B.M. No. 43
Stability of bench mark (including frequency of checking)	Geodetic B.M. established by Lands Department (1st order). G.H.T. B.M. cut in bluestone step of Custom House in position not subject to wear. Yearly
Value of mean sea-level above zero of gauge	1·636 ft
Method of computing mean sea-level	By geodetic levelling
Site	Yarra Street Pier, Geelong

Details of Tide Gauge

Station (locality)	Geraldton, W.A.
Latitude 28°47′S.	Longitude 114°35′E.
Owner	Public Works Department, W.A.
Operator	Harbour and Lights Department
Period of operation	July 18, 1961, continuing
Periods for which continuous tidal records are available	July 18, 1961, to present
Frequency of accuracy checks (time and height)	Daily
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Leupold and Stevens*
Time scale (hr/in) 10	Height scale (ft/in) 1
Range of gauge	7 ft
Diameter of float	10 in.
Environmental effects on gauge	Winds
Period of intended operation of gauge and future plans	Indefinitely

*Previously a Bailey tide recorder.

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	SE. corner of most easterly bollard plate
Height of bench mark above gauge zero	11·33 ft
Frequency of checking this height	As required
Relationship between bench mark and land levelling system	9·83 ft above low-water mark as used for water supply and sewerage work
Stability of bench mark (including frequency of checking)	Cast steel bollard on reinforced concrete wharf
Value of mean sea-level above zero of gauge	2·873 ft
Method of computing mean sea-level	Summation of 2-hourly ordinates over period of 13 lunations (1961–62)
Site	

Details of Tide Gauge

Station (locality)	Gladstone, Qld.
Latitude 23°53'S.	Longitude 151°12'E.
Owner	*Department of Harbours and Marine, Brisbane*
Operator	Gladstone Harbour Board
Period of operation	Dec. 21, 1954—Feb. 13, 1961
Periods for which continuous tidal records are available	Dec. 21, 1954—Feb. 13, 1961
Frequency of accuracy checks (time and height)	Weekly
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Alfred J. Amsler and Co., Switzerland
Time scale (hr/in) 1 1/3	Height scale (ft/in) 1
Range of gauge	
Diameter of float	8 in.
Environmental effects on gauge	Unknown
Period of intended operation of gauge and future plans	No further records. Recorder removed

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	
Height of bench mark above gauge zero	
Frequency of checking this height	
Relationship between bench mark and land levelling system	
Stability of bench mark (including frequency of checking)	
Value of mean sea-level above zero of gauge	
Method of computing mean sea-level	
Site	Gladstone Harbour

Details of Tide Gauge

Station (locality)	Hobart, Tas.
Latitude 42°53'10"S.	Longitude 147°20'17"E.
Owner	Marine Board of Hobart
Operator	Marine Board of Hobart
Period of operation	Date unknown, continuing
Periods for which continuous tidal records are available	Reliable records date from Feb. 1960 when new tide gauge installed
Frequency of accuracy checks (time and height)	Almost daily
Method of checking accuracy of recorded heights	Heights checked against State Permanent Marks. Accuracy to about 1 in.
Maker's name	George Kent Limited, London
Time scale (hr/in) 1·25	Height scale (ft/in) 0·92
Range of gauge	+0 ft to +9 ft. Zero is reputed M.L.W.O.S.
Diameter of float	12 in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	M.B.H. Mark No. 17 corresponding to State Permanent Mark No. 194
Height of bench mark above gauge zero	10·05 ft
Frequency of checking this height	Monthly
Relationship between bench mark and land levelling system	Part of State permanent mark system
Stability of bench mark (including frequency of checking)	There is extremely slow subsidence of mark. None
Value of mean sea-level above zero of gauge	3·4 ft
Method of computing mean sea-level	
Site	On wharf in Sullivan Cove, opposite Marine Board Office

Details of Tide Gauge

Station (locality)	Kingston, S.A.
Latitude 36°50′S.	Longitude 139°50′30″E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	June 1946—June 1952
Periods for which continuous tidal records are available	As above
Frequency of accuracy checks (time and height)	Every 2 days
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	E. Esdaile and Sons, Sydney
Time scale (hr/in) 2	Height scale (ft/in) 2
Range of gauge	−1 ft to +13 ft
Diameter of float	3 in.
Environmental effects on gauge	West winds cause waves
Period of intended operation of gauge and future plans	No further records

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Arrow on doorstep of Royal Mail Hotel
Height of bench mark above gauge zero	14·50 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Same as railway levels, Kingston–Naracoorte railway
Stability of bench mark (including frequency of checking)	Stone doorstep. About every 3 yr
Value of mean sea-level above zero of gauge	2·2 ft
Method of computing mean sea-level	Hourly heights, June 1946—May 1952, Liverpool Tidal Institute
Site	Kingston Jetty

Details of Tide Gauge

Station (locality)	Lord Howe Island, Pacific Ocean
Latitude 31°31′S.	Longitude 159°7′E.
Owner	Department of Civil Aviation
Operator	Department of Civil Aviation
Period of operation	June 19, 1953, continuing
Periods for which continuous tidal records are available	June 19, 1953—May 6, 1955; Oct. 16, 1956—Dec. 13, 1956; Mar. 21, 1957, to present
Frequency of accuracy checks (time and height)	
Method of checking accuracy of recorded heights	Board alongside gauge
Maker's name	E. Esdaile and Sons, Sydney
Time scale (hr/in) 2	Height scale (ft/in) 1
Range of gauge	10 ft
Diameter of float	3 in.
Environmental effects on gauge	
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. on concrete step
Height of bench mark above gauge zero	16·96 ft
Frequency of checking this height	On installation
Relationship between bench mark and land levelling system	Not calculated
Stability of bench mark (including frequency of checking)	On concrete step
Value of mean sea-level above zero of gauge	3·82 ft
Method of computing mean sea-level	From 1-yr data
Site	Public jetty in Hunter Bay

Details of Tide Gauge

Station (locality)	Lucinda, Qld.
Latitude 18°31″S.	Longitude 146°19″E.
Owner	Lucinda Bulk Sugar Terminal Organization
Operator	Lucinda Bulk Sugar Terminal
Period of operation	Aug. 4, 1961, continuing
Periods for which continuous tidal records are available	Aug. 4, 1961, to present
Frequency of accuracy checks (time and height)	Daily
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	R. W. Munro Ltd., London
Time scale (hr/in) 1 1/16	Height scale (ft/in) 2 6/13
Range of gauge	24 ft
Diameter of float	Between 5 and 7 in.
Environmental effects on gauge	
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	
Height of bench mark above gauge zero	
Frequency of checking this height	
Relationship between bench mark and land levelling system	
Stability of bench mark (including frequency of checking)	
Value of mean sea-level above zero of gauge	
Method of computing mean sea-level	
Site	*Lucinda Bulk Sugar Terminal*

Details of Tide Gauge

Station (locality)	Mackay Outer Harbour, Qld.
Latitude 21°06′26″S.	Longitude 149°13′22″E.
Owner	Mackay Harbour Board
Operator	Mackay Harbour Board
Period of operation	1944, continuing
Periods for which continuous tidal records are available	Since 1944 to present
Frequency of accuracy checks (time and height)	Weekly
Method of checking accuracy of recorded heights	By soundings
Maker's name	A. J. Amsler and Co., Switzerland
Time scale (hr/in) 1 7/12	Height scale (ft/in) 1
Range of gauge	−1 ft to +23 ft
Diameter of float	12 in.
Environmental effects on gauge	Winds
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	State B.M. No. 43
Height of bench mark above gauge zero	32·59 ft
Frequency of checking this height	Not checked
Relationship between bench mark and land levelling system	Part of State permanent mark system
Stability of bench mark (including frequency of checking)	Excellent. None
Value of mean sea-level above zero of gauge	
Method of computing mean sea-level	Refer Harbours and Marine Department, Brisbane
Site	On No. 1 Pier

Details of Tide Gauge

Station (locality)	Melville Bay, East Arnhem Land, N.T.
Latitude 12°13′24″S.	Longitude 136°41′36″E.
Owner	Commonwealth Aluminium Corporation Ltd.
Operator	Chief Hydrographer, Commonwealth Aluminium Corporation Ltd.
Period of operation	Nov.—Dec. 1958
Periods for which continuous tidal records are available	29 days
Frequency of accuracy checks (time and height)	Weekly
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Ott Bayen, Germany
Time scale (hr/in) 13	Height scale (ft/in) 2
Range of gauge	20 ft
Diameter of float	6 in.
Environmental effects on gauge	
Period of intended operation of gauge and future plans	No further records

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Tellurometer Trigonometrical △ on Drimmie Hill
Height of bench mark above gauge zero	13·74 ft
Frequency of checking this height	
Relationship between bench mark and land levelling system	None
Stability of bench mark (including frequency of checking)	Permanent trigonometrical station on Drimmie Hill
Value of mean sea-level above zero of gauge	Not computed
Method of computing mean sea-level	
Site	Wooden jetty at western base of Drimmie Hill

Details of Tide Gauge

Station (locality)	Moruya River entrance, N.S.W.
Latitude 35°58′S.	Longitude 150°3′E.
Owner	Department of Public Works, N.S.W.
Operator	Department of Public Works, N.S.W.
Period of operation	Oct. 1951—Oct. 1952
Periods for which continuous tidal records are available	Nov. 1951—Oct. 1952
Frequency of accuracy checks (time and height)	Daily
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Department of Public Works, N.S.W.
Time scale (hr/in) 2	Height scale (ft/in) 1
Range of gauge	12 ft
Diameter of float	9 in.
Environmental effects on gauge	Affected by river flows
Period of intended operation of gauge and future plans	No further records

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. No. 7 G.I. pipe at station 7
Height of bench mark above gauge zero	14·24 ft
Frequency of checking this height	
Relationship between bench mark and land levelling system	B.M. No. 7 is not connected to New South Wales standard datum
Stability of bench mark (including frequency of checking)	A pipe set in concrete in base of northern breakwater
Value of mean sea-level above zero of gauge	2·55 ft
Method of computing mean sea-level	From records for Nov. 1951—Oct. 1952, Liverpool Tidal Institute
Site	At inner end of north breakwater

Details of Tide Gauge

Station (locality)	Newcastle, N.S.W.
Latitude 32°55′S.	Longitude 151°48′E.
Owner	Department of Public Works, N.S.W.
Operator	Department of Public Works, N.S.W.
Period of operation	Prior to 1890, continuing
Periods for which continuous tidal records are available	For many years. In July 1961 control of Newcastle gauge and records were transferred to Maritime Services Board of New South Wales
Frequency of accuracy checks (time and height)	Daily
Method of checking accuracy of recorded heights	Against visual gauge
Maker's name	Department of Public Works
Time scale (hr/in) 2	Height scale (ft/in) 1
Range of gauge	12 ft
Diameter of float	9 in.
Environmental effects on gauge	Affected by river flows
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. No. 1, Customs House, Newcastle
Height of bench mark above gauge zero	14·0 ft
Frequency of checking this height	5-yr intervals
Relationship between bench mark and land levelling system	B.M. No. 1 not accurately connected to New South Wales standard datum
Stability of bench mark (including frequency of checking)	Has been stable for over 50 yr. 5-yr intervals
Value of mean sea-level above zero of gauge	2·86 ft
Method of computing mean sea-level	Mean values based on heights of high and low waters
Site	Inside entrance to Hunter River

Details of Tide Gauge

Station (locality)	Point Lonsdale, Vic.
Latitude 38°17′36″S.	Longitude 144°37′01″E.
Owner	Ports and Harbours Branch, Vic.
Operator	Ports and Harbours Branch, Vic.
Period of operation	Nov. 14, 1962, continuing
Periods for which continuous tidal records are available	From Nov. 14, 1962, to present
Frequency of accuracy checks (time and height)	Weekly
Method of checking accuracy of recorded heights	By actual measurement of the water level both inside and outside the well, from a B.M. on top of the steel stand pipe
Maker's name	R. W. Munro Ltd.
Time scale (hr/in) 1	Height scale (ft/in) ½
Range of gauge	−2 ft to +10 ft
Diameter of float	18 in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Door sill of Point Lonsdale lighthouse
Height of bench mark above gauge zero	45·210 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Level of Point Lonsdale lighthouse B.M. reduced to datum of Geodetic Survey of Victoria, i.e. mean sea-level at Point Lonsdale is 42·273 ft
Stability of bench mark (including frequency of checking)	Door sill of lighthouse constructed on rock foundation and selected as primary for precise levels for Victoria. Yearly
Value of mean sea-level above zero of gauge	2·937 ft
Method of computing mean sea-level	Preliminary value obtained from 2-yr observations
Site	Outer end of Point Lonsdale Jetty

Details of Tide Gauge

Station (locality)	Port Adelaide Inner Harbour, S.A.
Latitude 34°51′S.	Longitude 138°30′E.
Owner	South Australia Harbours Board
Operator	Head Chainman and Tidal Attendant
Period of operation	From about 1880, continuing
Periods for which continuous tidal records are available	1917 to present
Frequency of accuracy checks (time and height)	Daily
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Stevens (from May 14, 1962)*
Time scale (hr/in) 0·833	Height scale (ft/in) 1
Range of gauge	−5 ft to +17 ft
Diameter of float	10 in.
Environmental effects on gauge	None, sheltered position
Period of intended operation of gauge and future plans	Indefinitely

*Tide gauge from 1880 to 1962 was: make, Sir W. Thomsons Tide Gauge No. 5 (J. White, Glasgow): Height scale, 3 ft/in; time scale, 1·27 hr/in; float, 4⅝ in. diameter.

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. No. 1
Height of bench mark above gauge zero	12·75 ft
Frequency of checking this height	6 months
Relationship between bench mark and land levelling system	Same as Port Adelaide datum, which is the State datum
Stability of bench mark (including frequency of checking)	Railway rail about 35 ft long driven into rock. Precise levelled 1943–62. Ordinary levels every 2–3 yr
Value of mean sea-level above zero of gauge	4·9 ft
Method of computing mean sea-level	Hourly heights, Liverpool Tidal Institute
Site	South Australian Harbour Board dockyard, between Jervois Bridge and Birkenhead Bridge

Details of Tide Gauge

Station (locality)	Port Adelaide Outer Harbour, S.A.
Latitude 34°47′S.	Longitude 138°29′E.
Owner	South Australia Harbours Board
Operator	Head Chainman and Tidal Attendant
Period of operation	Nov. 1943, continuing
Periods for which continuous tidal records are available	Nov. 1943 to present
Frequency of accuracy checks (time and height)	Twice a week
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Ballout
Time scale (hr/in) 1	Height scale (ft/in) 1½
Range of gauge	−2 ft to +15 ft
Diameter of float	8½ in.
Environmental effects on gauge	Wind, especially SW., could affect water level
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Brass pin in base of concrete signal tower
Height of bench mark above gauge zero	20·56 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Same as Port Adelaide railway datum
Stability of bench mark (including frequency of checking)	Solid building. 5 yr
Value of mean sea-level above zero of gauge	4·9 ft
Method of computing mean sea-level	Hourly heights, Liverpool Tidal Institute
Site	On south revetment mound, near outer harbour

Details of Tide Gauge

Station (locality)	Port Augusta Power Station, S.A.
Latitude 32°32′45″S.	Longitude 137°46′45″E.
Owner	South Australian Harbours Board
Operator	South Australian Electricity Trust
Period of operation	Aug. 1955, continuing
Periods for which continuous tidal records are available	Aug. 1955 to present. Some discontinuities owing to breakdown of old gauge
Frequency of accuracy checks (time and height)	Daily
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Negretti and Zambra
Time scale (hr/in) 1½	Height scale (ft/in) ½
Range of gauge	−2 ft to +18 ft
Diameter of float	4½ in.
Environmental effects on gauge	Near head of gulf. N. winds lower water level, NW.–WSW. raise water level
Period of intended operation of gauge and future plans	S.A. Electricity Trust is running this gauge for their own information and it is not expected to continue much longer

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Electricity Trust bench mark
Height of bench mark above gauge zero	
Frequency of checking this height	
Relationship between bench mark and land levelling system	Same as Commonwealth railway datum
Stability of bench mark (including frequency of checking)	Checked regularly with railway bench mark
Value of mean sea-level above zero of gauge	Not calculated
Method of computing mean sea-level	Not computed
Site	On wharf near Port Augusta power station

Details of Tide Gauge

Station (locality)	Port Augusta West, S.A.
Latitude 32°29′30″S.	Longitude 137°45′30″E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	Jan. 19, 1949—Aug. 19, 1955
Periods for which continuous tidal records are available	Whole period. There are many breaks in these records. Old machine
Frequency of accuracy checks (time and height)	Weekly
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Negretti and Zambra
Time scale (hr/in) 1½	Height scale (ft/in) ½
Range of gauge	−2 ft to +18 ft
Diameter of float	4½ in.
Environmental effects on gauge	Head of gulf: N. winds lower water level, NW.–WSW. winds raise water level
Period of intended operation of gauge and future plans	No further records

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Arrow, east side doorstep Hotel Augusta
Height of bench mark above gauge zero	16·59 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Same as Commonwealth railway datum
Stability of bench mark (including frequency of checking)	Stone doorstep. 2 yr
Value of mean sea-level above zero of gauge	5·9 ft
Method of computing mean sea-level	Hourly heights, Liverpool Tidal Institute
Site	On jetty near bridge connecting Port Augusta and Port Augusta West

Details of Tide Gauge

Station (locality)	Port Hedland, W.A.
Latitude 20°18′S.	Longitude 118°35′E.
Owner	Department of Public Works, W.A.
Operator	Department of Public Works, W.A.
Period of operation	Apr. 4, 1960, continuing
Periods for which continuous tidal records are available	Apr. 4, 1960—Jan. 12, 1962; Sept. 17, 1962, to present
Frequency of accuracy checks (time and height)	Weekly
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Lege, London
Time scale (hr/in) 2·125	Height scale (ft/in) 3·75
Range of gauge	30 ft
Diameter of float	6 in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	P.H.2
Height of bench mark above gauge zero	28·83 ft
Frequency of checking this height	As necessary
Relationship between bench mark and land levelling system	28·83 above chart datum (1437), i.e. has a common datum
Stability of bench mark (including frequency of checking)	Concrete block in sand
Value of mean sea-level above zero of gauge	
Method of computing mean sea-level	
Site	

Details of Tide Gauge

Station (locality)	Port Kembla, N.S.W.
Latitude 34°28′S.	Longitude 150°55′E.
Owner	Department of Public Works, N.S.W.
Operator	Department of Public Works, N.S.W.
Period of operation	Aug. 1957, continuing
Periods for which continuous tidal records are available	Since Aug. 1957 to present
Frequency of accuracy checks (time and height)	Daily
Method of checking accuracy of recorded heights	Against visual gauge
Maker's name	Department of Public Works, N.S.W.
Time scale (hr/in) 2	Height scale (ft/in) 1
Range of gauge	12 ft
Diameter of float	9 in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. No. 5 on concrete block near base of No. 3 jetty
Height of bench mark above gauge zero	12·51 ft
Frequency of checking this height	5-yr intervals
Relationship between bench mark and land levelling system	B.M. No. 5 not accurately connected to New South Wales standard datum
Stability of bench mark (including frequency of checking)	Has been stable for more than 15 yr. About 5-yr intervals
Value of mean sea-level above zero of gauge	2·83 ft
Method of computing mean sea-level	Mean values based on heights of high and low waters
Site	End of No. 3 jetty

Details of Tide Gauge

Station (locality)	Port Lincoln, S.A.
Latitude 34°43′S.	Longitude 135°52′E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	Nov. 1917, continuing
Periods for which continuous tidal records are available	Nov. 1917—Apr. 1937; Aug. 1956—Nov. 1957; Apr. 1962 to present
Frequency of accuracy checks (time and height)	3 Times a week
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Stevens (from Sept. 23, 1962)*
Time scale (hr/in) 0·833	Height scale (ft/in) 1
Range of gauge	−2 ft to +17 ft
Diameter of float	10 in.
Environmental effects on gauge	Fairly sheltered, NE. and SE. winds affect gauge slightly
Period of intended operation of gauge and future plans	Indefinitely

*Prior to Sept. 23, 1962, gauge was Negretti and Zambra, scale 1 ft/in, 1 hr/in, float 4¾ in. diameter.

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Arrow on corner of verandah of Harbour Master's Office
Height of bench mark above gauge zero	15·77 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Same as Port Lincoln–Thevenard railway
Stability of bench mark (including frequency of checking)	Solid brick building. Every 2 yr
Value of mean sea-level above zero of gauge	2·9 ft
Method of computing mean sea-level	Hourly heights, 5 yr, Liverpool Tidal Institute
Site	At outer end of bulk loading berth

Details of Tide Gauge

Station (locality)	Port Macdonnell, S.A.
Latitude 38°03′S.	Longitude 140°42′E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	June 1956, continuing
Periods for which continuous tidal records are available	June 1956 to present
Frequency of accuracy checks (time and height)	3 Times a week
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Stevens (from June 24, 1962)*
Time scale (hr/in) 0·833	Height scale (ft/in) 1
Range of gauge	−3 ft to +10 ft
Diameter of float	10 in.
Environmental effects on gauge	Open sea conditions. S. and SW. winds would affect gauge
Period of intended operation of gauge and future plans	Indefinitely

*Before June 24, 1962, gauge was Esdaile Portable, scale 2 hr/in, 2 ft/in, float 3 in. diameter.

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Arrow on Court House doorstep
Height of bench mark above gauge zero	10·73 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Local datum
Stability of bench mark (including frequency of checking)	Solid stone building. Original B.M.
Value of mean sea-level above zero of gauge	1·9 ft
Method of computing mean sea-level	Hourly heights, 5 yr
Site	Port Macdonnell Jetty

Details of Tide Gauge

Station (locality)	Port of Normanton, Karumba, Qld.
Latitude 17°30′S.	Longitude 140°50′E.
Owner	Queensland Government (Committee for Co-ordination of Levels)
Operator	Department of Harbours and Marine, Queensland
Period of operation	Sept. 25, 1956, continuing
Periods for which continuous tidal records are available	Sept. 25, 1956, to present
Frequency of accuracy checks (time and height)	Twice a week
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	R. W. Munro Ltd., London
Time scale (hr/in) 1·43	Height scale (ft/in) 2¾
Range of gauge	24 ft
Diameter of float	6 in.
Environmental effects on gauge	Depends on seasonal influences
Period of intended operation of gauge and future plans	Levels Committee operates gauge as check on geodetic levels. It will be installed elsewhere after December 1964

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	State Permanent Mark 601
Height of bench mark above gauge zero	20·53 ft
Frequency of checking this height	Three times in period 1957–62
Relationship between bench mark and land levelling system	Gauge zero is 2·93 ft below State datum as determined from B.M. No. 601
Stability of bench mark (including frequency of checking)	Brass plug in concrete. Check levelled when installed
Value of mean sea-level above zero of gauge	5·36 ft
Method of computing mean sea-level	Hourly heights
Site	On former Department of Civil Aviation jetty in Norman River, township of Karumba

Details of Tide Gauge

Station (locality)	Port Pirie, S.A.
Latitude 33°11′S.	Longitude 138°01′E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	July 1917, continuing
Periods for which continuous tidal records are available	July 1917 to present
Frequency of accuracy checks (time and height)	3 Times a week
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Stevens (from Sept. 2, 1962*)
Time scale (hr/in) 0·833	Height scale (ft/in) 1
Range of gauge	−2 ft to +17 ft
Diameter of float	10 in.
Environmental effects on gauge	None, sheltered
Period of intended operation of gauge and future plans	Indefinitely

*Prior to Sept. 2, 1956, gauge was Negretti and Zambra, scale 1 hr/in, 1 ft/in, float 4¾ in. diameter.

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Arrow on W. side slate doorstep front entrance to Harbour Master's Office
Height of bench mark above gauge zero	15·77 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Same as Adelaide–Pirie railway
Stability of bench mark (including frequency of checking)	Solid stone building. About once every 5 yr
Value of mean sea-level above zero of gauge	5·4 ft
Method of computing mean sea-level	Hourly heights, 10 yr, Liverpool Tidal Institute
Site	Oil berth between Baltic wharf and new ore berth

Details of Tide Gauge

Station (locality)	Stenhouse Bay, S.A.
Latitude 34°17′S.	Longitude 136°56′E.
Owner	South Australia Harbours Board
Operator	*Harbour Master*
Period of operation	Dec. 1941—June 1946
Periods for which continuous tidal records are available	As above
Frequency of accuracy checks (time and height)	Once a week
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Hydro Chronograph
Time scale (hr/in) 7·2	Height scale (ft/in) 1
Range of gauge	−3 ft to +12 ft
Diameter of float	4¼ in.
Environmental effects on gauge	SW. winds cause fair swell
Period of intended operation of gauge and future plans	No further records

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. on post set in granite toe of cliffs at shore end of jetty
Height of bench mark above gauge zero	10·54 ft
Frequency of checking this height	Original B.M.
Relationship between bench mark and land levelling system	Local datum
Stability of bench mark (including frequency of checking)	Set in granite assumed stable
Value of mean sea-level above zero of gauge	1·8 ft
Method of computing mean sea-level	Hourly heights, June 1942—June 1946, Liverpool Tidal Institute
Site	On Stenhouse Bay jetty

Details of Tide Gauge

Station (locality)	Thevenard, S.A.
Latitude 32°09′S.	Longitude 133°39′E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	From Apr. 29, 1959, continuing
Periods for which continuous tidal records are available	July 1917—Aug. 1920: Feb. 1934—May 1943: Apr. 1959 to present
Frequency of accuracy checks (time and height)	Twice a week
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Stevens (from May 20, 1962*)
Time scale (hr/in) 0·833	Height scale (ft/in) 1
Range of gauge	−5 ft to +17 ft
Diameter of float	10 in.
Environmental effects on gauge	SW. winds affect gauge
Period of intended operation of gauge and future plans	Indefinitely

*July 1917—Aug. 1920, Feb. 1934—May 1943, gauge was Negretti and Zambra, scale 1·33 hr/in, 1 ft/in, float 4¼ in. diameter; Apr. 29, 1959—May 20, 1962, Esdaile portable, 2 ft/in, 2 hr/in, float 3 in. diameter.

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. near SW. corner of wheat shed
Height of bench mark above gauge zero	10·87 ft
Frequency of checking this height	*Every 2 yr*
Relationship between bench mark and land levelling system	Same as Port Lincoln–Thevenard railway system
Stability of bench mark (including frequency of checking)	Pin set in rock and concreted. Checked about every 5 yr depending on surveys
Value of mean sea-level above zero of gauge	3·3 ft
Method of computing mean sea-level	Hourly heights for period 1934–42, Liverpool Tidal Institute
Site	On jetty

Details of Tide Gauge

Station (locality)	Thursday Island, Pacific Ocean
Latitude 10°35′S.	Longitude 142°13′E.
Owner	C.S.I.R.O. Division of Fisheries and Oceanography, Cronulla, N.S.W.
Operator	Harbour Master
Period of operation	Jan. 21, 1952—Feb. 21, 1958
Periods for which continuous tidal records are available	Jan. 21, 1952—Feb. 21, 1958
Frequency of accuracy checks (time and height)	Weekly
Method of checking accuracy of recorded heights	Recorded height checked against tide pole
Maker's name	E. Esdaile and Sons, Sydney
Time scale (hr/in) 2	Height scale (ft/in) 1
Range of gauge	10 ft
Diameter of float	3 in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	Recorder removed on Feb. 21, 1958

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	
Height of bench mark above gauge zero	
Frequency of checking this height	
Relationship between bench mark and land levelling system	
Stability of bench mark (including frequency of checking)	
Value of mean sea-level above zero of gauge	
Method of computing mean sea-level	
Site	

Details of Tide Gauge

Station (locality)	Townsville Harbour, Qld.
Latitude 19°15′11″S.	Longitude 146°50′14″E.
Owner	Townsville Harbour Board
Operator	Townsville Harbour Board
Period of operation	Nov. 19, 1948, continuing
Periods for which continuous tidal records are available	Nov. 19, 1948, to present
Frequency of accuracy checks (time and height)	
Method of checking accuracy of recorded heights	
Maker's name	Alfred J. Amsler and Co., Switzerland
Time scale (hr/in) 1½	Height scale (ft/in) 1
Range of gauge	−2 ft to +16 ft
Diameter of float	11½ in.
Environmental effects on gauge	Local drainage and unusual weather conditions
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Townsville Harbour Board Bench Mark (Master)
Height of bench mark above gauge zero	
Frequency of checking this height	Whenever gauge is altered
Relationship between bench mark and land levelling system	See Harbour Plan
Stability of bench mark (including frequency of checking)	Any movement unlikely, close proximity to Magazine Hill
Value of mean sea-level above zero of gauge	Not calculated
Method of computing mean sea-level	Not calculated
Site	Outer end of concrete pier No. 1, approx. ½ mile from harbour entrance

Details of Tide Gauge

Station (locality)	Victor Harbour, S.A.
Latitude 35°34′S.	Longitude 138°38′E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	June 1953, continuing
Periods for which continuous tidal records are available	June 1953 to present. Many breaks up to July 1962
Frequency of accuracy checks (time and height)	3 Times a week
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Leupold and Stevens*
Time scale (hr/in) 0·833	Height scale (ft/in) 1
Range of gauge	−5 ft to +12 ft
Diameter of float	10 in.
Environmental effects on gauge	None. Sheltered position
Period of intended operation of gauge and future plans	Indefinitely

*Before July 1962 gauge was Negretti and Zambra, scale 1 ft/in, 1 hr/in, float 4¾ in. diameter

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Arrow on NE. corner of store, Railways goods shed
Height of bench mark above gauge zero	16·01 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Same as Adelaide–Victor Harbour railway
Stability of bench mark (including frequency of checking)	Solid stone building, accepted as being stable
Value of mean sea-level above zero of gauge	1·8 ft
Method of computing mean sea-level	12 months' hourly heights, Liverpool Tidal Institute
Site	On Granite Island jetty

Details of Tide Gauge

Station (locality)	Victoria Dockhead Signal Station, Melbourne
Latitude 37°49′16″S.	Longitude 144°55′57″E.
Owner	Melbourne Harbour Trust Commissioners
Operator	Melbourne Harbour Trust Commissioners
Period of operation	1909, continuing
Periods for which continuous tidal records are available	Dec. 1932 to present
Frequency of accuracy checks (time and height)	Daily readings
Method of checking accuracy of recorded heights	By reference to tide pole visible 30 ft distant and established by land levelling
Maker's name	
Time scale (hr/in)	Height scale (ft/in)
Range of gauge	−1½ ft to +7 ft
Diameter of float	9 in.
Environmental effects on gauge	Winds and river discharges
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	MHT. B.M. No. 113. Reduced level 13·41 ft M.M.B.W. datum
Height of bench mark above gauge zero	13·22 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Zero Admiralty Chart datum is equal to 0·19 ft on the land levelling system (Melbourne and Metropolitan Board of Works datum)
Stability of bench mark (including frequency of checking)	Bronze plug set in 20 ft diameter 3 ft thick reinforced concrete platform on a mass of piles supporting a 60-ton steam crane (no known change since established in 1929). Yearly
Value of mean sea-level above zero of gauge	
Method of computing mean sea-level	
Site	

Details of Tide Gauge

Station (locality)	Wallaroo, S.A.
Latitude 33°54′S.	Longitude 137°36′E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	Feb. 1928—Apr. 1938
Periods for which continuous tidal records are available	As above
Frequency of accuracy checks (time and height)	Twice a week
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Negretti and Zambra
Time scale (hr/in) 1	Height scale (ft/in) 1
Range of gauge	−5 ft to +17 ft
Diameter of float	4¾ in.
Environmental effects on gauge	Open bay affected by SW., W., and NW. winds
Period of intended operation of gauge and future plans	It is proposed to erect a Stevens gauge about middle of 1963 and this will be permanent

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. on iron rail near west end of Harbour Master's Office
Height of bench mark above gauge zero	14·48 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Same as railway datum, Wallaroo–Adelaide line
Stability of bench mark (including frequency of checking)	Iron rail driven to firm soft soil. About every 2 yr depending on work in district
Value of mean sea-level above zero of gauge	2·9 ft
Method of computing mean sea-level	Hourly heights, 5 yr, Liverpool Tidal Institute
Site	Near shore end of old jetty

Details of Tide Gauge

Station (locality)	Whyalla, S.A.
Latitude 33°1′S.	Longitude 137°30′E.
Owner	South Australia Harbours Board
Operator	Harbour Master
Period of operation	Nov. 1942—July 1946
Periods for which continuous tidal records are available	As above
Frequency of accuracy checks (time and height)	Every 2 days
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	E. Esdaile and Sons, Sydney
Time scale (hr/in) 2	Height scale (ft/in) 2
Range of gauge	−1 ft to +13 ft
Diameter of float	3 in.
Environmental effects on gauge	Open to S. and E. winds
Period of intended operation of gauge and future plans	No further records

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	B.M. 515 ft north of forge steel plant
Height of bench mark above gauge zero	34·71 ft
Frequency of checking this height	Yearly
Relationship between bench mark and land levelling system	Same as Morgan–Whyalla water main
Stability of bench mark (including frequency of checking)	Concrete bench mark. Yearly
Value of mean sea-level above zero of gauge	4·9 ft
Method of computing mean sea-level	Period 1942–46, Liverpool Tidal Institute
Site	Near inner end of fitting-out wharf in basin

Details of Tide Gauge

Station (locality)	Williamstown, Vic.
Latitude 37°51′49″S.	Longitude 144°54′35″E.
Owner	Melbourne Harbour Trust Commissioners
Operator	Melbourne Harbour Trust Commissioners
Period of operation	1859, continuing
Periods for which continuous tidal records are available	Unreliable data from 1872 to Sept. 1943, reliable from Sept. 1949 to present
Frequency of accuracy checks (time and height)	*Daily*
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	J. Newman and Venner Ltd, England
Time scale (hr/in) 4	Height scale (ft/in) 1
Range of gauge	−1 ft 6 in. to +6 ft 6 in.
Diameter of float	9 in.
Environmental effects on gauge	None
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	M.H.T. B.M. No. 160
Height of bench mark above gauge zero	12·434 ft
Frequency of checking this height	Quarterly
Relationship between bench mark and land levelling system	Zero Admiralty Chart datum equals R.L. 0·19 ft of Melbourne and Metropolitan Board of Works datum
Stability of bench mark (including frequency of checking)	Niche cut in wall at N. corner of time ball tower, Williamstown. Yearly
Value of mean sea-level above zero of gauge	1·387 ft
Method of computing mean sea-level	Liverpool Tidal Institute from dubious data in 1945
Site	Near boat landing, Ann Street Pier

Details of Tide Gauge

Station (locality)	Wyndham, W.A.
Latitude 15°27′S.	Longitude 128°6′E.
Owner	Public Works Department, W.A.
Operator	Public Works Department, W.A.
Period of operation	Oct. 16, 1962, continuing
Periods for which continuous tidal records are available	Satisfactory records not yet available
Frequency of accuracy checks (time and height)	Weekly
Method of checking accuracy of recorded heights	Tide board alongside gauge
Maker's name	Leupold and Stevens
Time scale (hr/in) 2½	*Height scale (ft/in)* 2
Range of gauge	40 ft
Diameter of float	10 in.
Environmental effects on gauge	Probably in wet season
Period of intended operation of gauge and future plans	Indefinitely

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Admiralty bench mark on power line pylon
Height of bench mark above gauge zero	32·26 ft
Frequency of checking this height	As required
Relationship between bench mark and land levelling system	30·86 ft above zero of land levelling system
Stability of bench mark (including frequency of checking)	Lead plug set in concrete foundation
Value of mean sea-level above zero of gauge	
Method of computing mean sea-level	
Site	

Details of Tide Gauge

Station (locality)	Yamba, N.S.W.
Latitude 29°25′40″S.	Longitude 153°22′E.
Owner	Department of Public Works, N.S.W.
Operator	Hydrographic Surveyor
Period of operation	Feb. 1963, continuing
Periods for which continuous tidal records are available	From Feb. 1963 to present
Frequency of accuracy checks (time and height)	Every 4 days
Method of checking accuracy of recorded heights	By visual tide gauge
Maker's name	E. Esdaile and Sons, Sydney
Time scale (hr/in) 2	Height scale (ft/in) 1
Range of gauge	7 ft
Diameter of float	3 in.
Environmental effects on gauge	River discharges and winds
Period of intended operation of gauge and future plans	Temporary gauge

Details of Tide Gauge Datum

Local bench mark related to tide gauge zero	Zero southern breakwater
Height of bench mark above gauge zero	19·46 ft
Frequency of checking this height	
Relationship between bench mark and land levelling system	Not connected to standard datum
Stability of bench mark (including frequency of checking)	Should not be regarded as stable for geodetic levelling purposes
Value of mean sea-level above zero of gauge	
Method of computing mean sea-level	
Site	Clarence River entrance

STATION LOCALITY INDEX

Indian Ocean	Christmas I., 8 Cocos (Keeling) Is., 9
New South Wales	Ballina, 5 Camp Cove, Port Jackson, 7 Clarence River Entrance, 8 Coffs Harbour, 9 Eden, 11 Fort Denison, Port Jackson, 12 Lord Howe I., 16 Moruya River Entrance, 18 Newcastle, 19 Port Kembla, 22 Yamba, 30
Northern Territory	Darwin Harbour, 10 Melville Bay, East Arnhem Land, 18
Pacific Ocean	Lord Howe I., 16 Thursday I., 26

Queensland	Cairns Harbour, 7
	Gladstone, 15
	Lucinda, 17
	Mackay Outer Harbour, 17
	Port of Normanton, Karumba, 24
	Thursday I., 26
	Townsville Harbour, 26
South Australia	Ardrossan, 4
	Beachport, 5
	Brighton, 6
	Edithburgh, 11
	Franklin Harbour, 13
	Kingston, 16
	Port Adelaide Inner Harbour, 20
	Port Adelaide Outer Harbour, 20
	Port Augusta Power Station, 21
	Port Augusta West, 21
	Port Lincoln, 23
	Port Macdonnell, 23
	Port Pirie, 24
	Stenhouse Bay, 25
	Thevenard, 25
	Victor Harbour, 27
	Wallaroo, 28
	Whyalla, 28
Tasmania	Devonport, 10
	Emu Bay, Burnie, 12
	Hobart, 15
Victoria	Geelong, 14
	Point Lonsdale, 19
	Victoria Dockhead, 27
	Williamstown, 29
Western Australia	Albany, 4
	Bunbury, 6
	Fremantle, 13
	Geraldton, 14
	Port Hedland, 22
	Wyndham, 29

Printed by C.S.I.R.O., Melbourne

C.S.I.R.O. DIVISION OF FISHERIES AND OCEANOGRAPHY

TECHNICAL PAPERS

1. M. Blackburn and G. W. Rayner.—Pelagic fishing experiments in Australian waters.
2. T. W. Houston.—Commercial trawling lists in the Great Australian Bight, 1949–52.
3. M. Blackburn and R. Downie.—Oily pilchards in New South Wales waters.
4. A. H. Weatherley.—Tasmanian farm dams in relation to fish culture.
5. D. J. Dunstan.—The barramundi *Lates calcarifer* (Bloch) in Queensland waters.
6. H. R. Jitts.—Measurements of light penetration in the Tasman Sea 1955–57.
7. D. J. Rochford.—The primary external water masses of the Tasman and Coral Seas.
8. K. Wyrtki.—The surface circulation in the Coral and Tasman Seas.
9. G. F. Humphrey.—The concentration of plankton pigments in Australian waters.
10. B. S. Newell.—Hydrology of south-east Australian waters: Bass Strait and New South Wales tuna fishing area.
11. B. V. Hamon.—Structure of the East Australian Current.
12. B. Wisely and C. Purday.—An algal mass-culture unit for feeding marine invertebrate larvae.
13. J. M. Thomson.—The tagging and marking of marine animals in Australia.
14. E. J. F. Wood.—Dinoflagellates in the Australian region. II. Recent collections.
15. B. V. Hamon.—Australian tide recorders.