Mapping Australia's coastal defence structures

Understanding the gaps and the need for a national dataset

Julian O'Grady, Claire Trenham, Helen Bloustein, Ramona Dalla Pozza, Heidi Evans, Julia Nunn, Susan Sweeney. CSIRO, DEECA, UTAS, DWER, DEW. NESP 2.10 Oceans and Coasts

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Australia's coastline is facing increasing pressures from erosion, exacerbated by rising sea levels and extreme weather events. To determine which parts of the coast are vulnerable, it's crucial to identify areas protected by engineered coastal structures such as sea walls, groynes, and levees. The Climate Systems Hub, through its knowledge brokers, is helping to address this issue by enquiring with state governments about available spatial data on coastal protection structures.

Summary

A recent report from the Insurance Council of Australia, titled Actions of the Sea, highlights the need for consistency in how coastal defence data is gathered and shared. It recommends that state and local governments develop spatial databases of coastal defences according to a standard framework.

The state-based datasets on coastal structures vary in detail and how they are names, and a limitation is that these datasets aren't regularly updated. This means they often don't reflect the full coastal protection landscape. Depending on the quality and level of detail, the data can be used in a range of applications—from first pass scientific research at the national scale to detailed first-pass coastal hazard analysis to inform planning policy decisions.

The Climate Systems Hub is working to progress this issue. The hub's knowledge brokers are reaching out to key staff in state governments to inquire about available spatial data on coastal protection structures. Ideally, these datasets would include vital information such as the location, height, and type of each structure.

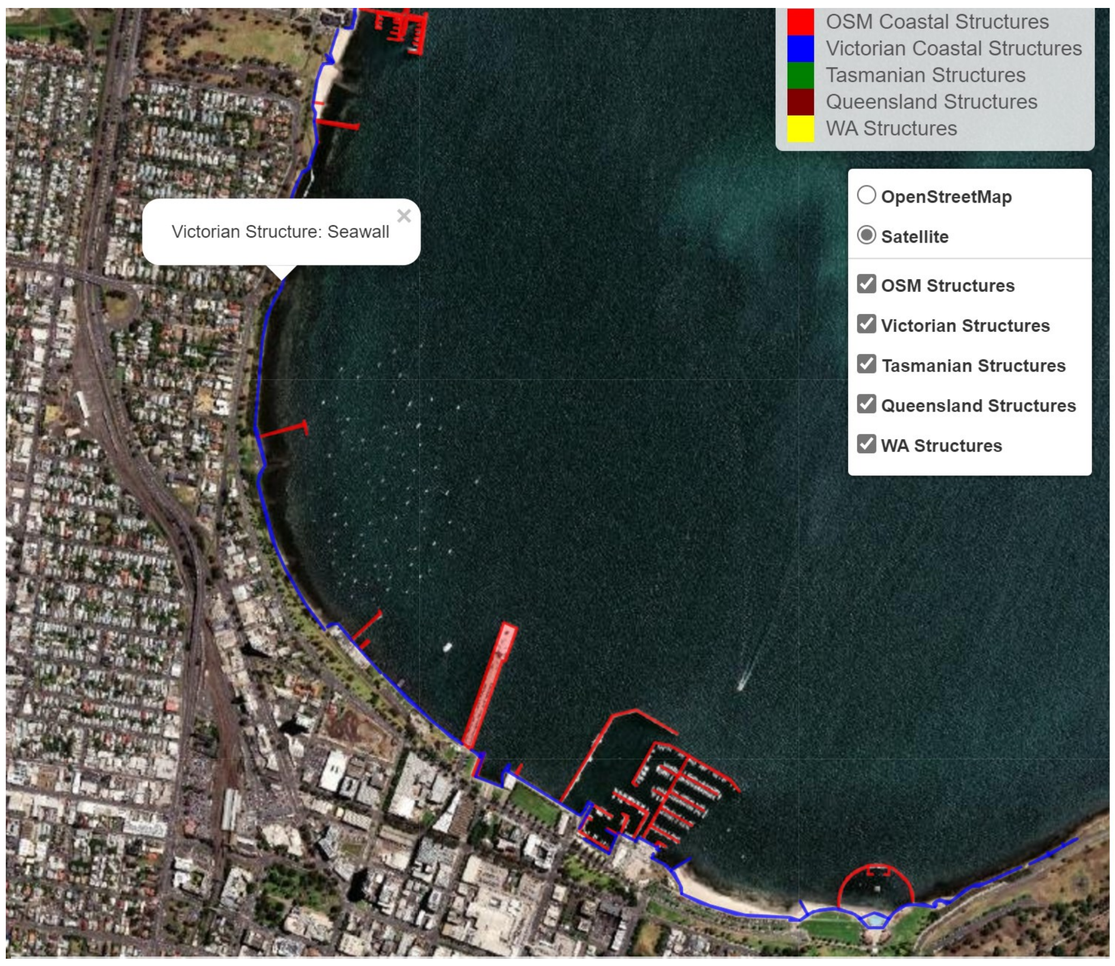

Figure 1: Zoomed in map of the coastal structures around Geelong in Victoria. Blue lines are the Victorian structures, red lines/polygons are from Open Street Maps.

Datasets

Currently, Victoria, Tasmania, Queensland, and Western Australia provide standardised publicly accessible datasets on their coastal protection structures. However, this data is not readily available for South Australia, the Northern Territory, or New South and there is insufficient information regarding potential updates to these datasets. A comprehensive national dataset would help researchers and decision makers assess the risks to Australia's coastlines and guide efforts to protect vulnerable regions.

Existing national datasets, such as Smartline, are being used to help fill current gaps in our datasets of coastal defences. Smartline is a national product that identifies whether a structure exists or not. OpenStreetMap (OSM), a collaborative project where users contribute geographic information, also includes mapping of coastal structures in Australia. Although OSM is not yet comprehensive, it serves as a useful starting point for understanding where protections exist—and where they do not. By exploring OSM contributions, we aim to inform efforts to collect standardised data and make it more accessible to coastal researchers, engineers, and policy managers.

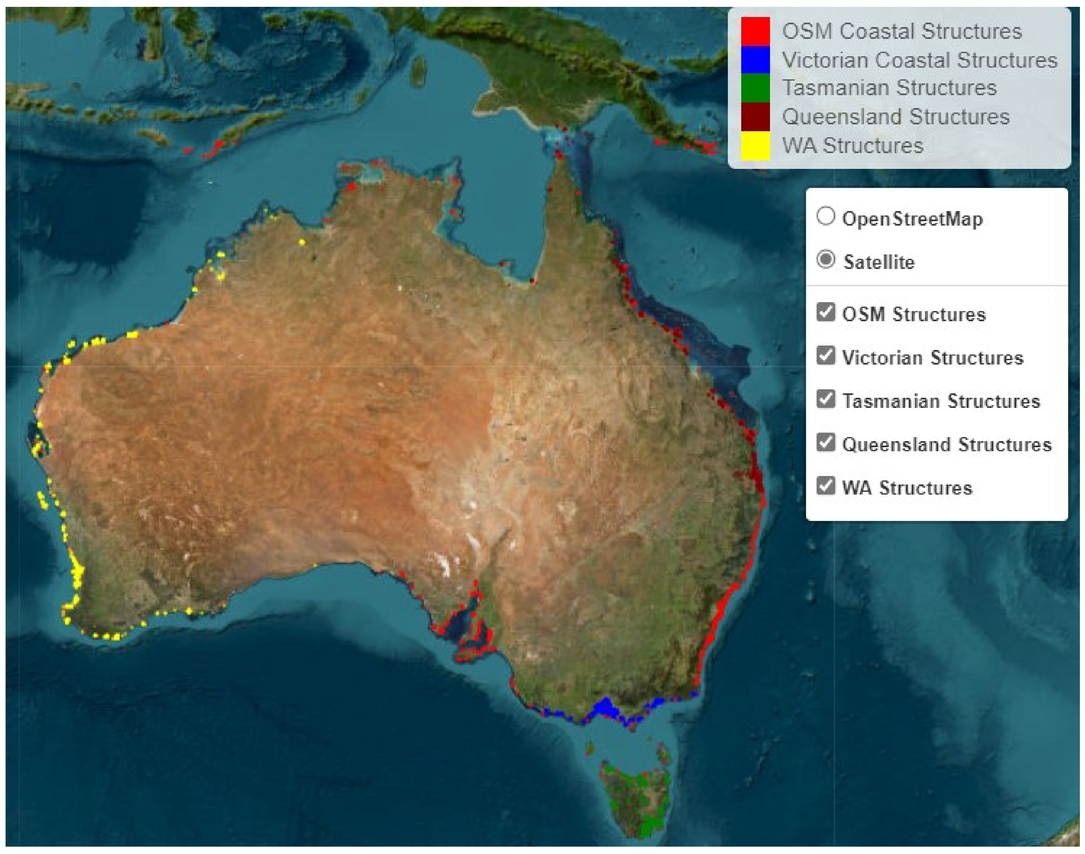

Figure 2:. Coastal structure data is available form TAS (green), VIC (Blue) WA (yellow) and QLD (Maroon) government websites and nationally form Open Street Maps (OSM).

Consistent naming of structures

Each state has its own unique term for naming structures. Using those names as a basis, a national product was generated by choosing a name that represents the most appropriate and straightforward term. All similar structure names outlined in the following table were then merged.

Structure	State based naming of structure
breakwater	man_made:breakwater, Breakwater, BKW, OBW
groyne	man_made:groyne, Groyne, GRN
wharf	man_made:quay, WHF, Wharf, wharf, Wharf Line, Wharf_commercial, Wharf_noncommercial
Seawall	wall:seawall, barrier:retaining_wall, barrier:wall, Seawall, SWL, Sea Wall, Revetment
Boatlaunch	leisure:slipway, Boat Ramp, BLR, Slipway
jetty pier	man_made:pier, Jetty, JET, Pier
Boardwalk	bridge:boardwalk, BDW
Other	emergency:lifeguard, Dry Dock, Other, Unknown, Fish Farm, Marina, Navigation Buoy, Oyster Bed, MS_Misc, CSW, OFP, CHN, Dominantly artificial shores (erodibility unclassified but commonly low)

Where to from here?

Researchers and knowledge brokers within the hub are actively exploring the most effective ways to consolidate and centralise coastal protection data , while also identifying potential applications of this data across the NESP hubs. This could involve mapping efforts through platforms like OpenStreetMap or the creation of a national data repository. The success of this initiative depends on the active involvement and collaboration of researchers, engineers, policymakers, and the broader community.

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