



National Estuaries Network



22nd Meeting

8th – 10th May 2012, Hobart

Hosted by: TAS Derwent Estuary Program

Organisers and Conveners:

Jason Whitehead: TAS DEP

03 62333595;

Christine Coughanowr

03 62336547

Marine Board Building (1 Franklin Wharf, Hobart) – Level 3 Conference room.

Glass doors to left out of the elevator

Lynda Radke: Geoscience Australia (Canberra)

(02) 6249 9237; Mob: 0428 422 970

Attendees:

NSW

Kerryn Stephens

NSW Office of Environment and Heritage

Peter Scanes

NSW Office of Environment and Heritage

Tony Roper

NSW Office of Environment and Heritage

Victoria

Greg Woodward

Vic. Department of Sustainability & Environment

Jeremy Hindell

Vic. Department of Sustainability & Environment

Queensland

James Udy

Qld Healthy Waterways

Tasmania

Jason Whitehead

Derwent Estuary Program

Christine Coughanowr

Derwent Estuary Program.

Christine Crawford

University of Tasmania

Michael Attarrd

NRM North

SA

Sam Gaylard

SA Environmental Protection Authority

NT

Simon Townsend

NT Dept. of Natural Resources, Environment the Arts and Sport

Peter Dostine

NT Dept. of Natural Resources, Environment the Arts and Sport

WA

Kerry Traylor

Swan River Trust

Malcolm Robb

WA Department of Water

National

Lynda Radke

Geoscience Australia

Simon Allen

CSIRO Wealth from Oceans National Flagship

Greg Stuart

Bureau of Meteorology

Barbara Robson

CSIRO Land and Water

Jonathan Hodge

CSIRO Land and Water

Arnold Dekker

CSIRO Land and Water

Rick Smith

CSIRO Land and Water

Monday 7th May 2012

Check in to **St Ives Apartments (A on map)**.

Accommodation

St Ives Apartments, 67 St. Georges Terrace, Battery Point
(<http://www.stivesmotel.com.au/>) (03-6221-5555)

For those who are keen on a pre-meeting dinner (Monday night) meet at the **Cargo Bar** (47 Salamanca Place, Battery Point) (**B on Map**) at **7pm**.

Bakery, Newsagency, Chemist, Groceries (**all within Salamanca Area**)

Breakfast options

Zums: *7am* (**C on map**)

Machine Laundry Café: *7am* (**D on map**)

Jackman & McRoss: *7:30am* (**E on map**)

Other nice restaurants (in Salamanca & wharf areas)

Tuesday 8th May

NEN Meeting 9am – 5pm

Meet **8:45 am** in the Marine Board Building (1 Franklin Wharf; **F on map**) meeting venue is on the 3rd floor (glass doors on left when you come out of the elevator) (about 15 min walk from St Ives Hotel).

8:45-9:00 coffee

Meeting starts 9:00 am sharp

NEN Drinks/Dinner

Optional pre-dinner drinks (6:00pm) at **Prechers** (corner of Montpelier Rd & Knopwood Steet; **G on map**)

Dinner is at 7 pm at **Annapurna Indian Restaurant, 93 Salamanca Place (6224-0400) (<http://www.annapurnaindiancuisine.com/>) (H on map).**

Note: Meal costs **are** covered by NEN Secretariat. Beverages are not included. BYO, Corkage is \$5 per bottle.

Tuesday 8th May, 2012

National Estuaries Network Meeting
Marine Board Building 3rd floor Conference Room

8:45 – 9:00 Tea, Coffee and settle in

9:00 – 9:15 **Christine Coughanowr, Jason Whitehead & Lynda Radke**
Welcome, Housekeeping, Apologies & Introductions

9:15 – 10:30 **State/Territory Roundtable Update** (Each State/item – up to 15 min (including discussion); (Chair: Lynda Radke)
What's happening in estuary science/management in Australia - each state and national representative to give a brief overview of estuary management/science within their jurisdiction.

- **TAS** update (Christine Coughanowr/Michael Attarrd)
- **WA** update (Malcolm Robb/Kerry Traylor)
- **NSW** update (Kerryn Stephens/Peter Scanes)
- **NT** update (Simon Townsend/Peter Dostine)
- **SA** update (Sam Gaylard)

10:30– 11:00 **MORNING TEA**

11:00– 12:30 **Continue with State Roundtable update**

- **VIC** update (Greg Woodward/Jeremy Hindell)
- **CSIRO** update (Simon Allen)
- **ACEAS** update (James Udy)
- **Bureau of Meteorology** update (Greg Stuart)
- **Geoscience Australia** update (Lynda Radke)

12:30– 1:30 **LUNCH**

1:30 – 3:00 **WORKSHOP: Estuarine Report Cards and Reporting Frameworks**
Chair: Christine Coughanowr

- Introduction: Coughanowr (15 minutes)
- TAS:Coughanowr/Attard/Crawford (25 minutes)
- NT/Darwin Harbour: Townsend (25 minutes)
- WA/Swan River: Traylor/Robb (25 minutes)
- SA: Gaylard (25 minutes)

3:00 – 3:30 **AFTERNOON TEA**

3.30 – 5.15

- QLD: Udy (25 minutes)
- NSW: Roper/Scanes (25 minutes)
- VIC: Hindell (25 minutes)
- Discussion & follow-up (30 min)

5.15 – 5.30

- Other Business – Future of the NEN/Next meeting

7 pm – late **NEN Dinner**

Wednesday 9th May

NEN Fieldtrip : Boat tour of the 'Huon-D'Entrecasteaux Channel-Derwent'

Morning & afternoon tea on the boat and Pizza lunch at Woodbridge will be provided.

Depart front of St Ives Apartment at 8:10am – Return Hobart Wharf at 5:30pm
Largely boat based - bring warm clothes & water proofs

Planned Itinerary

Depart St Ives Apartment 8:10am (Bus to Franklin on the Huon River / estuary)

8am-9am Wooden Boat Centre (Franklin)

9am-10am – Egg Island boat based (Tasmanian Land Conservancy)

10am- 1pm - Boat tour Huon & D'Entrecasteaux Channel to Woodbridge

1-2pm PIZZA LUNCH (Woodbridge)

2-2:30pm – Woodbridge Marine Discovery Centre

2:30-5:30pm - Boat tour D'Entrecasteaux Channel to Hobart on the Derwent (possibly via Nyrstar zinc smelter)

Finish at Watermans Dock – Hobart at ~5:30pm

Dinner 7 pm at T42 (Elizabeth St Pier; I on map). Meal costs are not covered by NEN.

Thursday 10th May

NEN Science Symposium / Mini-Conference at CSIRO Marine Laboratories (J on Map)

Meet **8-8:30am** at CSIRO – 4 taxis will arrive at 8am to transfer you and your luggage to the venue. If you prefer to walk, it will take approx. 15 minutes (approx. 1 kms). **CSIRO** is on the Map (**J on map**)

**Mini-Conference Title – *Research and Management of Tasmanian Estuaries* (see below)
(start at 8am and finish at 3:30pm)**

Taxis can also be booked for airport transfers

National Estuaries Network – Science Symposium, May 10th, 2012


“Research and Management of Tasmanian Estuaries”

Agenda and Session Times VENUE = CSIRO Marine Laboratory - Hobart



Australian Government
Geoscience Australia

Session & chair	Time	Topic	Speaker
	8.00 – 8.30am	<i>Registration Tea / coffee</i>	
	8.30-8:35	Welcome	Christine Coughanowr
	8:35-9:00	Scene setting – Tasmanian Estuaries	Christine Crawford IMAS
Session 1	9.10 – 9.30	Developments in nutrient stable isotope techniques: Tracing sources and biogeochemistry of NH ₄ and NO ₃ in estuaries	Andrew Reville CSIRO
	9.30 – 9.50	Bio-optical parameters measured in southern Tasmanian waters: their importance in the accurate satellite retrieval of estimates of phytoplankton biomass in this region.	Lesley Clementson CSIRO
	9.50 – 10.10	Nitrification by Microbial Communities as an Indicator of Estuarine Health	Levente Bodrossy- CSIRO
	10.10 – 10.30	Natural distribution and the effects of anthropogenic disturbance on estuarine benthic macroinvertebrates.	Jason Beard IMAS
	10.30 – 10.50	<i>Morning tea</i>	
Session 2	10.50 – 11.10	Ecosystem Health Assessment Program- Implementing a monitoring and reporting framework for waterway health in the Tamar Catchment.	Amanda Locatelli TEER – NRM North
	11.10 – 11.30	Modelling Alternate Estuarine Management Scenarios Informs Resource Managers	Karen Wild-Allen CSIRO
	11.30 – 11.50	Environmental Research in Support of Sustainable Aquaculture	Catriona Macleod IMAS
	11.50 – 12.10	An assessment of metal concentrations in the Tamar Estuary's wild caught seafood	Monique Thompson TEER – NRM North
	12.10 – 12.30	Mineralogy and mobility of heavy metals in the Derwent River	Sebastien Meffre - UTas
	12.30 – 12.50	Mercury bioaccumulation in flathead. Tracking estuarine food web pathways using multiple lines of evidence.	Hugh Jones IMAS
	12.50 – 1.30pm	<i>Lunch</i>	
Session 3	1.30 – 1.50	Secondary Effluent Treatment at Norske Skog Boyer: Effluent changes and their impact on the receiving environment.	Des Richardson Norske Skog Jeff Ross - IMAS
	1.50 – 2.10	What's driving change in the marine sector and where does climate change fit in: Preliminary results for the coastal community of St Helens, Tasmania.	Ingrid van Putten CSIRO
	2.10 – 2.30	Southern Tasmanian Coastal Saltmarsh Futures	Vishnu Prahalad NRM South
	2.30 – 2.50	Handfish surveys in the lower Derwent Estuary	Mark Green CSIRO
	2.50 – 3.10	Population dynamics, spatial depth/habitat distribution and biology/ecology of the endangered Maugean skate (<i>Zearaja maugeana</i>).	Michelle Treloar IMAS
	3.15 – 3.30pm	Summaries and close	Simon Allen
	3.30pm	<i>Afternoon tea and finish</i>	

 National Estuaries Network	Meeting Hobart, Tas
	8 May, 2012
AGENDA PAPER	TASMANIA

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

SOUTH-EAST TASMANIA

Derwent Estuary Program (DEP)- Christine Coughanowr

1. Update – Estuary Management

- Work continues through C4OC grant to support WQIP and HCVAE recommendations, including:
 - groundwater remediation (Nyrstar),
 - stormwater projects (WSUD and erosion control at building sites)
 - dredging and reclamation guidelines
 - weed control / containment (rice grass and karamu work continues),
 - spotted handfish actions – population surveys and spawning substrate enhancement
 - biodiversity-related educational materials
 - little penguins - population surveys and management (revegetation, fencing & new burrows)
 - 2011 Report Card
 - Derwent Estuary Conservation Action Plan (Nature Conservancy method) being refined to better assess and prioritise biodiversity threats, strategies and actions

2. Update – Estuary Research

- Ambient and recreational water quality monitoring on-going (DEP)
- Deployed sensors (salinity, temperature) installed at Tasman Bridge (Hydro/Entura for DEP)
- Rivulet and stormwater monitoring (monthly plus some events) (DEP)
- Derwent biogeochemical model is being updated and additional management scenarios evaluated (CMAR)
- A Marine Virtual Lab project just started for the Greater Derwent Estuary (including the Channel) which will collect/consolidate data sets and develop data products to support better decision making (UTas/CMAR)
- Mapping and assessment of saltmarsh vegetation at Lauderdale as part of climate change adaptation study
- Mercury bioaccumulation study (IMAS PhD/Nyrstar/DEP) in progress
- Review of catchment water quality and flow completed – (consultant report funded by DEP and NRM South)

3. Update – Estuary Issues

- Wetlands and foreshore earthworks and landfilling.
- Marine pest monitoring is still not being systematically undertaken.
- Increasing development pressures in adjacent catchment (water development, land-use changes) and Channel (aquaculture, new housing)

NORTH-EAST TASMANIA

Tamar Estuary & Esk Rivers Program (TEER)– Amanda Locatelli, Michael Attard, Monique Thompson

1. Update – Estuary Management

- Established a Northern Tasmanian Stormwater Program with commitment for 2 years 2012-2014. Partnership between TEER, Ben Lomond Water and 8 councils. Major projects include, documenting the stormwater system, MUSIC modelling, Stormwater Management Planning, stormwater monitoring and training.
- Developed and Launched the Tamar Estuary Report Card early Dec 2011.
- Produced and Launched the 2011 TEER Ecosystem Health Assessment Program Monitoring report which explores data collected in the first year of the TEER EHAP collected from 2009-2010.
- Establishing ambient water quality monitoring program in partnership with local water authority Ben Lomond Water to monitor sites the upper Tamar estuary and North and South Esk River tributaries to gain a better understanding of the impacts of Waste Water Treatment plants in the greater Launceston area.
- Established a partnership with CSIRO involving deployment of remote solar powered data loggers which relay temperature stratification data via telemetry.
- Working closely with The Department of Primary Industries Parks water and the Environment to develop water quality targets specific to the Tamar Estuary and its fresh water tributaries.
- The 2012 Tamar Estuary Report Card is being developed into an Augmented Reality smart phone application through the Utas HITLab. The smart phone app. will enable users to tour the Tamar estuary in 3D communicating the findings of the report card and key messages concerning environmental issues affecting the health of the estuary. The Application will be launched with the report card in October 2012.

2. Update – Estuary Research

- A Tamar Estuary Seafood Survey was undertaken in 2011-12, investigating metal contaminants in wild, intertidal oysters and four recreationally targeted fish. Oysters along the gradient of the Estuary were found to have exceedingly high levels of Zn and Cu, breaching the FSANZ (2004) guidelines for molluscs and posing a risk to human health if consumed. Metals in fish were not found to exceed FSANZ (2004) guidelines and serving calculations found metals were not of a concern to human health in Tamar Estuary recreationally targeted fish. It is intended signs will be erected in key public access areas to advise against eating wild shellfish from the Tamar Estuary, which is in line with the current warnings issued by the DHHS.
- A Freshwater Ecosystem Health Assessment framework and report card is currently being developed to close the 'catchment to coast' gap and identify river health issues that may be more effectively managed and reduce the impact upon the Estuary health. This program is still in developmental stages, however a freshwater report card, based on 10 year historical monitoring data, is due for release at the end of 2012.
- The Gambusia Control Program has undergone a program review in order to better direct funding into the future of the program. The Tamar Estuary has a relatively small population of the invasive, pest species, *Gambusia holbrooki*, or mosquito fish. A risk assessment has been used, in conjunction with other review documents, to identify any high risk vectors for further distribution and the potential impact on Tasmania's aquatic ecosystems. Human translocation was identified as the most likely mode of dispersal and public awareness and education should be the main focus of any further funding commitments.
- TEER is scoping the feasibility of developing a Water Quality Improvement Plan for the TEER catchments. The likely focus of the Plan will be nutrients and sediments. The Plan will integrate and build upon the significant foundational work already undertaken including the WaterCAST catchment model, the TUFlow estuarine model and the water quality objectives currently in development. A decision support tool will be developed to integrate the models and runs scenarios.

3. Update – Estuary Issues

- On the radar- Marine Pest Surveys, Seagrass habitat mapping, biological indicators.

 National Estuaries Network	Meeting No. 22 Hobart, Tasmania
	8 May, 2012
AGENDA PAPER	Western Australia

Prepared by: Malcolm Robb
Position: Manager Water Science
Organisation: Department of Water

1. Update – Estuary Management

- Considerable debate again in WA about who does manage estuaries. DoW confirmed as the lead agency for estuary management except for the Swan Canning where the SRT is effectively the estuary manager under the Swan and Canning Rivers Management Act.
- DoW reframing its role in waterways based on reduction in staff and funding across the board
- Chief Scientist, Professor Lyn Beazely, released a report on dolphin deaths and estuary health which calls for better coordination of estuary research and linking to management needs.
- DoW charged with developing a framework for coordinating estuarine research but without any explicit funding for estuarine research.
- Full catchment Water Quality Improvement Plans for the Hardy Inlet and the Leschenault estuary have been completed, public comment received and being finalised for submission to Government for endorsement.
- DoW continues to develop condition assessments for SW estuaries and estuary condition report cards based on the Water Quality Index (WQI) approach used for Chesapeake Bay and Moreton Bay. Briefing of Minister to occur soon
- Due to funding cuts almost all estuary monitoring will cease in the new financial year

2. Update – Estuary Research

Sediment Oxygen Fluxes

- Work on estimating effectiveness of estuarine oxygenation continues with extended campaigns in the upper Swan in and around the Caversham Plant. These involve allowing oxygen to decline throughout the water column and then operating oxygen plant to measure effect and influence. Emphasis is on water sediment interactions with continuous profiling using Unisense Lander with oxygen microelectrodes to determine oxygen fluxes and penetration into sediment


Seagrass health indicator development

- The Department of Water (in a project funded by the Swan River Trust) are developing a seagrass assessment protocol which may be applied as an indicator of estuarine condition. The assessment of seagrass condition encompasses a range of metrics describing the health of *Halophila ovalis*, the dominant seagrass species in the Swan-Canning Estuary. Measurements include environmental, biotic measures of seagrass and epiphyte growth and chemical measurements of the water column, sediment and seagrass. Field work has taken place on a monthly to six weekly schedule since October 2011, the final field collection will take place in May 2012. Laboratory analysis is currently underway. Reporting will be finalised in 2013.

Assessing change in the extent and distribution of seagrass

- The Department of Water is currently also involved in the development of a protocol to measure the change in seagrass extent and distribution in the Swan-Canning estuary. The project focuses on the six sites identified as characteristic seagrass habitats in the estuary in the seagrass health indicator project. Seagrass species composition, presence/absence and density were assessed along fixed transects with focus also on the depth range/limit of seagrass at these sites. The

intent is that the method is repeatable, and that change in seagrass composition, extent and distribution is measurable against the current baseline data set. This information will potentially support the seagrass health assessment protocol and feed into overall score of seagrass health/estuary condition

 National Estuaries Network	Meeting No. 22 Hobart, Tasmania
	8 May, 2012
AGENDA PAPER	Swan River Trust, WA

Prepared by: Kerry Trayler
Position: Principal Scientist
Organisation: Swan River Trust

1. Update – Estuary Management

Swan Canning Estuary

- **River Protection Strategy**

A draft River Protection Strategy is being revised based on public comment. The Strategy required by the *Swan and Canning Rivers Management Act 2006* outlines a range of actions by key river management organisations to improve the management, health and amenity of the river.

- **Development of report cards**

The Trust is expected to report to the Minister, at least biennially, on the extent to which environmental and community benefit targets are being met in the Swan Canning Riverpark and the success of the multi-organisational commitments made in the RPS. The Trust is developing a report card to be used as the primary reporting communication tool hoped to be ready in coming months. Compilation of content for that Report Card has commenced with its development being undertaken in consultation with a Technical Advisory Panel. It is envisaged that the work that the Department of Water is undertaking towards a water quality report card for the system will be part of the overall report card.

- **Non- nutrient contaminants program**

The Trust is progressing a series of investigations to understand the source of contaminants to key areas of the Swan Canning Riverpark.

- **Oxygenation projects**

The Trust currently has four oxygenation plants within the Riverpark with two in the upper Canning and two in the upper Swan. A third plant is planned for the Canning and based on a review undertaken by CSIRO on internationally available technologies, the new plant will utilize side-stream hypolimnetic oxygenation. It is envisaged the new plant will be operational before end of June 2013.

- **Water quality improvement planning**

Nine local Water Quality Improvement Plans (WQIPs) have now been established and based in priority catchments as identified in the Healthy Rivers Action Plan and based on modeling in the Swan Canning Water Quality Improvement Plan. The WQIPs aim to reduce nutrient loads into the Swan and Canning rivers through nutrient intervention and changed management practices. As part of the implementation of the Ellen Brook WQIP negotiations are underway for the establishment of a 50 hectare soil amendment trial in Ellen Brook this winter.

- **Drainage intervention works**

The Drainage Nutrient Intervention Program continues to trial the application of constructed wetland and compensation basin restoration projects to principally improve water quality, but also habitat and amenity value at sites where they are implemented. Currently there are nine sites with intervention works in place.

Three of these occur in the Ellen Brook catchment. Ellen Brook is the largest of the Swan Canning catchments feeding into the estuary and provides a disproportionately large load of nutrients to the system. Investigations have been underway to determine the feasibility of a large-scale wetland, which will include a phoslock dosing system, at the end of Ellen Brook. Construction on this project is planned to be complete by end June 2013. The application of Neutralised Used Acid as a nutrient filter in the treatment system, while promising, requires further testing to resolve underlying technical issues.

- **Foreshore management**

The Trust conducts foreshore management works through its Riverbank Program funding initiatives, has distributed more than \$7.9 million across 162 projects since 2002. Along with partner contributions, the value of these projects is estimated at almost \$16 million. The application of funding is guided through a Foreshore Assessment and Management Strategy released in 2008. Best Management Practice Guidelines for Foreshore Restoration continue to be updated and are complemented by an extension plan aimed at providing tools and training in order to building the capacity of the 27 partner foreshore land managers.

2. Update – Estuary Research

- **Dolphin health, population and ecology investigations**

The Trust has provided funding for Murdoch University to undertake detailed assessment of the size and structure of the dolphin population in the Riverpark. An interim report suggests that the resident dolphin population has recovered since the death of six dolphins in 2009. Four mother calf pairs have been observed and appear to be regular users of the estuary which is positive. A report on the dolphin population will be completed in September 2012.

- **Development of Indicators of ecological health**

Fish communities: The Swan River Trust is working with Murdoch University to finalize the fish community index. It is expected that the index will form part of the Trust's report card on ecosystem health.


Seagrass: Department of Water are finalizing field work towards to development of a seagrass health index. Measurements of leaf metrics, sediment condition, epiphyte characteristics have been collected since September 2011. Sample processing and data collation are well underway with the project scheduled for completion in early 2013.

- **Estuarine Modelling**

The Department of Water and the Swan River Trust are collaborating with modellers from the University of Western Australia in the development of a coupled hydrodynamic-biogeochemical model that can simulate oxygenation dynamics at key locations in the Swan-Canning estuary. A hydrodynamic grid has been established in TUFLOW and validation of physico-chemical data is underway. While the initial application of this model is to enable the optimal operation of oxygenation plants, it is recognized that it will have broader application

- **Algal monitoring approaches**

The Trust is involved in a collaborative project with researchers at Curtin University aimed at the development of an autonomous monitoring system capable of detecting the density of algae present in the Swan and Canning Rivers and to discriminate between the represented taxonomic groups using an above water hyperspectral radiometer (DALEC). Outcomes so far are promising, however the model is still being fine tuned. The outcome of this fine-tuning will determine how effective the model is at separating algal classes. Ensuring the instrument can be used across the range of conditions that occur in the estuary has been a major hurdle.

 National Estuaries Network	Meeting No. 22 Hobart, Tasmania
	8 May, 2012
AGENDA PAPER	NSW

Prepared by: Kerry Stephens¹ / Dr Peter Scanes¹ / Tony Roper¹ / Dr Bob Creese²
Position: Water, Wetland & Coast Division/ Scientific Services Division/ Fisheries Research
Organisation: 1. Office of Environment & Heritage / 2. Department of Primary Industries

1. Update – Estuary Management

- As previously discussed the NSW Minister for the Environment, announced in late 2011 that she was seeking feedback on the arrangements for managing coastal erosion, coastal plans and coastal regulation and ideas for improvement. A coastal taskforce has been established to look at these matters. The taskforce is yet to release its recommendations.
- In 2011 the NSW Government commissioned an Independent Scientific Audit of Marine Parks in NSW. The Audit has now concluded and the Audit report was released in February 2012. The report is available at: <http://www.marineparksaudit.nsw.gov.au/> . The two over-arching recommendations are:
 - A. The governance of the NSW Marine Estate be reorganised by bringing the entire estate under one legislative and administrative structure that is closely aligned with the five catchment management authorities covering the NSW coastal drainage systems.
 - B. Science for the NSW Marine Estate be reorganised under an independent Scientific Committee. The Audit Panel also makes recommendations about the organisational approach that this Committee should take and suggests a number of research priorities. In particular, these priorities call for greater emphasis on research in the social and economic sciences and the application of these findings to management.

A range of other recommendations relevant to estuaries were made including:

(R5) From the information available to the Audit Panel, it would appear that there is a need to further extend the Monitoring, Evaluation and Reporting (MER) system to include a greater focus on marine, estuarine and inshore environments as a priority. This should include monitoring for invasive species in and around areas where boating or shipping activity is particularly intense.

4. Within the framework developed by the risk assessment and as a possible extension of the MER, the Audit recommends:

- b. that beyond the assessment of nutrient and sediment impacts in coastal waterways, a statewide survey of contaminant levels across NSW waters utilising both bio-monitor and sediment grab approaches would provide important information as to where ANZECC/ARMCANZ sediment-quality guidelines are exceeded, or emerging contaminants of concern are identified. This should allow for the identification of current sources and the nomination of areas that should be targeted for remediation. This should be accompanied by a clear and consistent approach to understanding and managing the fate and effects of contaminants (including transport and remobilisation) for the NSW Marine Estate.

The NSW Government is yet to respond to the report.

- Coastal Catchment Management Authorities (CMAs) in NSW are currently in the process of updating their Catchment Action Plans (CAPs). Both OEH and DPI are supporting CMAs in the preparation of their plans.

The NSW Natural Resources Commission has released the '[Framework for assessing and recommending upgraded catchment action plans](#)'. The upgraded CAPs will be whole-of-government and community plans. The preferred approach to the CAP updates is for them to take a resilience thinking approach whereby a small number of important variables that control the way a complex landscape system is functioning, and the thresholds within which the system can continue to function in a desired way are identified. For estuaries this is proving to be a difficult process as few ecosystem thresholds can be identified at a regional or estuary-specific level.


- OEH continues to support Local government in the development of coastal zone management plans (that address pressures on estuary health) and localised estuary health assessments. Both are priorities for funding under the NSW Estuary Management Program (funding applications for 2012/2013 have closed and are currently being assessed).

2. Update – Estuary 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.
ONGOING. For further information, contact Greg West on greg.west@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. Major field trials in Botany Bay will commence in November 2011,
ONGOING. For more 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.
ONGOING. For more information, contact Tim Glasby on tim.glasby@industry.nsw.gov.au
- A comprehensive risk assessment project examining the threats to marine biodiversity in NSW (including in estuaries) has been initiated, partly as a response to the terms of reference for the current Independent Scientific Audit of NSW Marine Parks ([see http://www.marineparksaudit.nsw.gov.au/](http://www.marineparksaudit.nsw.gov.au/)). The project will use a QERA approach (Qualitative Environmental Risk Assessment) which relies on collating existing information and eliciting expert opinion from marine scientists working in NSW. NEW project – started July 2011, will run for approx. 18 months. For more 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. This work is completed and is being reported. 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 scientists from OEH and DPI as part of a current effort to model seagrass habitat in Lake Macquarie and Tuggerah Lake. ONGOING. 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 Lake and Lake Macquarie. The study has identified differences between lakes, in particular the nitrogen content of primary producers (seagrasses and algae). The effect appears to be reflected through the broader food web. ONGOING. For further information – contact Aaron Wright at Aaron.Wright@environment.nsw.gov.au or Jaimie Potts at Jaimie.Potts@environment.nsw.gov.au
- NSW OEH is continuing to sample estuaries through spring/summer as part of the Monitoring Evaluation and Reporting (MER) process. 120 estuaries have been sampled so far and 20 more will be sampled this summer. Dissolved oxygen measures will be included this summer. Scores and grades have been calculated for all estuaries. In collaboration with UNSW (Prof Ian Suthers) OEH will test the feasibility of measuring zooplankton size/abundance characteristics as a potential indicator of estuarine condition. ONGOING. Contact Peter Scanes at Peter.Scanes@environment.nsw.gov.au.
- NSW OEH is working with four coastal local government Councils to develop consistent estuarine report cards including the indicators of chlorophyll a, turbidity, dissolved oxygen, seagrass health and riparian nativeness (naturalness). NEW. Contact Peter Scanes at Peter.Scanes@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. Sediment cores have been collected and analysed to establish selenium input. Experiments will be undertaken to measure volatilisation of selenium from sediments. ONGOING. For further information – contact Jaimie Potts on Jaimie.Potts@environment.nsw.gov.au
- NSW OEH, Jaimie Potts and Peter Scanes are investigating possible reasons for the absence of seagrass in many intermittent estuaries. In particular we are investigating the possibility of nitrogen toxicity, even in low impact systems. This work may result in an indicator of seagrass stress based on stable carbon isotopes. NEW Contact Jaimie Potts Jaimie.potts@environment.nsw.gov.au

- NSW OEH in collaboration with DPI Fisheries have submitted a funding application to Catchment Action NSW for \$245,000 to develop a predictive modelling capability for estuary and marine condition and a decision support system for prioritising investment and management. Exploratory statistical analysis using multivariate techniques will be utilised and will include investigating classification systems used in the MER program, predictor-response relationships and index design and sensitivity. Major clients are the five coastal CMAs, the Marine Parks Authority and local government. NSW Contact Tony Roper at tony.roper@environment.nsw.gov.au or Bob Creese at bob.creese@industry.nsw.gov.au.

 National Estuaries Network	Meeting No. 22 Hobart, Tasmania
	8 May, 2012
AGENDA PAPER	Northern Territory

Prepared by: Julia Fortune and Simon Townsend
Organisation: NRETAS

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, isNRM Pty Ltd, The Australian National University and the Australian Institute of Marine Science.
- Robyn Henderson has been appointed as the new coordinator of the WQPP. Robyn will continue to oversee and support AHU in the development of the WQPP.
- Ongoing stakeholder consultation will feature heavily over the course of the next year as part of developing control actions in conjunction with key stakeholders.
- WQIP Buffalo Creek catchment
 - A WQIP is proposed by the Commonwealth and will be developed by consultants Aurecon. Buffalo creek is a hypereutrophic system located east of Darwin. The system is subject to a waste discharge from the Leayner-Sanderson STP and is within a catchment subject to extensive urban development pressures. The process to develop the WQIP will be undertaken in parallel with the broader WQPP for Darwin Harbour.
- AHU intends on undertaking a review of the WQO's for the Darwin Harbour region in the next year. Further work will focus on accounting for the large variability associated with tidal regime and seasonality in the region.

2. Update – Estuary Research

- The closure of some Darwin beaches in 2010 and 2011 due to elevated *E. coli* and enterococci have caused community concern. A project with Charles Darwin University to select microbial indicators and conduct preliminary genetic profiling as a step towards source tracking was undertaken in June 2011. Results are expected to be made public by a Govt appointed taskforce later in 2012.
- 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. Some progress on the collection of time series data is expected in the next year with a focus on the region subject to the Inpex LNG proposal.
- Shellfish study – field work associated with the collection of water, sediment and *Telescopium* sp to assess the bioaccumulation of metals, toxicants and EDC's has concluded . Preliminary findings will be published in August 2012.
- BRUVS fish survey work and monitoring program underway in Darwin Harbour in collaboration with Fisheries and the Marine Biodiversity unit of NRETAS.
- Seagrass monitoring by Marine Biodiversity Unit is underway.
- Dolphin monitoring is currently being undertaken by NRETAS in Darwin Harbour. This includes an extensive aerial survey to the west along the coastline to the WA border.
- Benthic habitat mapping of Darwin Harbour was undertaken in collaboration with AIMS, Darwin Port Corporation and GA. It is expected that this will provide vital information on benthic habitat's and inform future monitoring and conservation effort in the region. Bathymetry data is now available via GA and extends to upper reaches of the Blackmore and Elizabeth estuaries of Darwin Harbour.
- An Integrated Monitoring and Research Program (IMRP) is currently being developed for the Darwin region. The vision of the IMRP is to provide quality data to measure ecosystem health and inform sustainable development of Darwin Harbour today and into the future. The IMRP will focus initially on marine, estuarine and freshwater monitoring and research of the Darwin Harbour region. This stakeholder invested program will aim to achieve a sustainable and integrated approach to monitoring and research in the region.

3. Significant Issues for Discussion

- Developing robust water quality benchmarks (objectives) in a dynamic macro tidal system to standardise for variable temporal and spatial water quality.
- Designing a monitoring program to detect early and incremental degradation of estuarine health, and implications for Report cards, design and analysis, and resource efficiency.

 National Estuaries Network	Meeting No. 22 Hobart, Tasmania
	8 May, 2012
AGENDA PAPER	Victoria

1. Update – Estuary Management

- Victorian Index of Estuarine Condition trial continues (funded by DSE and Melbourne Water). Fish and bird survey components being done by Arthur Rylah Institute. Balance of measures being assessed by Deakin University - Contact: Fiona Warry (fiona.y.warry@dse.vic.gov.au).
- The Port of Hastings Development Authority was established on 1 of January 2012. At present it is focussed on establishing the organisation with systems, processes and capability. Pending the next financial budget, the PoHDA are hoping to start scoping environmental baseline programs in the second half of 2012.
- Monash ARC - *The Influence of Catchment Land Use on Ecological Functioning of Estuaries: Summer Report 2012* – please refer to attachment.
- The State-wide assessment of Victorian coastal wetlands has been completed. The final report was printed in late 2011 and is available at http://www.ozcoasts.gov.au/geom_geol/vic/index.jsp
- A report called *Mangroves in Western Port Discussion Paper* has been completed for DSE.
- Parks Victoria has released an information booklet on Mangroves of Victoria.
- EstuaryWatch has released its latest publication - *Interpreting Estuary Health Data*. This can be found at <http://www.ccma.vic.gov.au/What-we-do/Community/EstuaryWatch.aspx>. This manual has been prepared to assist EstuaryWatchers and estuary managers to understand and interpret the data collected through the EstuaryWatch program. Other news from EstuaryWatch includes:
 - The EstuaryWatch team now has three staff at the Corangamite CMA:
 - There are currently 90 active EstuaryWatch volunteers.
 - There are 10 active EstuaryWatch groups in the Corangamite Catchment.
 - There is 1 active EstuaryWatch group in West Gippsland Catchment.
 - There is 1 active EstuaryWatch group in Glenelg Hopkins Catchment.
 - Parameters being monitored by EstuaryWatch volunteers monthly include, dissolved oxygen, temperature, pH, salinity, electro conductivity, turbidity, depth and mouth condition.
- The Estuaries Group at the Centre for Aquatic Pollution Identification and Management (CAPIM), led by Prof. Mick Keough and Assoc. Prof. Steve Swearer in the Department of Zoology at the University of Melbourne, continues with their efforts to develop new approaches for detecting impacts of urban, industrial and agricultural pollutants in estuaries.
 - The fish group are developing novel fish bioassays for detecting sublethal impacts of EDCs (ie. 17b-estradiol) and heavy metals (ie. Cu, Pb, Zn) in estuarine water and sediments, using two native species, the Eastern blue spot goby (*Pseudogobius sp.9*) and the Common galaxias (*Galaxias maculatus*). Some of the endpoints we have been exploring in the early life stages of fish include rates of deformity, sensory

development, larval behaviour and otolith microchemistry, while in juvenile and adult fish we have been assessing gonad histology and gene expression. These bioassays, in particular ones using embryos, are the first of their kind for Victoria. As both fish species are widespread and common throughout SE Australia, the aim is for these bioassays to become a broadly applicable biomonitoring tool.

- The invertebrate group have commenced field-based sediment spiking experiments using plaster blocks and sediment dosed with copper and zinc. Results from these experiments will demonstrate how benthic invertebrate communities respond to specific concentrations of metal pollution in sediments. The focus of this work is currently at three estuaries in Port Phillip Bay, Victoria, but will later be expanded to more estuaries along the Victorian coast. Laboratory-based experiments designed to detect behavioural changes in response to sediment pollution using common invertebrate taxa (e.g. Nereidae polychaetes) are planned for later this year.
- The University of Melbourne (Mick Keough and staff) edited and co-authored the publication *Western Port science review – Understanding the Western Port Environment: a summary of current knowledge and priorities for future research* – this is available from the Melbourne Water website at <http://www.melbournewater.com.au/westernportreview>
- The East Gippsland Catchment Management Authority (EGCMA) and NSW Office of Water supported another round of monitoring in the Snowy estuary in late 2011 to ascertain the physical effects of the spring e-flow release from Jindabyne. The first round was in 2010. The monitoring included entrance dimensions and water level, salinity and temperature in the estuary before, during and post release. This information will be used to inform longer term monitoring needs.
- Fisheries Victoria have developed a Report Card framework through a workshop series with the State of Victoria Department of Primary Industries group based in Queenscliff, a visiting scientist (Prof. WC Dennison) and a Science Communicator (K Moore). Please contact Andy Longmore, DPI Queenscliff for further information.
- Melbourne Water
 - Prepared an internal discussion paper on estuaries to inform development of their Regional Healthy Waterways Strategy.
 - Completed the ‘Healthy Estuaries Strategy’. Please contact Melbourne Water if interested.
 - Completed two year field work for the trial inclusion of a bird sub-metric for the Victorian Index of Estuarine Condition.
 - Not done any major investigations since their big Werribee flows study. However, they are planning to deliver flows to the Werribee estuary next year in line with the Sherwood report, which is good news. She also says that they are planning to use the new DSE Flows methodology to calculate flow requirements for the Yarra River with a long term eye to delivery of flows in three or four years time.

 National Estuaries Network	Meeting No. 22 Hobart, Tasmania
	8 th May 2012
AGENDA PAPER	CSIRO

Prepared by: Simon Allen
Position: Research Stream Leader
Organisation: CSIRO

NATIONAL

Carbon Cluster

CSIRO has recently established a new Collaborative cluster on Marine and Coastal Carbon Biogeochemistry. Led by Professors Peter Ralph (UTS) and Carlos Duarte (UWA) the focus of this cluster is the research and delivery of carbon inventory information on sources, speciation, stocks and flows of carbon in Australian marine and coastal environments, and process understanding of changes in carbon cycling resulting from natural and anthropogenic change that can be used to underpin assessment of sequestration potential, ecosystem status and vulnerability. This collaboration will assist CSIRO accelerate the development and delivery of marine, climate and ecological information streams based on models that can (i) better evaluate and predict primary productivity¹ and its importance to environmental and economic services, (ii) assess the implication of climate induced changes on biogeochemical cycles, including ocean acidification², and (iii) sequestration options including the application of Blue Carbon³ and other strategies for carbon burial. Contact Andy Steven (andy.steven@csiro.au)

Informing catchment management using high frequency nutrient monitoring

This project examined the use of high frequency nutrient monitoring data to inform water quality improvement and catchment management. High-frequency monitoring of nutrients in rivers and streams has only recently become possible with the development of portable nutrient analysers. With an increased emphasis on the use of sensors and real-time monitoring and reporting these instruments have tremendous appeal. They are, however, still expensive and there can be a large cost of maintenance associated with them. This project provided (i) an inventory of projects in CSIRO that have used these analysers for high-frequency nutrient monitoring in catchments (Swan, Tasmania, SE Qld) and a summary of their findings and experiences, and (ii) a review illustrating the value of high frequency nutrient monitoring in a wider range of applications and outlining mathematical approaches to assess the cost-effectiveness of high resolution nutrient monitoring. The report is in the final stages of completion.

An extension to this work has installed a nitrate analyser on the Pioneer River in the Whitsunday Mackay region. Contact Kirsten Verburg (Kirsten.verburg@csiro.au)

TERN ACEF:

The Australian Coastal Ecosystems Facility (ACEF), a new facility of the Terrestrial Ecosystem Research Network (TERN), aims to provide long-term collection and distribution of key coastal datasets for use in making policy and management decisions about the protection and use of Australia's coastal assets. ACEF will enable the distribution of coastal ecosystem data and information through a range of easily accessible web-based systems.

Recent activity:

- ACEF information infrastructure: a range of geo-spatial server software is being installed at the Queensland Cyber Infrastructure Foundation (QCIF) and CSIRO to support the delivery of data and other systems. This includes geoserver, geonetwork, geonode, etc.
- National Marine Turtle Database user workshop – initial agreement was reached around the need and high level scope of the database. Business needs and technical requirements phases to follow.
- Ongoing discussions with Geosciences Australia regarding synergies and opportunities for collaboration between ACEF and GA.
- Presentation and demonstration of capabilities at the TERN Annual Symposium – ACEF was well received with strong interest in several activities.
- Evaluation of a range of geo-spatial integration and visualisation technologies underway.
- Data acquisition efforts ongoing including targeted communication with agencies holding key datasets (eg. Water quality, coastal habitats, etc).
- CoastalComs cameras for shoreline and waveheight detection – raw and summarised data will be made available for 17 locations around Australia soon through an online data portal.
- Coastal Research webportal launched – see below

Coastal Research webportal

CSIRO has developed the Coastal Research webportal was launched at the Australian Coastal Councils conference in March and provides access to past and present Australian coastal research, links associated data and information. The webportal was developed for local councils but is accessible to state and federal government agencies, research institutions, consultants and also the public. The coastal research webportal is a free resource developed by CSIRO for local councils and researchers to: a) access current and previous research projects, b) find related publications, c) access coastal data, classified by state as well as national and international links plus important coastal documents are listed in data links under Coastal Reports and d) links to a range of available data and metadata. In addressing the needs of our local coastal councils, we have opted for short, plain English, acronym-free research summaries and provided further data links (under Creative Commons licensing). The link is <http://coastalresearch.csiro.au>
Contact Jonathan Hodge (jonathan.hodge@csiro.au)

Satellite Remote Sensing

- SOE funding CSIRO to report on algal growth and algal bloom trends as perceived from SRS products.
- More than 8 years of Tasmanian Ocean colour data now available using CSIRO developed algorithms. <http://www.marine.csiro.au/remotesensing/imos.test/aggregator.html>
- SRS scientists and modellers are working on developing a common interface between their domains using surface spectral absorption and surface spectral backscatter. To this end a commons bio-optical model has been developed and is being implemented in the CSIRO EMS biogeochemical model.
- The IMOS bio-optical database has been steadily populated with many years worth of CSIRO cruise data over the last 6 months.

There has been a massive upturn in interest in the SAMBUCA method for deriving bathymetry and habitat information from satellite or aircraft based passive optical remote sensed data. Requests have been received from all major hydrographic offices. Fast track mechanisms to get move this method from research tool to operational tool are being investigated. Contact Arnold Dekker (arnold.dekker@csiro.au)

Methods for measuring estuarine infauna and nitrogen cycling microbial communities

Human activities are altering biodiversity at an unprecedented rate. Current assessment methods only examine a minute fraction of the true biodiversity of an ecosystem. To address this, CSIRO researchers have developed two approaches which enable thousands of organisms to be examined simultaneously.

Firstly, a DNA microarray chip which contains the genetic information for thousands of animals, plants and micro-organisms, is used to identify the DNA signatures extracted from an environmental sample, such as a sediment core or a volume of water. This information can then be used to compare reference and impacted locations. Extending from this development has been the application of high-throughput sequencing as an ecological monitoring tool. In this approach, the DNA of environmental samples are sequenced and compared using a new approach called pyrosequencing. This method can potentially provide information on all organisms present within a sample. Presently, we are examining how these approaches can be adopted to monitor and assess the health of coastal ecosystems. This includes refining the way we collect, process and analyse the samples, and the ecological relevance of the data. Trial projects utilising ecogenomics are currently being performed in Kakadu National Park and along SE Queensland. In conjunction with CSIRO, the USPEPA is trialling this approach to assess the ecological impacts of a number of emerging contaminants, e.g. Triclosan, an antibacterial agent commonly found in health care products. We envisage that the inclusion of ecogenomic tools will greatly advance the way we examine estuarine and other environments.

Nitrogen is one of the key building blocks of life and the environmental genomics team at CMAR has created a new tool that studies nitrification - the conversion of ammonia to nitrite - the first step in nitrogen loss from a system. The team utilised genomics technology to create a gene microarray, which can rapidly and cheaply describe a whole microbial community, the invisible workforce behind the nitrogen cycle. Comparing a range of different Australian estuaries for sediment biogeochemical properties and for their microbial community responsible for nitrification, the team showed that the microbial community composition was likely related both to the environmental conditions and to site histories of the respective estuaries. These results highlight the link between microbial community structure and the state of the environment and support the notion that assays of functional gene abundance and composition can be used as proxies for fundamental processes. Furthermore, the results highlight the potential of rapid, affordable, high-throughput assays of microbial community composition for assessing estuarine health, supporting management decisions.

Contact Anthony Chariton (Anthony.chariton@csiro.au) for estuarine infauna and Lev Bodrossy (Lev.bodrossy@csiro.au) for nitrogen cycling genomics

Metal concentrations

Soft metalliferous ores, increasing use of copper-based paints to reduce biofouling (including aquaculture), are expanding the footprint metal contamination within estuaries. Measurement of total metal concentrations are not suitable for assessing potential impacts to aquatic biota. The potential impacts of increased metal contaminant loadings in estuaries needs to be evaluated in relation to the bioavailability of the metals to aquatic organisms. However, while our current regulatory frameworks for sediment quality assessment include consideration of contaminant bioavailability, the tools presently available are frequently inadequate. The use of inappropriate or inadequate information for environmental impact assessment (EIA) impedes both the management and approval processes for development within our coastal marine environment. We have a range of projects aimed at improving the suite of tools available for EIA and assisting industries (e.g. aquaculture and mineral export industries) with improving the procedures for assessing and

managing the risks their practices pose to the environment. Contact Stuart Simpson (stuart.simpson@csiro.au).

Visualisation and Data Access:

The NecTAR project for a MARine Virtual Laboratory has started. Lead through the Australian Ocean Data Network (AODN) by Roger Proctor. CSIRO is providing access to its models, model output and modelling framework to allow either existing model output data to be analysed or specific model scenarios to be developed using a common interface. As an adjunct project, the MARVL Information System will allow access to operational data streams in SE Tasmania for the forcing and initialisation of models through the MARVL interface.

Estuarine and nearshore ecosystems – Assessing alternative adaptive management strategies for the management of estuarine and coastal ecosystems

With NARFP funding and a number of collaborators will be developing a guideline of National adaptation strategies for the estuarine environment by drawing together existing information and tools. These will be tested with a few case studies that are selected to represent different estuarine types. Objectives are to:

- Synthesize and integrate all current knowledge, data, tools and processes for the development of a national assessment of impacts and adaptation strategies for management of estuarine and coastal marine ecosystem under climate change.
- Evaluate the key adaptation strategies recognising that there needs to be a process to harmonise adaptation strategies for the public benefit.
- Develop a guideline on developing National adaptation strategies for the estuarine environment.

Contact Cathy Dichmont (cathy.dichmont@csiro.au)

Improved Stable Isotope Methods for Determining the Source, Distribution and Uptake of Anthropogenic Nutrients in Australian Coastal Waters

Discharge of nitrogen containing nutrients to waterways from anthropogenic activities such as sewage, agriculture and industry modify Australia's sensitive natural ecosystems in a number of deleterious ways. Foremost among these are the changes in community structure, particularly at the base of the food chain, and the way these changes propagate up through ecosystems. Identifying and distinguishing the source(s) of nitrogen and measuring its uptake across the breadth of the food web is a vital step in understanding the impact of nutrient runoff and developing management strategies to minimize its effect.

Stable isotopes have been used in the past to trace nutrient inputs into coastal environments with mixed success, generally due to poor source determination and a lack of resolution between living and detrital material. CSIRO WfO has established a project to utilize emerging compound specific stable isotope techniques to better quantify uptake and remineralisation of nutrients. These relatively new chemical techniques allow the isotopic signature of nitrate and ammonia to be determined in both fresh and seawater samples, the latter having been previously difficult to analyse with any precision. The new methods have the added benefit that they maintain the isotope signature of both nitrogen and oxygen in nitrate. These isotopes are fractionated differently depending on the process of removal from the water column (e.g. uptake vs denitrification), thus providing an opportunity to obtain broad scale understanding of removal processes compared with the often used spot (core/chamber) measurements, and therefore much better comparison with model outputs. Contact: Andy Revill (Andy.Revill@csiro.au)

Catchment to Coast Modelling Review

A review of the current state of the art in integrated biophysical catchment to coast modelling is now being finalised. The review, conducted through the Water for a Healthy Country National has identified gaps and research priorities in catchment to coast modelling. Several NEN members have provided input to this process and will be contacted to allow an opportunity for additional feedback once a draft review paper is ready. Major research priorities have been grouped into six categories: 1) Catchment nutrient process modelling; 2) Inclusion of additional water environments and components; 3) New modelling techniques; 4) Building more flexible models and modelling communities; 5) Improving modelling practise; and 6) Integration of models with observations. Within each category, promising areas for investment have been identified. Contact: Barbara Robson (barbara.robson@csiro.au)

Ecosystem response to catchment processes knowledge synthesis

(Due to start in July 2012, with plans still being finalised). This project will synthesise recent learnings in catchment to coast biogeochemistry and ecological responses. It will produce a series of view papers to draw together our current understandings of the transport of materials through catchment and estuary systems. Separate reviews will focus on sediments, nitrogen, phosphorus and possibly other materials of importance. The reviews will consider how these cycles change across key environmental gradients within Australia. Contact: Barbara Robson (barbara.robson@csiro.au)

WESTERN AUSTRALIA

A hydrodynamic model of the Leschenault Estuary

Philip Gillibrand has taken over the final stages of the calibration of the Leschenault hydrodynamic model. Observations of inputs from the Collie River have been causing some instability, but within acceptable limits for implementing biological models in this region. As stated in previous reports, the element that marks this work as unique is the close collaboration with Department of Water in Western Australia and the full use of operational datastreams to drive the model. This means that in addition to delivering insight into the dynamics of the Leschenault the model itself can continue to run beyond the end of the project for a surprisingly low ongoing cost. The project is funded by the Department of Water in Western Australia. Contact Philip Gillibrand (Philip.Gillibrand@csiro.au)

Source and biogeochemical cycling of dissolved organic matter, Swan-Canning estuary and catchments

Dissolved organic matter (DOM), observed as tannin or tea coloration, is ubiquitous in estuaries of South-western Australia, yet its role in river and estuary ecosystem function is not well understood. In recent studies funded by the CSIRO and Swan River Trust, we examined the source and function of dissolved organic carbon (DOC) and associated nitrogen compounds in streams draining agricultural and urban sub-catchments as well as the Swan-Canning estuary using fluorescence spectroscopy and laboratory bioassays. . In streams we found that bioavailable DOM was

negatively related to humic-like fluorescence, but positively related to protein-like fluorescence. In

estuaries, fluorescence spectroscopy fingerprinted distinct estuarine DOM sources from vascular plant material, fresh autochthonous sources, and degraded marine sources. Lastly, radiocarbon techniques have identified both old and new DOM in agro-urban streams. Highly aged carbon (70-80 percent modern) in streams draining urban catchments suggests that DOC is either from the mobilization or decomposition of aged peat or it contains a significant proportion of hydrocarbon material from anthropogenic activities. Conversely, relatively modern DOC (>95 percent modern)

in agricultural catchments suggests that DOC loads are related to native vegetation and/or agricultural sources. Our findings demonstrate that simple fluorescence and bioassay techniques can be used better understand the flow of carbon and nutrients in aquatic food webs. Further, radiocarbon isotope techniques can be used to determine how anthropogenic activities influence the mobilization of organic matter in urban environments. The work and analysis is ongoing. Contact Kevin Petrone (kevin.petrone@csiro.au)

Kimberley Marine Research Program

With support from the West Australian Department of Environment and Conservation (DEC) plus State and Commonwealth funding and administered by the West Australian Marine Science Institute a number of collaborators are developing project proposals to:

- provide the foundational datasets required for marine park and marine resource management as well as better understanding and managing current human impacts; and
- to provide the scientific understanding of ecosystem functioning and response to a range of potential human impacts that are likely to arise in the future, including climate change.

The research program is designed to be integrated across a range of disciplines and to span appropriate time and space scales through a mixture of observation and modelling. It has a set of priorities for Kimberley catchments and estuaries including:

1. How does seasonal and cyclonic riverine discharge (e.g. nutrient, freshwater and sediments) influence inshore marine ecosystems?
2. What is the relative significance of terrestrially-derived nutrient in sustaining inshore marine food webs?
3. How do human use of rivers and catchments affect estuarine and inshore marine ecosystems?
4. What is the biodiversity significance of estuarine habitats and communities?
5. What is the significance of estuaries in the life-cycles of marine species, particularly commercially significant species and threatened marine fauna?
6. How will climate change impact on catchment to ocean interactions? What are the rates of pelagic primary productivity and how does this compare with other areas of and elsewhere?
7. Are there large spatial (e.g. inshore-offshore) and temporal (e.g. seasonal, inter-annual) variations in pelagic primary productivity in this region?
8. What processes are 'driving' this variation?
9. How significant is pelagic primary productivity to the maintenance of Kimberley ecosystems?
10. How are large-scale oceanic processes related to local physical and biological oceanography?
11. How does the distribution of fauna and flora relate to large and small scale oceanographic processes?
12. How do large tides influence inshore and estuarine ecosystems, how might modification (e.g. damming, water extraction etc) effect these ecosystems?
13. How will changes in climate (e.g. rainfall) affect tropical estuaries in terms of discharge, and how will this influence other physical processes (e.g. sedimentation)?
14. How might we best monitor changes in physical and biological oceanography, particularly in relation to climate change?
15. What will be the trajectory of oil spills under typical oceanographic conditions?

Contact Nick Hardman Mountford (nick.hardman-mountford@csiro.au)

QUEENSLAND

eReefs

The vision for eReefs is to develop an “operational system” which enables accounting and forecasting of hydrodynamics and water quality from the catchment to the reef.

In order to operationalise eReefs, four R&D work packages will be undertaken over the next 5 years: (1) Enhanced Monitoring, (2) Interoperable data and information systems, (3) Operational Catchment and Marine Modelling and (4) Reporting and Visualisation Services. The most substantial of these work packages is WP 3- Operational Catchment and Marine Modelling, which will develop an integrated suite of marine receiving water models to represent the circulation, transport and fate of water and dissolved and suspended constituents from the estuaries to the Great Barrier Reef (GBR) shelf-break. This will include the development of a relocatable estuary mode. Funding is provided by federal and Queensland governments, and philanthropic partners. CSIRO, AIMS and BoM are the key research providers.

Contact Andreas Schiller (andreas.Schiller@csiro.au)

QIMOS

The Australian Integrated Marine Observing System (IMOS) will in 2012/13 provide additional funds, matched by CSIRO to increase the level of sustained observing in the GBR region which will directly affect the quality and quantity of observations available for calibrating the e-reefs model.

TERN Supersite

The Logan estuary in SEQ is apart of the TERN Periurban supersite. Four stations located at the head to the mouth of estuary provide high-frequency data of flow, turbidity, CDOM, nitrate, pCO₂ and meteorological data. Data can be seen at : <ftp://ftp.csiro.au/LoganRiver/index.htm>. Fish biomass and fish movements are also measured using acoustic methods. Associated studies include studies of trophodynamics in association with Griffith University and the use of high resolution cameras to monitor bird distributions. Two new projects utilising this infrastructure are a pilot study one continuous monitoring methods for eReefs and SEQUITOR a project funded by AND to A demonstration integrated coastal knowledge platform, that will integrate observational (e.g. monitoring) data from catchment, river and coast with models of catchment, estuarine and coastal processes to enable the discovery and generation of new knowledge and better understand the catchment-to-coast system. Contact Andy Steven (andy.steven@csiro.au)

SEQ 2011 Post flood Responses

The January 2011 flood delivered well over 1.2 million tonnes of sediment to Moreton Bay, At the peak of the flood, water carrying sediment from the Brisbane, Lockyer and Bremer Rivers extended to the middle of Moreton Bay and totally filled Bramble Bay and Deception Bay, with layers of fine sediment from 10cm to >30cm being recorded across this area. A number of institutions have responded to post-flood monitoring of the impacts and recovery of Moreton Bay to the January flood. CSIRO has undertaken biogeochemical and bio-optical surveys on 4 occasions at 17 stations, and conducted seagrass surveys and collected samples to assess recovery. Similarly, Griffith University has made assessments of a benthic biota including seagrass, coral and macro-algae. The University of Queensland has made measurements of sediment distribution. Further surveys investigating the longer term ecological implications have been undertaken. A data exposure workshop has been held, revised conceptual models developed and a report releases. Further write-up workshops are being organised. Contact Andy Steven (andy.steven@csiro.au)

Towards ecologically relevant targets for river pollutant loads to the Great Barrier Reef

Degradation of coastal ecosystems in the Great Barrier Reef (GBR), Australia, has been linked with a decline in water quality from land-based runoff. This paper examines the reduction in current end-of-catchment loads required for total suspended sediment (TSS) and dissolved inorganic nitrogen (DIN) to achieve GBR water quality guidelines. Based on first-order estimates of sustainable pollutant loads, current TSS and DIN loads would need to be reduced by approximately 7,000 ktonnes/yr (41%) and 6,000 tonnes/yr (38%), respectively. Next, these estimated reductions for TSS and DIN are compared with Reef Plan targets for anthropogenic sediment (-20% by 2020) and nitrogen (-50% by 2013) loads. If successful, these targets will accomplish approximately 40% of TSS and 92% of DIN load reductions required to achieve sustainable loads to the GBR lagoon. These first-order estimates elucidate the need to establish ecologically relevant targets for river pollutant loads to the GBR for management and policy. This work is ongoing. Contact Frederieke Kroon (frederieke.kroon@csiro.au)

NORTHERN TERRITORY

Estuarine-coastal Research on Kakadu National Park through the Northern NERP Hub:

Estuaries and the coast are key features of northern Australian rivers because they support high value fisheries and encompass habitats high in biodiversity. However, we have limited understanding of the factors that influence the patterns of estuarine and coastal habitat diversity, and the processes that sustain high productivity, even in high conservation value and pristine areas such as Kakadu National Park. Additionally, climate change seriously threatens the resilience of communities that rely on ecosystems for their well-being. Indigenous coastal communities in northern Australia, for example, are particularly vulnerable because such impacts will exacerbate existing threats to natural and cultural values that are inextricably connected. These cumulative impacts will substantially reduce opportunities for sustaining and developing future ecosystem-based livelihoods such as ecotourism. Hence, the socio-economic and ecological impacts of a range of climate change scenarios along the northern coastline need to be examined in combination with other existing pressures including multiple use, and adaptation options developed and implemented.

The CSIRO WfO Flagship is one of 16 consortium partners in the Northern NERP hub that has commenced critical research on Kakadu National Park to help close key knowledge gaps on tropical estuaries, and to help develop and assess adaptation options for climate change in partnership with Indigenous communities and other stakeholders. Areas of research include: ecohydrological modelling including sea level rise prediction (AIMS); an assessment of the biodiversity of estuarine fish in the Alligator Rivers Region/Kakadu (Griffith University); developing remote-sensing tools to map, monitor and assess the condition of catchment, coastal and near-offshore habitats as surrogates of biodiversity (CSIRO); developing ecogenomic approaches to monitor and assess biodiversity in estuaries (CSIRO); developing monitoring and assessment tools (e.g. I-Tracker) with Indigenous land and sea rangers in order to better manage dugongs, turtles and sea grass (NAILSMA-CSIRO); developing a Management Strategy Evaluation (MSE) for Kakadu's coastal floodplains and estuaries, in partnership with Indigenous land owners and park rangers, to help manage current and future threats such as invasive species and sea level rise (CSIRO, Charles Darwin University). Contact Peter Bayliss (peter.bayliss@csiro.au)

Erosion source discrimination of soil and carbon sources contributing sediment in a rural Australian catchment using Compound Specific Isotope Analysis (CSIA)

Knowledge of the source of eroded soils can contribute important information required for the mitigation of soil loss from agricultural lands and sediment-associated degradation of river and lake

systems. Determining the proportions of eroded soils contributing sediment to rivers and streams using physical and chemical characteristics can be a direct and cost-effective way of directing erosion control actions

CSIRO has used Compound Specific Isotope Analysis (CSIA) to assess the ability of $\delta^{13}\text{C}$ signature of fatty acid compounds to discriminate erosion sources in a rural Australian catchment. The study focussed on a high flow event (ten year recurrence interval) which occurred in the Logan-Albert catchment in January 2008 and has built on a previous sediment tracing study undertaken in 2008 using fallout radionuclides and major/minor element geochemistry.

It was found that surface soil from forest, pasture and cultivated land-uses are well discriminated using CSIA. Furthermore, sub-surface soil sources associated with channel bank erosion and exposed subsoils (gullies and hillslope scalds) occurring specifically in the mid-western Logan catchment could also be discriminated.

Selected fatty acid and bulk carbon $\delta^{13}\text{C}$ data were used in the *IsoSource* mixing model to determine erosion sources contributing sediment to the flood event. The results were compared with results obtained using other sediment tracers. For the lower Logan River, the CSIA tracing results are consistent with fallout and element geochemistry tracing, with channel bank erosion being confirmed as the major sediment source. Moreover CSIA has quantified the significant contribution of exposed subsoils originating on hillslopes and drainage lines from the mid-western region of the Logan catchment. In the Albert River catchment about 50% of sediment comes from forest land-use, although more than half of apparently comes from sub-surface sources.

These results have demonstrated that the CSIA technique has the potential to significantly enhance the ability of sediment tracing studies to determine the extent that different land-uses and erosion processes are contributing eroded soil to rivers, thus testing and validating model predictions and calibration of model parameters. Contact: Andy Revill (Andy.Revill@csiro.au)

Tasmania

Estuarine effects of Wastewater Discharge.

CSIRO is engaged in a collaborative project with Tasmania's Southern Water modelling the effects of estuarine STP discharges. Contact: Karen Wild-Allen. (karen.wild-allen@csiro.au)

Optimum Biogeochemical Sampling Strategies

As part of a project looking at optimum BGC sampling strategies a number of novel or new sensors and sensor platforms have been deployed in SE Tasmania, these range from profiling moorings, prototype transducer based ammonia sensors, wet chemistry nutrient analysers and prototype rapid response flow injection analysers. The results from the RRFIA are particularly promising. Contact Karen Wild-Allen. (karen.wild-allen@csiro.au)

Tasmanian Marine Analysis Network.

This long running project looking at the increasing our ability to sense and understand the marine environment through improved informatics and the development of lower cost sensing has delivered some interesting results in the last 6 months. The real time quality control methods developed have been adopted by the IMOS National Reference Station Network. The use of self organising maps to sift through vast stores of model output is delivering new insight and increasing our ability to "make sense" of data. The autonomous underwater vehicle has been fitted with upwards and downwards looking spectrometers and is now proving to be a useful platform for the collection of pelagic spectra. Contact Simon Allen (simon.allen@csiro.au)

 National Estuaries Network	Meeting No. 22 Hobart, Tasmania
	8 May, 2012
AGENDA PAPER	South Australia

Prepared by: Sam Gaylard
Organisation: SA Dept. for Environment and Heritage

1. Estuary Management in SA

Overarching Management

The South Australian Estuaries Policy was developed by DENR to set out clear strategies to address 5 main outcomes for the management of estuaries in South Australia. The Draft Estuaries Policy is currently in a holding phase.

An overview of the draft Policy is available at

http://www.lga.sa.gov.au/webdata/resources/files/Estuaries_Draft_Policy_Overview_Low_Res.pdf

Estuary Action Plans

Under the NRM Act there are provisions for NRM Boards to develop management and action plans for estuaries. The Adelaide Mount Lofty NRM Board have developed estuary action plans for 4 priority estuaries along the Fleurieu Peninsula (Onkaparinga, Hindmarsh, Inman & Bungala estuaries). These action plans highlight:

- natural values of the estuaries (eg: fish passage or wader feeding areas)
- community values
- Threats
- Recommended management actions for a range of different management agencies

These plans are available at

<http://www.amlrnm.sa.gov.au/Plans/Coastandestuaryplans/Estuaryactionplans.aspx>

Reporting for these estuaries is based on the progress to regional targets, rather than actual condition reporting.

The Coorong and Murray Mouth

The Coorong and Murray Mouth region is one of the best habitats for waterbirds in Australia. However, following a decade of low to no River Murray inflows, the region is now degraded, with significant declines in fish and bird numbers.

The CSIRO CLLAMMecology project has developed a two-step approach to help plan future management interventions to rehabilitate this region. The first step of this approach is to evaluate

future climate and management intervention scenarios using a hydrodynamic model to predict future water level and salinity regimes, the two key ecosystem drivers in this region.

These water level and salinity predictions can be made for the length of the Coorong (~110 km) at decadal or longer time-scales as a function of River Murray discharge over the Lower Lakes barrages, connection to the sea via the Murray Mouth, and Upper South East Drainage discharge.

The second step of the approach is to evaluate ecological responses to changes in water level and salinity. Several tools have been developed, including models that evaluate the change in the distribution of key fish and bird species, of key habitats (such as mudflats), or of whole ecosystems.

The management actions of the program are largely dependant on the outcomes of the Murray Darling Basin Plan.

For more details on the Coorong and CLLAMMecology <http://www.csiro.au/en/Organisation-Structure/Flagships/Water-for-a-Healthy-Country-Flagship/CLLAMMecology-Cluster.aspx>


Condition reporting

The EPA is responsible for reporting on the condition of waters, including estuaries. Historically the EPA monitored a number of the large estuaries (Onkaparinga, Cygnet, Inman) using physical and chemical parameters however the relevance of this is questionable and new methods for investigating the condition of South Australia's estuaries is currently being investigated. The envisaged output from condition monitoring in estuaries by the EPA will be report cards of ecological condition.

The EPA have undertaken a survey of contaminant residues in estuarine fish based on land use. The findings were largely unsurprising with a number of locations with elevated levels of lead and PCB's. Work was undertaken on whole fish to assess the ecological risk however some samples approached or exceeded food standards so subsequent work is currently underway to assess fish fillets from high risk estuaries to determine human health risks.

New or different threats

The mining boom is driving pressure on the use of the Port Pirie creek estuary which is heavily contaminated with over 100 years of use as a lead and zinc smelter export site. Other users want to export other commodities out of this location and the shallow draft and highly contaminated status of the sediments is creating new risks for the region.

 National Estuaries Network	Meeting No. 22 Hobart, Tasmania
	8 May, 2012
AGENDA PAPER	Geoscience Australia

Compiled by: Lynda Radke

Position: NEN Coordinator and GA representative

1. Coastal Marine and Climate Change Group: Seabed Mapping and Coastal Information Section

CERAT. The Coastal Eutrophication Risk Assessment Tool is being developed for the NSW Office of Environment and Heritage, Department of Premier and Cabinet for dissemination through OzCoasts. The tool is in the final stages of testing and bug-fixing.

TRaCK: A Tropical Rivers module (OzCoasts) was developed in partnership with the Griffith University node of the Tropical Rivers and Coastal Knowledge (TRaCK) consortium and Boab Interactive. The module contains the Australian Riverine Landscape Classifier (AURICL) and provides links to the TRaCK Digital Atlas. AURICL will assist researchers and policy makers make better decisions about riverine landscapes. It is a dynamic and flexible system (i.e. can be updated as new data layers become available) for classifying and comparing tropical catchments and their rivers based on the similarity, or dissimilarity, of a wide range of parameters. Importantly, AURICL provides researchers with: (i) data-sets to link stream segments from the National Catchment Boundaries database to estuary point locations for north Australia; (ii) a collection of riverine attribute data that sum their upstream contributions to an estuary; and (iii) an amalgamation of inputs for estuaries with multiple contributing streams. To date, researchers have only had access to very general data on the catchments that feed estuaries (e.g. catchment areas).

TERN. A partnership between OzCoasts and the coastal facility of the TERN (Terrestrial Ecosystem Research Network) is currently under negotiation.

Contact: Lynda Radke | Lynda.Radke@ga.gov.au | 02 6249 9237

2. Coastal Marine and Climate Change Group: Climate Hazard and Risk Section

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. Based on this, a nationally consistent coastal geomorphic dataset was derived by collating and re-classifying more than 60 existing coastal geomorphic datasets. This dataset compliments the Smartline (polyline map) of coastal geomorphology for use in coastal vulnerability assessments. The data is currently in a stakeholder review process, and will become publicly available through the Geoscience Australia portal by September. Discussions are underway with state agencies and other stakeholders to form a Coastal Geomorphic Information Committee that will consult on governance and future development of these and similar coastal datasets.

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 include impact assessments of future climate sea level scenarios 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 sediment budget and associated shoreline position response to sea level rise) with detailed hydrodynamic storm surge modelling (utilising both ANUGA and GCOM2) to determine the potential areas of inundation.

Contact: Martine Woolf | Martine.Woolf@ga.gov.au | 02 6249 9075 | hazards@ga.gov.au

3. National Earth Observation Group: Science and Strategy Section

The National Dynamic Landcover Dataset for Australia was released in November 2011. This dataset is based on time series analysis of MODIS data covering 8 years. The dataset could be used for some coastal applications provided that the areas of interest are large >250 metres x 250 metres and relatively uniform. The dataset is not suitable for habitats that are smaller than this or contain sharp environmental gradients. The dataset could be used to gain insight into processes effecting the large coastal wetlands and inter-tidal environments across northern Australia, however it is not well suited to the more compact coastal wetland and intertidal environments that predominate in southern Australia. The data set can be visualised or accessed online from <http://www.ga.gov.au/earth-observation/landcover.html>

The Australian Satellite Calibration Working Group presented Australian satellite calibration / validation activities including for coastal applications, at the CEOS Plenary meeting of the Calibration Validation Working Group held in Brisbane in February 2012.

Field spectroradiometers: 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 There were no requests for these instruments since February 2011.

Contact: Medhavy Thankappan (02-6249-9310; Medhavy.Thankappan@ga.gov.au).


4. Groundwater Group: Groundwater and Environment Section, 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 sea water intrusion 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 has been conducted in three phases: 1. Literature review and baseline assessment; 2. Conceptualisation and vulnerability methodology design; 3. Vulnerability assessment and mapping.

The project team is currently in the final phase of the project, with an expected end-date of June 2012. At that time various technical reports and a summary report will be made available.

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

 National Estuaries Network	Meeting No. 22 Hobart, Tasmania
	8 May, 2012
AGENDA PAPER	Bureau of Meteorology

Prepared by: Greg Stuart
Position: Coastal Information Lead
Organisation: Bureau of Meteorology

1. Update – Estuary Management


- Existing BOM activities focus on monitoring and forecasting (short term/ seasonal) stream flow
- National Plan for Environmental Information and BOM Strategic Plan broaden this level of interest and activity considerably
- The focus is shifting to environmental intelligence for safety, sustainability, prosperity and well-being
- eReefs is the BOM's first foray into the area of marine/estuarine water quality
- http://www.bom.gov.au/environment/eReefs_Infosheet.pdf
- eReefs is a collaboration with CSIRO, AIMS, Queensland Government, Great Barrier Reef Foundation

2. Update – Estuary Research

- Taking mature research and turning it into operational systems e.g. Marine Water Quality Dashboard
- Limited efforts in estuaries to date
- Starting to plan for a national coastal information system through NPEI

3. Significant Issues for Discussion

- Coast to Coast conference symposium on
- Where can BOM assist NEN members in terms of provision of information?

 National Estuaries Network	Meeting No. 22 Hobart, Tasmania
	8 May, 2012
AGENDA PAPER	Queensland

Prepared by: Dawn Couchman

Position: Senior Fisheries Scientist

Organisation: Queensland Department of Agriculture, Fisheries and Forestry

1. Update – Estuary Management

- Management of declared Fish Habitat Areas likely to move from Fisheries Queensland in Department of Fisheries, Forestry to Dept National Parks, Recreation, Sport and Racing as a result of recent State election. Overall objective is greater emphasis on access to natural resources.
- Declared Fish Habitat Area Network reporting framework and status report. The status report in being finalised and will include a summary of the current status of each of the 73 FHAs in terms of any management issues that may need to be addressed to enhance the network.
- SPP for protection of fish habitats. This project is on-going, depending on the fate of the state planning instruments program under the new government arrangements. Nicole McKirdy has been temporarily appointed as of January 2012 to drive the project in Fisheries Queensland.
- Several incidents at Gladstone involving spillage and runoff of hydrocarbons into adjacent tidal lands. Spillage occurred from a tanker which ran off the road into mangroves and the runoff occurred from a sealant for a car parking area adjacent to the Calliope River.
- Gold Coast Broadwater Master Plan being developed for navigation channels, with dredging focussed on primary channels only and spoil to be removed from system where economic.
- Fisheries Queensland will be implementing a voluntary buyback program to reduce effort in commercial inshore net fisheries. Nine million dollars has been made available by the Queensland Government over the next three years. There may be synergies between this program and a Queensland Government commitment to enhance protection of dugongs and turtles in Queensland waters.
- The DataOcean project is proceeding with likely public access available from late 2012. The project will provide an internet portal to Queensland fisheries commercial catch and effort data as well as recreational participation and catch data for 2010 -11 (and 2000-01) as both tabular outputs and mapped if required.

2. Update – Estuary Research

- Position advertised for the Marine Fish Habitat classification project. This role will develop a marine fish habitat classification system similar to the terrestrial vegetation classification system used to identify key habitat types that make up regional ecosystems. Filling of the position is on hold due to post-election issues.
- Mangrove watch has moved to James Cook University in Townsville – Jock Mackenzie and Norm Duke running the program with a view to linking with seagrass watch.
- Recent Honours student research supported by funding from the 2012 Marine Fish Habitat Scholarship Program are 2 at JCU, Michael Bradley (The Functional Importance of intertidal snags as fish nurseries and their role in compensating for loss of seagrasses) and Jacob Tapp (Understanding the value of different mangrove zones to fisheries species and ecosystem processes) and 1 at UQ, Jarred Oxley (What is the relative importance of different nursery habitats to recruitment of adult snapper (*Pagrus auratus*) in southern Queensland?).

- 2011 recipient Kate Fraser thesis - "Demersal fish-habitat associations on southern Queensland's continental shelf" at UQ received first class honours. Presentations are being organised for the other 2011 students from JCU, Vinay Udyawer (The spatial ecology of Australian blacktip sharks *Carcharhinus tilstoni* within a nursery area and the effects of extreme weather) and Shaye Carman (The Functional Importance of the Pattern of Habitat Interspersion within a Seascape. For more information on the scholarship program and for summaries of the research, go to the Fisheries Qld fish habitat research program page http://www.dpi.qld.gov.au/28_9206.htm
- Climate vulnerability project is completed for audit of Moreton Bay region and Townsville region audit underway. Likely increase in mangrove area in Moreton Bay but shift in distribution northwards with concurrent losses of upper littoral marine plants [salt couch; succulents] and adjacent freshwater communities. Local government conservation strategies to determine priorities for management and habitat retention.
- Fisheries Queensland is collaborating with National Environment Research Program Tropical Ecosystem hub researchers assessing the importance of various inshore habitats as shark nursery areas within the Great Barrier Reef region to allow assessment of the effectiveness of current closures to commercial and recreational fishing. Dr Colin Simpfendorfer, JCU is project leader.
- A further collaborative NERP TE project led by Dr Nadine Marshall of CSIRO to design a long term socio-economic monitoring program for the Great Barrier Reef region is looking at the activities of coastal communities and plans to undertake its first trial surveys by mid 2012.
- Another collaborative project led by Dr Cathy Dichmont of CSIRO is using a qualitative Management Strategy Evaluation framework to assess objectives and tradeoffs associated with alternative management strategies for the inshore Great Barrier Reef.
- NERP project details at <http://www.nerptropical.edu.au/research>

3. Significant Issues for Discussion

- Significant cuts in travel (20%) and operating budgets across government.
- Impact of the increased emphasis on development of resources and increased access to protected areas including marine parks on the sustainability of the fishing industry.