

## **Ross Fryar Coastal and Water Infrastructure and Impacts**

Ross Fryar has extensive experience with respect to infrastructure in the coastal environment, based on hydrodynamic and water quality modelling and assessments in coastal and estuarine areas. A number of these projects pertain to the assessment of impacts and mitigation measures for plumes and outfalls, including sediments, wastewater and thermal plumes. Ross has acted as project manager, project director and peer reviewer for a range of these projects undertaken for sites throughout Australia, the Asia/Pacific, South America, Africa and the Middle East.

### **Relevant Experience**

- ☞ Gold Coast Cruise Terminal (Notional Seaway Project) EIA
- ☞ Brisbane River Pathogen Modelling project
- ☞ Desalination plant siting and feasibility study - Queensland.
- ☞ Water quality assessments and reviews for development projects in the Middle East, including Palm Jumeriah and Palm Jebel Ali
- ☞ Modelling for Port development project, MMHE Yard, Malaysia
- ☞ Evans Heads Effluent Release Study – assessment of baseline and impacts associated with lagoon and ebb tide release options for wet weather and effluent discharge in northern NSW.
- ☞ Brisbane River Water Quality Model for the Oxley/Wacol WWTP Upgrade EIS.
- ☞ Moreton Bay Water Quality Model - Bay Islands Waste Water Options Study. Hydrodynamic and nutrient modelling for Moreton Bay, with an assessment of several outfall options.
- ☞ Ras Az Zawr, Arabian Gulf. Hydrodynamics, sediment transport and thermal plumes associated with a proposed refinery and port development in Saudi Arabia.
- ☞ 25 Sewage Lagoon (Melbourne). Assessment of e-coli die off and the effectiveness of the flowpath through the 25W sewage lagoon.
- ☞ George Town WWTP Outfall. Basic near field plume dispersion modelling to assist in mixing zone definition in the Tamar River (northern Tasmania).
- ☞ 2D hydrodynamic modelling (RMA2) to assess currents and dredging impacts for Hay Point
- ☞ Simulation and design of water quality lake for an industrial estate in Townsville (Winner of a Qld Government award)
- ☞ Darwin East Arm Port – Predictive Modelling. Creation of a model to establish discharge criteria for a dredging operation in sensitive waters. An existing RMA2 model was enhanced, leading to a detailed assessment of plume dispersion, allowable discharge concentrations, and the establishment of trigger values in keeping with ambient conditions and sea state.
- ☞ Port of Townsville Commercial Marina. Project director for ongoing modelling investigations on behalf of the Port of Townsville. The commercial marina project

relates to the assessment of alternative marina configurations, the potential for siltation to occur, likely maintenance requirements, and the impacts associated with the proposed marina (i.e. erosion and deposition in adjacent areas).

- Port of Townsville Siltation and Modelling Study. Project manager of a study into the causes and management options associated with reducing the maintenance dredging of Townsville's Outer Harbour. A 3D mathematical model was established in order to reproduce circulation patterns in Cleveland Bay and the port area.
- Rewa River Salinity Modelling, Fiji. Part of the Suva-Nausori Water Supply project. Modelling to allow confirmation of the most suitable location for a new water supply off-take from the Rewa River.
- Melville Bay Circulation Modelling - Nabalco/ALESA. Job manager for 3D modelling exercise to address tidal current patterns and dispersion of thermal plume and other potential contaminants at Melville Bay, Nhulunbuy, NT. Data collection and oil spill modelling were also undertaken.
- Cocos Islands Marina Basin - Two dimensional modelling of marina basin options at Rumah Baru using the SMS/RMA2 package. Options included inland and offshore basins.
- Lake Tinaroo Water Quality Policy. 3D modelling to support the development of a new water quality policy for the lake. A complex hydrodynamic and water quality model was established, which considered a range of inflow and outflow locations, wind, temperature, solar radiation, rainfall and evaporation.
- Port of Weipa hydrodynamic and sediment modelling. Detailed model of key hydrodynamic and sediment transport processes, with coupling to wave modelling. Proof of high level interaction of waves on sedimentation process.
- Townsville Port Authority Stormwater Discharge Study. Project manager for study to determine stormwater discharge criteria suitable for conformance to the Environmental Protection Act.
- Port of Brisbane Dredging/Siltation Study, Qld: Field measurement and monitoring of siltation at a number of wharves in Brisbane River. Analysis of results and correlation with tidal, shipping and rainfall information.
- Arica Bay sediment plume modelling, Chile.
- Near field thermal plume modelling, Kharg Island refinery, Iran.
- Review of a range of relatively small coastal modelling projects including Jacobs Well Marina, Queensland; Djibouti Container Terminal;

### **Qualifications and Affiliations**

- BE (Civil Honours) 1987, M Eng St 1995
- NPER 3 registration
- Member, Institution of Engineers Australia and Member of Civil College

## Conference Papers and Journal Publications

1. Fryar R., Botev I., and Koskela R., *Dredging in Sensitive Environments – Using Smart Models to Manage Costs and Impacts*, World Dredging Conference, Hamburg, Germany (Oct 2004)
2. Koskela R., Fryar R., Koskela T., Sestokas K., Fraser A. and Lee J. (2004). *Developing Site-Specific Water Quality Objectives for Coastal Systems*. Enviro 04 Conference, Sydney. (in press).
3. Koskela R., Fryar R., Botev I., Petch D., Skarratt B., Eberhardt S., Koskela T., Fraser A. and Lee J. (2004). *Defining Mixing Zones for Wastewater Discharges*. (in preparation).
4. Fryar R., Koskela R., Botev I., Lee J., (2003) *Innovations in Managing Dredge Impacts in Coastal Waters*, NSW 2003 Coastal Conference, Port Macquarie, November 2003
5. Fryar R., Botev I., Martin C., and Jones C., (2003) *Reducing High Dredging Costs For The Port of Townsville -A Full Scale Hydrodynamic And Sediment Transport Model*, Coasts and Ports, (Auckland September 2003)
6. Fryar R. and Botev I., (2003) *Modelling to reduce dredging cost*, Civil Engineers Australia, (Coastal and Ocean Engineering Feature) October 2003
7. Botev I. and Fryar R., (2002) *3D Modelling of an Ecologically Sensitive Bay*, 2002 NZWWA Modelling Conference, Auckland, Nov 2002
8. Fryar and Botev, *Using Three Dimensional Models To Manage Outfalls and Minimise Environmental Impacts – Modelling Moreton Bay and The Brisbane River*, AWA 2002 Regional Conference, Mooloolaba, November 2002
9. Martin C. and Fryar R. - *Berth 11 Siltation And Hydrodynamic Modelling*, The Queensland Ports' Association 35<sup>th</sup> Engineering Conference, Cairns (Aug 2002)
10. Fryar R. and Botev I., *Receiving Water Modelling in Queensland - Assessing Impacts*, SIA (Qld) Regional Conference, Hervey Bay, September 2002
11. Fryar and Botev, *Application of 3D Models in the Coastal Environment*, Australian Journal of Water Resources, Vol 6 No.1, 2002
12. Fryar, Botev and Regan, *Application of 3D Models in the Coastal Environment*, 6<sup>th</sup> Conference on Hydraulics in Civil Engineering, IE Aust, Hobart, November 2001

## Seminars and Lectures (selection only)

- ☞ Fryar R., and Koskela R., *Application of 3D Models in Coastal and Estuarine Environments* Lecture delivered to 4<sup>th</sup> Year students, Centre for Marine Studies, Coffs Harbour, October 2003
- ☞ Fryar R., and Koskela R., *Application of 3D Models in Coastal and Estuarine Environments*, Seminar delivered in Adelaide (June 2003), Launceston, Sydney, Newcastle, Coffs Harbour and Ballina (August 2003), Melbourne (September 2003).