



Wave-rider buoy

Overview

The Department of Transport's (DoT) Coastal Information (CI) team is a centre of expertise for data collection, retention, analysis, management, dissemination and presentation of marine, land, infrastructure and transport related information. The CI branch primarily services Coastal Infrastructure Business Unit's core business activities, as well as Department of Transport activities and private sector clients.

Oceanographic Services

This team of specialist technical staff is responsible for the acquisition, analysis and management of oceanographic information comprising high quality tide, wave and current data collected from a range of modern oceanographic measuring devices from throughout WA.

Tide data is collected using a number of tide gauges in locations extending from Esperance on the South coast to Wyndham in the north.

Tide gauge data has been collected for more than 100 locations around the WA coastline. Historic data is significant for the design of new coastal facilities as it provides information relating to extreme weather events such as storms, cyclones and floods. This allows coastal engineers to design cost-effective structures suitable and adapted to the local conditions.

Data from the gauges is downloaded automatically and validated using mathematical computer processes and human checks. Once analysed the data is used to produce a range of tide information including:

- Tide predictions for safe navigation of ports and coastal waters
- Tidal datums for hydrographic surveys and the production of navigational charts
- Tidal statistics for coastal engineering design, environmental studies, coastal development and scientific research
- Tidal information for management of marine facilities
- Extreme event analysis of storm surges.

Tide data is also used by organisations other than DoT to inform climate change studies; shipping movements and port operations; the management of extreme events by the State Emergency Service and the Bureau of Meteorology (BOM). The data is presented in near real time on the DoT website.

Wave data is collected using wave-rider buoys at strategic locations around the State. Signals are received at a shore station where it is processed by a data logger which produces wave data statistics. The data is further validated and analysed and then used by various organisations as mentioned above. It is also used for recreational marine activities as well as scientific and educational research.

Specialised and finer detail data is collected by acoustic wave and current (AWAC) instruments deployed to the ocean bottom to depths of up to 20 metres. Data from these instruments has provided valuable information for the investigation of proposed boat ramps, boat harbours and other coastal protection works around the State.

Both tide and wave data are in high demand by research organisations such as universities, the Commonwealth Scientific and Industrial Research Organisation and BOM. Requests are also received from other State Government departments. Data is also used by local governments and engineering companies who are engaged to undertake work along the WA coastline.

Hydrographic Surveys

Hydrographic survey data is collected using specialised sonar equipment and computer acquisition software. It is used to determine the bathymetry of the seabed (the depth and shape of the seabed). The information developed then supports DoT's management of the WA coastline and coastal facilities.

The specialised team of hydrographic surveyors primarily carry out hydrographic and engineering survey work in support of DoT's maritime objectives. They also provide contract services for a number of WA port authorities to obtain crucial data for shipping movements. Before the 1990s extensive single beam surveys were conducted along the Mid-West coast to produce navigation charts. Today surveys of poorly charted coastal areas still occur and are used to determine safe passage and anchorages for recreation and commercial vessels.

Bathymetric surveys are studies of the underwater depth of the ocean floor and are used for:

- Identifying the most suitable shipping channel, planning dredging works, developing charts and clearance surveys
- Investigations to confirm reported shoals and sandbanks
- Confirmation of river and inland waterway depths
- Monitoring of harbour basins and shipping channels
- Coastal monitoring which includes land based engineering surveys and bathymetric studies
- Assisting with marine habitat mapping
- Providing data for identification of suitable locations for proposed maritime facilities.

The surveys are carried out using either of the two purpose built hydrographic survey vessels. The *Alex Hansen III* is a 9 metre versatile vessel which can operate within a range of 20 nautical miles from the WA coastline, while the *Profiler II* is a 6.5 metre vessel used for near-shore and inland waterway surveys.

Land based engineering surveys also undertaken by the group are used for:

- Investigation and monitoring for maritime facilities, navigation aids and beach monitoring; and
- Construction surveys for maritime facilities and navigation aids.

While the majority of survey data is used for the teams within CIBU the data collected is also utilised by a number of other State Government and non-government organisations such as the port authorities and local governments. Examples of recent projects include the high profile Augusta Boat Harbour where surveys were conducted to complement the marina development, and the Port Geographe Coastal Reconfiguration where monitoring of bathymetry and the shoreline was essential to assist with developing the optimum redesign.

Geographic Information Management

The management and dissemination of spatial information is now recognised as a vital component of any business dealing with infrastructure development, land tenure management or field based research. In partnership with the other sections of CIBU, Geographic Information Management (GIM) is responsible for the analysis and management of data collected as well as the dissemination of spatial information to other users within DoT.

GIM is responsible for the development and maintenance of CIBU's asset, lease and licensing applications. A browser based intranet system is used that enables spatial and textual data to be displayed and managed by the custodial business area. GIM is responsible for the development and maintenance of this system.

GIM is providing integrated systems to help manage the coastal facilities and administer infrastructure licences, as well as to accurately preserve and make available its information holdings. Engineering plans and drawings are physically maintained and catalogued for ease of access. Oceanographic data gathered relating to tides, waves and hydrographic surveys is integrated and viewable via a web interface.

Marine safety information relating to navigation aids and regulated marine use boundaries are also managed and incorporated. Further contextual data from other sources is acquired and integrated, including the coastline, land administration data, roads and bus routes.

GIM fulfils DoT's responsibilities to manage and provide access to marine data as a valuable community asset, consistent with the WA Land Information System (WALIS) guidelines and policies.

Cartographic Services

Maritime and transport related mapping activities are performed by the highly skilled and specialised team which has won various State, national and international awards and commendations for excellence in mapping sciences.

Cartographic Services delivers:

- Tenure and planning products for the development and maintenance of WA's maritime infrastructure such as boat harbours, jetties and boat launching facilities
- Aerial Photography interpretation for the creation of coastline movement plots and general mapping products
- WA's Nautical Chart Program which includes the production of hard copy paper charts, notice to mariners and digital nautical charts
- Bicycle maps including the Perth bike map series

- A large range of TravelSmart maps
- Analysis mapping of vehicle and pedestrian surveys
- Graphic design services for reports and brochures.

The team has access to an extensive library of spatial data, including aerial photography, cadastre, road networks, coastlines and administrative boundaries which aid the mapping process. An extensive suite of specialist software is utilised to produce high quality end products which can then be distributed digitally or output as hard copy in a range of sizes and media.

Coastal Data Web Information

CIBU provides a key supporting role in the management of the marine pages on the DoT website. The site provides information about ocean conditions including both historical and real time wave data, tide predictions, storm surge, live coastal images via coast cams, information on nautical charts, notices to mariners and access to maritime geographic data held by DoT.

Coast Cams

www.transport.wa.gov.au/imarine/coast-cams.asp

Nautical Charts

www.transport.wa.gov.au/imarine/nautical-charts.asp

Notices to Mariners

www.transport.wa.gov.au/imarine/notices-to-mariners.asp

Oceanography

www.transport.wa.gov.au/imarine/tide-and-wave-data-current.asp

www.transport.wa.gov.au/imarine/historical-tide-and-wave-data.asp

www.transport.wa.gov.au/imarine/storm-surge-data.asp

Data Management

www.transport.wa.gov.au/imarine/marine-geographic-data.asp

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