Hello members and wetlanders.

Thank goodness for computer technicians. This issue nearly didn’t happen thanks to a computer meltdown. But, luckily here we are with the first edition for the year. Thanks for all your contributions. Please keep them coming in. If you have any ideas for articles or would like to see a particular theme covered in upcoming issues please be in touch. I can be contacted at swsoceania@gmail.com.

Best wishes, Maria

From the President’s desk

As our 'angry summer' draws to a close, I’d like to welcome you to this autumnal edition of *Lentic* and thank Maria for her hard work in pulling this together for all of our benefits. Since we all seem to be increasingly busy in our working lives, it is no small feat for our chapter members to contribute their valuable time to such endeavours and of great value to our community to have a forum to share our ideas and work. I encourage you all to make use of this newsletter to tell of your achievements, opinions and upcoming events of interest to Oceania’s wetland scientists and managers.

We have a busy year ahead for our SWS Chapter including the forthcoming launch of a new SWS website which will include an update chapter section for us to make use of. In May, many of our members will be travelling to Portland, Oregon to attend the first Joint Aquatic Sciences Meeting. Along with Dr Michael Reid of the University of New England, I will be chairing a plenary session at this conference on robust restoration for freshwater ecosystems in the face of uncertainty in which contributions will be given by a number of our esteemed members including Professor Max Finlayson. Professor Jenny Davis is also to lead a session on temporary wetlands.

I have recently been involved in a special committee exploring financial and other arrangements between SWS central and its chapters. Hopefully the outcome of this will be greater support for chapters in the near future which will enable us to organise more such activities!

In other news, a number of our members, including myself, Max Finlayson and Jenny Davis, head to Nanjing next week to participate in an Australia-China Wetland Network Research Partnership Symposium. This is a great opportunity for us to share knowledge as well as visit Poyang Lake, a floodplain lake of the Yangtze. I will be sure to provide a story on this trip in the next issue of *Lentic*....

All the best,

Sam
Strategic Foresight for Wetland Policy, Management and Research

presented by the Society of Wetland Scientists Oceania Chapter

27 - 29 October 2014
Sydney Olympic Park

Day 1.
- Introduction to strategic foresight
- Elements and history of strategic foresight
- Overview of tools and approaches

Day 2.
- In-depth training in horizon scanning and formal scenario development techniques
- Horizon scanning and scenario development for Oceania wetlands

Day 3.
Writing workshop on the future of Oceania’s wetlands and their management

Indicative costs*:
- Day 1 only: $250/$200 (SWS members $150)
- Day 1 and 2: $400/$320 (SWS members $300)
- Days 1, 2 and 3: $500/$370 (SWS members $350)
  *meals included

For more information or to register your interest, please contact Dr Samantha Capon:
s.capon@griffith.edu.au

Steven Cork is an ecologist and futurist. With a focus on the development and implementation of environmental policy and the sustainability and resilience of natural resources management in the public and private sectors, Professor Cork has led and contributed to many significant projects including the United Nations’ Millennium Ecosystem Assessment and the 2011 National State of the Environment Report. He currently works privately as a futurist, strategist and ecological advisor as the Principal Consultant of EcoInsights and is also an adjunct Professor in the Crawford School of Public Policy at the Australian National University.
Dr Peter Gell, Federation University, Ballarat, Victoria

The natural ecological character of Wetlands listed under the Ramsar convention is identified at the time of listing and, through the condition review process, signatory nations are now required to nominate quantifiable “limits of acceptable change”. This is a means by which the Ramsar Conference of the Contracting Parties (COP) can encourage monitor the world’s most significant wetland sites and encourage the conservation of wetlands under the wise use remit. In a sense this process intends to mitigate deleterious change to the world’s wetlands under global and national pressures and draws on the nation’s wetland ecologists and managers to report the state of their sites. But understanding change is a natural domain of another group of wetland scientists – the palaeoecologists who access the records of change archived in wetland sediments to reveal longer term natural variability and directional change. The assembly of both wetland ecologists, and palaeoecologists, was the broad goal of the organisers of Ramsar Wetlands: Understanding Change in Ecological Character” in order to explore how the Ramsar Convention might accommodate past change and better understand present condition and trajectories of change with the benefit of longer histories of change and variability.

The meeting was first proposed at a Past Global Changes (PAGES) Floodplain lakes meeting in Fayetteville, Arkansas in September 2010. PAGES is a core project of the International Geosphere Biosphere Program and members of the Human-Climate-Environment interactions focus group were seeking a means of better interacting with the managers of water systems. The PAGES community identified ‘natural ecological character’ and ‘limits of acceptable change’ as key Ramsar challenges to which they could contribute.

Under the auspices of water theme of PAGES Focus IV, and the Ramsar Secretariat and the Scientific and Technical Review Panel, a workshop was held in Queenscliff, Victoria in November, 2013 on the shores of the Port Phillip and Bellarine Ramsar site. Over 70 delegates from 15 countries attended comprising wetland ecologists, practitioners, managers and policy makers and a diversity of palaeoecologists who brought vignettes of evidence of long term and on-going change to the condition of wetlands. It became evident that wetlands and climates change and that a perspective on condition, tied to particular states or points in time, was limiting understanding of wetlands under the Ramsar convention. The process through which ecological character and limits of departure were identified was explored and discussed. Evidence was presented on the magnitude of contemporary wetland change including the drainage and disappearance of wetlands in China and India, the impact of oil spills in the Niger delta and limited access to explore Andean wetlands due to the threat of military conflict. More subtle, chronic changes in wetlands are revealed from sediment records. They show the ongoing transformation of wetlands into unprecedented conditions, and how unrepresentative the wetland character that was that described in the listing process. Case studies were presented from the Everglades, the lower rivers Nile and Yangtze, New Zealand, United Kingdom and Australia.

The meeting members plan to assemble a suite of papers in a special issue of Marine and Freshwater Research, but also a synthesis paper describing wetland change from the short, and longer term perspectives. To lead the Ramsar process into a position where it can accommodate wetland change, past, present and future, members of the meeting will also produce a Ramsar Briefing Paper for tabling at a future COP. The meeting was well supported, and well received, and represented a real coming together of neo and palaeoecological approaches, and policy makers and field managers. Perhaps most notable was the enthusiasm generated by the meeting prompting participants to commence planning for PAGES projects across the Asian region to inform on the condition of their wetlands. The organising committee greatly appreciated the support from PAGES, Victorian Catchment Management Authorities, Parks Victoria, the Australian Rural Industries Research and Development Corporation as well as the Collaborative Research Network of Federation University (formerly the University of Ballarat).
Everchanging Wetlands - Understanding with the benefit of hindsight.

Peter Gell (Federation University Australia)

I have the privilege of being the consultant to monitor waterbirds in a large wetland in NSW. Colleagues and I have monitored this wetland three times a year since it filled in 1989. We are now beginning to see the tail end of the third cycle of filling and drying over this time and we are only now cementing in our minds the patterns of assemblage change that are repeated through each cycle. In the wetland monitoring world this represents clearly the benefit of the long term perspective and we use these rare insights to argue the case for ongoing funds to continue monitoring programs to ensure they are regular and continual.

Only in few of our wetlands were our predecessors far sighted enough to establish such long term monitoring programs. Fortuitously, some were wise enough to enshrine monitoring in licence agreements so many long term programs are associated with major developments. However, it is important to understand that, in sites overlooked for such programs, all is not lost. In sites that are perennial, or which dry relatively rarely, the continuous accumulation of sediment archives samples of the chemical, physical and biological evidence needed to monitor the condition of wetlands, retrospectively, for decades, centuries and even millennia. While evidence for vertebrates is rarely obtained, subfossil diatoms, pollen, cladocerans, chironomids, ostracods, gastropods, beetles, algal pigments, macrophyte remains and stable isotopes can be extracted to reconstruct many of the elements needed to understand the nature and function of a wetland through time.

The palaeolimnological community is Australasia is small relative to that in Europe and North America but many sites have now been examined. A particular focus has been on the wetlands of the Murray Darling Basin where over forty studies have now been undertaken. Some billabongs in the system have preserved evidence of their condition continuously for several thousand years and show that, when the climate was vastly wetter than today in the mid-Holocene, they were very fresh. These long term records also show that salinity has been ever-present and so the present impact of salinization, which is seemingly devastating in some areas, is no stranger to the Murray system.

A recent attempt to synthesize the records of the Murray and Murrumbidgee show that many, if not most, wetlands have switched from macrophyte dominated systems to turbid systems dominated by phytoplankton. Critically, for those seeking evidence for regime shifts in modern lakes, this mostly happened early in the European history of the continent. The wetlands most vulnerable to this switch were those which were large, and deep, as greater proportions of the substrate were beyond the photic zone soon after catchments started shedding sediments at modern rates. Shallower wetlands, higher up the catchment, tended to bounce back from these impacts as light continued to drive macrophyte growth despite higher turbidity levels. Lower in the system drying has effectively performed the same function and macrophytes appear to have alternated with phytoplankton dominance through history. Interestingly, phytoplankton dominance in some sites pre-dates the impact of European development, again showing that high sediment loads are no stranger to the Murray system.

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The palaeo-record also urges some caution for those who might claim that precedence shows that our wetlands have been minimally impacted of late. None of the MDB studies to date provide evidence that a wetland is in a ‘pristine’ state – all have changed to a degree. Plant macrofossil and pollen evidence shows the loss of charophytes and the rise of Azolla and Typha. Diatom evidence shows widespread eutrophication, salinization and increased turbidity. Cladoceran evidence shows reduced diversity and a shift from littoral Daphnia and chydorids to pelagic bosminids. Radiometric dating shows shallow wetlands accumulating up to 4 cm/yr of fine sediment posing a risk of complete infilling in the near future.

The wetland science community has generated a great volume of evidence for the changing nature of the region’s wetlands, largely independent, I’d have to say, of the palaeolimnological community. The coming together of a diverse array of like-minded researchers at the recent “Ramsar Wetlands: Understanding Change in Ecological Character” workshop was energising, with wetland ecologists fully appreciating the value of the insights gained from the longer term perspective. Heritage assessment, condition benchmarking, identification of trajectories of change and of past analogues all benefit from an understanding of the deeper past. In concert these approaches they strengthen the case we can make that the natural condition of our aquatic systems has been compromised, that they are in need of rehabilitation and that society needs to invest in the knowledge that will enable investment in restoration to be well targeted.

Peter Gell (Federation University Australia; p.gell@federation.edu.au)

Further Reading
Big Problems require Big Solutions at Big Swamp, lower Manning River, NSW

Dr William Glamore, University of New South Wales
Mr David Hopper, Greater Taree City Council

A two year collaborative project has turned a large acidic landscape into a new tidal wetland. The Water Research Laboratory (WRL) of UNSW Australia (The University of New South Wales), working with Greater Taree City Council and WetlandCare Australia, have undertaken a comprehensive scientific study to identify and remediate high priority acid farmlands on the Big Swamp floodplain, near Taree, NSW. For many years, the site has been listed as one of the three worst ASS hotspots in NSW.

Big Swamp is the local name for a series of drained agricultural floodplains located on the Manning River estuary on the mid-north coast of NSW. The Big Swamp floodplain was historically a large brackish backswamp known for its abundant bird populations. Over the past 110 years, the system has undergone major hydrologic modifications, due to the construction of an extensive floodplain drainage network system and floodgates. The combination of extensive drainage and sulfidic subsoils has acidified the soil and adjacent waters. While the entire site (approximately 2000 hectares below 2 m AHD) is now acidic (pH<4.0), rainfall events increase acid discharges creating large acid plumes throughout the lower estuary. These plumes impact the once thriving oyster industry and decrease overall primary production.

A detailed surface and groundwater study has been underway within the Big Swamp catchment since mid-2012. The study has identified acid hotspots, transport pathways, flooding issues and nominated high priority areas for remediation. In January-February 2013, a significant flooding event occurred in the lower Manning River estuary forming large acidic plumes (pH<2.7). The acid plume dynamics within the estuary were extensively monitored to assess acid impacts and saline dynamics. The final report from the study outlined key areas to restore, monitoring strategies and detailed on-ground works including drain infilling, land reshaping and wetland creation.

In late-2013, approximately 670 hectares of private properties located within prioritised zones were acquired by Council through Caring for our Country funding. From July to December 2013 the on-ground works were implemented onsite and post-remediation monitoring is underway. Based on Council’s preliminary monitoring, the water quality has significantly improved and the wetland vegetation is recovering. The on-ground works are designed to ensure that the new landscape will naturally evolve towards a dynamic saltwater/freshwater wetland.

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Red-brown floc (a) observed draining from Big Swamp following the Jan-Feb 2013 rainfall event and acid plume (b) observed discharging into Manning River
Further land acquisition and on-ground works will be undertaken in 2014 through funding secured by Council and WRL. This will expand the remediated area to the north-east of the site and target additional high priority acid contributing drains. On-going research is currently underway by WRL staff (including Jamie Ruprecht and Duncan Rayner), with three journal papers on acid dynamics to be released in 2014.

A full copy of the Big Swamp Hydrologic Study can be obtained by contacting David Hopper at Greater Taree City Council or Dr Will Glamore at UNSW, Australia.
The ecology and demography of freshwater turtles in urban wetlands

Populations of freshwater turtles are decreasing globally through habitat loss, fragmentation and isolation, and over-exploitation by humans. Habitat fragmentation and landscape modification through the process of urbanisation have long been identified as threatening processes to wildlife communities and ecosystems. Despite the ever increasing demand by humans to clear land for urban development very little is known about the direct impacts these modifications may have on many vertebrate species. In Australia, in particular, the fastest human population growth areas tend to be in the outer suburbs which increasingly places pressure on wildlife communities. Understanding these impacts on wildlife populations and how they respond to landscape modifications and anthropogenic activities is important in deciding land and wildlife management strategies.

Despite freshwater turtles being a significant component of freshwater vertebrate communities in south-eastern Australia, little is known about their demography in southern Victoria. Furthermore, their responses to habitat modification and other environmental disturbance have not been well studied. This study, led by Dr Andrew Hamer at the Australian Research Centre for Urban Ecology aims to examine the demography of freshwater turtle populations in the Melbourne region and attempt to gain an understanding of some of the potential impacts of urbanisation. This research is being conducted with the assistance of Earthwatch Australia.

The main turtle species recorded is the common long-necked turtle (*Chelodina longicollis*), though three other species have been recorded; all are not indigenous to the Greater Melbourne region. The results from two seasons (2012 and 2013) indicates there are larger and presumably older *C. longicollis* at wetland sites surrounded by a high road density, whereas more juvenile *C. longicollis* occur at less urbanised sites. This result suggests greater recruitment and possibly immigration is occurring at sites surrounded by green open space and near other wetlands; conversely, highly urban (isolated) sites generally contain non-recruiting populations composed of ageing turtles. This long-term population study will continue to at least 2016 with funding provided by The William Buckland Foundation.

For further information, contact Dr. Andrew Hamer a.hamer@unimelb.edu.au

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Ground water dependent ecosystems mapping in Queensland

Ground water dependent ecosystem (GDE) mapping in Queensland now covers Eastern Murray-Darling Basin, Wide Bay-Burnett, Pumicestone Passage Catchment, the Mackay–Whitsunday and Pumicestone areas. The mapping covers the three types of GDEs:

- Ecosystems dependent on the surface expression of groundwater (Surface Expression GDEs)
- Ecosystems dependent on the sub-surface expression of groundwater (terrestrial GDEs)
- Subterranean aquatic ecosystems (Subterranean GDEs)

They have been classified according to a range of criteria including GDE type, status (e.g. active), region (e.g. Great Artesian Basin), regional ecosystem or wetland type, hydrological and salinity modifiers.

The GDE mapping has been developed building on existing information, including wetland mapping, regional ecosystem mapping, a spring and small waterholes database and drainage lines.

For more information on GDEs visit Wetlandinfo.
Update on the Gooseneck Swamp Restoration Trial, Grampians National Park
Mark Bachmann, Nature Glenelg Trust

On Saturday 14th December 2013, perfect weather greeted a group of 40 people that had gathered to experience a leisurely and informative bushwalk in the Grampians National Park, near Dunkeld.

The purpose of the day was to learn about the Gooseneck Swamp Restoration Trial (introduced in the previous edition of *Lentic* [Vol 2, Issue 3, Oct 2013]), which got underway back in late August 2013 when Nature Glenelg Trust and a group of community volunteers built a trial sandbag weir structure to prevent the artificial drainage of Gooseneck Swamp for the first time in over 50 years.

Reasonable late winter and spring rainfall have meant that the structure has been operating effectively since being put in place, with the extra 45cm depth of water now retained by the structure, creating additional wetland habitat for aquatic plants, waterfowl and frogs. In fact, the group was spoiled by hearing a chorus of nationally threatened Growling Grass Frog (*Litoria raniformis*) calls echoing across the wetland several times during the day.

Other frogs that have so far been detected during initial site monitoring in spring 2013 include the Striped Marsh Frog (*Limnodynastes peronii*), Spotted Marsh Frog (*Limnodynastes tasmaniensis*), Eastern Common Froglet (*Crinia signifera*) and Pobblebonk (*Limnodynastes dumerili*) – with more species expected in the future. Demonstrating the connectivity of the system with the Wannon River, a nationally threatened species of fish, the Dwarf Galaxias (*Galaxiella pusilla*) was also recorded from the site for the first time during the 2013 season of monitoring.

In an encouraging sign as we entered the summer months back in December, the swamp remained full as a result of the impact of the temporary weir structure. Over the months ahead volunteers from the Hamilton Field Naturalists Club are continuing to monitor the response of wildlife, to help record the range of environmental benefits brought about by the trial.

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The changing face of Gooseneck Swamp as the trial unfolds...

Gooseneck Swamp on Day 17 of the trial

Gooseneck Swamp on Day 79 of the trial

Gooseneck Swamp on Day 108 of the trial: the Bushwalk and Information Day on Saturday the 14th December, 2013
Meeting members of the SWS Oceania Board

**Dave Rissik**
Dave is a Past President of SWS Oceania and was a founding Board member of the Chapter. He was President of the organising committee of the highly successful conference in Cairns in 2006. Dave is a coastal/marine ecologist with a strong interest in links between science and management. He has worked at the interface between science and management for over 20 years. Presently he is Deputy Director of the National Climate Change Adaptation Research Facility and involved in ensuring that good applied research is conducted that is useful to end users and makes a difference. He is involved in several collaborative research projects many of which relate to systems thinking and the interrelationships between social, economic and ecological systems.

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**Phil Papas**
Phil is an aquatic ecologist with 18 years of experience working with inland aquatic systems; specialising in invertebrate ecology, wetland ecosystems and river health. Phil manages the aquatic invertebrate and wetland ecology program at the Arthur Rylah Institute for Environmental Research (ARI) (Victorian Department of Environment and Primary Industries). The team undertakes aquatic invertebrate and threatened species research and wetland research and development. Phil has worked on projects in several jurisdictions for local, state and Commonwealth governments and private enterprise. He has more recently contributed to the development of the Victorian Index of Wetland Condition and led two statewide assessments of wetland condition. Phil supported the development of SWS newsletter and will continue to provide input into its design and content. He facilitated new membership in Victoria and South Australia and coordinated facilities for a joint SWS Oceania, NCCARF and CSU workshop held at ARI. email: phil.papas@depi.vic.gov.au . phone: 03 9450 8665