



WAMSI Biannual Progress Report to 31 May 2007 for *WAMSI Node 1 Project 1 (WAMSI Code 1.1):*

Southwest Australian Coastal Biogeochemistry

Executive Summary

The Southwest Australian Coastal Biogeochemistry study has had a productive first 11 months. Highlights have included a 28 day Southern Surveyor cruise to investigate the factors responsible for the "autumn bloom" or deep chlorophyll maxima observed at the shelf break and to characterise the benthic biomass, productivity and level of benthic-pelagic coupling on the shelf.

The findings of this voyage, which is not due for completion until June 6, will be reported on in the next progress report. A nutrient budget for the WA shelf waters has also been developed which suggests as much as 84% of primary productivity is recycled on the shelf. This highlights the importance of investigations of benthic-pelagic coupling being given prominence in WAMSI Node 1 projects.

In one aspect of the research to investigate this, modelling the response of phytoplankton productivity in the water column to changes (fluxes) in the amount of nutrients resuspended from sediments has shown that variations in this flux within the range of field measurements can account for seasonal variations in surface chlorophyll measurements. In other highlights, we have addressed the problem of how to downscale hydrodynamic models which typically use large grid sizes to enable simulation of currents over large geographic areas without the use of supercomputers.

For the WAMSI models we have adopted the use of nested polar grids which have smaller grid sizes close to the shore. We have been able to develop a system of nesting within the 10km gridscale SRFME hydrodynamic model for the WAMSI model to achieve a 100m grid coverage of the Marmion Marine Park.

A pilot sediment model has also been developed and applied to the Marmion Lagoon with the objective of assessing movement of material from the inshore coastal areas out to the shelf in particular during storm and high swell events. Recognising the likely importance of wave dynamics in coastal marine habitats, planning has also been underway for the deployment of a sophisticated array of instruments to measure the influence of waves on the cross – reef exchange and circulation of the Marmion Marine Park lagoon.

A range of measurements of kelp productivity have also been made and kelp densities will be related to wave generated energy measurements when data from the instrument deployment described above is obtained.

These are only preliminary findings in the first year of a five year program.