National
Estuaries
Network

17th November 2011, Townsville

Organisers and Conveners:

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Science Symposium
'Research and Management of North Queensland Marine Ecosystems'

Hosted by:
QLD Dept of Employment, Economic Development and Innovation
And
Geoscience Australia

Agenda and Abstract Booklet

Reef HQ Great Barrier Reef Aquarium, Conference Room
Upstairs at 68 Flinders Street, Townsville Q 4810, www.reefHQ.com.au

Queensland Government

Australian Government
Geoscience Australia

AGENDA

Session & chair	Time	Topic	Speaker
	8.15 – 8.45am	*Registration* *Tea / coffee*	
	8.45	Welcome	Lynda Radke – NEN Mal Pearce - DEEDI
	9am	Scene setting – North Qld estuaries	Dr Marcus Sheaves, JCU
Session 1			
Lynda Radke (chair)	9.10 – 9.30	Hi-Definition of Nursery Grounds	Murray Bower
	9.30 – 9.50	A framework for assessing estuarine risk and condition	Andrew Moss
	9.50 – 10.10	Sea Level rise, LiDAR and fish habitat vulnerability – Qld case study	Dawn Couchman
	10.10 – 10.30	One fish, two fish, green fish, blue fish – comparisons of deep shoal grounds open and closed to fishing using baited video	Mike Cappo
	10.30 – 10.50	*Morning tea*	
Session 2			
Kerryn Stephens (chair)	10.50 – 11.10	Reef Plan paddock to reef monitoring, modelling and reporting program	John Bennett
	11.10 – 11.30	Managing coastal ecosystems from the paddock: the role of agricultural extension	Carla Wegscheidl
	11.30 – 11.50	Phytoplankton Blooms in the GBR waters; seasonal and spatial dynamics from ocean colour remote sensing data	Arnold Dekker
	11.50 – 12.10	Nekton display preferences when choices are available	Ross Johnstone
	12.10 – 12.30	Conservation genetics of the critically endangered narrow sawfish (*Anoxypristis cupsidata*) in northern Australian	Blanche Danastas
	12.30 – 12.50	Reef Rescue with Seagrass-Watch and extreme weather impacts on seagrass this year, including the flow on effects to dugong & turtle.	Len McKenzie
	12.50 – 1.30pm	*Lunch*	
Session 3			
Dawn Couchman (Chair)	1.30 – 1.50	Taxon-specific responses to connectivity over a tropical coastal plain	Ben Davis
	1.50 – 2.10	Feeding across borders: The realisation of connectivity in intertidal habitats	Nina McLean
	2.10 – 2.30	Exposure of coastal wetland environments to pesticides	Aaron Davis
	2.30 – 2.50	Do environmentally-friendly vessel moorings reduce impacts on fish habitats? A Morton Bay case study	Rebecca Sheppard
	2.50 – 3.10	The importance of estuaries for the health of the Great Barrier Reef World Heritage area.	Donna Audas
	3.15 – 3.30pm	Summaries and close	John Beumer
	3.30pm	*Afternoon tea and finish*	

Hi-Definition of Nursery Grounds

Murray Bower, Ross Johnston, Marcus Sheaves

Please contact Marcus Sheaves (*marcus.sheaves@jcu.edu.au*)

ABSTRACT

Although tropical estuarine habitats have long been considered as nursery grounds a definitive understanding of the exact relationships between juvenile fish and the full range of habitats available to them has proven elusive. A major reason for this is that many estuary habitats (e.g. snaggy areas) prevent the use of standard netting techniques. Even when conditions are clear enough for underwater observations, traditional underwater visual census techniques can not be employed because of the threat of attack by estuarine crocodiles. We have recently trialled a hi-definition video sampling technique that can be applied as long as water clarity is reasonable. The utility of this technique is demonstrated by its use to define for the first time the juvenile habitats of Papuan Black Bass, Lutjanus goldiei, Spot-tail Bass, L. fuscescens, and pigmy snapper, L. maxweberi. These are freshwater and estuarine snappers that are endemic to New Guinea, and although L. goldiei and L. fuscescens are world class sport fish they are totally unmanaged in Papua New Guinea because of a total absence of research needed to support fisheries management. These video techniques have enabled a level of definition of the juvenile habitats of these New Guinea snappers that surpasses that of some of the best known tropical Australian estuary species like Mangrove Jack, L. argentimaculatus. We discuss some of the possibilities of these hi-definition video techniques and how they can be melded with other recent technologies to vastly improve our understanding of estuarine and freshwater habitat use at a range of scales.

A Framework for Assessing Estuarine Risk and Condition

Andrew Moss

Department of Environment and Resource Management

ABSTRACT

Between 2006 and 2008, a framework for assessing risk to and condition of estuaries was developed by the then Queensland EPA (now the Department of Environment and Resource Management). This assessment framework was applied to a series of estuaries in the Burnett Mary region of Queensland. Reports on this are available on the Burnett Mary Regional NRM body web site (www.bmrg.org.au)
This presentation describes the framework and the outputs as well as a software package that assists users in applying the framework. A brief description of the framework is given below.

The framework is intended to be management focussed and is based around a comprehensive range of stressors that are known to impact on estuaries. These include not only traditional water quality type stressors such as nutrients and toxicants but also stressors such as changes to inflows, removal of habitat and the introduction of pest species. For each stressor, a conceptual model was set up that encompassed both pressures and condition. For example, in the case of nutrients, pressures would include fertiliser use or point discharges while the impacts on condition include increased phytoplankton and macroalgal populations. Indicators of both pressure and condition were defined for each stressor and a system of scoring the level of pressure and condition indicators was derived.

The outcome is a framework that allows each estuary to be quantitatively assessed in terms of both pressures and condition for each of a set of key stressors. The advantage of this system is that it allows the most important stressors in each estuary to be identified and, importantly, prioritised for management, in a structured way. For example, should management be focussed on nutrients or on habitat protection on some other stressor. Report cards based on this framework have been produced for a series of central Queensland estuaries.
In order to make this assessment framework more readily accessible to other users, the whole assessment process was encapsulated into a software implementation which goes under the unfortunate acronym of VPSIRR. Essentially, this software prompts the user to enter all the necessary data on estuary pressures and condition and then calculates a set of output scores.

Sea Level Rise, LiDAR and Fish Habitat Vulnerability – Queensland Case Study

Arnon Accad[2], John Beumer[1], Dawn Couchman[1], Ralph Dowling[2], Dave Sully[1] and Julian O'Mara[3]

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ABSTRACT

The focus of Sea Level Rise (SLR) has been largely on its impacts on the built environment. Projected sea level rise, increasing ocean acidity, temperatures and changes to runoff as a result of climate change will have ongoing impacts on fish habitats and on local and regional fisheries productivity. Coastal recreational, commercial and indigenous fisheries along the east coast of Queensland depend entirely on healthy fish habitats. Several projects are underway that look at impacts of SLR and will document past and ongoing changes to the critical intertidal fish habitats of mangroves and associated marine plant communities.

Fisheries Queensland is conducting a project which maps the vulnerability of marine plant communities to the physical impacts of climate change over three SLR scenarios. Audits of the community changes are made and these projected changes will inform and be incorporated into local government planning schemes to develop adaptation strategies, such as natural buffer areas, that provide for retreat and colonisation. The University of Queensland is undertaking a related project to adapt the Sea Level Affecting Marshes Model (SLAMM) to inform on changes to the diversity and zonation of plant species and community structure within tidal fish habitats as a result of changes to tidal inundation and sedimentation regimes from SLR. The Queensland Herbarium has commenced a related mapping project that is establishing 20 sites for the long-term monitoring of mangrove and associated marine plant communities in Moreton Bay to document past and ongoing changes based on over 70 years of information.

One Fish, Two Fish, Green Fish, Blue Fish –
Comparisons of Deep Shoal Grounds Open and Closed to Fishing Using Baited Video

Mike Cappo

Australian Institute of Marine Science (AIMS)

ABSTRACT

Counts by divers have shown a rapid rise in coral trout populations on shallow reefs closed to fishing in 2004, but the deeper “reds grounds” have been inaccessible to fish scientists until the development of baited video techniques.

In this talk I will present four years of data counting and measuring deepwater reds, coral trout, tusk fish and reef sharks (including tigers and hammerheads) from three types of “shoal ground” with “Baited Remote Underwater Video Stations” {BRUVS} that can film down to 100 metres and are made from cheap components.

On the diffuse, low-relief grounds off Townsville prized target species were actually less abundant in green zones, yet in nearby Brook Shoals there were vastly more “reds” in the area closed to fishing (and that difference is increasing).

On the discrete banks off Gladstone there were about twice as many reds and other prized species on sunken banks in deepwater down to 50 metres. The pattern around the reef bases of the remote Mackay and Swains reefs was not visible unless different habitat types were accounted for. There were about one and a half times more fished species at the bases of green reefs closed to fishing – but only in deep coral-dominated habitats. Everywhere reef sharks were more abundant in green zones.

I will illustrate these differences with “highlights of play” video from the different types of shoals, and attempt to explain them with seabed swathe-maps generated by Dr Thomas Stieglitz of James Cook University.

I will also give examples of a new direction in presenting our results where we have mounted actual fish counts, video and pictures of the seabed on Google earth and YouTube to let the public make up their own minds…a picture speaks a thousand words.

Paddock to Reef Integrated Monitoring, Modelling and Reporting Program

John Bennett,

Department of Environment and Resource Management

ABSTRACT

Reef Plan, first introduced in 2003, is a joint commitment of the Queensland and Australian governments to minimise the risk to the Reef ecosystem from a decline in the quality of water entering the Reef from the adjacent catchments. Reef Plan specifically focuses on non-point source pollution from broad scale land use. The plan was updated in 2009 (Reef Plan 2009) to ensure that reef water quality is improved and that the Reef has the resilience to cope with the stresses of a changing climate. Reef Plan 2009 is underpinned by a suite of targets linking land management, water quality and ecosystem health from the paddock to the Reef. Reef Plan 2009 included a key action to develop and implement a robust monitoring and evaluation strategy to evaluate the efficiency and effectiveness of implementation and report on progress towards the Reef Plan goals and targets. This strategy is the Paddock to Reef Integrated Monitoring, Modelling and Reporting program (P2R).

A collaborative approach was used to develop the program including a suite of Reef-wide and regional workshops and forums involving a broad range of expertise from the following areas:

- Paddock scale land management practices and processes
- Catchment water quality processes (including monitoring and modelling)
- Marine water quality and ecosystem health processes
- Remote sensing technologies
- Program managers and policy officers.

More than 100 scientific and technical personnel from 18 organisations were involved in the program design. The program design built upon the knowledge generated since the commencement of Reef Plan in 2003 and utilised current research, development and innovation. This design minimised costs as it utilised, refocused and integrated existing monitoring and reporting programs. The framework for the design involves monitoring and modelling a range of attributes at a range of scales including management practices, water quality at the paddock, sub catchment, catchment levels and in adjacent marine areas. The P2R results are to be reported annually in a Reef Report Card, with the first one recently released in August 2011. This presentation will provide an overview of the P2R program.

Managing Coastal Ecosystems from the Paddock: The Role of Agricultural Extension

Carla Wegscheidl

Project Leader (Extension and Education Pilot), Department of Employment, Economic Development and Innovation

ABSTRACT

Catchment land use activities influence the health and resilience of coastal ecosystems. As the dominant land use in North Queensland, agriculture is recognised as a significant source of sediments, nutrients and chemicals to the coast. This is the focus of the Reef Water Quality Protection Plan 2009 (Reef Plan), which aims to halt and reverse the decline in water quality entering the Great Barrier Reef lagoon. The important role of agricultural extension in facilitating land management changes by rural landholders is highlighted in Reef Plan as integral to achieving the management practice changes required to improve Reef water quality. This presentation gives an overview of Reefocus Extension, a new program underway in the Herbert and Johnstone River catchments, to enhance extension coordination and delivery to improve land management practices. The Department of Employment, Economic Development and Innovation is working with industry, community and government to support rural landholders to review and improve their farming practices for improved economic, agronomic and environmental outcomes. This program works across the sugarcane, beef cattle grazing, banana, mixed cropping, dairy and forestry industries, bringing together these various industries to work collaboratively to improve land use management. Reefocus Extension emphasises the connectivity between extension, agricultural activities and the water quality in receiving environments and the flow on effects to downstream coastal ecosystems. Monitoring the impact of extension activities on management practices and linking this with water quality monitoring helps build the picture of the role of agricultural extension in catchment management. Progress and lessons learnt to date will be presented.

Phytoplankton Blooms in the Great Barrier Reef waters:
Seasonal and Spatial Dynamics from Ocean Colour Remote Sensing Data

Blondeau-Patissier D.[1,2], Dekker A. G.[1,2], Brando V. E.[1,2], Phinn S. R.[2], Weeks S. J.[2], Schroeder T.[1]

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ABSTRACT

Ocean colour remote sensing provides a synoptic view of the surface and near-surface of the coastal and oceanic waters. The spatial and temporal mapping of phytoplankton bloom dynamics from ocean colour satellite data is relevant to coastal managers because information on the timing, location and concentrations of algal bloom events are key indicators for assessing aquatic ecosystem health. Blooms of phytoplankton in coastal waters are linked to many environmental variables including nutrient supply, water temperature, water clarity or water column mixing. In the Great Barrier Reef waters, phytoplankton growth is primarily limited by the availability of nutrients and may show increases as a response to river flood plumes containing sediments, nutrients and other dissolved and particulate organic matter. Climatology maps, latitude-time plots and time-series of satellite-derived proxies for phytoplankton concentrations and algal surface expressions (e.g., *Trichodesmium sp.*) were examined using weekly composites of ESA-MERIS satellite image products for the Great Barrier Reef from May 2006 to August 2010. Temporal and spatial differences in phytoplankton dynamics in the subregions of the Great Barrier Reef waters are presented and interpreted. Phytoplankton dynamics in tropical marine ecosystems have been largely under-studied and this research partly addressed this knowledge gap. The findings of this study for the Great Barrier Reef waters led to 2011 State-of-the-Environment reporting on algal dynamics for the GBR and other coastal waters around Australia.

Nekton Display Preferences When Choices are Available

Ross Johnston & Marcus Sheaves

James Cook University, Townsville, Australia

ABSTRACT

Sound understanding of nekton-habitat associations is crucial to effective and sustainable management of estuary and coastal wetlands. Our understanding of those associations is quite limited for tropical wetlands, particularly estuaries, in part because of inherent difficulties in sampling nekton in tropical estuaries (complex habitat, turbid water). Estuaries are linear structures but habitat studies along the length of estuaries are not corrected for habitat type which changes along an estuary. Although described habitat associations may well be valid there is a danger of confounding habitat preferences and spatial patterns of habitat availability. For instance some species may appear to have restricted distributions that simply reflect preferred habitat distributions. We investigated whether different species assorted in relation to different habitat units (30-100 m) in close proximity, i.e. close enough for nekton to move freely between (< 500m) in a short time.

With different habitat types in close proximity we detected clear habitat preferences for a number of species that may appear to have less explicit habitat preferences, or appear to be confined to a particular part of the estuary, when examined along the length of an estuary. Ponyfish, *Leiognathus equulus*, were encountered most frequently along low angle (<50° slope) mud banks with low current velocities and rarely along steep banks with overhanging mangroves, herring, *Herklotsichthys castelnaui* , adjacent to structure in depths > 0.6 m and silver biddies, *Gerres filamentosus*, were more likely to be captured from low angle (<50° slope) sand banks. Although habitat classifications at this scale potentially encompass many smaller scale habitats the ability to develop clear species-habitat preferences is an important step towards improved habitat management and monitoring of estuary health by enabling at least partial predictability about potential distribution patterns of estuarine nekton.

Conservation Genetics of the Critically Endangered Narrow Sawfish (Anoxypristis cuspidata) in Northern Australia

Blanche Danastas[a], Lynne van Herwerden[b], Colin Simpfendorfer[c], Kevin Feldheim[d], Stirling Peverell, Jason Stapley[e] and Rory McCauley[f].

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[f]*Shark & Ray Sustainability, WA Fisheries and Marine Research Laboratory, Dpt. of Fisheries, Government of Western Australia*

ABSTRACT

Concerns over the status of sawfish populations have led to recognition of the urgent need to develop management and conservation actions. Little is known about the narrow sawfish (*Anoxypristis cuspidata*), however it is widely distributed in northern Australia and thought to be the most mobile of the four sawfish species that occur here. This research is a world first look at the conservation genetics of narrow sawfish, listed as critically endangered under IUCN Red List. The aims of this study were to examine the population genetics of narrow sawfish using a mtDNA marker and to examine the frequency of multiple paternity in litters of narrow sawfish embryos using nuclear microsatellites. This research adds new and significant knowledge to our understanding of narrow sawfish.

The present study examined 164 samples from the West and East coasts of Australia and the Gulf of Carpentaria (GoC). Despite low polymorphism in the 350bp portion of the mtDNA CR examined, this study found that *A. cuspidata* is significantly genetically structured in northern Australian waters and that the West and East Coasts are separate stocks (ÿ$_{st}$=0.23, P=0.0001). Population genetic analyses revealed a shallow evolutionary history and genetic diversity that is lower in narrow sawfish than in all other sawfish in Australia (ÿ%=0.11, *h*=0.34) and decreases from West to East. Genetic monogamy was found in the four litters examined, providing the first evidence of an elasmobranch with genetic monogamy. The low genetic diversity observed and potentially enhanced risk to erosion of genetic diversity due to genetic monogamy are risk factors that could have considerable impact on this species (Chapman et al., 2004a, van Oppen and Gates, 2006). Whilst narrow sawfish may be afforded resilience due their short generation time and high abundance relative to other species of sawfish, the primary threats that have led to historical declines are ongoing (Tobin et al., 2010, Peverell, 2005, Compagno et al., 2006). In the context of severe global declines, narrow sawfish could remain relatively abundant in Australian waters in perpetuity if they are managed properly, with strong regard for the Precautionary Principle.

Intertidal Seagrass Status, Seagrass-Watch and the Reef Rescue Marine Monitoring Program

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ABSTRACT

The Reef Rescue Marine Monitoring Program, established in late 2004, is a long-term water quality and ecosystem heath monitoring program carried out in the inshore region of the Great Barrier Reef (GBR) Lagoon. The program will help to assess the long-term effectiveness of management (ie Reef Plan) in reversing decline in the quality of water entering the Great Barrier Reef Marine Park. The Reef Rescue MMP assesses the health of key marine ecosystems (inshore coral reefs and intertidal seagrasses) and the condition of water quality in the inshore GBR lagoon. Three generic types of intertidal seagrass habitats are monitored as part of the Reef Rescue MMP; estuarine, coastal and reef top. A cornerstone of the seagrass monitoring component is the participatory Seagrass-Watch program.

Prior to the extreme weather events of 2011, the seagrass meadows of the GBR were in a vulnerable condition with declining trajectories reported throughout much of the GBR. Poor water quality due to reduced light availability for growth and elevated nutrients have partly attributed to this decline. In addition, the broader scale impacts of the 2010-2011 wet season across the regions exposed to flooding and cyclones appear to have resulted in further impacts on seagrass meadows in the GBR. These impacts exacerbate the already stressed seagrass ecosystems of the GBR in recent years. Overall there are indications that seagrass meadows along the GBR are continuing to decline and are now in a very poor state. These declines are considered to be contributing to the considerable increase in mortality of dugongs and sea turtles occurring in 2011.

Taxon-Specific Responses to Connectivity over a Tropical Coastal Plain

Ben Davis, Marcus Sheaves

Estuary & Tidal Wetland Ecosystems Research Group, School of Marine & Tropical Biology, James Cook University, Townsville

ABSTRACT

Distribution of fish over a fragmented landscape is generally governed by local topography interacting with fish dispersal abilities, and subsequently modified by extinction variables. In tropical tidal regions a high species richness is likely to bestow diverse motilities, habitat preferences, and by extension physiological tolerances. Consequently, while vestiges of fragmented coastal wetlands in North Queensland remain in-tact, they present a striking scenario in which to analyse previously unknown spatial patterns of landscape use.
Two years of assemblage-level surveys in a North Queensland model wetland revealed that coastal wetland assemblages are primarily and consistently split at the coarsest level by connectivity. Contrary to what might be expected, fish compositions in more isolated wetland units are not a nested subset of compositions from better connected units, yet are distinct.

This indicates functional divergence of more isolated wetlands, rather than simply representing a sink for well-dispersing species. At a finer scale, distribution of certain fish among better connected wetlands can be accounted for despite complications due to intricate interactions between connectivity and habitat selection processes. These findings provide a preliminary framework in which to manage these highly threatened yet potentially critical fish habitats.

Feeding Across Borders: The Realisation of Connectivity in Intertidal Habitats

Nina McLean, Marcus Sheaves

Marine and Tropical Biology, James Cook University, Townsville

ABSTRACT

It is widely agreed that connectivity is an important process that strongly influences both physical and ecological processes. Connectivity allows for the movement of materials or organisms between either spatially or temporally separate habitats. Such processes influence nutrient sources, nutrient translocation and nutrient subsidies which inevitably impact food web dynamics. However, the complex nature of connectivity makes it difficult to study, and few studies have looked at the complexities within a connectivity event which can potentially influence the movement of energy among food webs. Intertidal habitats are key areas for studying connectivity. They provide relatively simple and well-defined connectivity events over small scales. The flood tide facilitates the tidal migration of nekton from subtidal to intertidal habitats and presents opportunities for tidally-synchronised foraging excursions.
Therefore nekton act as potentially important vectors in transporting production back to subtidal environments. The aim of this study was to evaluate taxon- and trophic-specific responses to connectivity across the intertidal gradient. Three locations in North Queensland were sampled, including Blacksoil Creek, Ross River and Lucinda Beach. Seine nets were used to collect samples to provide data on the temporal occurrence and composition of the nekton assemblages. Information about feeding patterns within the intertidal zone was also obtained through gut content analysis. Utilisation of intertidal habitats by nekton differed with trophic necessity.
A greater understanding of the complex spatial and temporal variations of utilisation within connectivity events will help to increase our understanding of the dynamics and consequences of the movement of materials and energy fluxes across habitat boundaries.

Exposure of Coastal Wetland Environments to Pesticides

Aaron Davis, Jon Brodie, Steve Lewis, Zoe Bainbridge

Australian Centre for Tropical Freshwater Research, James Cook University

ABSTRACT

This presentation will outline the dynamics of pesticide movement at a landscape scale within the agriculturally developed floodplain of the Burdekin River delta, one of Australia's largest coastal floodplain and estuarine environments. A range of herbicide residues predominantly associated with the sugarcane industry have been detected in local waterways during both low flow and flood event conditions, with a strong seasonal signal evident in catchment monitoring results.

Wet season catchment monitoring highlights that major rainfall events produce widespread surface water run-off across all floodplain sub-catchments, and effectively homogenize surface run-off water quality across the Burdekin delta. While several waterways exhibited frequent low concentrations of pesticides throughout much of the year under dry season conditions, the Barratta Creek system stood out with relatively elevated pesticide levels documented over the long term during the dry season, often above available ecosystem protection guidelines for particular herbicides.

Numerous challenges exist, however, that limit the capacity to make meaningful risk assessments associated with pesticide presence in natural environments in northern Queensland.

Lack of basic guideline levels for many commonly detected toxicants, minimal toxicity testing of relevant tropical biota, complex and potentially interacting mixtures of contaminants in receiving environments, and little knowledge regarding chronic, long-term exposure of relevant biota to low pollutant levels makes informed and meaningful data interpretation a difficult task. While historic research effort has focused on the Great Barrier Reef, coastal freshwater and estuarine ecosystems (often with their own high ecological values) in close proximity to agricultural land likely face some of the greatest herbicide-associated risks of any receiving environment.

Do Environmentally-Friendly Vessel Moorings Reduce Impacts on Fish Habitats? A Moreton Bay Case Study

Kurt Derbyshire[1], Rebecca Batton[1] and Rebecca Sheppard[2]

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ABSTRACT

Moorings management in Queensland can be complex, with multiple agencies involved depending on the location. A key and ongoing management issue is that traditional vessel mooring designs disturb marine habitats through scouring of the sea bed. This can affect fisheries productivity and other important ecosystem services provided by marine habitats such as seagrass. Environmentally-friendly moorings (EFM) protect marine habitats by keeping the mooring tackle and the vessel off the sea bed at all times. EFM had not previously been used in Queensland so a project consortium was formed to trial EFM designs at four sites in Moreton Bay over an 18 month period. The consortium included State government agencies, SEQ Catchments, the University of Queensland, Tangalooma Resort, Seagrass Watch, the Moreton Bay Seafood Industry Association and the Moreton Bay Access Alliance.

The trials determined the efficacy of the EFM in securing boats in Moreton Bay's environmental and maritime conditions and reducing impacts on marine habitats. Outcomes of the trials, including industry uptake, will be presented, along with plans to promote greater use of EFM and to extend EFM trials to other parts of the Queensland coast.

The Importance of Estuaries for the Health of the Great Barrier Reef World Heritage Area

Donna-Marie Audas and Paul Groves

Great Barrier Reef Marine Park Authority

ABSTRACT

One of the greatest challenges for Great Barrier Reef managers is to understand the role played by coastal ecosystems in maintaining the health and resilience of the Great Barrier Reef. Historically, the Great Barrier Reef catchment has experienced considerable change driven by population growth and intensive and extensive agricultural expansion, which may have resulted in significant modification and losses in the extent and function of many of these coastal ecosystems. The *Great Barrier Reef Outlook Report 2009*[1] has identified coastal development and run off of poor water quality in the Great Barrier Reef catchment as two of the current major threats to the Great Barrier Reef World Heritage Area. In response to the Outlook Report, the Great Barrier Reef coastal ecosystem project has been initiated to better understand the value of coastal ecosystems, their function and role in the resilience of Great Barrier Reef ecosystems. This has included comprehensive data collection and collation, building on existing ecosystem mapping to define Great Barrier Reef coastal ecosystems and the development of conceptual models of these systems. Coastal ecosystem groupings identified by the Great Barrier Reef Marine Park Authority include low-lying rainforest, forests and woodlands, grasslands and heathlands, riparian forests and freshwater wetlands, estuarine and marine areas. With the assistance of technical experts, this project aims to provide critical knowledge about the role of coastal ecosystems to inform the community and decision makers. It will provide a higher level of awareness of what coastal ecosystems are and their importance to the Great Barrier Reef, including implications to Reef Health from any further loss.

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