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## **Appendix 4 – Information about Dredging Models in Other Regions or States**

### **Interstate Governance and Management of Recreational Waterways**

The issue of cost effective management of navigation in high usage recreational waterways is not unique to NSW. The management of the Gold Coast Waterways in Queensland and Gippsland Lakes, Western Port and Port Phillip in Victoria provide examples of management and funding of dredging to maintain navigability in minor/recreational ports which have dynamic sedimentary processes, elsewhere in Australia.

It should be noted that these ports serve high numbers of recreational users but are also commercial ports with commercial fishing and tourism vessels complementing use by recreational fleets. The following sections provide a brief overview of boating use, governance, management processes and investment in dredging in these waterways. Lessons that could be transferred to the management of Swansea Channel are highlighted.

#### **1. Dredging of recreational waterways in Queensland**

Maritime Safety Queensland is the agency responsible for ‘maintaining access in high use waterways for recreational boating’ (MSQ website). Like NSW, this agency is part of a broader maritime and roads portfolio.

Dynamic sedimentary processes in shoaling inlets are recognised as creating navigation and safety issues for recreational vessels. Dredging also has flood mitigation benefits. Where the dredged sediment is clean sand, it can be used for land fill or for beach nourishment.

##### ***Boating activity – Gold Coast waterways***

17 per cent of Queensland recreational vessels are within the Gold Coast region, following a 37 per cent increase in registered recreational vessels in the region over 5 years. The total number of registered vessels is now 41,000 recreational and 840 commercial.

Over five years, the Queensland government has invested \$12 million in maintaining navigation channels by dredging in Gold Coast waterways. Maritime Safety Queensland and Gold Coast City Council have committed to invest a further \$2.5 million annually on an ongoing basis.

The Gold Coast Waterways Steering Committee, with representatives from state government, Gold Coast City Council and Marine Queensland oversees waterways development, including dredging.

Maritime Safety Queensland also oversees a competitive bid program for boating infrastructure and waterway management/maintenance. Key input to the assessment of bids is a recent study of recreational demand forecasts, which identifies priority needs for boat ramp, boat harbour and jetty requirements

#### **2. Dredging of recreational waterways in Victoria**

The recreational and commercial ports of Westernport Bay, Port Phillip Bay and Gippsland Lakes are managed by local Port authorities, under the broader administration of the State Transport department and Minister for Ports. The Transport Department is responsible for navigation dredging in these ports, which have significant economic value in regional economies because of their very high recreational boating use.

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## **Westernport and Port Phillip Bay**

Parks Victoria is the Port manager for local ports in Westernport Bay and Port Phillip Bay estimates some 73 million visits annually, supporting 600 local businesses such as commercial fishermen, tour operators and fishing charters.

In a media announcement in August 2011, the Minister for Ports announced:

As Minister for Ports, I'm pleased to work in partnership with parks Victoria in management of these local ports and we provide \$4.4 million each year to Vic parks to help them maintain these assets and keep these ports active and open. But I'm pleased to announce today that, in addition to that annual funding, we're providing an additional \$2 million lump sum for Parks Victoria for really important works and part of those works are undertaking \$450,000 for dredging of Patterson River to remove the silt, to make a deeper channel for boating, make it safer, make it more accessible and to make this active waterway even busier, which is really terrific for this local community.

## **Gippsland Ports**

The history of management of the entrance to Gippsland Lakes has several similarities with Lake Macquarie, except that there is a clear process link between lake entrance shoaling and beach volume/recession at Gippsland Lakes. The shoaling of the trained lake entrance has required ongoing dredging for more than 30 years. Until 2008, navigation dredging used a side casting dredge; however, it became clear that this type of dredging was not effective in recreational or cost terms. Several management actions followed:

- Formation of a Gippsland Lakes Ocean Access Initiative and Gippsland Lakes Ocean Access Environmental Management Plan. This initiative has been funded (most recently) with \$9.1 million over four years, managed by Gippsland Ports, which is a statutory authority of the Victorian government. The strategy includes design depths and widths for navigation channels, principally in the range 50 metres to 100 metres width and 4.0 to 4.5 metres depth. Vertical and horizontal tolerances for channel form are specified.
- Gippsland Lakes Ocean Access Engagement Strategy. Key stakeholders identified include local, state and commonwealth government organisations; recreational, business and commercial/industry users; indigenous and heritage users; local residents and environmental interest groups. The Gippsland Ports web site is a key communication tool, together with an annual stakeholder briefing.
- Lakes Entrance Sand Management Program (using a trailing suction hopper dredge and offshore dredge spoil disposal grounds).
- Dredge management plan (design and operational parameters). Gippsland Ports holds the necessary Commonwealth and State permits and consents. Requirements included an environmental risk register, management plan and stakeholder engagement plan.
- Annual reports of dredging activities and compliance with the environmental management plan. This includes ongoing detailed bathymetric survey of the channels and the disposal grounds, ongoing wave climate monitoring, as well as review of environmental performance in all aspects of the program.

In 2011/12, the dredging campaign focused on achieving channel depths specified in the Program. Some 380,000m<sup>3</sup> of sand was removed from navigation channels (particularly across the bar and wedge channels) over 67 days of dredging. Dredge rates varied between 12.8 and 24 m<sup>3</sup> per minute (or 720 to 1450m<sup>3</sup> per hour).

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Although the lakes have different commercial and recreational profiles, the management plan and reporting processes for Gippsland Lakes provide useful models for Swansea Channel and Lake Macquarie.

### 3. Tuggerah Lakes Estuary Management

In 2008, Wyong Shire Council (WSC) received funding (\$8.66 million in Stage 1 and a further \$11.34 million for Stage 2) from the Australian Government through Caring for our Country, to implement actions in its Estuary Management Plan that relate to water quality improvement – estuary health. Implementation is managed through Council's Natural Resources Unit with input from its Coast and Estuary Management Committee. The works program does not include dredging of navigation channels, but does include recreational facilities (such as boat ramp upgrades and shared foreshore pathways) on foreshores.

WSC does own a dredge which operates intermittently in the entrance channel and in creek entrances. Its operation is funded by Council. Each dredging campaign has in the past been approved by DPI Fisheries and carried out in accordance with a construction and environmental management plan approved by the department.

The entrance to Tuggerah Lakes is not a trained entrance. The Estuary Management Plan provides for two types of dredging in the Tuggerah Lakes system:

- Dredging in the mouths of tributary creeks to remove built up sediment (deposited from bank erosion and the catchment), improve water quality and to provide navigation for small vessels. This work would be accompanied by other projects to stabilise creek banks, thus reducing the need for dredging.

The Estuary Management Plan included a recommendation for an 'all in one' approval for creek entrance dredging, which would apply to all dredging in the lakes, acknowledging the tie and cost constraints of separate approvals. Suggested funding sources were state agencies and H-CRCMA.

- Ongoing dredging in The Entrance, to maintain recreational amenity in the prime tourist area of Tuggerah Lakes and to allow a small amount of continuous exchange of lake water and ocean water. This was expected to provide some biodiversity benefits, subject to detailed biodiversity studies to optimise the dredging plan.

In relation to dredging at The Entrance, the Estuary Management Plan recommended a series of triggers to set the timing of dredging activity. Council would manage the entrance dredging program (which is not for navigation, other than perhaps very small recreational craft). All entrance management operations were proposed to be reported to OEH and DPI Fisheries. Investment and outcomes would be reported to a technical advisory group and to the Estuary Management Committee.

WSC will dredge The Entrance channel in late 2012. The Entrance was last dredged in May 2010 and the dredge has been out of the water for maintenance. The proposal is to realign the channel by removing between 30,000 m<sup>3</sup> and 80,000 m<sup>3</sup> from the southern side of the channel.

The sand in The Entrance is marine sand with a clear hydrodynamic link to the adjacent ocean beaches.

The sand will be used to nourish the northern entrance shoreline near Karagi Park and Dunleith Caravan Park, improving the amenity of the entrance area for recreation. Sand dredged from The Entrance in the past has been placed on The Entrance North Beach, but the beach is currently in good condition, despite recent winter storms. The sediment

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dynamics at The Entrance are currently being modelled and the dredging program will also allow up to date calibration of the hydrodynamic processes.

#### **4. Lake Illawarra Authority**

The Lake Illawarra Authority is a statutory management authority, formalised by the *Lake Illawarra Act 1987*. The role and functions of the Authority are under review.

The aim of the Authority was to restore recreational and tourism values of the lake, by restoring estuary health. The works program for the Authority has had a strong focus on ecological enhancement, but also included a major program of improving recreational facilities on land and water.

Responsibility for administration of the Authority has been with the Minister for Primary Industries and the Minister for Regional Infrastructure and Services. The Authority had a Board of ten members, appointed by the Minister for Lands, chaired by a local community representative. Other Board members included Wollongong and Shellharbour City Councils, SRCMA, DP&I Fisheries, DP&I Crown Lands and five community members. An Executive Officer was provided by DPI Catchments and Lands (Crown Lands). The Board met formally six times a year. Minutes and Annual Reports were prepared and made public. Information below is from the 2010-11 Annual Report of the Lake Illawarra Authority.

The program of works managed by the Authority included:

- Construction and maintenance of entrance training structures. Unlike Lake Macquarie, a key function of the entrance works at Lake Illawarra is to reduce the amount of sand entering the estuary from the adjacent open coast and keep the entrance predominantly open. Even with the training walls, some dredging is required to prevent shoaling in the entrance area. In 2010-11, the Authority estimated the budget to remove 5000 m<sup>3</sup> of marine sand from an area 150 metres by 20 metres in the entrance channel, was \$100,000.
- Small scale dredging (less than 1000 m<sup>3</sup>) around boat ramps and jetties to improve recreational amenity.
- Facilities and boat storage for diverse recreational boating organisations.
- Estuary biodiversity projects.
- Foreshore recreation facilities including bike and walking paths, picnic areas etc.

In 2010-2011 the Authority had a budget of \$2.46 million. The budget was derived from:

- NSW Government (39 per cent).
- Other Government Grants (5 per cent). Small grants were obtained from NSW Estuary Management Program, NSW Floodplain Management Program, Better Boating Program and Recreational Fishing Trust.
- Wollongong and Shellharbour Councils (44 per cent).
- Other (12 per cent).

The contributions from State and Local government to the operation of the Authority are therefore 50/50, with Councils making their contributions in cash or in kind, through performing pre agreed works. The Authority has several full time and contract staff.

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## 5. Port Hacking

Dredging of navigation channels in Port Hacking was conducted in 2012. A minimum of 70,000m<sup>3</sup> was planned to be dredged from the channels. Sand extracted from the dredge path was placed in water 4 metres to 8 metres deep, off North Cronulla Beach. The new bedform was intended to improve surfing conditions, but sand would eventually move on shore and protect the sea wall.

This project is managed by Sutherland Shire Council, with 100 per cent of the budget provided by the NSW Estuary Management Program, based on an MOU with a previous NSW Government. A similar estuary dredging and beach renourishment program was undertaken in 2007-2008, with 90,000 m<sup>3</sup> of sand sourced from the Port Hacking navigation channels.

The works are identified in both the Estuary Management Program for Port Hacking and the Coastline Management Plan for Bate Bay (2010). Sutherland Shire Council manages the implementation of these Plans, using its Coast and Estuary Management Committee to provide community and stakeholder involvement.

## 6. Manning River and Farquhar Inlet

Navigation in the Manning River estuary is generally by small, locally based motor vessels and sailing vessels. Parts of the Manning Estuary have been dredged since the 1850s, when river transport was the main means of access to Taree. Between 1889 and 1950, some 4.3 million tonnes of sediment was dredged from the Harrington Inlet Bar and 4.9 million tonnes from the reaches from Harrington to Wingham.

Farquhar Inlet is one of the entrances to the Manning River at Old Bar. This entrance is not trained and has a history of intermittent closure. Dredging to improve navigation and environmental flows is an action in the Manning River Estuary Management Plan and the Farquhar Inlet Entrance Opening Management Plan. Greater Taree City Council has also prepared a Manning River Maintenance Dredging Strategy (2010) to set priorities for 27 dredging sites. Council describes this document as a 'framework to assist in the application for funding to achieve maintenance dredging works that have been identified.'

The bed of the Manning River is Crown land. Estuary management projects, for estuary health, navigation and recreation are managed through Council's Estuary and Coastline Management Committee. The Committee has members from Council, agencies and the local community, including diverse waterway users (commercial oyster growers and fishermen).

Maintenance dredging was carried out in the navigation channels adjoining Cowans Channel and Charlies Island in mid 2012.

Dredging in the river is being done with a dredge purchased by the local community (Farquhar Inlet Management Group), at a cost of \$300,000. Taree City Council is managing the dredging program, with input from Roads and Maritime Service and Crown Lands. The current dredging project has created two sand islands in the estuary, which the community group proposes will provide both recreational space and habitat for shorebirds. The Management Group has a series of other Manning River estuary projects lined up for the dredge, provided Council can source operational funds. These projects include:

- Manning River Rowing Club course.
- Harrington Back Channel, Harrington swimming lagoon and Harrington Waters canals.

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## **7. Georges River Estuary Management**

Environmental projects and overall planning objectives for the Georges River are managed by the Georges River Combined Councils Committee Inc. (GRCCC), which includes representatives from nine local councils along the estuary, river and its catchment. The Georges River discharges into Botany Bay. The GRCCC program includes the Botany Bay Coastal Catchments Initiative. The management issues for the Georges River are not the same as those in Swansea Channel (its programs do not include estuary dredging), but the GRCCC manages up to 11 natural resource programs across the system, including water quality improvement, stormwater and estuary health projects. The programs are closely aligned with the Catchment Action Plan prepared by Sydney Metropolitan CMA.

The Georges River model illustrates a management system where multiple local Councils work together to implement one integrated natural resources program. Several State agencies with environmental responsibilities and the Sydney Metropolitan CMA are also stakeholder members of GRCCC. The GRCC is hosted by Hurstville City Council which provides some management resources. The GRCCC also employs a small number of full time staff and part time staff. Councillors from member Councils are the decision makers.

The GRCCC has prepared various issue specific plans (including the Botany Bay Plan and Georges River Estuary Management Plan), and most recently (2011), a revised and updated Management and Implementation Plan. Progress is reported on the GRCCC website and also in Annual Reports and Executive Summaries. The GRCCC receives contributions from member Councils which are used to fund its river and estuary management activities (including as partnership funding for grants).

## **8. Regional Crown Reserve system**

Two examples of existing Regional Crown Reserves in coastal contexts are the Tweed Coast Regional Crown Reserve (gazetted August 2006) and the Nelson Bay Foreshore Regional Crown Reserve. Both reserves cover tidal waterways, sea bed and coastal land parcels. Plans of Management have been prepared for both of these Regional Crown Reserves. Their management illustrates a potential management pathway for Swansea Channel and the broader marine and catchment areas of Lake Macquarie.

The Tweed Coast Regional Crown Reserve, which includes the Tweed River estuary and parts of its foreshore, several smaller estuaries, marine waters and sea bed and the beaches and foreshore areas along the Tweed Coast, is a landscape which has a number of characteristics, values and issues in common with Lake Macquarie. A significant difference is the presence of the Tweed Bypass Scheme, which takes sand from the southern side of the Tweed River entrance and places it on beaches to the north.

For comparison purposes, the following information explains the waterway management issues in the Tweed Regional Crown Reserve and how they are being addressed.

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## **Waterway issues and management – Tweed River**

Issues include:

- Increased boating activity and increased demand for boating infrastructure in the lower Tweed as a result of improved navigation conditions in the Tweed River Entrance.
- Protection of aquatic health and the aquaculture industry, threatened by declining water quality associated with development adjacent to waterways.
- Proliferation of private unauthorised marine infrastructure, including pontoons, jetties and ramps, which impede public access.

Like Lake Macquarie, the construction of training walls on the Tweed River entrance in the 1880s did not remove the need for dredging to maintain navigable waters. More than 2 million cubic metres of sand has been dredged from the Tweed River since that time, for both navigation purposes and extraction of the sand resource. The Plan of Management includes ongoing dredging activities, including ongoing dredging of the entrance (at the seaward end of the training walls) to maintain a navigable river entrance. This dredging is in addition to the pumping for the sand bypassing scheme, but is funded as part of that scheme. Dredging within the estuary is also conducted, using funds from the Minor Ports and Trained River Entrances program, to provide navigation and access to the Southern Boat Harbour for fishing vessels and other vessels.

The Plan of Management reports that between 2004 and 2007, after the Tweed River Bypass scheme was operational and navigation in the river entrance became reliable, vessel registration in the Tweed Region grew by 6 per cent. This is twice the NSW growth over the same period and among the highest in NSW and Queensland' (TSC 2007).

### ***Management structure and governance – Tweed Coast Regional Reserve***

The Tweed Coast Regional Reserve is managed by DPI Catchments and Lands and Tweed Shire Council as Reserve Trust Managers. The Reserve Trust Managers implement the Plan of Management. They may also enter into leases or licences over all or part of the Reserve lands, provided the lease or licence is consistent with the plan of management, the Crown Lands Act and in the public interest.

The Plan of Management proposed that a 'Reserve Agency Liaison Group' would be formed, which, in addition to DPI Catchments and Lands and Tweed Shire Council, would involve various state agencies and also the Traditional Owners. This group would function as an advisory panel to facilitate coordinated management across the various agencies and organisations.

The Plan of Management refers to annual expenditure on the Tweed Regional Crown Reserve of \$3 million, without an allowance for infrastructure replacement. The Plan of Management foreshadowed a further \$1 million per annum for asset replacement, to be reviewed annually in accordance with operational plans, plus \$0.2 million annually for maintenance of the entrance training walls.

The Tweed Coast holiday parks are within the Regional Crown Reserve and income from these parks is used by Tweed Shire Council to provide funds for managing the Regional Reserve, without a direct input from its rate base. Council's resources may be matched by grants from State and Commonwealth programs where the objectives of a specific project are consistent.

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### ***Tweed River Boating Management Plan (RMS)***

The Boating Management Plan does not deal with dredging of the Tweed River entrance, but addresses a range of complimentary boating safety issues. In particular it recommends specific information for boat operators about bar crossings and the inclusion in boat licensing tests of questions about safe bar crossings. These information and training actions are also relevant to Lake Macquarie and Swansea Channel.