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DIVERSE DEPTHS: SEE BEANEATH THE SHALLOWS FORUM

CUSTOMS HOUSE, SYDNEY

12 MARCH 2013

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DIVERSE DEPTHS SEE BENEATH THE SHALLOWS

Tuesday 12 March 2013

The Barnet Long room, Customs House, 31 Albert St Circular Quay, Sydney

Australia generally has nutrient-poor marine waters but despite this, it hosts a high biodiversity. With 80 percent of the population living on the coast combined with the slowly intensifying impacts of climate change, marine biodiversity will be under increasing pressure to adapt.

An increase in the observation, monitoring and research of our marine environments will enable us to understand the cause and effect of changes occurring now and in the future and how we can adapt and better manage our oceans.

This event will expand awareness and knowledge about the effects climate change may have on marine biodiversity globally and locally as well as marine and coastal biodiversity issues and possible management implications in the Sydney area.

Diverse Depths: See Beneath the Shallows is supported by the



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Tuesday 12 March 2013

THE BARNET LONG ROOM, CUSTOMS HOUSE LEVEL 1, 31 ALBERT ST, CIRCULAR QUAY, SYDNEY



0900	REGISTRATIONS OPEN	
0930	INTRODUCTION & WELCOME	SCCG
0940	OPENING ADDRESS	Ms Valerie Taylor AM
1000	(TBC) ESTABLISHMENT OF COMMONWEALTH MARINE RESERVES	Video Address to the SCCG from Minister Tony Burke MP, Federal Minister for Sustainability, Environment, Water, Population and Communities
1010	PROMETHEUS UNBRIDLED: THE IMPLICATIONS OF CLIMATE CHANGE FOR MARINE BIODIVERSITY	Dr Katherina Petrou, Chancellor's Postdoctoral Research Fellow, Plant Functional Biology & Climate Change Cluster University of Technology Sydney
1050	FRINGE DWELLERS: LIFE & HARD TIMES IN THE INTERTIDAL ZONE	Dr Paul Adam, Visiting Fellow University of NSW
1120	MORNING TEA	
1150	BANG FOR BUCK: THE CHALLENGE OF CHOOSING INDICATORS OF ANTHROPOGENIC IMPACTS IN ESTUARIES	Dr Katherine Dafforn, Research Associate University of NSW and Sydney Institute of Marine Science
1220	SYDNEY HARBOUR: ITS DIVERSE BIODIVERSITY	Dr Pat Hutchings, Senior Principal Research Scientist Australian Museum
1250	LUNCH	
1320	ALGAL BLOOMS: THE GOOD, THE BAD AND THE DOWNRIGHT TOXIC!	Ms Penelope Ajani, PhD Student Macquarie University and the Sydney Institute of Marine Science
1400	ESTUARINE & MARINE MONITORING & MANAGEMENT AROUND SYDNEY	Dr Bob Creese, Acting Director of Fisheries Research Department of Primary Industries, Fisheries
1430	COASTAL GEODIVERSITY UNDER THREAT	Dr Peter Mitchell OAM, Director Groundtruth Consulting
1500	AFTERNOON TEA	
1530	MANAGEMENT OF ASSETS & PROTECTING MARINE LIFE : FINDING THE BALANCE	Ms Belinda Atkins, Manager of Environmental Services Mosman Council
1600	UNDERWATER SYDNEY AND THE CATLIN SEAVIEW SURVEY	Mr Robin Barham Underwater Earth
1600	FORUM CLOSE	

Ms Valerie Taylor AM

Underwater Photographer and Videographer, Artist, Author, Scriptwriter,
Conservationist, Model and Actress

Valerie Taylor is a pioneer in the history of scuba diving and the underwater environment. Born in Australia in 1936, she developed a natural affinity with the ocean at a very young age.

In 1960 Valerie took up spear fishing, eventually winning several Australian championships for both spear fishing and scuba. In 1969, Ms Taylor decided to retire from the sport of killing fish, became an ambassador of the ocean, took up underwater photography and became one of the world's top underwater photographers, a position she holds to this day. Together with her husband Ron, she spent her life specialising in producing spectacular underwater action on film.

In 1973, National Geographic featured some of her underwater stills and displayed her image on the June front Cover. This led to a level of world-wide recognition for her talents.

Valerie was awarded a NOGI Award for Arts by the Underwater Society of America in 1981, a great honour among the global diving community.

In 1986, Valerie was knighted by Prince Bernhard at the Palace in Holland for her work in the field of conservation. In 1997, Valerie was awarded the American Nature Photographer of Year. The following year, she received the Golden Palm Award at Antibes, France, and in 2000, she became an inaugural Member of the Women Divers Hall of Fame. Valerie was also honoured with two distinguished National titles - the senior Australian Achiever of the year 2002, the country's second highest national award and the Centenary Medal. In 2010, she was awarded a Member of the Order of Australia (AM).

Valerie has also been honoured by the Wild Life Conservation Society of Australia for her work with her husband, Ron, in conservation and she is the Patron of the National Parks Association of NSW.

For over 50 years, she has worked tirelessly and courageously to dispel some of the myths surrounding sharks and contributed a wealth of knowledge in understanding shark behaviour. A great adventurer, she was the first to test chain mail as a protective measure against shark attacks, electronic shark repellent barriers and to swim with Great White Sharks with no cage.

Valerie still dives and declares that nothing feels better than getting into the water and feeling weightless again.

For a full list of achievements, please visit

http://www.oceanartistsociety.org/members-details.php?member_id=50

Notes:

Dr Katherina Petrou

Chancellor's Postdoctoral Research Fellow, Plant Functional Biology and Climate Change Cluster
University of Technology Sydney

Dr Katherina Petrou is a phytoplankton ecophysiologicalist whose research focusses on phytoplankton responses to environmental stress. She has worked in research institutes in Germany, London and Barcelona and is now a Research Fellow and lecturer at UTS. Her current research couples photobiology and biochemistry with marine sulphur ecology to unveil how environmental stress influences sulphur cycling in the marine environment and to shed light on how marine microbial interactions will behave in a changing ocean.

Prometheus Unbridled: the implications of climate change for marine biodiversity

Change is an integral part of our planet's history; past millennia have experienced major shifts in environmental condition and ecosystem structure. However, these rates of change were generally very slow, following geological time scales which permitted species to adapt, migrate, or in the case of those unable to do either, become extinct.

In recent decades however, there is indisputable evidence linking the rapid industrialisation of the modern world to global atmospheric change. This change is occurring at an alarming speed, and knowledge about how this change will affect the functioning and diversity of the marine environment is still in its infancy. Recent studies have shown that rapidly rising greenhouse gas concentrations are causing shifts in ocean chemistry, temperature and circulation patterns, which are driving ecological transformations in our ocean systems. These potentially irreversible changes have wide-reaching impacts including: species range shifts, extinctions, altered food-web dynamics, reduced abundance of habitat-forming species, increased efficacy of invasive species and diseases, and ultimately, reduced ecosystem complexity. This talk will examine the evidence underpinning these climate-driven ecological shifts and explore the implications of humanity's unbridled industrialisation for marine biodiversity and the health of our future ocean.

Notes:

Dr Paul Adam
Visiting Fellow
University of NSW

Dr Paul Adam has been a plant ecologist at the University of NSW since 1978. One of his major interests throughout his career has been the ecology of intertidal saltmarsh.

He has been actively involved in the development and application of wetlands protection policies since the early 1980s (with SEPP14) and was a member (latterly Chair) of the Scientific Committee for the Threatened Species Act for 9 years.

Fringe Dwellers: life and hard times in the intertidal zone

The intertidal zone naturally experiences change but human intervention has greatly increases the rate and range of impacts. The growing human population in the coastal zone, and the impacts associated with climate change, will increase the pressures facing intertidal communities.

The major intertidal and associated communities will be described and existing protective measures discussed. The possible consequences of future environmental change, including sea level rise will be considered, and possible measures to manage and ameliorate some of the impacts will be raised. Local may be appropriate and necessary in some instances, but most issues will require consistent, sustained national and international action.

Notes:

Dr Katherine Dafforn

Research Associate

University of NSW and Sydney Institute of Marine Science

Katherine completed her post graduate studies at the University of New South Wales (UNSW) in 2010 before taking a postdoctoral position at UNSW. Her research encompasses estuarine health and management. She is particularly interested in broad-scale health assessment tools and the development of sensitive sampling programs to detect contaminant impacts. Katherine's research has also examined invasion by exotic species and factors that facilitate invasion of natural systems focussing on the addition of artificial structures to waterways.

Bang for Buck: the challenge of choosing indicators of anthropogenic impacts in estuaries

Estuaries are the most impacted of all marine habitats, and more than half of Australian estuaries have been modified by human activities. Recent biological surveys of estuaries including Sydney Harbour revealed that there were substantial impacts associated with contaminants, but these were not always as predicted. Sediment function appears to be impacted and invertebrates are showing high levels of stress while some fish exhibit slower growth rates in heavily contaminated areas.

Despite high contamination levels in the sediment, we also observed more diverse and productive ecological communities in heavily modified than relatively “pristine” estuaries.

Adult fish sampled from Sydney Harbour were often larger than those in modified estuaries and larval fish abundances were consistently higher in heavily modified estuaries. The patterns extended to other communities and we saw increased species richness and abundance of organisms living in the sediments, particularly bristle worms in Sydney Harbour.

Sessile invertebrate communities were also more abundant in modified estuaries although diversity was similar and much of the diversity in modified estuaries was driven by the presence of non-indigenous species. These patterns may be partly explained by the ongoing input of nutrients that will increase productivity up to a point, but could lead to algal blooms and fish kills. Our results highlight the importance of selecting sensitive indicators in estuarine assessment and being able to distinguish the effects of multiple stressors.

These findings have implications for future monitoring and management of Sydney Harbour and other heavily modified estuaries.

Notes:

Dr Pat Hutchings
Senior Principal Research Scientist
Australian Museum

BSc London, PhD, DSc University of Newcastle UK.

Pat's research interests are all aspects of polychaete sea worms, taxonomy phylogeny and their role in marine ecosystems. Conservation of marine ecosystems, especially coastal areas and extensive work in mangroves and seagrass beds.

Sydney Harbour: Its diverse biodiversity

All records of crustaceans, molluscs, polychaetes, echinoderms and fishes from Sydney Harbour were extracted from the Australian Museum database, and plotted onto a map of Sydney Harbour that was divided into four regions. Records were analysed according to the number of species, genera and families present and over 3000 species were recorded, approximately double to triple the number of species found in the neighbouring Hawkesbury River, Botany Bay and Port Hacking. We examined the rate of accumulation of records and species over time since the 1860s, which followed a stepwise pattern usually correlated with the research activity of specific curators at the Australian Museum. The high species richness of Sydney Harbour is probably the result of multiple factors including significant tidal flushing and the high diversity of habitats present. Not all parts of the harbour have been well sampled, however, and we highlight areas and habitats that should be prioritised for further biodiversity survey. An Appendix is provided listing all species in the five groups of animals considered here. The present study highlights the remarkable richness of the Sydney Harbour fauna and provides a consolidated background to guide future management and research, and highlights the values of museum collections.

Notes:

Ms Penelope Ajani

PhD Student

Macquarie University and Sydney Institute of Marine Science

Ms Penelope Ajani has been engaged in the development, conduct and communication of marine science, especially in the area of phytoplankton for the past twenty years. She has worked in academia, government and as a private consultant. Penelope has undertaken research to microscopic algae along the NSW coastline with particular emphasis on algal blooms including harmful/toxic blooms and assisted public authorities, industry, universities and the community in relation to the identification and management of these blooms in NSW.

Algal Blooms: the good, the bad and the downright toxic!

Phytoplankton, or microalgae, are microscopic plants (*phyto* = *plant*) that live suspended (*planktos* = made to wander) in the water. They live in all oceans, lakes and rivers throughout the world with over 10,000 species identified in coastal and oceanic waters alone. They are responsible for forty percent of global photosynthesis and produce almost half the world's oxygen. They also form the bottom of the aquatic food chain supporting many forms of marine life including important fisheries.

But...fluctuations in the nutrient status of coastal waters, either of natural origin (coastal upwelling or catchment runoff), or associated with anthropogenic (human) disturbances, can lead to changes in phytoplankton composition and abundance. This may result in the excessive growth of algae know as an *algal bloom*. Algal blooms can be harmful/toxic and threaten fish resources, human health, ecosystem function and the recreational amenity of beaches. Or, they can be completely harmless water discolorations.

This presentation will reveal the importance and beauty of phytoplankton, the types of algal blooms and their management, and the latest research into phytoplankton ecology along the New South Wales coastline.

Notes:

Dr Bob Creese

Acting Director Fisheries Research

Department of Primary Industries – Fisheries NSW

After gaining PhD degree from University of Sydney, Dr Bob Creese spent three years overseas researching rocky intertidal ecology. Held academic positions at the University of Auckland from mid 1980s to 2000, based at the Leigh Marine Laboratory. Research expanded to include subtidal ecology, aquaculture & conservation biology. Returned to Australia in 2000 to lead Aquatic Ecosystems research unit at NSW Fisheries and do research on marine pests, estuarine ecology and marine protected areas. Has had a large involvement in habitat mapping programs and resource assessment work under the state Government's MER program. Became acting Director of Fisheries Research in 2012.

Estuarine & Marine Monitoring & Management around Sydney

Marine and estuarine habitats are important in their own right as major components of biodiversity, but they can also serve as surrogates for a much wider range of marine biodiversity when developing options for protection or management. Fisheries NSW, a division within the NSW Department of Primary Industries, administers the *Fisheries Management Act*. Aquatic habitats are specifically recognised under this legislation, and the division has a number of ongoing programs to monitor the extent and condition of these habitats, to protect vulnerable components of them and to initiate restoration efforts to help improve the status of degraded habitats. This presentation will showcase some of these habitat activities within the Sydney region. The focus will be on rocky shores, seagrass beds, mangroves and saltmarshes. The emerging use of threat & risk assessment as a way to prioritise management action and further research will be introduced. Finally, I will canvas ways in which the work of Fisheries NSW can be more effectively integrated with other research initiatives in the region.

Notes:

Dr Peter Mitchell OAM

Director

Groundtruth Consulting

Dr Peter Mitchell taught earth sciences and environmental science at Macquarie University and the University of Canterbury (NZ). A former member of the NSW panel of the Australian Heritage Commission dealing with the nomination of Natural Heritage, former member of a Scientific Advisory Panel to Manly Council, currently a member of Ryde Council's Heritage Advisory Committee and co-author of a wonderful book on temperate shore platforms that is available for purchase from Groundtruth Consulting.

Coastal Geodiversity under threat

Whilst we focus on loss and change in marine biodiversity we tend to ignore the rocky substrate on which much of our biodiversity depends. This talk will describe the nature of the rocky framework of the intertidal zone and shallow marine environments. It will explore the geological factors that provide habitat such as; rock type, structural patterns, and weathering characteristics, and then consider how this geodiversity is being reduced and what may happen with a rising sea level. Geodiversity is fundamental to fostering biodiversity and it's high time we included it in our planning. Now there's the challenge!

Notes:

Ms Belinda Atkins

Manager of Environmental Services

Mosman Council

Ms Belinda Atkins graduated from the University of Western Sydney in 2000 with a Bachelor of Applied Science (Environmental Management and Tourism), and a Bachelor of Applied Science (Honours) in protected areas management (2001). Belinda has previously worked as an interpretive officer at Bicentennial Park, educating school groups and park visitors about the wetland ecosystem and parklands. Belinda joined Mosman Council in 2002 as an environment officer focusing on water quality monitoring and has now been working at Council in various environmental positions for over 10 years. Belinda is currently the Manager Environment and Services, having responsibility for environmental management, sustainability education, waste management, environmental health, and cleansing contracts (beach cleaning, street sweeping, graffiti and buildings cleaning).

Management of Assets & Protecting Marine Life : Finding the Balance

Councils have a responsibility to protect and conserve the natural environment as well as managing infrastructure and assets, maintaining a clean and healthy environment and improving the area for passive recreation and community access to the harbour and foreshore areas.

To ensure Council meets its responsibilities a balance needs to be struck between undertaking works to ensure Council assets are maintained for safety, accessibility, aesthetics and/or heritage value, and ensuring that the habitat of marine species is not adversely impacted upon, and where possible new habitat is actually established.

Notes:

Mr Robin Barham **Underwater Earth**

Robin took his first underwater breath in the early 1980s aged 14 and has spent most of his life in or on the water since, having been a dive instructor, oarsman and rowing coach, sailor, surfer, surf lifesaving instructor and Rescue Watercraft Operator.

Professionally, Robin spent 25 years as a Lloyd's Underwriter prior to joining Underwater Earth. At Lloyd's he insured maritime assets (shipping, energy, ports and terminals) for 12 years, before moving into satellite insurance and joining the Catlin Group as Space Underwriter.

In 2006 he moved to Australia with his family to build and manage an aviation portfolio.

In 2010 he was looking for a science project for Catlin to sponsor, and met Richard Vevers of Underwater Earth. Together they shaped a programme suitable for sponsorship and the Catlin Seaview Survey was born. Robin left Catlin in 2012 to work full-time on the project.

Robin is a member of the Chartered Insurance Institute and the Royal Aeronautical Society, and studied Space Systems Engineering at Southampton University. When not in the water, he rides motorbikes and flies a paraglider.

The Catlin Seaview Survey: Revealing the underwater environment

Underwater Earth's project, the Catlin Seaview Survey has brought underwater 360 degree panoramas to over a billion computer screens through Google Maps and Streetview.

Robin will talk about this project, explaining what it aims to achieve, what it has accomplished to date, and discuss how this model can be used to engage an audience with the treasures of the marine environment, and to monitor and manage that environment.

Notes:

Diverse Depths: See Beneath the Shallows
Biographies and Synopses

Notes: