

 <b>National Estuaries Network</b>	<b>Meeting No. 18</b> Darwin, NT
	18 <sup>th</sup> May 2010 9am – 5pm
<b>MINUTES</b>	NT Dept. of Environment, Heritage & the Arts Offices, Level 2, Darwin Plaza, Darwin City

*Attendees:*

<b>NSW</b>	Tim Pritchard	NSW Dept. of Environment, Climate Change & Water
	Kerryn Stephens	NSW Dept. of Environment, Climate Change & Water
	Peter Scanes	NSW Dept. of Environment, Climate Change & Water
<b>Victoria</b>	Jeremy Hindell	Vic. Department of Sustainability & Environment
<b>Queensland</b>	David Rissik	Qld Dept. of Environment & Resource Management
	Dawn Couchman	Qld Dept of Employment, Economic Development & Innovation
<b>Tasmania</b>	Jason Whitehead	Tas. Dept. of Environment, Parks, Tourism, & the Arts (apologies but provided summary)
	Richard Mount	University of Tasmania
<b>SA</b>	Patricia von Baumgarten	SA Dept. for Environment & Heritage (via phone hook-up)
<b>NT</b>	Julia Fortune	NT Dept. of Natural Resources, Environment, the Arts & Sport
<b>WA</b>	Vanessa Forbes	WA Department of Water
<b>National</b>	Lynda Radke	Geoscience Australia
	Emma Murray (Chair)	Geoscience Australia
	Jodie Smith	Geoscience Australia
	Arnold Dekker	CSIRO Land & Water

## Tuesday 18<sup>th</sup> May, 2010

<u>Tuesday 18<sup>th</sup> May, 2010</u>	<b>National Estuaries Network Meeting</b>
9:00 – 9:10	Conference Room, Environment, Heritage & the Arts Offices, Level 2, Darwin Plaza <b>Chair Emma Murray:</b> Welcome, apologies, and housekeeping
9:10 – 10:30	<b><u>State/Territory Roundtable Update (Each State – up to 15 min)</u></b> <i>What's happening with respect to estuary management in Australia</i> - each state and national rep to give brief overview of estuary management in their jurisdiction. <ul style="list-style-type: none"><li>o <b>NT</b> update (Julia Fortune)</li><li>o <b>SA</b> update (Patricia von Baumgarten via phone hook-up)</li><li>o <b>NSW</b> update (Tim Pritchard / Kerryn Stephens/ Peter Scanes)</li><li>o <b>VIC</b> update (Jeremy Hindell)</li><li>o <b>WA</b> update (Vanessa Forbes)</li></ul>
<b>10:30 – 11:00</b>	<b>MORNING TEA</b>
11:00 – 12:15	<b><u>Continue with State Roundtable update</u></b> <ul style="list-style-type: none"><li>o <b>TAS</b> update (Emma Murray for Jason Whitehead)</li><li>o <b>QLD</b> update (Dawn Couchman / Dave Rissik)</li><li>o <b>CSIRO</b> update (Arnold Dekker)</li><li>o <b>GA</b> update: (Lynda Radke / Jodie Smith)</li></ul>
<b>12:15 – 1:15</b>	<b>LUNCH</b>
1:15 - 2:15	<b><u>Chair Richard Mount:</u></b> <ul style="list-style-type: none"><li>o Tim Pritchard and David Rissik – <i>Applying the Common Assessment and Reporting Framework (CARF) to Estuaries in NSW and Queensland</i></li></ul>
2:15 -3:15	<ul style="list-style-type: none"><li>o Richard Mount – Outline of CARF latest developments</li><li>o All NEN Participation – Discussion on applying CARF in other States/Territories.</li></ul>
<b>3:15 – 3:30</b>	<b>AFTERNOON TEA</b>
3:30 – 4:00	<ul style="list-style-type: none"><li>o All NEN Participation – Continue Discussion on applying CARF in other States/Territories</li><li>o Summarise Main Points and Actions</li></ul>
4:00 – 5:00	Quick discussion on needs for next NEN meeting (probably in November hosted by NSW) <ul style="list-style-type: none"><li>- what issues to discuss? Local/state/national scale?</li><li>- was the “science roundtable” held at the Canberra meeting useful?</li><li>- have 3-day meeting as usual?</li><li>- how far should meeting minutes and presentations be circulated? outside immediate NEN members?</li><li>- NEN support of project proposals. Eg. Proposal to Australian Space Research Program (Arnold to give background)</li><li>- State/Territory Summary Template: is it good/bad? headings need changing?</li><li>- NEN Climate Change Adaptation, Estuaries Paper: How to go forward with this?</li></ul> Close Meeting

 <b>National Estuaries Network</b>	<b>Meeting No. 18</b> Darwin, NT
	18 <sup>th</sup> May 2010
<b>AGENDA PAPER</b>	State / Territory: Northern Territory

**Prepared by:** Julia Fortune, Manager – Aquatic Health Unit

**Organisation:** NT Dept. of Natural Resources, Environment, the Arts & Sport

**1. Update – Estuary Management**

- Development of a monitoring and modelling strategy has been drafted as a component of the second phase of the Water Quality Protection Plan.
- Monitoring effort in the Darwin Harbour region bolstered by new collaborative projects aimed at piloting a number of bioindicators for the estuarine monitoring program. Programs have been developed in partnership with Larrakia Sea Rangers in the region.
- Water quality objectives will soon be declared under the Water Act providing legislative credence to these objectives as regulatory and monitoring performance benchmarks.
- The first report cards produced on the health of Darwin Harbour and its catchment. Another series to be published by August/Sept 2010.
- Work towards a more integrated approach to monitoring and management in the Darwin and Daly regions.
- Develop of a decision support tool to integrate catchment and estuarine modelling, and complete the second phase of the WQPP. This is subject to the success of a CFOC funding application.

**2. Update – Estuary Research**

- Completion of TRaCK research in Darwin Harbour with a focus on biogeochemical process and nutrient budget.
- Coastal dolphins research in Darwin Harbour and coast of NT (Garig Gunak Barlu National Park and Kakadu National Park).
- Monitoring now includes a number of collaborative projects with Larrakia for chlorophyll-a mapping of urban affected estuaries in wet and dry seasons. An additional project will monitor a longitudinal transect in flood plumes in the wet season in the Elizabeth River Estuary.
- Shellfish and mudcrab study – bioaccumulation of metals, toxicants and EDC's.

**3. Significant Issues for Discussion**

- Lack of data/knowledge of estuaries outside Darwin Harbour.
- Need for habitat mapping to inform future monitoring and conservation efforts and guide major development proposals.
- Threshold triggers for corals and other significant habitats across Darwin Harbour in light of proposed developments.
- Impact of sewerage discharge on tidal creeks in the Darwin region.

 National Estuaries Network	Meeting No. 18 Darwin, NT
	18 <sup>th</sup> May 2010
<b>AGENDA PAPER</b>	State / Territory: SA

**Prepared by:** Patricia von Baumgarten, Principal Marine Advisor (Policy)

**Organisation:** SA Department for Environment and Heritage

**Update – Estuary Management & Research**

SA is will be releasing its State-wide inventory of estuaries this year. GIS layers are already available through <http://www.environment.sa.gov.au/naturemaps/index.html>

There will be a new Department for Environment and Natural Resources from 1 July 2010. That should allow for better coordination on SA estuaries work.

Inman River and Hindmarsh estuaries have their action plan released to the public. More info on: <http://www.amlnrm.sa.gov.au/CoastandMarineServices/CoastalandMarineEnvironments/EstuaryActionPlans.aspx>

A Draft Estuary Action Plan for the Bungala River is currently available for public comment, visit the following website to view the DRAFT document <http://www.amlnrm.sa.gov.au/CoastandMarineServices/CoastalandMarineEnvironments/EstuaryActionPlans.aspx>

Lots happening on the Coorong and Lower Lakes region. Check <http://www.environment.sa.gov.au/cllmm/index.html>

**Prepared by:** Peter Goonan, Principal Scientific Officer (Aquatic Biology)

**Organisation:** SA Environment Protection Authority, Science & Sustainability Division

**Update – Estuary Management & Research**

SA EPA intends to start work on our mostly very small coastal creek outlets later this year with a focus on assessing nutrient enrichment effects (water column nutrients, chlorophyll a, presence and depth of submerged aquatic veg and/or filamentous green algae) and fine sediment deposits (composition, sulphidic or not) using some pilot studies as a starting point. We are interested in other monitoring and assessment programs obviously and consistency in methods where possible but see no point in measuring every known indicator just for data collection's sake, hence the focus on the major risks from nutrients and sediments over here. Hopefully we can report on progress at a later NEN meeting.

 <b>National Estuaries Network</b>	<b>Meeting No. 18</b> Darwin, NT
	18 <sup>th</sup> May 2010
<b>AGENDA PAPER</b>	State / Territory: NSW

**Organisation:** Department of Environment, Climate Change & Water

**1. Update – Estuary Management (Kerryn Stephens, Urban & Coastal Water Reform)**

- Release of the **NSW Sea Level Rise Policy Statement** (November, 2009, available at [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)). The Policy Statement sets out the NSW Government's approach to sea level rise, including sea level planning benchmarks relative to 1990 mean sea levels of 40 cm rise by 2050 and 90 cm rise by 2100 and is accompanied by a technical note explaining how the benchmarks were derived.

Studies funded through the NSW Coastal and Floodplain Programs including estuarine process and estuarine flood risk assessments are to take into account the sea level rise benchmarks. Draft guidelines for implementing these benchmarks in coastal hazard and flood risk assessments were released in November 2009 for consultation. Final guidelines should be available in June 2010

The Policy Statement also supports the **Draft NSW Coastal Planning Guideline: Adapting to Sea Level Rise** (available at [www.planning.nsw.gov.au](http://www.planning.nsw.gov.au)). The draft Guideline outlines a proposed approach to addressing sea level rise in land-use planning and development assessment. This should also be available in June 2010.

- **Ecosystem Health Assessment Tools Workshops.** DECCW conducted 10 workshops along the NSW coast during February/March 2010 showcasing four new tools produced by DECCW:
  - Estuary Conceptual Models,
  - Environmentally Friendly Seawall Guidelines,
  - Monitoring, Evaluation and Reporting sampling protocols, and
  - Coastal Eutrophication and Risk Assessment Tool (CERAT).

The workshops were primarily targeted at staff in land use planning and estuary management roles within State agencies, Catchment Management Authorities and Local Government.
- **Estuary Management Program funding review.** Workshops with Councils and CMAs are planned for August this year to discuss priorities for delivery through the program. For 2010/2011 funding the revised focus emphasises:
  - updating estuary plans to consider climate change impacts, including sea level rise
  - estuary health monitoring and improvement
  - focusing on stressed estuaries.
- **Coastal Erosion Reforms Package.** A number of new initiatives are being developed to strengthen the options for councils and communities to manage coastal erosion at sites with current erosion threats. These include:
  - Legislative amendments to permit temporary landowner funded emergency coastal protection works, provided they meet strict conditions, strengthened order and penalty powers, powers to require councils to prepare coastal erosion emergency management plans and provisions for councils to raise a coastal protection service charge to provide for landowner funded works and impact management.

- The Minister for Environment and Climate Change recently released an exposure draft of the *Coastal Protection and Other Legislation Amendment Bill 2010*. This is accompanied by a set of Ministerial Requirements and a Guide for landowners. Briefing sessions have been held for all coastal councils in NSW and the documents are currently being amended in the light of feedback from these sessions on implementation.
- **New Coastal Zone Management Planning Guidelines.** The 1990 Coastline Management Manual and the 1992 Estuary Management Manual will be replaced with new Coastal Zone Management Planning Guidelines for local councils. Draft guidelines will be released by DECCW for consultation mid-2010.

**2. Update – Estuary Research (Tim Pritchard & Peter Scanes, Scientific Services Division)**

- The CERAT tool has now been released as part of a package of estuary management tools.
- DECCW is just about to complete an improved spatially explicit model of impact of catchment runoff on algal and seagrass production in Tuggerah Lakes, based on the DEFIRE models developed for riverine estuaries
- DECCW is also moving to expand the existing Ecological Response Models to include explicit links between higher consumers and types of estuarine habitat. This is being done by establishing food-web relationships and identifying which habitats and food sources are important for a range of fish species.
- DECCW is testing a range of process based ecological indicators for estuary health. At present we are establishing methods and conducting pilot studies with the intention of testing sensitivity in the next year. The indicators are:

<b>System Component</b>	<b>Measure</b>
System Structure	habitat availability
	physical influences (water chemistry)
Biological Structure	abundance of primary producers
	composition of sand invertebrate assemblages
	composition of fish assemblages
Energy Flow	bird assemblages
	primary production (seagrass, benthic and pelagic)
	microbial decomposition
	micro-carnivore consumption
Biological stress	macro-carnivore consumption
	macro-algal recruitment
	fish ulcers
	mangrove herbivory
	Mangrove parasitism

The main “new” indicators here are the energy flow and biological stress indicators and follow on directly from the ideas in Fairweather 1999.

- Research on the algal dynamics in Nadgee Lagoon is continuing to throw up difficult questions about the function of undisturbed systems.
- DECCW has joined Marcus Sheaves (Qld), Rod Connelly (Qld), Jeremy Hindell (Vic), Jeff Ross (Tas), Christine Crawford (Tas) and others in a NARP bid to focus on the impacts of climate change and sea level rise on critical estuarine habitats.
- DII Fisheries and DECCW are working on a strategic research plan for quantifying the value of vegetated estuarine habitats for estuarine fishes

### 3. Significant Issues for Discussion

- Common Assessment and Reporting Framework (CARF)
- **National approach for assessing risk to ecosystem health and infrastructure** from multiple, concurrent factors including sea level rise and catchment based flooding. A National Climate Change Forum – Adaptation Priorities for Australia’s Coast was hosted by Penny Wong in February this year in Adelaide. This followed the Department of Climate Change publication of “Climate Change Risks to Australia’s Coast – A first pass national assessment” in November 2009. At the Forum there was considerable discussion of the priority need to develop methods to assess impacts in estuaries from coincident sea level rise, storm surge and catchment flooding and that the Commonwealth may convene a technical forum to discuss potential methodologies for assessing joint probabilities. As such, DECCW would request the NEN to communicate with the Department of Climate Change regarding the NEN’s support for such a forum.

 <b>National Estuaries Network</b>	<b>Meeting No. 18</b> Darwin, NT
	18 <sup>th</sup> May 2010
<b>AGENDA PAPER</b>	State / Territory: Victoria

**Prepared by:** Jeremy Hindell, Principal Research Scientist

**Organisation:** Vic. Department of Sustainability and Environment

### 1. Update – Estuary Management

- Roll out of the Victorian Strategy for Healthy Rivers, Estuaries and Wetlands. Update of the River Health Strategy to include estuaries and wetlands. This strategy will guide the management of estuaries in the future.
- Victorian Estuarine Network. Putting some energy into getting the VEN up and running again. Website has been updated :  
<http://www.dse.vic.gov.au/DSE/nrencm.nsf/LinkView/EEA41EB7C569588FCA257172000B90D1CB8C3B1FB196F9DE4A256B660015733C>
- Invasive species – Green Shore Crab issues in the Gippsland Lakes. Some robust and complex policy debate within Victoria about what should and could be done to manage the issue of perceived high numbers of green shore crabs in the Gippsland Lakes.
- Estuarine Entrance Management Support System. Plans to roll this out and populate across relevant estuaries within Victoria.
- Vulnerability of estuarine to climate change. Another area of work that Victoria particularly interested in. Have a funding proposal in to start some work in this area.
- Upcoming conference in the Gippsland Lakes. Being run by Paul Boon at VUT. Guest speakers already locked in, and invitations sent out to stakeholders and members of the public. To be held in November 2010 at lakes Entrance.

### 2. Update – Estuary Research

- Preliminary evaluation of the Index of Estuary Condition. Framework for assessing IEC has been developed. This is now being tested and refined through DSE.
- Victorian Investment Framework – Consolidated estuarine bid on linking climate change impacts, estuary opening and Index of Estuarine Condition.
- ARC Linkage proposal – to understand catchment impacts on estuaries (submitted in recent round). New bid put up to the ARC in May round of Linkage funding.
- Validating anglers as research methods for assessing fish populations in estuaries. Collaborative project between DSE and Fisheries Victoria. Has just completed comparison of catches by recreational anglers and fishery independent methods.
- Coastal hotspots ARC project – in conjunction with Griffith University. David Crook from DSE leading this project from Victorian perspective.

### 3. Significant Issues for Discussion

- Need/Best ways to integrate NEN thinking for larger/National programs (e.g. NARP, NERP)
- Climate change impacts on estuaries – estuaries currently falling through the gaps.

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<b>AGENDA PAPER</b>	State / Territory: Western Australia

**Prepared by:** Vanessa Forbes, Helen Nice, Sarah Evans, Kierny Kilminster

**Position:** Senior Environmental Officers

**Organisation:** Department of Water, Perth WA

### 1. Update – Estuary Management

The Water quality improvement plan for the **Vasse Wonnerup estuary/wetlands** near Busselton has recently been released for implementation. The document has been developed in accordance with the *Framework for Marine and Estuarine Water Quality Protection*, and includes information of ecosystem condition and emerging issues for the catchment, wetlands/estuaries and Geographe Bay.

Similar documents are being prepared for the **Leschenault Estuary** (Bunbury, WA) and **Hardy Inlet** (Augusta, WA). The Department of Water (Water Science Branch) has had particular involvement in the analysis of water quality data and the modelling the delivery of nutrients to the estuaries.

### 2. Update – Estuary Research

#### *Swan River*

Water Science Branch staff have been involved in preparation of a report to the Government Chief Scientist investigating the causes of the peak in dolphin deaths in the Swan Estuary in 2009. Some of the investigations have included assessing levels of contaminants in the dolphin blubber. Further to this, a report has been delivered to the Minister for the Environment by Professor Lyn Beazley which has highlighted social and ecological value of estuaries and the importance of funding for research and monitoring of estuaries in WA.

There has been an **investigation targeting a historic contaminated site in the Swan Estuary**, showing that estuarine sediments adjacent to the site contain levels of contaminants exceeding environmental guidelines. In addition, we have shown these sediments to cause a range of toxic effects to a range of estuarine organisms (fish, amphipods, copepods and mussels). We have also shown that mussels inhabiting the area have bioaccumulated a range of organic contaminants. Finally, work is ongoing to assess sediment infauna within this portion of the Swan Estuary to determine whether there has been a recovery since remediation in the late 1990s or whether there is still a measurable impact; and Passive Sampler technology is also being utilised to assess loads of a broad range of contaminants discharging from drains associated with this site and entering the Swan Estuary.

**Passive Sampler technology** will also be used to target likely PCB hotspots within the Swan Canning Estuary such as landfill sites and historic power stations adjacent to the system. This is a relatively new technology that allows us to measure such contaminants at levels that conventional laboratory methods have failed to reach to date.

Water Science Branch staff have recently been involved in a collaborative study investigating **the effects of artificial oxygenation on the water column and surface sediment interactions** in the upper Swan River estuary. The study was undertaken in collaboration with two visiting scientists, Dan McGinnis from Geomar (Germany) and Lee Bryant from Virginia Tech (USA) using eddy correlation and in-situ and ex-situ micro-profiling instrumentation. The sampling program built on our understanding of sediment fluxes gained from multiple Geoscience Australia sediment surveys using benthic chambers and coring. Initial results suggest that increasing bottom water oxygen concentrations though oxygenation supports an oxic sediment surface and that oxygen fluxes were much higher at sites under the influence of the oxygenation plume. We also

undertook extensive water column profiling to help determine the impact of the oxygenation plant upon water column DO, which appear to be far wider than previously anticipated. We now have lots of data to process, and will keep the NEN updated with future findings and publications.

*South and southwest coast estuaries*

The Water Science Branch has also been developing a **tool for identifying the influence of disturbed acid sulfate soils on water resources**. This tool is based on measuring the sulfur stable isotope ratio in precipitated sulfate, and also determining if the water has extra sulfate compared to the ratio of sulfate to chloride expected for seawater. Extra sulfur in water may come from oxidation of pyrite, but may also come from other sources such as fertiliser, gypsum and/or greywater. The sulfur isotope ratio derived from reduced sources of sulfur (such as pyrite) is distinctly different than seawater sulfur isotope ratio. With this tool we have identified several estuarine sites as receiving acid sulfate soil drainage.

The **estuary resource condition monitoring project** has been completed. The project included sediment and macrophyte investigations in 8 estuaries (Stokes Inlet, Wellstead Estuary, Beaufort Inlet, Wilson Inlet, Irwin Inlet, Walpole-Nornalup Inlet, Hardy Inlet and the Leschenault estuary). This has been a valuable collaborative program with Geoscience Australia in trialling different methods and technologies for mapping submerged aquatic vegetation and sediment characteristics in estuaries. Many of these estuaries had/have very little available data.

The Water Science Branch is currently involved in a **High Conservation Value Aquatic Ecosystem (HCVAE)** 'proof of concept' study. The purpose of this project is to trial an integrated condition assessment of a high conservation value aquatic ecosystem. Historically condition assessments have been conducted on individual aquatic ecosystem components e.g. estuaries or rivers. The purpose of the HCVAE framework is an integrated approach bringing together each component and specifically assessing, for the purpose of management, the elements / values that define the identified HCVAE. Recognising the short time frame for the study (end of this financial year) we have selected the Walpole Nornalup 'aquatic ecosystem', as our 'HCVAE'. As a Marine park and a biodiversity hotspot, the Walpole Nornalup aquatic ecosystem has genuine merit for HCVAE status. We aim to run the project as a desktop study using recent monitoring and FARWH data and available data on wetlands to assess the system as a HCVAE. With future funding we would anticipate validating the study.

Funding cuts have had a dramatic effect on our regular estuary monitoring programs particularly on the South Coast. Monitoring is predominantly limited to profiles and Chl *a*. There may be isolated opportunities to include nutrients e.g. Walpole-Nornalup inlets through the DEC (Marine Parks).

 <b>National Estuaries Network</b>	<b>Meeting No. 18</b> Darwin, NT
	18 <sup>th</sup> May 2010
<b>AGENDA PAPER</b>	State / Territory: Tasmania

**General State-Level – Jason Whitehead, Dept. of Environment, Parks, Tourism & the Arts**

1. Update – Estuary Management

Revision of State Coastal Policy is still continuing. Draft now publicly released for comment and is available from: [http://www.planning.tas.gov.au/stpol/current\\_direction\\_-\\_scp08](http://www.planning.tas.gov.au/stpol/current_direction_-_scp08)

**The closing date for comments is 21 June 2010.**

2. Update – Estuary Research

Tasmanian Planning Commission is undertaking a sea-level rise inundation project for local government (work being carried out by Richard Mount)

- Saltmarsh sea level rise modeling work in Pittwater-Orielton Lagoon (UTas) and Derwent estuary (UTas, DEP & NRM South) and NW coast of Tas (Utas & NRM Cradle Coast).

*Landscape Logic:*

Landscape Logic is a research hub under the Commonwealth Environmental Research Facilities scheme, managed by the Department of Environment, Water, Heritage and the Arts. It is a partnership between six regional organisations, five research institutions and state land management agencies in Tasmania and Victoria.

Landscape Logic – Estuaries Decision Tree and Estuary Condition Model (products will be uploaded at <http://www.landscapelogicproducts.org.au/site/>). Details on specific Tasmanian projects relating to estuaries can be accessed via <http://www.landscapelogic.org.au/projects/projects.html>

*TasMAN & TasICTC:*

The TasMAN & TasICTC (based at CSIRO Hobart) have deployed developmental sensors in the Derwent-Storm Bay. The sensor network is viewable at the website: <http://www.marine.csiro.au/wfowsn/wfowsn.jsp>

- Data from the sensors contributes to computer modeled ‘near real-time’ & ‘predictive’ simulations viewable at <http://www.emg.cmar.csiro.au/www/en/emg/projects/INFORMD.html>
- click on “Near Real-Time Results” in the menu on the left, there are a number of links to model output (including forecasts)

**Derwent Estuary Program (DEP) – Jason Whitehead**

1. Update – Estuary Management

- The 5-yearly *State of the Derwent Report 2009* has been printed & released. The report is also downloadable in electronic format from the DEP website: <http://www.derwentestuary.org.au/>
- Water Quality Improvement Plan 2 (WQIP2) – completed The WQIP2 includes the findings from Biogeochemical modelling, further heavy metals in biota and sediment nutrient & metal studies. The report is downloadable in electronic format from the DEP website.
- Conservation Action Plan workshops. The DEP has funding through a Federal Community Coastcare Grant to improve our Environmental Management Plan by undertaking Conservation Action Plan workshops. The workshops are being facilitated by Greening Australia (2/3 completed).
- Recreational water quality monitoring for 2009/10 season completed– in partnership with local government. Communication includes signage, websites, weekly newspaper reporting and discussion with swimming event organisers.

## NEN State / Territory Summary (May 2010)

- Rice grass survey and treatment to continue (DEP Coastcare funded). Dec 2009 – first survey since 1997 no Rice grass located in the Derwent estuary. DEP monitoring will continue annually for next several years.
- Penguin colony management and habitat restoration (DEP Coastcare funded)
- Derwent Estuary wetland and saltmarsh climate change assessment to 2100 – include coastal inundation assessment using LIDAR (UTas, NRM funded, DEP project). The DEP have been discussing with local government and planning bodies how to use the report findings.

### 2. Update – Estuary Research

- Ambient water quality measurements – monthly in partnership with industry.
- Nutrient and heavy metal fluxing from sediments (ARC-linkage, Jeff Ross- TAFI and others).
- Rocky Reef diver surveys and search for Derwent endemic seastars completed – TAFI/DEP Coastcare funded)
- Derwent – community diver based ‘Reef Life Survey’ commenced. Approx 70 sites surveyed.
- Foreshore Weed Prioritization (DEP – Coastcare funded)
- Derwent aerial seagrass and *Ruppia* mapping 2/3 completed (UTas – TAFI - DEP – Coastcare funded)
- 12 month upper Derwent *Ruppia* & seagrass ecophysiology study commenced in Dec 2009 (TAFI – DEP CfoC funded)
- AUV monitoring in the Derwent (TasMAN, TasICTC & DEP) – test missions occurring in the upper and middle estuary
- Heavy metals in biota (Hg – food web study (TAFI project), and in seafood (TAFI, Nyrstar, Dept Human Health Services, ILF, Fishcare, TARFish, DEP – CfoC project)
- Hobart port Introduced marine pests survey design – being developed by DPIPWE

## **Tamar Estuary Esk Rivers Program (TEER) - Amanda Locatelli**

### 1. Update – Estuary Management

#### *Tamar Estuary EHMP:*

- The Tamar Estuary and Esk Rivers (TEER) program is a regional partnership program between NRM North, State and Local Government, and the statutory authorities responsible for water management in Tasmania have initiated an Ecosystem Health Monitoring Program for the Tamar Estuary. Monitoring commenced in October 2009 and will include collecting monthly ambient data from 20 sites along the 70km length of the Tamar, additional data from industry and local government will be collated into a centralised database. The first Tamar Estuary report card is due for lunch mid 2010 based on historic data sets. This monitoring program will form the basis of consistent, reliable, on-going monitoring of the Tamar Estuary to provide better information to decision makers.

#### *Gambusia Trapping:*

- NRM North continues to provide funding for the *Gambusia* Trapping program. Trapping is focused on controlling populations of *Gambusia* at the Tamar Islands Wetlands. *Gambusia* is found in various dams and drainage lines adjacent to the Estuary and the Tamar Island Wetlands. Success in trapping and controlling *Gambusia* at one site at the wetlands has been evident by the re-colonisation of green and gold frogs at this site which have not been present for the last several years. This project is currently funded to June 2010.

### 2. Update – Estuary Research

#### *Sediment Modelling:*

- The TEER Program has recently completed a major modelling study to investigate the sources of sediment entering the Tamar Estuary from the upper catchment area (10,000km<sup>2</sup> estimated at 18% of Tasmania). Sedimentation of the upper reaches of the Tamar Estuary has been a long standing issue of contention in the community. The findings of the study show that approx. 50,000-80,000 tonnes of TSS are generated in the catchment each year and the majority of this load is associated with grazing and forestry related land uses. The upper North and South Esk, Brumby’s and Meander catchment areas produce the highest loads which correspond to areas of high slope and rainfall in the catchment.

#### *Sediment Source Fingerprinting:*

- A PhD study being undertaken by a student from the University of Tasmania is focusing on using sediment source fingerprinting techniques to identify unique chemical fingerprints for geology types in

the South Esk catchment. This study will aim to identify the provenance of sediment delivered to the Tamar Estuary from the South Esk catchment. Expected completion date: Dec 2012

## **NRM North – Emma Williams**

### 1. Update – Estuary Management

#### *George River:*

- Using DPIPWE's Coastal Risk Management Plan Template and Guidelines, the Break O'Day Council is undertaking the development of a Risk Management Plan for the George River Floodplain, to identify and plan for impacts to infrastructure and other assets on the floodplain threatened by floods and tidal surges within the estuary system.
- Volunteer monitoring of the estuary's water quality continues. Contact: Polly (Richard) Buchhorn, NRM Facilitator, Break O'Day Council 03-6376-7900 / [polly.buchhorn@bodc.tas.gov.au](mailto:polly.buchhorn@bodc.tas.gov.au)
- The State of the Estuary Report for Georges Bay (April 2007 to March 2008), prepared by Christine Crawford and Kylie Cahill of TAFI, is available, although public launch was delayed because of changes to funding, this assessment of the estuary has not been repeated.
- Debate regarding recent concerns about possible toxicant contamination persists in the public realm.

#### *Lower Ringarooma River:*

- The Ecological Character Description for the Ramsar site (which incorporates the estuary and confluence of the Boobyalla and Ringarooma Rivers) is nearing completion of the external peer review. NRM North has continued funding for the removal of willows and control of gorse within the Ramsar site and stock exclusion fencing to the waterway in addition to the dairy effluent management improvements and other on-ground works previously undertaken to directly improve management of the Ramsar site.
- NRM North has also extended engagement of private landholders within the catchment area in Property Management Planning. This will lead to the funding of on-ground incentives on these private properties (mainly agricultural in nature) to improve land management practices that ultimately affect the character of the estuarine wetland.

Contact: Emma Williams, Healthy Coasts and Seas Program Coordinator, NRM North 03-6333-7779 / [ewilliams@nrmsouth.org.au](mailto:ewilliams@nrmsouth.org.au)

## **NRM South – Jill Pearson**

### 1. Update – Estuary Management

- Pittwater- Orielton Lagoon (PWOL) - 2 year project funded through CFOC. Action plan being developed to prioritize on-ground works (weed control, fencing, reveg, access etc); detailed storm water design; community education and awareness raising activities (information sessions, field tours, on-ground volunteer events etc)
- Moulting Lagoon – fencing and weed management at key sites around the lagoon to improve water quality and habitat

### 2. Update – Estuary Research

- The Ecological Character Description of PWOL – final draft with DEWHA reviewers. This will include management objectives / information
- 2008 Tasmanian River Condition Index on the Coal River Sub-catchment (NRM South) – in about 1 months time river health data and assessment information will be available for the Coal sub-catchment. This will include site specific information for between 7 – 20 sites.

### 3. Update – Estuary Issues

- The ongoing issue of communicating the science in the most appropriate way to get up take in policy and planning. This as well as packaging the environmental, economic and scientific case for estuaries management and protection to get better outcomes.

 <b>National Estuaries Network</b>	<b>Meeting No. 18</b> Darwin, NT
	18 <sup>th</sup> May 2010
<b>AGENDA PAPER</b>	State / Territory: Queensland

**Prepared by:** Dawn Couchman, [Senior Fisheries Scientist, Marine Habitat], Malcolm Dunning [Principal Fisheries Scientist, Assessment & Monitoring] and John Beumer [Principal Fisheries Scientist, Marine Habitat]

**Organisation:** Fisheries Queensland, a service of the Department of Employment, Economic Development and Innovation

### 1. Update – Estuary Management

- Declared Fish Habitat Area Network strategy 2009 – 2014  
[http://www.dpi.qld.gov.au/28\\_12808.htm](http://www.dpi.qld.gov.au/28_12808.htm) A subset of the Queensland Fisheries Strategy 2009 – 2014. Habitat is one of the three pillars that supports the Qld Fisheries Strategy. The Declared FHA strategy sets out a vision for the future of declared FHAs in Qld and a strategy for conserving, managing and enhancing the declared FHA network.
- Amendment package for declared FHAs includes East Cape York re-declarations for 6 FHA s encompassing about 117 000 Ha of fish habitats. The re-declaration is to align boundaries with cadastral boundaries and also to align with trawl fishery closure areas.
- New FHA declaration proposal for Western Cape York at Albatross Bay near Weipa. Albatross Bay will be the first FHA for West Cape York and will encompass 26 000 ha of prime fish habitats. Negotiations (commenced in July 2008) are currently at the second round of consultation with stakeholders, including traditional owners.
- Revised inshore fisheries management arrangements for both recreational and commercial fishers were implemented by mid 2009. Includes changes to some bag and size limits for finfish species, protection of some estuarine shark and ray species (including sawfish and spartooth sharks) and catch limits for others (eg. white-spotted guitarfish), revision of the kinds of nets that can be used in some areas and attendance requirements.  
[http://www.dpi.qld.gov.au/28\\_14415.htm](http://www.dpi.qld.gov.au/28_14415.htm)
- The saltmarsh identification field guide is being updated and reprinted and should be available by June this year.
- Fisheries Queensland is amending the metric used for its issue specific marine fish habitat offset policy under the Queensland Government Environmental Offset Policy framework. Final consultations being undertaken with DERM in relation to the development of metrics for the vegetation management and biodiversity offsets policies mandated by that agency.
- LNG proposals and significant implications for seagrass meadows due to environmental impacts from dredging, reclamation and pipeline crossings. Offset package agreed with >1000 ha of tidal fish habitats to be declared as an extension to Fitzroy FHA and funding for habitat research, rehabilitation (through local NRM groups) and enhanced FHA management.
- Fisheries Queensland review of habitat functions within new departmental structure (where do we fit on the new 'scorecard'). Report due at end of June.

## 2. Update – Estuary Research

- Instream structure inventory project 2 – Ramsar sites in Corio/Shoalwater Bay and Bowling Green Bay. This is the second project implementing the instream structure inventory protocols developed in the first project in Trinity Inlet and Hinchinbrook Channel. Final project report to be available on the Queensland Wetlands website and revised guidelines to be available on the DEEDI Fisheries Queensland website. Response Action Plans have been drafted for structures mapped in each area. Multi-agency working group established to progress actions in the Corio Bay area.
- Qld Wetlands Program (QWP) gap analysis undertaken to look at possible research directions. John Beumer on the governance panel. Fisheries Qld has put up a proposal to undertake Instream structure inventory work in the Great Sandy Straits Ramsar site which also includes a number of declared FHAs.
- Habitat vulnerability mapping project for impact of sea level rise on marine fish habitats in Qld (study sites to be determined). Project funded to run 2010 – 2012. Negotiating with DERM to access elevation level data. Mapping products to assist with determination of areas where fisheries productivity may be at risk due to loss change of habitats and to enhance local government planning of coastal areas.
- Historical coastline mapping project for Moreton Bay islands in response to compliance issues and loss of mangroves due to illegal clearing. Three month project supported by offset funding to develop spatial & temporal maps of marine plant distribution. Community engagement to support strategic approach to management of island foreshores.
- Fisheries Queensland enhancing CHRIS information system as DataOcean – providing fishers, fishery and fish habitat managers and other clients access to coastal fish habitat information, fish catch / effort information and fish monitoring information with a map interface. DataOcean to be fully operational by mid 2012: <http://chrisweb.dpi.qld.gov.au/CHRIS/>
- Annual reports on the status of Queensland inshore fisheries resources produced and available on the website: [http://www.dpi.qld.gov.au/28\\_10916.htm](http://www.dpi.qld.gov.au/28_10916.htm)
- Results of survey of marine boat-based recreational fishing in South East Queensland 2007-2008 released: [http://www.dpi.qld.gov.au/28\\_15883.htm#Key\\_findings](http://www.dpi.qld.gov.au/28_15883.htm#Key_findings)
- State-wide recreational fishing survey (participation rates, catch and effort levels and spatial distribution) to be undertaken by Fisheries Queensland in 2010 / 2011 [http://www.dpi.qld.gov.au/28\\_16920.htm](http://www.dpi.qld.gov.au/28_16920.htm)
- Long term monitoring program continuing for major inshore finfish species targeted by recreational and commercial fishers; see website: [http://www.dpi.qld.gov.au/28\\_10714.htm](http://www.dpi.qld.gov.au/28_10714.htm)
- Port of Airlie final report (BACI project on impacts of development on fish habitats) out soon. Presentation due mid-year at QUT.

## 3. Significant Issues for Discussion

- Moreton Bay mangrove dieback - In response to concerns about the possible impact of dieback on Moreton Bay mangroves, a review committee was established in November 2009 and a working group convened in February 2010 to address the status of the Bay's mangrove communities. Fisheries Qld has some issues with the report that was provided on the extent of dieback. Currently under review.

**Prepared by:** Dave Rissik, Chief Scientist

**Organisation:** Qld Department of Environment and Resource Management

#### **4. Update – Estuary Management**

- Queensland has released a Queensland Water Monitoring Framework which will underpin all of our water monitoring. A risk assessment based on catchment pressures has been undertaken. Monitoring programs will be undertaken in waterways in high risk catchments. These include South East Queensland and GBR Catchments.
- DERM is working with the Fitzroy Basin Association and key stakeholders to form a Partnership for monitoring the catchment and receiving waters. This is based on the SEQ model. As part of this, DERM is developing local water quality guidelines for the Fitzroy Region.
- A GBR monitoring program is underway and will be used to prepare an annual report card on progress to Reef Plan targets and to improving Aquatic Ecosystem Health in the GBR.
- DERM's conceptual modelling group are doing some innovative work developing interactive conceptual models for key wetlands. Several products are in the pipeline.
- A review is being undertaken into the Ecosystem Health Monitoring Program.
- Amalgamating NRW and EPA has led to the integration of groups involved in freshwater, wetland, estuary and marine monitoring and is assisting with the development of fully integrated monitoring programs.

#### **5. Update – Estuary Research**

- ARC Linkage Grant: Resilience of Moreton Bay to climate change: Links between nutrient inputs and plankton dynamics. (Richardson, Burford, Yin, Possingham and Rissik).
- ARC Linkage Grant: Influence of marine protected areas on ecosystem resilience and ecological processes. (Connolly, Pitt, Rissik, and Babcock).
- ARC Linkage submitted: A study of turbulence and influence of anthropogenic inputs in small subtropical estuaries. (Chasson, Rissik and Ramsay).
- ARC Linkage submitted: Monitoring and evaluating Moreton Bay and its catchments as a socio-ecological system: enhancing social science contributions to marine park management. (Ross, Dressler, Shaw, Johnson and Rissik).
- Research with Griffith University: Planning for resilience: mitigating the double blow of climate change and catchment run-off on seagrass habitat. (Burfeind, Connolly, Pitt and Rissik).
- A number of projects are wrapping up following the Pacific Adventurer Oil Spill including effects on sandy beach ecosystems, effects on rocky shores, impacts and management of coastal wetlands. (DERM, Uni of Sunshine Coast).

#### **6. Significant Issues for Discussion**

- The use of the CARF Framework as a national approach for estuary monitoring.
- Building the use of tools such as VPSIRR in other states.

 <b>National Estuaries Network</b>	<b>Meeting No. 18</b> Darwin, NT
	18 <sup>th</sup> May 2010
<b>AGENDA PAPER</b>	National: Geoscience Australia

**Petroleum & Marine Division: OzCoasts Project (Lynda Radke)**

*Climate change module:* We have developed a climate change module for the Australian Government Department of Climate Change and Energy Efficiency. The module will provide information and tools to help communicate the risks of sea-level rise and other potential impacts of climate change on coastal areas. It will include elevation data and a modelling portal for access to existing and new elevation data and derived products, including sea level inundation maps for Perth to Mandurah, Adelaide, Melbourne, Sydney, Hunter and Central Coast & Brisbane and Gold Coast. The inundation footprints illustrate three sea level rise scenarios: a low (0.5m), medium (0.8m) and high (1.1m) scenario for a 2100 time period, with values based on IPCC projections (B1 and A1FI scenarios) and more recent science. Release of this module has been put on hold until a stakeholder review process is completed.

*NSW products:* We are making good progress with the development of a web-based version of NSW DECCW’s Coastal Eutrophication Risk Assessment Tool (CERAT). It is anticipated that it will be released early in the next financial year. It will be made available in the Natural Resource Management module. We have also recently completed the loading of NSW DCCW’s Lagoon water and sediment data (56 Estuaries with 27,000 rows of samples and 150,000 rows of sample data) into the GA corporate data model for delivery via OzCoasts.

*New Beach content:* We have released a new beach search application which will enable users to search for information on Australia’s more than 10,000 beaches based on geomorphic type and region (LGA, NRM, State, IMCRA, Marine Planning). The beach data is Dr. Andrew Short’s research legacy (University of Sydney), and is owned by Surf Life Saving Australia.

*On-TRaCK:* A meeting was held with A. Brooks and J. Spencer of Griffith University, to discuss the potential web-based implementation (via OzCoasts) of a TRACK-sponsored tool for making user determined classifications of northern rivers catchments.

*Smartline speed:* There has been some minor progress with smartline speed issues made by carving the dataset up and manipulating it in various ways. Some of these have worked on the single datasets but, when they are all queried the speed is still an issue.

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

*Reminder:* The audit purchased 83 Coastal QUICKBIRD scenes (covering ~50,000 km<sup>2</sup> of coastal Australia). Chris Auricht has set up a web page to view degraded versions of these images and to provide access to KML files for Google-Earth (<http://www.auricht.com/Coasts/index.html>) and then follow links to the HTML Quickbird results; or use the direct link as follows:

<http://www.auricht.servebbs.com/maps/quickbird/index.html?basemap=Google+Hybrid&overlay=QuickBird>). Note: please let GA/Chris know if your security settings prevent you from viewing these images, or else ask your IT people to clear the site from its suspicious status. The complete images are also now available on a 43GB memory stick at a cost of \$280 from the GA sales centre. For more information on acquiring the images (or adding your name to the list) follow this link: <http://www.ga.gov.au/remote-sensing/get-satellite-imagery-data/ordering/pricing/quick-bird.jsp>

### **Petroleum & Marine Division: Coastal Research & Management Project (Ralf Haese)**

The Coastal Research and Management project will come to an end in June, but coastal matters, in particular further development of OzCoasts and coordination of NEN, will continue within the Seabed Mapping and Coastal Management project.

All coastal water and sediment data from estuaries collected by Geoscience Australia over the last 10+ years are currently QCed and are planned to be accessible through OzCoasts by the end of June. The database will contain data from about 140 sites and will include data such as water column and porewater nutrient concentrations, total organic carbon concentration and chemical composition of sediments and rates of nutrient release and oxygen uptake by sediments.

A range of publications with a focus on estuarine water and sediment quality including recommendations for the use of indicators and monitoring are in their final stage before release:

1. Intra-annual variability in primary producer groups and nitrogen dynamics in an intermittently closed estuary exposed to Mediterranean climate (R. Haese and G. Pronk, under review by journal)
2. Effect of nutrient loading on biogeochemical processes in tropical tidal creeks (J. Smith et al., under review by journal)
3. A classification of coastal lagoons based on the distribution of primary producer groups and associated biogeochemical processes (R. Haese, under review by Geoscience Australia before submission to journal)
4. Historic environmental changes and sediment-based condition assessment for Hardy Inlet, Western Australia (R. Haese et al., final preparation for printer)
5. Oxygen demand and nutrient release from sediments of the Upper Swan River estuary (C. Smith et al., final preparation for printer,)
6. Seagrass monitoring using towed underwater video and its application to four estuaries in southern Western Australia (M. Tran et al., in preparation)

Abstracts for presentations on 1.) seagrass monitoring using underwater video data and 2.) the effectiveness of indicators in different types of estuaries have been submitted to the organisers of the AMSA conference.

### **Geospatial & Earth Monitoring Division: A National Scale Vulnerability Assessment of Seawater Intrusion (Baskaran Sundaram)**

This project is being implemented by Geoscience Australia, the National Centre for Groundwater Research and Training (NCGRT) and State and Territory Water agencies on behalf of the Australian Government's National Water Commission, and commenced in November 2009. The main objective of this project is to provide a national-scale vulnerability assessment of coastal aquifers currently affected by seawater intrusion and potentially at risk in the future as a consequence of over-extraction and/or sea-level rise due to climate change.

Contact: Baskaran Sundaram 02-6249-9842 / [baskaran.sundaram@ga.gov.au](mailto:baskaran.sundaram@ga.gov.au)

## Geospatial & Earth Monitoring Division: Climate Change Project (Paul Taylor)

*National Coastal Geomorphology Polygon Mapping Project.* This project is collating and re-classifying more than 60 different datasets from around the country to develop a nationally consistent, polygon map of coastal geomorphology of Australia. The final product will compliment the Smartline (polyline map) of coastal geomorphology for use in coastal vulnerability assessments. The project is due for completion by Dec 2010. The classification scheme is presented below (for more information contact: [naturalhazards@ga.gov.au](mailto:naturalhazards@ga.gov.au); heading “coastal vulnerability”).

### CLASSIFICATION SCHEME

<b>LEVEL 1:</b>	.....	Substrate type (1:1M – 1:250K) <i>hard or soft</i>
<b>LEVEL 2:</b>	.....	Coastal depositional system (1:1M – 1:250K) <i>alluvial, estuarine, coastal barrier, bedrock...</i>
<b>LEVEL 3:</b>	.....	Coastal geomorphic feature (1:100K – 1:25K) <i>alluvial fan, beach, dune, channel...</i>
<b>LEVEL 3a:</b>	.....	Geomorphic feature detail (1:25K – 1:10K) <i>foredune, blowout dune, saline swamp...</i>
<hr style="border-top: 1px dashed #000080;"/>		
<b>LEVEL 4:</b>	.....	Primary lithology (1:5M – 1:100K) <i>igneous, metamorphic, sedimentary</i>
<b>LEVEL 4a:</b>	.....	Primary lithology detail (1:500K – 1:25K) <i>basalt, conglomerate, mud, sand, gravel...</i>
<b>LEVEL 5:</b>	.....	Coastal habitat type (1:250K – 1:25K) <i>mangrove, salt marsh, seagrass...</i>

*Newcastle to Wollongong Infill Mapping Project.* This project is completing a detailed mapping project to infill one of several key gaps in the national coastal geomorphology polygon mapping project, which is the area between Newcastle and Wollongong. The project is utilising a range of datasets and information, including aerial photography, to complete the task, and will develop a generic methodology for use elsewhere. The project will include some field work to validate the methodology. This is in progress and is due for completion by Dec 2010.

#### *Detailed SLR and Storm Surge Impact Assessments in Mandurah and Bunbury*

This project is assessing the impacts of future sea-level rise combined with storm surge in Mandurah and Bunbury, in southwest WA. The assessment is utilising the University of Sydney’s Shoreface Translation Model to provide estimates of the potential coastal response to SLR, combined with detailed hydrodynamic modelling to determine the potential areas of inundation under different scenarios.

Contact: Paul Taylor 02-6249-9533 / [paul.taylor@ga.gov.au](mailto:paul.taylor@ga.gov.au)

 <b>National Estuaries Network</b>	<b>Meeting No. 18</b> Darwin, NT
	18 <sup>th</sup> May 2010
<b>AGENDA PAPER</b>	National: CSIRO Land & Water

**NEN Presentation:** Australian Coastal Observatory:

**By:** A G. Dekker, R. Mount and Chris Auricht.

The coastal space is “complex” to deal with administratively at a national scale.

A coherent national coastal satellite image data set for SoE type environmental baseline/reporting is required. Current practice is (some) states do their own satellite data collection – and processing. Satellite data are from different sensors and always geared towards terrestrial applications: Tasmania – Rapid-Eye; NSW – SPOT-5; many use Landsat; etc., etc.,

Comparison of products impossible as mostly done by state experts in their own preferred manner or limited areal coverage. Underlying satellite datasets not publicly available due to licensing. Capture of data ideal for terrestrial applications – often poor conditions for inland and coastal water applications (glint, waves, disregard of tides etc.).

All states need systematic satellite data of coastal habitats but have no such data sets that are suitable for coastal environments.

Commonwealth funded research entities (CERF, NERP etc.) with limited duration cannot deal with an integrated longer term strategic application such as this: it is crucial this is part of an ongoing strategic effort for systematic SoE reporting in coastal and reef systems.

Much progress has been made since “Evaluation of the Feasibility of Remote Sensing for Monitoring: National State of the Environment Indicators” (Wallace and Campbell, 1998). Maturing environmental information systems are incorporating remote sensing information products – remote sensing is no longer a stand alone method. Environmental information products are a synthesis of multiple sources of data and observations:

- National Intertidal Subtidal Benthic Habitat mapping: imagery, soundings, side scan, underwater video, dive observations etc
- National Carbon Accounting System (NCAS) estimates emissions through a system that combines:
  - thousands of satellite images to monitor land use and land use change across Australia since 1972 that are updated annually,
  - monthly maps of climate information, such as rainfall, temperature and humidity,
  - maps of soil type and soil carbon,
  - databases containing information on plant species, land management, and changes in land management over time, and
  - ecosystem modelling - the Full Carbon Accounting Model (FullCAM).

NLWRA 2 recommended a series of estuarine coastal and marine indicators many of which could be supported at the national level with composite information products including:

- Extent and distribution of key habitats
- Condition of key habitats

## NEN State / Territory Summary (May 2010)

- Chlorophyll a (ambient and algal blooms)
- Turbidity/Water clarity (photic depth, turbidity, CDOM, river plumes)
- Coral Bleaching
- Temperature changes

The Common Assessment and Reporting Framework (CARF) and the Environmental Condition Assessment Framework (ECAAF) are under strong development pathways in the coastal and marine arena. These enable consistent logical approaches to data and information management relevant to management purposes (including the EBM approach recently endorsed by MACC). Highlight value of Vulnerability and Risk assessments where Condition assessment is not feasible.

The Second National Intertidal Subtidal Benthic (NISB) Habitat Mapping workshop (Oct 2009) participants agreed:

“To define and plan a pathway towards an Australian Coastal Observatory that is both a research commons and also directly relevant and accessible by "management" i.e. specifically including the States and Regions (CMAs) as well as the Australian Government”.

Key concept: Support data re-use, fusion, merging and visualisation. Thus remote sensing should become embedded in systematic information management systems that support the needs of environmental managers.

### Next steps for the Coastal Observatory

- Planning workshop at Coast To Coast, Sept 2010 (please come!)
- National Intertidal Subtidal Benthic (NISB) Habitat mapping
- National Reference sites (exemplar and or testing sites)
- Collated imagery archives
- CSIRO Landsat,
- AGO/DCC Landsat,
- CSIRO Fowler Aerial Photo collection etc
- National Photic Depth mapping from Earth Observing Centre, Land and Water, CSIRO (including seasonal and annual averages) (derived from satellite imagery and in situ measurements)
- Refresh the OzCoasts estuarine, coastal and marine portal
- Pristine status of the estuaries
- Update estuarine habitat data sets
- Update the National ECM Habitat Map data sets

Collate the onshore LiDAR DEMs, nearshore LADS DEMs and offshore bathymetry and stitch it together with the freshwater systems data. Areas where such data sets already exist and this activity would be feasible are:

- Ningaloo, WA
- Cameron, WA
- Cape Otway, Vic
- Little Swanport, Tas
- Derwent, SE Tas via INFORMD, Tas
- Ceduna, Eyre Peninsula, SA
- River Murray Mouth, SA
- Great Sandy Straits, Qld
- Fitzroy, QLD
- Bonaparte Gulf, NT

## NEN State / Territory Summary (May 2010)

- Saltmarsh refuge modelling (e.g. using LiDAR elevation models and high resolution satellite imagery)
- Wind fetch modelling around the coast (e.g. cartographic fetch modelling)
- Areas at high risk (e.g. Montebellos, Montgomery Reef)

### WorldView-2:

First operational high spatial resolution satellite sensor designed and built for terrestrial AND coastal applications: specifications:

- 8 well positioned spectral bands
- 1.8 m resolution in 8 spectral bands (Human eye & Colour aerial photography is 3 bands; All other satellites 3 to 4 spectral bands)
- 0.4 m in black and white
- 32 km swath
- Pointable in space (agile)
- Return period : up to once every 3 to 5 days (pointable in space)

How does this compare to existing other satellite datasets?

Much more accurate assessment of what is where and what condition it is in (allows accurate bathymetry!); Allows setting a baseline for systematic trend analysis; Prepares for future hyperspectral satellites (proposal submitted to Australian Space Research program):

- In coastal (and inland water) applications unsurpassed:
- Mangrove and saltmarsh to species and condition level
- Intertidal (sand, mudflats, seagrass, rock platforms) to species and condition
- Subtidal (or inland waters):
- Bathymetry! = sorely needed around Australia's shallow parts of coastline. (WV-2 assessment can go down to 30 m deep - if visibility allows)
- Seagrass, macro-algae, reef, corals
- Water quality in lakes, reservoirs, rivers, estuaries, lagoons, bays

If Australia wants a systematic WorldviewV-2 coverage of coasts/MPA's the imagery needs to be collected!

A systematic processing to environmental information suitable for an environmental data record is essential –the frameworks exist! Multiple use will multiply the benefit  
And .....waiting means losing information that can never be retrieved.

Enormous value in re-use of this WV-2 data set: studies have shown multiplier of 30 times once publicly available – philosophy of NCRIS, ANDS and EIF.

e.g.: Would a 1.8 m and 0.4 m resolution image be useful (before and after) for next tanker to run aground in GBR??

Alignment of approaches:

- SoE
- Common Assessment and Reporting Framework (CARF) and the Environmental Condition Assessment Framework (ECAAF)
- NPEI for NEIS
- ANDS/ARCS/ERIN coordination
- Filling in TERN/IMOS coastal gap
- Multiple applications

## NEN State / Territory Summary (May 2010)

- Biodiversity assessment
- Aquatic Ecosystems Task Group (AETG) for High Conservation Value Aquatic Ecosystems (HCVAE) – mapping and assessment
- Commonwealth remote tropical/temperate marine parks
- Living Atlas of Australia
- Law of the Sea

The proposal is to

Acquire a 32 km wide strip of World View 2 data right around the Australian coast to the following standards:

- No cloud
- Maximum water penetration
- Low tide
- etc

Process this data to produce the following products:

- Imagery to visualise the coast
- Intertidal Subtidal Benthic Habitat mapping
- Vegetation condition maps (NDVI etc)
- Bathymetry
- Saltmarsh refuge pathways
- ECM indicators – Chl a, turbidity, etc

Make data and information products available via Coastal Observatory infrastructure, Excellent licensing deal, OzCoasts, NEIS etc

If core partnership CSIRO (GA?), (BoM?) and DEWHA: Commonwealth in control Consortium approach (logical participation of): GA, AIMS, CSIRO, BoM, Universities: selection, SME's relevant consultants already involved in MER, CARF, ECAF, HCVAE, State estuarine and coastal managers, Satellite data providers: SKM and Geo Image

CSIRO, UQ, GA and CUT have science expertise to develop the methodology

DEWHA and BoM (?NPEI-NEIS) and GA (?) have operational mandate and would hold the raw and processed coastal data sets and information products

Australian Coastal Observatory – continue the development pathway

Establish a consortium to acquire a nationally consistent WV2 data set, then process and deliver information products

Ensure direct input from key users

- DCC, SoE, DEWHA, GA etc
- National Estuaries Network (involves all states estuarine and coastal managers) – very supportive.
- TERN – help develop methodology
- SoE – first ever current systematic nationwide coastal satellite dataset
- ANDS and ARCS – legacy data (LIDAR-LADS, In situ, satellite data from 1973 to present)
- ASRP – prepare for future satellites

Internationally:

## NEN State / Territory Summary (May 2010)

- European Environment Agency has adopted earth observation of water quality as one of their solutions to fragmented, incomplete national delivery of water quality information.
- EU: MarCoast a multimillion Euro investment in operational coastal information services relying heavily on earth observation.
- NOAA CoastWatch –monitoring oil spill
- India: routine use of earth observation for mapping all marine shallow areas as well as coasts (specific use for dredging operation effects analysis).

Separate issue:

CSIRO has established a coastal collaboration cluster: see <http://www.csiro.au/partnerships/Coastal-Cluster.html>