

 National Estuaries Network	Meeting No. 20 Perth, Western Australia
	17 May, 2011
AGENDA PAPER	State / Territory: WA

Prepared by: Catherine Thomson¹, Vanessa Forbes¹, Malcolm Robb¹, Kieryn Kilminster¹, Steve Fisher¹, Zoe Goss¹, Kerry Trayler²

Position:

Organisation: 1.Department of Water – Water Science; 2.Swan River Trust

1. Update – Estuary Management

- Swan Canning Estuary

River Protection Strategy

A River Protection Strategy is being developed to replace Riverplan and to reflect the new responsibilities set out in the *Swan and Canning Rivers Management Act 2006*. Under the Act, the creation of a Riverpark provided a new basis for management and the need to develop better ways for government, industry and the community to work together to sustain the health and enjoyment of the rivers. The Strategy defines river values and sets out how these values are to be protected by establishing issues, priorities, responsibilities and key strategies to meet targets for ecological and community benefit. The Trust is expected to report to the Minister, at least biennially, on the extent to which those targets are being met. The Trust is currently working to develop a report card framework that addresses ecological health and community benefit.

Estuary health report cards

Department of Water (DoW) is developing a suite of estuary health report cards using Eutrophication (ASSETS), Seagrass health and Sediment Indices. These will be developed with the assistance of Professor Bill Dennison, (University of Maryland) for the Swan Canning and other south west estuaries. The report card for the Swan Canning will provide a starting point for reporting on ecological health and community benefit as required under the draft River Protection Strategy (see above). DoW is working with the Swan River Trust to develop ecological health indicators for the report card. The Swan River Trust is also working with researchers at Edith Cowan University to develop a Useability Index for the Swan Canning Riverpark. This provides a set of indicators to assess the level of community benefit and amenity of Parks and Recreation Reserves managed for public access.

Seagrass health monitoring – Swan Canning Estuary

A baseline spatial survey was undertaken in March 2011 (first comprehensive survey since 1999), using underwater video camera. The map of spatial extent will be complete this year. Department of Water and the Swan River Trust have established a collaborative project aimed at the development of seagrass health indices. Measurements of leaf metrics, sediment condition, epiphyte characteristics (over 12 months) will be examined as part of its development.

Fish Health Index – Swan Canning Estuary

The Swan River Trust is collaborating with Murdoch University to validate the sensitivity of a fish-assemblage based index of ecosystem health and to develop monitoring protocols. Sampling is underway and the project is expected to be completed in late 2011.

Non-nutrient contaminants (Claisebrook Cove)

Investigations into the occurrence of metals and organic contaminants other than nutrients are continuing in the Swan Canning estuary in 2011. These include:

- ecotoxicological and chemical analysis of sediments collected from the Swan Estuary in the vicinity of a site with relatively high concentrations of polycyclic aromatic hydrocarbons (PAHs) and metals (Claisebrook) to determine whether these contaminants are affecting the ecological health of the estuary

- a survey of benthic infauna in a remediated portion of this site to determine the effect of remediation on the recovery of sediment infaunal communities
- using passive samplers to identify drains as potential sources of organic contaminants such as PAHs, organochlorine (OC) pesticides and polychlorinated biphenyls (PCBs) into the estuary. This relatively new technology, in which organic contaminants in the water column accumulate on organic adsorbent material affords increased analytical sensitivity. In addition the passive samplers are deployed for several weeks, thereby increasing the probability of capturing episodic releases of these contaminants to the estuary from stormwater drainage, often missed using conventional grab sampling.

Upper Swan and Canning River – oxygenation projects

The Canning River has two oxygenation plants that have operated for the last 13 years and are an integral part of the long term management of the Kent Street weir pool in the upper Canning. The planned third plant is on hold due to non-conforming tenders.

In 2010 the Bridge Street Guildford plant range of influence was measured to ~5.6 km, beyond initial expectation. This plant is currently experiencing problems due to the corrosion of land based equipment. The cause of the corrosion is currently being investigated by the contractor.

The construction of a second plant was completed in April 2011. The plant is located at Caversham Ave, Caversham which is 5.2 km upstream of the Bridge Street, Guildford plant. This plant is currently being monitored to determine the range of influence and the oxygen fluxes at the water/sediment interface are currently being measured with the recently purchased microprofiler (see research section).

Kent St Weir – ecological status

Kent Street Weir was installed in the Canning River in 1927 initially to prevent the encroachment of salt water into a fertile agriculture area; freshwater licences were allocated for irrigation purposes to adjoining lots. Since then the weir has been opened every winter for ~4 months depending on river flow. In the 1980's the weir pool experienced severe macroalgal growth problems – these were controlled by mechanical harvesting and herbicide. In the 1990's and 00's the problem was replaced with frequent blue-green algal blooms. 2010 was the first time the weir boards remained in place during winter due to the severe decline in rainfall (hence river flow). This year high tides have resulted in significant saltwater intrusion into the weir pool, with water at almost marine salinity. DoW, Water Science branch is investigating the health status of the weir pool. This project is multifaceted, with studies of sediment contamination and accumulation, pelagic fish and macroinvertebrate communities and the release of bottom water nutrients and metals associated with saline water intrusions. Preliminary findings show that the sediments in the weir pool exceed environmental guidelines and the weir pool environment itself supports a depauperate ecology, mainly dominated by exotic fish and the hardy estuarine species, Swan River goby.

Dolphins and estuary health

In April 2010, the Chief Scientist of Western Australia (Prof. Lynn Beazley) submitted a report to the Minister for Environment entitled *Dolphin deaths in the Swan Canning Riverpark* and comments on the Bunbury inner waters, south-west of Western Australia. One of the eight recommendations in this report was for the Minister to establish a working group with extensive experience of science and government policy and for this group to report within six months and recommend initiatives that build on existing local expertise and science infrastructure in the field of marine mammal health and estuarine health. This group was established in August 2011 and release of its report to the minister is imminent.

The Swan River Trust has a collaborative project with Murdoch University to examine Dolphin Health and Ecology. The project builds on previous work undertaken to determine the cause of deaths of 6 dolphins in the Swan Canning in 2009.

Foreshore protection

Swan River Trust has taken on an enhanced enforcement role in the Swan Canning Riverpark in an attempt to reduce speed limits among boat users. This is in keeping with the results of recent research by the Australian Maritime College that confirmed that most small to medium sized vessels produce a large wake when travelling at 8km, but produce minimal wake at 5km. A reduction in speed limits to 5km has been implemented in particular sections of the estuary and compliance has been focussed on the upper Swan

- **South west**

Irwin, Beaufort, Wellstead – Currently Wellstead has a bar opening protocol that was developed with the shire, Beaufort and Irwin bar opening protocol is also being developed to assist shires and stakeholders.

Wilson Inlet has a number of management issues currently being addressed. A drainage review which included protocols for the bar opening based on conceptual or agreed (between expert panel) EWR's of various estuarine values such as wading birds, seagrass habitat, foreshore vegetation etc. Through Neville Boughton's work of the sand bar dynamics and the opinion that the sand delta formation behind the bar was obstructing water exchange between the Inlet and ocean the shire removed the 'excess' sand to open up the channel. As the bar did not open last year due to the poor winter rainfall we have not been able to determine if the dredging did improve water exchange or what effect it did have. However when the bar does open we intend to monitor flows continuously in the 2 main channels (ebb and flood tides), along with nutrient sampling at the bar, monitor the salt wedge effects at 2 sites (noting when the salt wedge reaches a site and the depth of the wedge) and determine the extent of the salt wedge across the Inlet. Of course we have conducted the seagrass mapping Vanessa helped with.

The Wilson Inlet Nutrient management plan continues and is currently due for review.

Major aspect of management is catchment water quality snapshots (Walpole/Nornalup, Oyster Harbour, Stokes and Culham Inlet, Tried for Bremer but no flows,). Water quality is measured at set sites within the catchment during first flush and high flows (if able) and repeated on 3 occasions. Maps and simple reports were produced for community members indicating site water quality compared to flow rates which has helped Groups prioritise works within the Catchment.

Using DOW catchment WQ data the nutrient loads have been calculated and provided to the Oyster Harbour catchment group (loads in kg per ha). Torbay loads are also calculated to determine the success of any on-ground works. On-ground work activities includes fencing and revegetation.

Sediment study (involving DOW and Community) have commenced on the Bremer River and on the Young river (within the pool system). Sediment plates have been set out in the pools and some other methods including simple measurements of the deep of horizons over time, surveying has been adopted. (All part of the actions in the management plans). There is a BMP occurring (DOW and SCNRM) on a tributary on the Young river which includes fencing of live stoke, revegetation and erosion control measures. Monitoring will include water level monitoring and sedimentation rates.

A drainage initiative (retrofitting a town drain) in Walpole/Nornalup to reduce nutrients going to the Inlet is in progress. There is also quite a bit of \$ going into priority areas of the catchment for fencing and revegetation.

- **Catchment modelling of flow and nitrogen and phosphorus loads**

- has been completed in five catchments. This work has supported Water Quality Improvement Plans (WQIPs). Leschenault and Scott WQIPs are not yet published (in draft for public comment).

Catchment	Modelling (flow, N, P) (year published)	WQIP (year published)
Swan-Canning	2010	2009
Peel-Harvey	2010	2008
Leschenault	2010	2011
Geographe Bay	2009	2010
Scott River	2011	2011

Note that the Peel-Harvey WQIP was the first WQIP and only included phosphorus management. The modelling was updated in 2009/10 to include nitrogen.

- **Estuary modelling**

Hydrodynamic modelling of the Leschenault Estuary, in collaboration with CSIRO. The long-term aim (funding permitting) is to develop an ecological model of the estuary.

2. Update – Estuary Research

- **The effects of artificial oxygenation on the water column and surface sediment – Swan River Estuary**

Sediment Investigations

Since establishing that the Bridge St, Guildford plant was able to deliver oxygen to the water column, the next step was to investigate whether the plant influences the oxygen flux into the sediment. In April 2010, two technologies were trialled (micro profiler and eddy correlation) to determine the oxygen flux into the sediment. Preliminary findings show that when the plant was running, oxygen penetrated ~1 mm in the sediment, and drastically reduced to almost 0 within ~3 hours after the plant was switched off. Oxygen fluxes measured by both instruments were of a similar order; however the microprofiler also had the capacity to measure oxygen penetration depth.

The construction of a second plant was completed in April 2011. The plant is located at Caversham Ave, Caversham which is 5.2 km upstream of the Bridge Street, Guildford plant. This plant is currently being monitored to determine the range of influence and the oxygen fluxes at the water/sediment interface are currently being measured with the recently purchased microprofiler.

A trial is also underway to explore the possibility of using a microbial assay to assess integrated oxygen conditions of the sediment in the upper Swan River. This technique uses community level physiological profiling to target the activity aerobic microbes. The application of this assay is still in developmental stages for the estuary.

- **Swan Canning Research and Innovation Program**

Swan Canning Research and Innovation Program aims to improve the scientific knowledge underpinning management of the Swan Canning river system. Through a collaborative grants scheme operating between 2007 and 2009, as well as partnership arrangements with higher educational institutions, research institutions, CSIRO and other government organisations, many valuable research and development projects have been completed or are underway. Currently, there are more than 50 research and innovation projects addressing six priority areas:

1. fish and aquatic fauna;
2. aquatic flora;
3. catchment and estuary issues;
4. climate change;
5. decision support systems;
6. community and behaviour change.

A subset of these projects can be viewed on the Trust's website

<http://www.swanrivertrust.wa.gov.au/science/program/Content/rivscience.aspx>

 National Estuaries Network	Meeting No. 20 Perth, Western Australia
	24 May, 2011
AGENDA PAPER	State / Territory: NT

Prepared by: Julia Fortune and John Drewry

Position: Senior Scientist

Organisation: Department of Natural Resources, Environment, The Arts and Sport

1. Update – Estuary Management

Water Quality Protection Plan (WQPP)

- Phase 2 of the WQPP project is to finalise the Darwin Harbour Water Quality Protection Plan, and runs from January 2011 to June 2013. The WQPP will include: a revision of selected water quality objectives; identification of pollutant sources and targets; recommended management measures; processes for ongoing adaptive management and public involvement and reporting.
- An integrated decision support system is being developed for Darwin Harbour catchment to improve understanding of the effect of various processes and potential developments on water quality in the catchment. The DSS will combine both catchment and urban modelling and harbour water quality hydrodynamic modelling to help identify management actions (e.g., water sensitive urban design and riparian vegetation) to help protect water quality, and to predict their effects on water quality in the Darwin Harbour. The DSS will be available to stakeholders to assist them to help identify what, where, at what cost, trade-offs and how effective proposed management actions and scenarios would be on water quality. Collaborators on the DSS include BMT WBM Pty Ltd, Equatica Pty Ltd, is NRM Pty Ltd, The Australian National University and the Australian Institute of Marine Science.

2. Update – Estuary Research

- The closure of some Darwin beaches in 2010 due to elevated *E. coli* and enterococci have caused community concern. A project is commencing with Charles Darwin University to select microbial indicators and conduct preliminary genetic profiling as a step towards source tracking.
- Baseline studies on phytoplankton communities are being conducted in the Elizabeth River estuary. Monthly samples of phytoplankton and measurement of water quality parameters including nutrients will document seasonal variation in phytoplankton community structure and provide important information for the assessment of future change.
- Other monitoring activities include ongoing quarterly harbour monitoring, monitoring in the Elizabeth River estuary, and collection of load-related data at several catchment gauge stations.
- The large inflow of freshwater with Cyclone Carlos will provide opportunity for some interesting results. The 2010/11 wet season in Darwin has been the wettest on record. The Darwin suburb of Leanyer has broken the record for the highest rainfall anywhere in the Northern Territory during a wet season (>3 m).
- Shellfish and mudcrab study – bioaccumulation of metals, toxicants and EDC's is continuing with NTG providing funds to AIMS to extend this work for another year. Preliminary findings will be published at the end of the year.

3. Significant Issues for Discussion

- The EIS Supplement for the INPEX gas pipeline and processing project as released in May 2011. There are many issues such as the effects of proposed dredging and spoil disposal, possible underwater blasting, noise etc on the harbour and its fauna and flora. Other issues include development of appropriate trigger values for dredging management for coral protection.
- There is an ongoing need to develop knowledge and policy associated with large dredging projects, and to improve the effectiveness of environmental regulation.

 National Estuaries Network	Meeting No. 20 Perth, Western Australia
	24 May, 2011
AGENDA PAPER	State / Territory: Victoria

Prepared by:
Position:
Organisation:

1. Update – Estuary Management


- VSHREW – acronym will be changed – still undergoing some revisions to reflect directions of new government
- Acid sulphate soil issues in Anglesea river estuary

2. Update – Estuary Research

- Index of estuarine condition – continuing trial. Deakin Uni doing a few physical attributes. ARI (and DSE) doing habitat, birds and fish.
- Estuarine Vulnerability to climate change – collating relevant spatial databases. Will be underpinned by DSE DEM and Janet Stynes' river/stream network (under GEOFABRIC). Database coming along well, and will be a great asset in the future – pulling together environmental and biological data for estuaries across Victoria – with a focus on understanding and predicting climate change impacts on estuarine form and function.
- Habitat mapping to support IEC trials.
- Fisheries links with freshwater flows – being led by DPI – build on ARC linkage grant work in the Gippsland Lakes by testing models around flows links to bream spawning in estuaries in Western Victoria
- ARC linkage project between Monash, ARI and others; to investigate functional links between estuaries and their catchments, namely how landuse change affects ecological and biogeochemical function.

3. Significant Issues for Discussion

- NCCARF NARP estuarine bid – *still* in the mix, but CSIRO leading. Currently with reviewers, and expecting feedback over coming weeks. State involvement greatly reduced, but there may be some scope to refine where (if they happen) case studies will be. Will keep relevant members of the NEN in the loop once we know whether it's going to be funded.

 National Estuaries Network	Meeting No. 20 Sydney, NSW
	25 May, 2011
AGENDA PAPER	State / Territory: TASMANIA

Prepared by: Jason Whitehead
Position: DEP Scientist
Organisation: Derwent Estuary Program

STATEWIDE

1. Update – Estuary Management *DPIPWE, Christine Crawford (IMAS) & others*

- Coastal Policy still under review – Tasmanian Planning Commission responded to the government, however no further progress to date.
- Regional land use strategies under development (TPC)
- Tasmanian Coastal Works Manual launched and in use (EPA Division/coastal)
- Tasmanian sea-level inundation project soon to be released (TPC/UTas)
- A method to identify High Ecological Value Aquatic Ecosystems of national significance is being developed in Tasmania (DPIPWE and DSEWPAC in conjunction with the 3 NRM regions).
- Factsheets soon released from IMAS for a number of smaller Tasmanian Estuaries along the north and east coasts.
 - Indicators of water quality thresholds of potential concern
-

2. Update – Estuary Research

- New project ‘risk assessment for the management of coastal bays and estuaries’ to begin. IMAS project - funded by Winifred Violet Scott UTAS grant
- ‘Retrospective study of the effects of land use on estuaries’ landscape logic project completed and creation of web interface for data access soon to be released. IMAS – Landscape logic

3. Update – Estuary Issues

SOUTH-EAST TASMANIA

Derwent Estuary Program (DEP)- Jason Whitehead

1. Update – Estuary Management

- Initiated work through C4OC grant to support WQIP and HCVAE recommendations, including:
 - groundwater remediation (Nyrstar),
 - WSUD, erosion control at building sites,
 - weed control / containment (rice grass and karamu),
 - spotted handfish actions (DEP, RLS, Veolia, Aquenal, IMAS)
- Promotion of regional tracks brochure & network
- Clean up Australia Day – in the Derwent in 2011 we had 130 groups; 11’000 people, ~28 tons of litter collected (mostly plastics)
- Discussion with planning bodies planning tools required for protection of wetlands and saltmarshes – under climate change scenarios.

- Upper Derwent – Murphys Flat Wetlands management Plan created by TPWS

2. Update – Estuary Research

- Derwent penguin project on-going – breeding penguin numbers low during 2010/11 season (DEP)
- Rocky reef and surveys completed (DEP, IMAS, UTas)
- Aerial seagrass/macrophyte surveys completed (DEP, UTas)
- 12 month upper Derwent *Ruppia* & seagrass ecophysiology study from Dec 2009 (IMAS – DEP CfoC funded)
- Wetlands mapping ground truth and survey (DEP, Utas)
-
- Ambient and rec water quality monitoring on-going (DEP)
- mercury bioaccumulation study (IMAS PhD/Nyrstar/DEP) in progress
- Heavy metals in seafood (IMAS Nyrstar, Dept Human Health Services, ILF, Fishcare, TARFish, DEP – DEP CfoC project)
- Nutrient processing/flux study completed (ARC Linkage/IMAS)
- Catchment review water quality and flow – (Hydro, NRM South, DEP – engaged consultants)
- Deployed sensors (pressure, salinity) installed at several sites in the Derwent (TasMAN/Tas ICT)
- Upper Derwent – survey of biota at Murphys Flat wetlands ‘Bush Blitz Tasmania 2010’ – by Tasmanian Museum and Art Gallery (TMAG)
- Storm Bay Monitoring at entrance of the Derwent estuary will continue for another 12 months (Winifred Violet Scott UTas funded – IMAS)

3. Update – Estuary Issues

- Wetlands and foreshore earthworks and landfilling.

Huon Estuary & D’Entrecasteaux Channel – Jason Whitehead, Jill Pearson

1. Update – Estuary Management

- Ambient water quality monitoring program under review (DPIPWE Marine Farming)
- Marine debris clean-up project completed. Maps produced in conjunction with seafood industry partners to show coastlines which will be the ongoing responsibility of the various companies (SeaNet/Oceanwatch)
- Development/deployment of gliders, AUVs and low-cost sensors (CSIRO/TasMAN/Tas ICTC)
- Integration of estuarine and regional models (CSIRO)
- Aquaculture (salmon farm) expansion proposal in the channel was rejected due to proximity to reef communities (sponges etc at shallow depth)
- Project to update to the State of the Channel Report being discussed / progressed with key partners (Kingborough Council, DEP, NRM South, aquaculture industry, state government)

2. Update – Estuary Research

- Huon Estuary – survey of biota at Egg Islands wetlands ‘Bush Blitz Tasmania 2010’ – by Tasmanian Museum and Art Gallery (TMAG)

NRM South– Jill Pearson and Andry Sculthorpe

Moulting Lagoon & Apsely Marshes - Jill Pearson

1. Update – Estuary Management

- Scoping for the potential to develop a co-ordinated condition monitoring program for the Swan-Apsley catchment (NRM South)
- CfoC application for weed control around Apsley Marshes being progressed through 2011 - 12 Business Plan competitive grants ground.

2. Update – Estuary Research

- Preliminary report being developed on the condition of freshwater, groundwater and estuarine assets in the Swan-Apsley Catchment (NRM South).
- Ecological Character Description for Apsley Marshes (Ramsar wetland) is finalised and publically available.
- The Ecological Character Description for Moulting Lagoon (Ramsar wetland) is nearly finalized.

Pittwater-Orielton (PWOL) – Jill Pearson and Andry Sculthorpe

1. Update – Estuary Management

- Action plan completed to prioritise on-ground works and management actions underway (e.g. fencing saltmarsh, weed control, reveg, community education). Stormwater Management Plan for PWOL: being developed by Sorell Council (NRM South)

2. Update – Estuary Research

- Ecological Character Description for PWOL (Ramsar wetland) nearly finalized.
- A report on the condition of Pitt Water Estuary and Orielton Lagoon is being developed (NRM South).

Little Swanport Estuary – Christine Crawford and others

2. Update – Estuary Research

- Book in press 'Value of water in a dynamic climate'. Looks at the Little Swanport catchment and estuary.

NORTH-EAST TASMANIA

Tamar Estuary & Esk Rivers Program (TEER)– Amanda Locatelli

1. Update – Estuary Management

- Continuing the Ecosystem Health Assessment Program (EHAP) including 21 sites for monthly ambient water quality monitoring.
- Next TEER EHAP report card for the Tamar Estuary will be released in November 2011.
- Continuing the Gambusia Control program at the Tamar Island Wetlands area. Undertaking an independent Gambusia Control Program Review and data analysis for 5 years worth of data.
- Employed a stormwater officer to work with local government and the regional water corporation to coordinate a stormwater management program.
- Initiated a stormwater drains stencilling project with local government and schools.
- Launched the TEER Sediment Demonstration Grants 2011 providing funds of up to \$20,000 to landholders, industry and local government to minimise sediment input into waterways which contribute to the excessive sediment load to the Tamar estuary.

2. Update – Estuary Research

- Investigating mass loads to the Tamar estuary through monthly ambient monitoring.
- Initiated a seafood safety investigation for the Tamar to determine the levels of metals found in finfish and oysters and risk for human consumption.
- Investigating the occurrence of filamentous algae at West Arm Inlet in the Tamar estuary through stable isotope analysis.
- Continuing the sediment source fingerprinting PhD project with the University of Tasmania.

NRM North – Emma Williams

Musselroe Bay estuary

1. Update – Estuary Management

- Musselroe Bay (about 28 full time residents plus land managers, including the adjacent Mt William NP), at the mouth of the Musselroe River, have participated in a community management plan (non-statutory) which incorporates recommendations for environmental management of the coastal area around the river, and outlines the community's aspirations for the area.

NORTH-WEST TASMANIA

NRM Cradle Coast – Belinda Colson

1. Update – Estuary Management

Leven and Port Sorell Estuaries

2. Update – Estuary Research

- Monitoring program by IMAS supported by NRM Cradle- Coast about to commence
- Bathymetric work to occur in the Leven estuary, and a hydrodynamic model to be created by the Danish Hydrological Institute (DHI). IMAS undertaking work through NRM Cradle-Coast support.

SOUTH WEST TASMANIA

Macquarie Harbour – Greg Dowson, Michael Rushton

1. Update – Estuary Management

- Ambient water quality monitoring continuing (@quarterly) (EPA Division)
- Large aquaculture expansion proposed for Macquarie harbour

Port Davey – Bathurst Harbour – Neville Barrett, others

1. Update – Estuary Management

- Marine best and other benthic surveys recently undertaken again by IMAS & consultancy – Aquenal Pty Ltd

 National Estuaries Network	Meeting No. 20 Perth, WA
	24 May, 2011
AGENDA PAPER	State / Territory: NSW

Prepared by: Dr Peter Scanes¹ / Kerryn Stephens¹ / Dr Bob Creese²

Position:

Organisation: 1. Office of Environment & Heritage / 2. Department of Primary Industries.

1. Update – Estuary Management

- Amendments to the *Coastal Protection Act 1979* commenced on 1 January 2011. Amongst other things the Act improves arrangements for coastal zone management planning, including coastal climate change adaptation and management of estuary health. Specifically, Section 55C (Matters to be dealt with in coastal zone management plans) has been amended and now includes:

A coastal zone management plan must make provision for:

- e) where the plan relates to an estuary, the management of estuary health and any risks to the estuary arising from coastal hazards, and
 - f) the impacts from climate change on risks arising from coastal hazards and on estuary health, as appropriate.
- To support the amended *Coastal Protection Act*, [Guidelines for preparing Coastal Zone Management Plans](#), were adopted as Ministerial guidelines in December 2010. The guidelines specify the requirements for Local councils preparing coastal zone management plans under the Act. The guidelines include minimum requirements for addressing coastal hazards, estuary health, community uses and community consultation. For plans including estuaries all requirements apply including the following estuary specific requirements:
 - a description of:
 - the health status of estuaries within the plan's area.
 - the pressures affecting estuary health status and their relative magnitude.
 - projected climate change impacts on estuary health. This is to include incorporation of the sea level rise benchmarks from the NSW Sea Level Rise Policy Statement 2009.
 - proposed actions in the implementation schedule to respond to estuary health pressures.
 - an entrance management policy for intermittently closed and open lakes and lagoons.
 - an estuarine monitoring program, consistent with the NSW Natural Resources Monitoring, Evaluation and Reporting (MER) Strategy.
 - A standard technical brief has been prepared for Local Council's to use when engaging consultants to prepare coastal zone management plans. A series of web based Coastal Zone Management Guide Notes are being finalised that provide technical advice on carrying out the required components of a plan. Those relevant to estuaries include:

Overarching

A1 Legislative and policy framework for coastal management
A2 Risk management framework
A3. Tools to assist in evaluation of management options
Coastal Hazards
B4 Coastal lake or watercourse entrance instability
B5. Coastal inundation / wave runup (including estuaries)
B7. Tidal inundation (including estuaries)
B8. Erosion within estuaries (caused by tidal waters, including the interaction of those waters with catchment floodwaters)
B10. Incorporating SLR into coastal hazard assessment
Estuary Condition
C1 Estuary health assessments
C2. Estuary health pressures
C3. ICOLL entrance management
C4. Estuary health monitoring
C5. Decision support tools for estuaries
C6. Management of threats to estuary health
Community Uses
D1. Public Access
D3. Cultural and heritage environment

2. Update – Estuary Monitoring & Research

- The coverage of estuarine macrophytes in NSW is mapped on a rolling 10 year program. This mapping uses the latest multiband ADS-40 imagery provided by LPMA NSW with the goal of mapping at least 11 estuaries per year. New methods are also currently being developed to map these habitats using object orientated image segmentation and classification techniques, allowing a move away from on-screen digitising to a more standardised and systematic methodology. This new technique is also being used in conjunction with very high resolution aerial imagery, obtained from low level helicopter flights, to map seagrass areas at a very fine resolution, providing detailed information about the density, composition and cover of the mapped seagrass beds. For further information – contact Greg West on greg.west@industry.nsw.gov.au
- Several projects evaluating the utilisation of restored wetlands by fish and other nekton, with particular focus on the removal of tidal/fish passage barriers such as culverts and floodgates, are currently nearing completion. Research in the Macleay and Clarence estuaries has been published or is in press, while studies in the Hunter estuary (at Hexham and Kooragang Island) are in the final stages of analysis. For further information – contact Craig Boys on craig.boys@industry.nsw.gov.au
- Methods for small-scale rehabilitation of the seagrass *Posidonia australis*, which is declared as threatened in many NSW estuaries, is progressing steadily. The work (funded initially by the NSW Environmental Trust) has focussed on methods for rearing *Posidonia* from seeds and aims to enhance growth rates of the plants to hasten their establishment. Methods are also being developed for transplanting mature *Posidonia* plants. This work has also involved studies on seagrass/sediment interactions to help identify the sediment requirements of these plants. For further information – contact Tim Glasby on tim.glasby@industry.nsw.gov.au
- The two main invasive species in NSW estuaries are the green alga *Caulerpa taxifolia* and the European shore crab *Carcinus maenas*. NSW government scientists undertake regular surveys for these invaders in NSW estuaries. In addition, there are ongoing projects to investigate the potential impacts of *Caulerpa taxifolia* on seagrasses and, in collaboration with the University of Technology Sydney, impacts on estuarine invertebrates. In collaboration with Macquarie University and the Sapphire Coast Marine Discovery Centre in Eden, NSW DPI is also investigating the impacts of *Carcinus* on native species and the oyster farming industry. For further information – contact Tim Glasby on tim.glasby@industry.nsw.gov.au

- As part of a multi-agency research project, NSW DPI is investigating differences in seagrass beds in parts of Lake Macquarie subjected to different temperature regimes. The study examines whether rates of feeding by macroinvertebrates differ between seagrass beds in warm water (usually associated with outlet structures from power plants) and those in cool water. The results will help provide insights into the potential effects of climate change on ecological processes that support fish populations. For further information – contact Karen Astles on karen.astles@industry.nsw.gov.au
- Another study is undertaking a vulnerability assessment for the potential effects of climate change on habitats in the Hawkesbury estuary. This project uses a combination of hydrodynamic modelling of different climate change scenarios and ecological and geomorphic characteristics of habitats to determine their vulnerability. The results will assist local councils in protecting vulnerable habitats. For further information – contact Karen Astles on karen.astles@industry.nsw.gov.au
- NSW OEH, Jervis Bay Marine Park and Katarina Mikac of the University of Wollongong have been collaborating to assess the effects of prohibition of bait pumping in inter-tidal sand flats in marine sanctuary areas on benthic macroinvertebrate abundance/diversity and benthic oxygen and nutrient cycling processes. For further information – contact Nathan Knott on Nathan.knott@environment.nsw.gov.au
- The distribution of seagrasses and other submersed plants is largely determined by water quality, hydrodynamics, and sediment suitability. However, aquatic plants have also been observed to grow in conditions previously established as being too poor for survival. In order to understand how survival below these critical thresholds was possible, we tested the hypothesis that large and dense submersed plant beds improve water quality within the plant stand. Monitoring of plant structure, hydrodynamics, light availability, nutrient concentrations, and sediment characteristics was undertaken over the growing season. We found that plant beds trapped suspended particles, which increased light penetration and sediment nutrient levels. The growth of epiphytic algae on leaves was also reduced, further increasing light penetration. This work provided valuable quantitative relationships between plant structure and extent of influence on water quality. The findings will be used by NSW OEH scientists as part of a current effort to model seagrass habitat in Lake Macquarie and Tuggerah Lake. For further information – contact Renee Gruber on Renee.Gruber@environment.nsw.gov.au
- NSW OEH and Professor Rod Connolly of Griffith University are undertaking a study using stable isotope signatures and gut content analysis to assess the relative contribution of different primary producers to the nutrition of five common fish and macroinvertebrate species in Tuggerah Lakes and Lake Macquarie. The study helps to better understand what the potential effects are from shifts in primary producer dominance as a function of eutrophication on the broader food web. For further information – contact Aaron Wright on Aaron.Wright@environment.nsw.gov.au
- NSW OEH, Larissa Schneider and Professor Bill Maher of University of Canberra are undertaking a study using a combination of stable isotope analysis to investigate selenium uptake and accumulation through the broader food web in Lake Macquarie. The study helps to better understand the trophic transfer of selenium and to validate models of Se transference that are being used overseas to manage Se inputs into aquatic ecosystems. For further information – contact Jaimie Potts on Jaimie.Potts@environment.nsw.gov.au

 National Estuaries Network	Meeting No. 20 Perth, WA
	24 May, 2011
AGENDA PAPER	State / Territory: Queensland

Prepared by: Rebecca Sheppard

Position: Senior Fisheries Scientist (Fisheries Queensland)

Organisation: Department of Employment, Economic Development and Innovation

1. Update – Estuary Management

- **DataOceans project** within Fisheries Queensland. This project will provide an on-line portal for access to information on Qld fisheries catch and effort data as well as update the coastal wetlands information previously hosted on CHRIS. Malcolm Dunning (Malcolm.dunning@deedi.qld.gov.au) is the project manager and St John Kettle is the new solutions architect.
- **State of the Environment Reporting 2011.** Fisheries Qld is providing input to the SOE 2011 Report, including information on fish stocks, habitat and aquaculture. DRAFT summary information includes:
 - The consumption of fresh, high quality seafood is an important economic driver for fishing industry development and supports Queensland's tourism industry across the State. Forward estimates for commercial fishing industry earnings in 2009–10 predicted the harvest at 31,550 tonnes valued at \$275 million. The most recent (2006) census data indicate that in Queensland, 2,760 people were employed in the commercial fishing industry—more than in any other Australian state.
 - The most recent (2005) recreational fishing estimates indicated that 733,400 people participated in recreational fishing in Queensland, harvesting 8,500 tonnes of fish. An updated Statewide Recreational Fishing Survey commenced in 2010 collecting information on participation rates, the regions where people fish and the species people catch. The results of the survey will be released mid-2012.
 - In 2010, there were 402 charter fishing licences on issue in Queensland. The number of licence holders actively fishing and their catch has declined from 2005–09.
 - In 2010, Queensland had 21 export fisheries. All have been accredited by the Australian Government as meeting national ecological sustainability guidelines. Environmental risks of fisheries, including those occurring within the Great Barrier Reef World Heritage Area, are being mitigated and approvals have been granted by the Commonwealth Government for their continued operation.
 - Most Queensland fish stocks are either 'sustainably fished' or their exploitation status is 'uncertain'. Concerns remain for the status of snapper stocks in the Rocky Reef Fin Fish Fishery off southern Queensland.
 - The *Queensland Fisheries Strategy: 2009–14* sets out new directions for the management of Queensland's fish habitats, the tools and processes used to manage fisheries harvest and the ways in which enhancement of the value of fishing and related industries can be achieved. It also reinforces the renewed drive to maximise the economic potential of Queensland's fisheries on a sustainable basis.
 - The Queensland Government is adapting fishery management arrangements to ensure community expectations for ecologically sustainable development are met, supported by improved assessment and monitoring of the sustainability status of fishery stocks and fishery ecosystems (*viz.* ecosystem based fishery management).
- **Fish Habitat Management Review** – Habitat review findings and recommendations are currently being addressed - call for greater risk management of development approvals and

increase in coverage of self-assessable codes. Recognition that Fisheries Act is the most effective statutory mechanism for management and protection of fish habitats for fisheries purposes - even though other agencies try to manage fishing through other management arrangements (Marine parks etc).

- **Moreton Bay mangrove dieback** working group progress with data collection protocol (attached) and conceptual model for mangrove dieback finalised (attached).
- **State Planning Instruments (SPI) program.** DEEDI (Fisheries Qld) has prepared a submission to support the development of a State Planning Policy (SPP) for Fish Habitat. The Qld Department of Infrastructure and Planning (DIP) has undertaken a review and prioritisation process of all SPI / SPP submissions by State agencies, to develop a draft forward program for 2011-2012 for consideration by the Growth Management CEO Committee in mid-November. The CEO Committee endorsed program will then be presented to Cabinet for consideration and approval in May 2011. If approved, work can begin on the development of the Fish Habitat SPP which will provide direction on the following issues relevant to the Sustainable Planning Act 2009:
 - How planning instruments can protect the values and functions of fish habitats and consequently economic values of fisheries in Qld through strategic consideration of existing and proposed planning impacts on these habitats; and
 - How particular development can achieve the relevant policy outcomes for protecting fish habitats values and functions.
 - Contact: John Beumer at DEEDI and Mandie McPherson at DIP.
- **Declared Fish Habitat Area Network:** Contact: Kurt Derbyshire
 - The declared Fish Habitat Area Network Strategy
http://www.dpi.qld.gov.au/28_12808.htm
 - FHA declaration proposal for Western Cape York at Pine River Bay near Weipa. Two rounds of public consultation have been finalised and revised FHA plan is with the Minister for approval, before going through the Parliamentary Council for declaration / legislation changes.
 - FHA Status Report – a reporting framework is being finalised that will provide the basis for a regular report on the condition, management, benefits and key risks for individual FHAs and the FHA network and to make management recommendations and/or actions, based on ratings, over the last 5 years. Issues for each FHA will be listed (where applicable) and recommendations made.
- **Stock status of Queensland's fisheries resources 2009 – 2010.** Fisheries Queensland conducted four workshops in 2009–10 to determine the status of key stocks harvested in line, pot, net and trawl fisheries. A total of 62 stocks (49 east coast and 13 Gulf of Carpentaria stocks) were considered in this first round. Of these, one stock was determined to have an overfished status, 18 stocks were sustainably fished, three were not fully utilised and 25 were uncertain. No assessment was made for 15 stocks.
- **Commercial fishing management updates:**
 - Rocky Reef Fin Fish Fishery - based on the outcomes of recent stock assessments, Fisheries Queensland has determined snapper as overfished and has reviewed the management arrangements for snapper and other fish in the Rocky Reef Fin Fish Fishery. A regulatory impact statement (RIS) was released for public comment.
http://www.dpi.qld.gov.au/28_19696.htm
- **Recreational fishing** – New Responsible Crabbing in Qld brochure developed
http://www.dpi.qld.gov.au/28_3065.htm
- **Seagrass Status 2010 Torres Strait and East Coast** – see attached. The Torres Strait and the east coast of Queensland have some of the most extensive seagrass meadows in the world with an estimated 17,206 sq km in the strait and at least 38,079 sq km down the east coast. As the status of the seagrass meadows and risks from human influences is not consistent over this large area, we have summarised our data by Natural Resource Management (NRM) areas. Seagrass meadows in Queensland and the Torres Strait are mostly variable year to year but have declined in abundance over the last 3-4 years. The total area of seagrass has changed little over the long-term (5-10 years). The threats to seagrass from human activity are not evenly spread and are almost all in the southern half of Queensland (south of Cairns). While of concern, seagrass declines are most likely the result of natural variations in climate, particularly tropical storms and flood run-off, against a background of reduced water quality.

- **Offsets** - A new offset calculator is being developed for application for fish loss of fish habitats due to development. Contact Melissa Dixon.

2. Update – Estuary Research

- **Climate change project on fish habitat vulnerability** – Contact Dawn Couchman & John Beumer
 - Funding approved for 2 year Climate Q project for mapping fish habitat (marine plants as surrogate) vulnerability to climate change induced sea level rise. Final approval from steering committee received in early October. Project to run from 1 October 2010 to 30 September 2012.
 - First pass audit of changes to fish habitats due to SLR has been completed for selected areas in Moreton Bay as part of our climate Q climate change project - link to the presentation we gave at the Coastal Councils forum also attached - copies of all presentations available on the Sea change Taskforce website <http://www.seachangetaskforce.org.au/Conference.html>
 - **Instream Structure Inventory (ISI) project progress** - Contact Mary Lawrence
 - New project managed by Fisheries Queensland and funded by SEWPaC through the Queensland Wetlands Program
 - Objective to conduct an inventory of instream structures in the Great Sandy Strait Ramsar site and 5 declared Fish Habitat Areas (FHAs) (Susan River, Fraser Island, Maaroom, Kauri Creek and Tin Can Inlet)
 - The project forms the third year of a 5 year Fisheries program to conduct instream structure inventories in declared Fish Habitat Areas and other protected areas (e.g. Ramsar, Indigenous Protected Areas)
 - Fisheries guidelines developed in the first year of the program will be used to conduct the inventory
 - A local multi-agency working group will be established for local knowledge and input
 - An aerial survey and information gathering / project awareness stakeholder workshop are planned for late May
 - **Marine Fish Habitat Scholarships**

In recognition of the importance of marine fish habitats and the need to enhance knowledge of these habitats for fisheries management, the Queensland Government established the Department of Employment, Economic Development and Innovation (DEEDI) Marine Fish Habitat Scholarships (MFHS) Program in 2005. Scholarships are available for Honours research projects based on fisheries links with marine fish habitats and their management needs. A total of five (5) projects will receive MFHS funding of up to \$5,000 (plus GST) per scholarship. List of recipients and research - http://www.dpi.qld.gov.au/28_11794.htm
- ## 3. Significant Issues for Discussion
- Townsville NEN meeting – set date (November), focus for research/presentations, (FHA management?), field trips etc.


 National Estuaries Network	Meeting No. 20 Perth, Western Australia
	24 May, 2011
AGENDA PAPER	National: CSIRO

Prepared by: Simon Allen

CSIRO Wealth from Oceans report to the National Estuaries Network May 2010

Leader Name	Description
Bayliss, Peter	Manuscript of conceptual food web models for tropical floodplain completed and sent to journal (Aquatic Ecology), using accumulated knowledge/data from the Magela floodplain on Kakadu National Park.
Bayliss, Peter	Qualitative modelling methods used to assess conceptual food web model above for tropical coastal floodplains, focussing on fire-aquatic weed interactions and impact on food webs.
Schroeder, Thomas	More than eight years (11/2002-01/2011) of daily regional valid remote sensing data covering the Tasmanian region has been made available through the Australian Oceans Distributed Active Archive Centre (AO-DAAC). http://www.marine.csiro.au/remotesensing/imos.test/aggregator.html
Schroeder, Thomas	The first version of the bio-optics model has been provided to CMAR to be included into EMS. This model is capable of simulating diffuse attenuation and remote sensing reflectance from region specific IOPs.
Schroeder, Thomas	The Tasmanian region is now included as one of 25 global super-sites into the CoastColour project of the European Space Agency (ESA) - www.coastcolour.org . ESA will provide regionally adapted historical and ongoing MERIS data at 300 m spatial resolution to the project (Task Ref 8).
Wild-Allen, Karen	Successful deployment of Huon2010 Near-Real-Time coastal mooring 17 August 2010. And again in May 2011. This mooring is a testbed for new real-time sensors
John Parslow	Implementation of data assimilation in Environmental Modelling Suite and standard sediment model test cases established
John Parslow	Improved mass conservation in transport model output from the hydrodynamics model in EMS, this allows the biogeochemistry to run many times faster than if linked to the hydrodynamics directly, thus allowing

	higher resolution BGC simulations than were previously possible.
Chariton	Trialling a new sequencing platform (Illumina). This technique will have 10x greater coverage than 454, however, it is un tested on environmental samples.
Barbara Robson	Peter Thompson, Vlad Matveev, Klaus Joehnk, Ian Webster, Pru Bonham and Barbara Robson conducted a field campaign to look at the flood plume from the Fitzroy River in January. This was the largest flood event in the Fitzroy River since detailed flow records began in 1964 and the work helped to document the plume extent, sediment and nutrient loads, phytoplankton and zooplankton responses. Klaus Joehnk and Barbara Robson will be presenting some preliminary results at the AMSA conference in Perth in July, and the results will also feed into developing and evaluating the eReefs models.
Barbara Robson	Burford, MA, Revill, AT, Palmer, DW, Clemenston, L, Robson, BJ and Webster, IT. 2011. River regulation alters drivers of primary productivity along a tropical river-estuary system. Marine and Freshwater Research.
Wendy Proctor	Leo Dutra (PI), William de la Mare, Pascal Perez, Nick Ellis, Sharon Tickell, Toni Cannard, Olivier Thebaud, Ricardo Pascual, Peter Bayliss, Chris Moeseneder, Cathy Dichmont, Fabio Boschetti and Sean Pascoe. 2010. Healthy Waterways Management Strategy Evaluation: Scoping Study for the Development of a 'catchment-to coast' MSE in SE Queensland - Phase 2 – Final Report . December 2010, CSIRO Wealth from Oceans Flagship.
Chris Sharman	<p>Shahriar MS, de Souza P and Timms G, "Smart Query Answering for Marine Sensor Data", Sensors. 2011; 11(3):2885-2897.doi:10.3390/s110302885, ISSN 1424-8220(Communication paper)</p> <p>D'Este C, de Souza PA, Sharman C and Allen S, "Automated Design of a Low-Cost Marine Sensor Network", presented at the European Geosciences Union General Assembly 2011, Vienna, Austria, 4 – 8 April 2011.</p> <p>Timms GP, Howell B, de Souza PA, D'Este C, Smith D, Atkins R and Sharman C, "Automated assessment and visualisation of measurement uncertainties in a low-cost marine sensor network", presented at the European Geosciences Union General Assembly 2011, Vienna, Austria, 4 – 8 April 2011.</p> <p>Shahriar MS, de Souza PA and Timms GP, "Smart Information Retrieval for Marine Sensor Data", European Geosciences Union General Assembly 2011, 03-08 April 2011, Vienna, Austria.</p>
Simon Allen	Note: July 2011 -The Quantitative Marine Science (QMS) program is running a "PhD Day" in July 2011 and will fly 10 students to Hobart from across Australia to explore opportunities for undertaking a PhD in QMS at UTAS. For more information email GRM.IMAS@utas.edu.au or visit the website http://www.imas.utas.edu.au/qms Applications close 17th June 2011

 National Estuaries Network	Meeting No. 20 Perth, Western Australia
	24 May, 2011
AGENDA PAPER	National: Geoscience Australia

Prepared by: Lynda Radke; Position: NEN Coordinator; Organisation: Geoscience Australia

Petroleum and Marine Division: Seabed Mapping and Coastal Management Project

Climate change module: The climate change module GA developed for the Australian Government Department of Climate Change and Energy Efficiency (DCCEE) was released in Dec 2010. The module provides information and tools to help communicate the risks of sea-level rise and other potential impacts of climate change on coastal areas. It includes a series of sea-level rise maps covering Perth, Melbourne, Sydney, the NSW central coast and South-East Queensland. Similar maps for Adelaide were released on May 19. These maps show low-lying vulnerable areas for low (0.5m), medium (0.8m) and high (1.1m) sea-level rise scenarios, for the period around 2100. The maps illustrate the type of event that could be expected to occur at least once a year – and possibly more frequently – by the year 2100. The elevation data underlying the maps can be accessed through the National Elevation Data Framework (NEDF) web portal hosted by Geoscience Australia, the first online data-access system of its type offered by government in Australia.

NSW products: We are making good progress with the web-development of the Coastal Eutrophication Risk Assessment Tool (CERAT) for the NSW Office of Environment and Heritage, Department of Premier and Cabinet. It is anticipated that the tool will be released in early June 2011 through the OzCoasts Natural Resource Management module. Updated NSW estuary reports and water and sediment data are now available on line.

On-TRaCK: Development of the TRaCK-sponsored of the Australian Riverscape Classification Service (AURICL) module is nearly complete. AURICL is a dynamic and flexible system for classifying northern catchments and their rivers based on the similarity, or dissimilarity, of a wide range of parameters.

Geospatial & Earth Monitoring Division: Climate Change Project

In collaboration with the Department of Climate Change and Energy Efficiency, Geoscience Australia has developed a national geomorphic classification scheme for the Australian coastal zone. This has been used to develop a nationally consistent coastal geomorphic dataset by collating and re-classifying more than 60 existing coastal data geomorphic datasets. The final product will compliment the Smartline (polyline map) of coastal geomorphology for use in coastal vulnerability assessments. The data is now complete, with planning underway for product delivery by the end of the year.

One of the key gaps identified in the above data is between Newcastle to Wollongong. Detailed mapping of this coast has been completed utilising a range of datasets and information, including aerial photography. The mapping program has filled the gap with data being incorporated into the National Geomorphic Dataset and aided the development of a generic methodology for use elsewhere.

Following the first pass national coastal vulnerability assessment, Geoscience Australia is conducting detailed vulnerability assessments in south west Western Australia at Mandurah, Bunbury and Busselton. These involve impact assessments of future climate sea level and coastal response, specifically looking at the impact of inundation from storm surge. The studies aim to combine the results of the University of Sydney's Shoreface Translation Model (providing estimates of the potential coastal response to SLR) with detailed hydrodynamic storm surge modelling (utilising both ANUGA and GCOM2) to determine the potential areas of inundation.

Contact: Hamish Anderson | Hamish.Anderson@ga.gov.au | 02 6249 9774 | hazards@ga.gov.au

Geospatial and Earth Monitoring Division: A National Scale Vulnerability Assessment of Seawater Intrusion Project

The principle aim of the project is to conduct a national-scale coastal aquifer vulnerability assessment and to identify the coastal groundwater resources currently vulnerable to SWI and potentially at risk in the future as a consequence of over-extraction, sea-level rise and/or recharge-discharge variations associated with climate change.

The project will be conducted in three phases: 1. Literature review and baseline assessment; 2. Conceptualisation and vulnerability methodology design; 3. Vulnerability assessment and mapping. These are summarised below.

Phase 1 has involved a literature review of a range of topics relevant to a national-scale SWI vulnerability assessment, including: factors that affect SWI, a summary of documented SWI case studies in Australia and their coastal aquifer characteristics, international regional-scale perspectives on the manifestation of SWI, approaches for assessing SWI vulnerability and a geomorphic classification of Australian coastal environments.

Phase 2 of the project will involve evaluation of the hydrogeological conditions of Australia's coastal aquifers. This will include: coastal aquifer classification and characterisation using a typology approach; data analyses, incorporating GIS-based investigation and trend analysis; and first-order mathematical analyses of SWI conditions.

Phase 3 will extend the results of Phase 2. Phase 3 outcomes will include mathematical SWI analyses to offer insight into SWI under various scenarios of groundwater extraction, climate and sea-level rise, i.e. representing current and predicted future conditions for a host of typical Australian coastal aquifer settings. Mathematical approaches will be parameterised from the typological assessment. A SWI vulnerability index will be applied to highlight areas where Australian coastal aquifers may be currently or potentially vulnerable to SWI as a consequence of extraction and/or climate pressures.

Contact: Baskaran Sundaram 02-6249-9842 / baskaran.sundaram@ga.gov.au

Geospatial and Earth Monitoring Division: National Earth Observation Group: Science and Strategy Project

A team from Deakin University led by Daniel Ierodiaconou used one ASD instrument from the National Spectroradiometer Loan service to collect spectral signatures of habitat types/condition for

a seagrass mapping project in Corner Inlet using funds provided by Parks Victoria. (16th to 27th February 2011)

Contact: Fuqin Li 02- 6249 5867/ fuqin.li@ga.gov.au

Reminder: GA maintains two field spectroradiometers that were purchased by the NLWRA. These instruments can be made available for loan subject to a few provisos. One of these provisos is that the data you collect is incorporated into the National Spectral Library. A preliminary page on the National Spectral Library has been set up (http://www.ozcoasts.org.au/nrm_rpt/library.jsp). The GA contact is Medhavy Thankappan (02-6249-9310; Medhavy.Thankappan@ga.gov.au).

Reminder: The audit purchased 83 Coastal QUICKBIRD scenes (covering ~50,000 km² of coastal Australia). Chris Auricht has set up a web page to view degraded versions of these images and to provide access to KML files for Google-Earth (<http://www.auricht.com/Coasts/index.html> and then follow links to the HTML Quickbird results; or use the direct link as follows: <http://www.auricht.servebbs.com/maps/quickbird/index.html?basemap=Google+Hybrid&overlay=QuickBird>). Note: please let GA/Chris know if your security settings prevent you from viewing these images, or else ask your IT people to clear the site from its suspicious status. The complete images are also now available on a 43GB memory stick at a cost of \$280 from the GA sales centre. For more information on acquiring the images (or adding your name to the list) follow this link: <http://www.ga.gov.au/remote-sensing/get-satellite-imagery-data/ordering/pricing/quick-bird.jsp>