LAKE EYRE BASIN CONFERENCE

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Proceedings of the

6th Lake Eyre Basin Conference

Basin Voice: Shared understanding and action for a sustainable LEB future

Linking science and management

PORT AUGUSTA, SOUTH AUSTRALIA

17-19 SEPTEMBER 2013

Lake Eyre Basin – Australia's unique, natural, desert river system:

Healthy environments, sustainable industries, vibrant communities, adaptive cultures

Day 1 – Tuesday 17 September, 2013

Conference Opening

Mr Greg Manning, Chair, Lake Eyre Basin Ministerial Forum Senior Officers Group

Greg began with some background to the Lake Eyre Basin (LEB) Intergovernmental Agreement, established in 2000 to address cross-border water management in the LEB and to protect the unique values of the region. Greg discussed the Agreement structure, including the role of the LEB Ministerial Forum, the Community Advisory Committee, the Scientific Advisory Panel and the Senior Officers Group. Greg drew attention to the conference goals, including the desire to advance the Strategic Adaptive Management process with conference delegates. Appreciation was shown for the support of sponsors and the efforts of the Conference Organising Committee.

The Hon. Ian Hunter MLC, South Australian Minister for Sustainability, Environment and Conservation

The Hon. Ian Hunter MLC formally opened the forum and acknowledged the traditional owners of the land, and the Aboriginal people visiting from other areas. The LEB was discussed as providing many important factors - economic, environmental and spiritual. There is a large challenge in managing such a unique and diverse landscape. The Agreement allows us to sustain collaborative water management across borders through government agreements and policies. In comparison to the Murray-Darling Basin the LEB is streets ahead. Collaboration with Traditional Owners has occurred through partnerships and co-management of conservation parks.

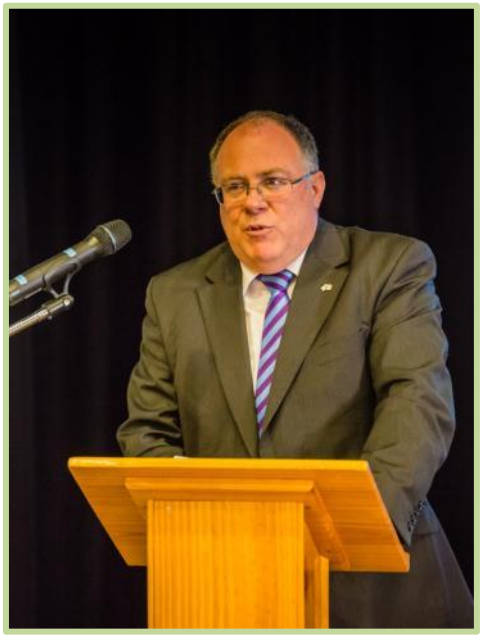


Figure 5: Minister for Sustainability, Environment and Conservation, the Hon. Ian Hunter MLC providing the opening address. Photo by Matt Turner

Minister Hunter expressed an interest in the science from the region and the collaboration with communities. A collection of short films of the stories of people from the LEB was launched - a joint project with LEB Community Advisory Committee, Territory Natural Resource Management and Desert Channels Queensland. Minister Hunter commended the enduring passion of people living in the region, noting that people impacted by the environment have a large role to play in the LEB Agreement.

Queensland's Wild River legislation and proposed changes to water allocation have raised concerns in South Australia. Minister Hunter indicated that the South Australian Government has written to the Queensland Government on the issue. A motion is being put to the South Australian Government raising concerns about this matter and seeking better engagement with the Queensland Government, given South Australia is a cosignatory to the LEB Intergovernmental Agreement.

Community Vignettes – Personal stories from people of the Basin

Mr Paul Tanner - Arabana Aboriginal Corporation

Paul Tanner is a proud Arabana man. His mother was born on the Oodnadatta Track at Curdimurka near Kati Thanda (Lake Eyre South). Through his mother, Paul is a descendant of the Arabana Strangways family who took their name from the old Telegraph Station at Strangways Springs. Paul's grandmother and family grew up south of Curdimurka on the Francis Dunbar Finniss Springs pastoral lease. By the 1930's Finniss was home to a United Aborigines Mission school, a church and a community of up to 200 people. Paul is one of 12 directors on the Arabana Prescribed Body Corporate which was set up after Arabana was granted Native Title on May 22nd 2012 at Finniss Springs. Paul is passionate about reclaiming Arabana knowledge, culture, language and care of country for himself and future generations as he missed out on so much of this due to policies of the past. Paul currently lives in Port Augusta with his partner Maria and family; he has worked in various Aboriginal support roles within the SA Justice System for the past 22 years.

Ms Janet Walton - South Australia Arid Lands Natural Resources Management Board

Janet has been living and working in the Lake Eyre Basin since 2004 when she moved to the SA Arid Lands to take on the position of Rangelands Biodiversity Support Officer with Greening Australia SA. Loving the landscapes and people of the outback, Janet's commitment to creating positive NRM outcomes through awareness-raising and building regional capacity, catapulted her into a role with the SA Arid Lands NRM Board in 2007 as a Natural Resource Management Officer based in Coober Pedy. Janet spends her time working with land managers on the Ecosystem Management Understanding Project™, better known as the EMU™ project, and provides NRM support to the Marla-Oodnadatta and Kingoonya NRM districts within the SAAL NRM region. Janet's dedication to positive NRM outcomes in the region sees her travelling long distances to connect with stakeholders and spending more weeks out bush than in the office. While some folks might see a barren landscape devoid of life, Janet knows and appreciates a landscape with extraordinary species richness, and is well known as a local plant identification guru. Janet is passionate about sharing her knowledge of landscape function and providing weed and feral animal management support to land managers of the SA Arid Lands.

Mr George Cooley - Umoona Community Council

George Cooley is a senior member of the Indigenous Community and is widely known throughout South Australia as an Indigenous representative, leader and strategist. He has served over the last 35 years on many Indigenous Councils, Boards and Community groups and since 2003, he has represented the interests of Indigenous stakeholders from the South Australian portion of the Basin on the LEB Community Advisory Committee. George is currently employed as the Housing Manager for Umoona Community Council and is also the Chairperson of the Umoona Council Inc. in Coober Pedy.

Ms Sharon Oldfield - Cowarie Station

Sharon Oldfield is a pastoralist from Cowarie Station on the Birdsville Track. She produces organic beef accredited through the National Association for Sustainable Agriculture Australia (NASAA). She has been actively involved in Natural Resource & Water Management for the past 15 years. She is a past member of the SA Soil Conservation Council, the SA Arid Areas Water Catchment Management Board and the Georgina Diamantina Catchment Committee. Sharon holds a Post Graduate Certificate in Rangeland Management. She is interested in the ongoing sustainable management of our natural resources while maintaining viable pastoral interests. Sharon is currently a member of the Rabbit Free Australia Committee and the SA Cattle Advisory Committee. Sharon represents community and pastoral interests on the LEB Community Advisory Committee.

Mr Colin Harris - Friends of Mound Springs

Colin Harris is President of the Friends of Mound Springs (FOMS). Established in 2006 to help raise awareness of the importance of the springs of the Great Artesian Basin, the group is South Australian based, but has strong national interests and connections. FOMS is one of many volunteer Friends groups set up in South Australia. Most of the Friends groups are associated with particular national or conservation parks, as the generic naming implies, but others – like FOMS – have a broader, off-park brief. Colin has been actively involved in mound springs management for over forty years, both within and outside of Government. At the time of retirement he was Director of Biodiversity Conservation in the South Australian Government, having served in a wide range of professional and senior management roles in its environment agency for thirty years. In recognition of his work with mound springs and native vegetation management more generally he was awarded the Public Service Medal in 1999.

Mrs Lisa Edwards - Muloorina Station

Lisa Edwards is 26 years old and the fourth generation on Muloorina Station, a cattle property on the edge of Kati Thanda-Lake Eyre, 52km north-west of Marree. Muloorina was purchased by Lisa's great-grandfather, Elliot Price, after which the conservation reserve on Lake Eyre is named. Lisa has recently moved back home to Muloorina with her now husband Gareth, whom she met while showing cattle in Adelaide. They are now looking forward to a long and happy life on the land.

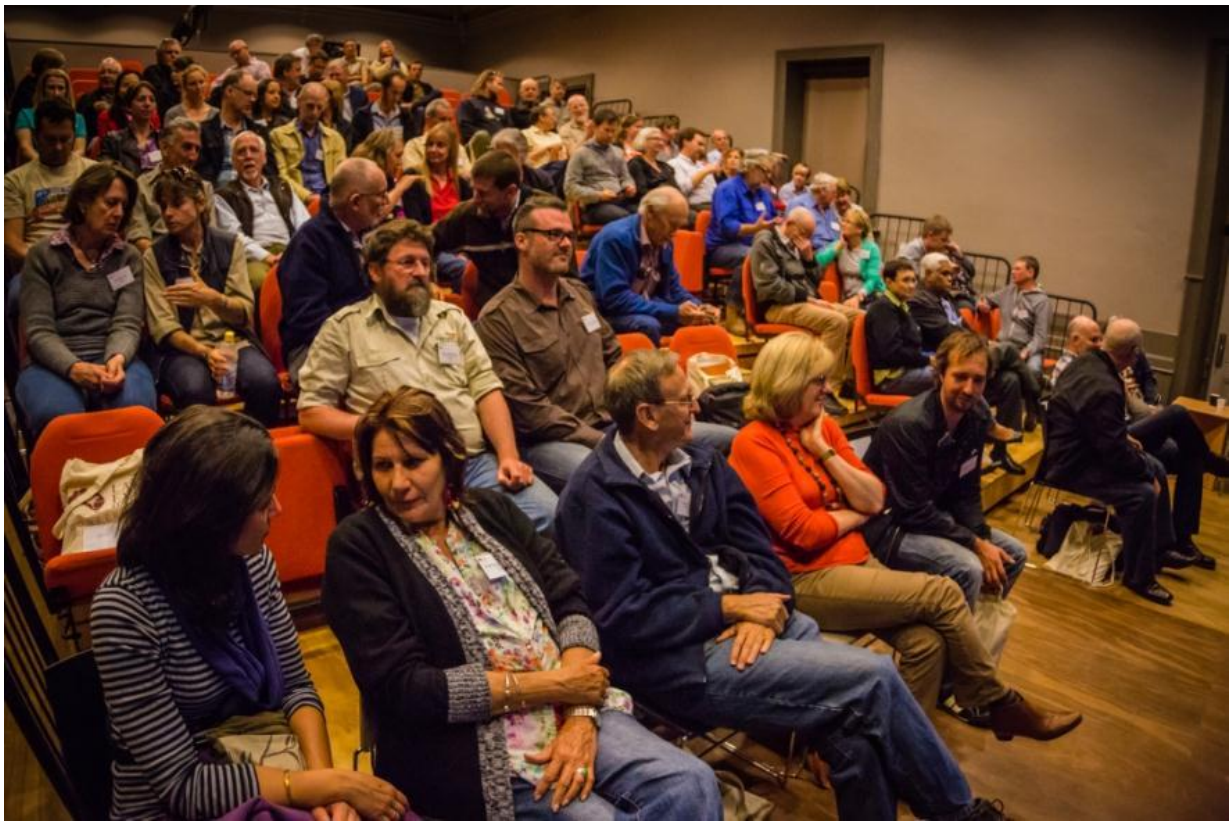


Figure 1: Conference audience. Photo by Matt Turner

Session 1: Extractive Resource Industries in the LEB – Mining and Petroleum

Session Chair – Mr Greg Manning, Chair, Lake Eyre Basin Ministerial Forum Senior Officers Group

Keynote Presentation – Should mining and other resources extraction be allowed anywhere?

Prof Chris Moran - Sustainable Minerals Institute

Presentation Summary

This paper attempts to put the case that to fully debate the merits or otherwise of extracting resources from the Lake Eyre Basin, it is important to consider a very big picture of resource uses and implications. Further, it is helpful to frame the question in terms of a systems hierarchy. Such a hierarchy can assist in ensuring the right question is being posed (and attempted to be answered) at the right system level and construct.

The framework that is used to define resource use is the well-known "5 capitals" model. In this case we extend the model to six capitals, viz., renewable and non-renewable natural capital, manufactured capital, social capital, human capital and financial capital. In this context, non-renewable natural capital represents natural resources that are consumed and/or transported out of the region at a rate that far exceeds their rate of replenishment, for example, soil erosion by wind and water that is accelerated by human activity (generally denudation of vegetation) in the landscape. Extraction of mineral and energy resources are equivalent. So, from the perspective of sustainability, these activities are known as contributors to "weak sustainability" as opposed to "strong sustainability" wherein the resources are only exploited at the rate at which they are naturally replenished. Therefore, when one activity or another is to be declared "sustainable" this fundamental definition is critically important. The reason is that it introduces the notion of trade-off and choice. That is, society has a choice as to which natural capital will be transferred into what other forms of capital, who benefits from the activity and in what ways those benefits are ultimately shared. Conversion of natural capital requires primary production. Primary production creates value and it is the distribution of that value throughout society that lies at the heart of decisions about resource extraction. Classically, the most significant tension is where the benefits from resource extraction do not accrue sufficiently at the point of extraction compared to other places and to the benefits of other people.

Mineral and energy resource extraction in Australia today face this challenge perhaps more than any other commodities. The reason for this is that the resources are being consumed dominantly to develop nations and lift hundreds of millions of people out of poverty but the impacts of extraction are located at the source, often tens of thousands of kilometres away. In this paper, it is contended that there are four conditions that must be met to move towards being able to claim that resources extraction is "sustainable". These conditions are:

1. Supply nations must be able to prosper as a result of resource extraction;
2. Demand nations must be given access to resources at a price that does not unreasonably deny them the right to a reasonable quality of life;
3. Those involved in discovering, extracting and transporting the commodities have to be able to return profits to their investors; and
4. There must be sufficient consideration of future generations to ensure that creation of value today is not undertaken at such a rate that future generations are compromised in being able to meet their needs.

What is needed is some way to measure and visualise the equity that we would wish to see across these four conditions to ensure no one is being over emphasised or neglected. How can decisions be made so that this equity is properly taken into account? For the LEB conditions 1 and 4 dominate. Under condition #1, if the region

where the extraction occurs is unreasonably degraded it is difficult to claim prosperity. The tension is most evident where the nation may receive sufficient benefit but not enough is passed to the region for there to be accord on the agreement to extract. Under condition #4, it may well be argued that resources extraction today limits future values being generated from the LEB, either the same minerals and energy resources or the other ecosystem services that the LEB supplies into the future.

What is clearly needed at the local scale, i.e., the scale of the LEB region, is a framework for informing such decisions. Such a framework should, at the very least, describe well the effects of resource extraction so that decisions can be made in light of that information. To deliver such a framework a conceptual model of the system is required and in turn the conceptual model will define the data requirements necessary.

Water is used as an example of how this might be approached. Mining and oil and gas extraction require water and can interfere with hydrological systems. The paper will highlight the major effects of these activities and their controls. Leading practices can be employed to ensure minimal adverse impacts from these activities. It is critical that a risk based approach be adopted from the outset for any development. The risk based approach ensures that data are acquired and information communicated in priority order according to the risks faced. Such an approach also requires that mitigation and control measures are articulated should an undesirable event occur.

Beyond the physical effects on water, water resources and the environments upon which they depend, extractive resources activities also raise challenges associated with livelihoods that preceded them. In most cases, these livelihoods depend on resources at or near the earth's surface. One critical issue is that the energy and mineral resources exit at depth and so a potential conflict of access arises. Legally, the explorer has a right of access. Morally, it is very important that this right is exercised in a respectful and thoughtful manner. When this does not occur conflict can arise that becomes very personal, i.e., often it is between the individuals involved rather than via institutions and arms-length processes.

Finally, the author will reflect on personal experiences over a number of years of involvement with government and industry processes. An issue that has arisen of significance is the tension between access to information, resourcing of the research necessary to understand effects and the independence of the individual research leaders involved.

Biography

Professor Chris Moran is Director of the Sustainable Minerals Institute at The University of Queensland. Prior to working at SMI, Professor Moran spent 16 years with CSIRO where he specialised in spatial science. With more than two decades experience in natural resources and water management and sustainability, his expertise is recognised internationally.

Professor Moran has published a significant number of scientific articles, technical reports, and commercial and government information papers. He serves on various government panels and committees, as well as UQ boards.

As the SMI Director, Professor Moran is responsible for research into all aspects of life of mine. His vision is to integrate the Institute's existing disciplinary excellence into NextMine, which will address the complex and multi-faceted challenges facing the resources industry.

Government representations and committees:

- Expert Panel for Major Coal Seam Gas Projects (Federal Government)
- Interim Independent Expert Scientific Committee for Coal Seam Gas and Large Coal Mines (Federal Government)
- Healthy Headwaters Coal Seam Gas Water Feasibility Study (State Government)
- Resources Sector Supplier Advisory Forum (Federal Government)
- National Groundwater Technical Advisory Committee (GTAC)
- Underground Coal Gasification Independent Scientific Expert Panel (State Government)

Keynote Presentation – The Bioregional Assessment Program and the Lake Eyre Basin

Prof Damien Barrett - CSIRO Water for a Healthy Country Flagship

Presentation Summary

The genesis of the Bioregional Assessments Program comes from the National Partnership Agreement on Coal Seam Gas and Large Coal Mining Developments (NPA) agreed to by Federal and state governments effective February 2012. This and the Environment Protection and Biodiversity Conservation (EPBC) Amendment Bill 2013 (Royal Assent: 21 June 2013) requires that impacts on water arising from coal seam gas and coal mining developments, including any impacts of associated salt production and/or salinity, be regarded as matters of 'national environmental significance'. As a result, water impacts from coal mining and gas production are considered in the same category as World Heritage assets, Ramsar wetlands, listed migratory species, and national heritage assets in terms of additional approvals required over and above state legislation governing development.

The EPBC Act Amendment Bill and NPA also instituted the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) to oversee development of a program of research called Bioregional Assessments. A bioregional assessment is a scientific analysis of the ecology, hydrology, geology and hydrogeology of a bioregion, with explicit assessment of the potential direct, indirect and cumulative impacts of coal seam gas and coal mining development on landscape features that are dependent on water resources. The Bioregional Assessment Program targets regions containing significant coal deposits in eastern Australia including the Lake Eyre Hydrological Basin which is underlain by the Galilee, Cooper, Pedirka and Arckaringa coal basins. Research work undertaken in the Bioregional Assessments is largely to be undertaken by the CSIRO, Geoscience Australia and the Bureau of Meteorology. The other bioregions under consideration are: (1) The Northern Inland Catchments incorporating the Namoi, Border Rivers-Gwydir, Maranoa-Balonne and Macquarie-Castlereagh catchments; (2) the Clarence-Moreton including South East Queensland and Northern New South Wales Rivers; (3) the Northern Sydney Basin, including the Gloucester Basin and the Hunter Central Rivers; (4) the Southern Sydney Basin including the Southern Rivers, Sydney Metro and Hawkesbury-Nepean catchments; and, (5) the Gippsland Basin in Victoria.

The Bioregional Assessments Program will generate scientific advice to the IESC and the Federal Environment Minister to assist the approvals process. They are to provide high quality scientific information on:

1. Water assets and coal deposits
2. Surface and groundwater hydrology
3. Anticipated direct, indirect and cumulative impacts on assets of coal resources development and the risks associated with these assets

All Bioregional Assessments are underpinned by the 'Methodology for bioregional assessments of the impacts of coal seam gas and coal mining development on water resources' (Barrett et al. 2013) that provides scientific guidance on how bioregional assessment should be undertaken in all bioregions and the process by which the IESC is informed through information collected and generated as part of each assessment. All Bioregional Assessments comprise 5 components which bring together scientific information from a variety of sources and synthesize this into advice (and uncertainties associated with this advice) for decision making. The components are: (1) contextual information which summarizes current knowledge on the bioregion; (2) model-data analysis which synthesizes information from data and models to generate descriptions of the hydrologic relationships within a coal bearing region; (3) impact analysis that assesses the direct, indirect and cumulative impacts of development on water assets; (4) risk analysis that aims to provide information on the likelihood of impacts on water resources from coal development; and, (5) the product summary – a transparent means of disseminating information derived from the Bioregional Assessments.

The advice provided to the IESC relies on a risk-based approach utilizing water balance modelling, adaptive management practices and a collaborative interaction with communities and industry. The aim of the Bioregional Assessments program is to strengthen the science underpinning decisions about coal development based on their impacts on water quality and quantity in relation to water assets. This program is a world first in generating a highly integrated, multi-disciplinary synthesis of scientific information over large regions to assist in the decision making processes around resources development.

Biography

Damian Barrett currently leads the 'Water in the Resources Sector' research stream in the Water for a Healthy Country Flagship Program in CSIRO. He is also an Adjunct Professor in the Centre for Water in the Minerals Industry, Sustainable Minerals Institute at The University of Queensland.

He graduated with a PhD in Ecology from the Australian National University in 1993 and has gained more than 20 years research experience in CSIRO, Cooperative Research Centre (CRC) for Greenhouse Accounting, eWater CRC, The Smithsonian Institution, and The University of Queensland.

Prof Barrett has undertaken research for the Australian Greenhouse Office, the National Land and Water Resources Audit, the CSIRO Climate Change Research Program, the Australian Bureau of Meteorology, NASA, and a range of state government agencies.

In his roles as Research Stream Leader and previously as Director of the Centre for Water in Minerals Industry, Prof Barrett has developed strong links between research, industry and government on topics such as the cumulative impacts of mining on water resources, water accounting and strategic water management on mine sites.

His current research interests include environmental biogeochemical modelling and biophysics, ecosystem functioning, physical hydrology, biodiversity and sustainability. He is investigating ways to better optimise landscape conservation interventions for biodiversity, landscape functioning, and ecosystem services outcomes.

Sustainable petroleum operations in the Cooper Basin

Mr Colin Cruickshank - Santos Limited

Presentation Summary

From its relatively humble beginnings in the Cooper Basin in 1954, Santos now has the largest exploration and production acreage in Australia. Santos nurtures a long-held culture of environmental care. Doing more with less, conserving natural ecosystems, actively managing water resources, realising a low carbon future, and lightening our environmental footprint are all important elements of Santos Cooper Basin operations.

Santos has integrated systems and procedures in place to manage our activities responsibly and find new ways to further reduce our ecological footprint. As an example, successful innovation in multi well pad development is delivering a range of improvements and efficiencies, including environmental initiatives. While in its early stages in the Cooper, pad development has delivered over a 50% reduction in land disturbance for drill pads and utilises above ground water storage tanks to avoid further excavation.

Sustainability is an integral part of Santos. This means responsibly managing our environmental impact, working in partnership with the communities in which we operate, focusing on the health and wellbeing of our people and reliably managing our business. Our key challenge over the short to medium term is to ensure we continue to deliver from existing operations, and develop new projects, sustainably. To do this we will seek to improve our safety performance, responsibly manage resources including water, improve our energy efficiency and maintain strong governance to achieve our strategy.

Biography

Colin Cruickshank is General Manger Development in Santos' Exploration and Sub Surface area where he oversees and advises on Santos' portfolio of hydrocarbon development projects. Prior to this he was responsible for the sub surface management and exploration, appraisal and development of conventional and unconventional gas assets in the Cooper Basin. Colin graduated from Melbourne University in 1985 with an honours degree in Chemical Engineering. He has over 27 years industry experience in a variety of technical and leadership roles, including drilling and completions, facilities, business planning, project engineering, reservoir engineering, producing operations and development planning. He has been with Santos for over 16 years where he has been closely involved with the company's operations in the Cooper Basin and is passionate about ensuring that development activities are undertaken in an environmentally sustainable way and to continuously improve the outcome while lightening the company's footprint.

Speak Friend and Enter: Is there a future for mining in the Lake Eyre Basin?

Dr Gavin Mudd - Monash University

Presentation Summary

Mining has historically been important in many parts of regional and remote Australia and mineral exports continue to dominate Australia's export earnings – but at what cost? The mining boom over the past decade has seen mining move into agricultural regions with no real history of mining, as well as the ever-increasing scale of mining leading to major problems such as water resources impacts, land use conflicts, mine waste management challenges, and much more. Mining has often occurred around the margins of the Lake Eyre Basin, such as the Mt Isa province in northwest Queensland or Olympic Dam project in northern South Australia, but it is now proposing to move into the interior – creating widespread concern about water flows, water quality, land use conflicts and related social and economic impact issues. While there has been a conventional oil and gas industry in the centre of the Lake Eyre Basin for some decades (e.g. Moomba, South Australia), the potential for coal and coal seam gas as well as expanded base metal and uranium mining in the Mt Isa province on the northern margins points to a major shift in the potential for mining across the Lake Eyre Basin.

In recent years the environmental and social costs of mining have received significant public and academic scrutiny – especially the expansion of coal and coal seam gas mining. While the mining industry has made substantial improvements in environmental planning and management – major pressures continue to be water resources (quality, quantity), disaster scenario planning and management (e.g. severe storms and flooding), mine waste management, greenhouse gas emissions and other air pollutants, land use conflicts (i.e. farming/agriculture vs. mining), and the effectiveness of mine regulation and especially rehabilitation (amongst other social and economic aspects).

This presentation will briefly cover four case studies to highlight the potential future of mining as a friend (or foe) to the Lake Eyre Basin: (1) Olympic Dam and possible future expansion(s); (2) Lady Annie copper mine disaster of 2009; (3) Cannington expansion; and (4) coal seam gas mining. Critical aspects and themes for all case studies will include water consumption, impacts on surface water and groundwater resources, mine regulation and rehabilitation, greenhouse gas emissions, amongst other issues.

Overall, mining may be able to make a positive contribution to the future of the Lake Eyre Basin, but it will have to ensure it is truly friendly towards the existing values and users of the LEB and work hard to develop a 'social licence to operate' – and especially ensure the various environmental and regulatory mistakes made elsewhere in the mining industry in Australia are not repeated. The talk should therefore be a thought-provoking and challenging view of the potential mining landscape and future issues for the Lake Eyre Basin to consider.

Biography

Dr Gavin Mudd has been an active researcher and advocate on the environmental impacts and management of mining for nearly two decades, including a particular specialty in sustainability in mining, uranium mining, groundwater, environmental impact assessment and environmental management. Gavin maintains an independent perspective, and has undertaken research for community groups, aboriginal organisations and even governments and mining companies. With strong qualifications and experience, he has developed a unique understanding of the multidisciplinary nature of the environmental aspects of mining in Australia and globally, culminating in a distinctive view on how to quantify an apparent oxymoron – that of "sustainable mining". Additionally, Gavin has active research interests in urban groundwater issues, groundwater management and assessment, especially with respect to climate change and sustainability.

Strategic Adaptive Management in the Lake Eyre Basin – an exciting journey

Prof Richard Kingsford - Lake Eyre Basin Scientific Advisory Panel

Presentation Summary

Aquatic ecosystems are connected over large spatial scales, have varied drivers, strong and often conflicting societal interests and interacting management processes. Many of the world's 100,000 or so protected areas (~12% of land) include freshwater ecosystems, some specifically declared for freshwater protection. Such complex social-ecological systems have considerable challenges. The Strategic Adaptive Management (SAM) approach is a management framework which can operate at different spatial and temporal scales. The stages of SAM should produce an agreed vision and/or mission among stakeholders, with an appropriate hierarchy of objectives that determines indicators to be measured, allowing ongoing reflection, learning and adaptation. Early implementation of SAM has begun within the Lake Eyre Basin, based on a legislative responsibility to report on watercourse and catchment condition across the Basin, and on policy agreement to link this assessment to management change in an adaptive model. There are many challenges, including varied governance, different institutions but the process potentially allows tracking of natural resource management and a focus on achieving goals and specific objectives. There is no panacea for achieving sustainable aquatic management, but Strategic Adaptive Management offers hope with its interlinked processes for navigating complexity and learning. SAM in freshwater conservation is progressing because of the imperative for sustainability, history of interaction between scientists and managers and the need for transdisciplinary governance of rivers. There are potential opportunities to consider how SAM might work at a level of different threats and their aligned indicators to ensure that values identified are protected.

Biography

Professor Richard Kingsford is Director of the Australian Wetlands, Rivers and Landscapes Centre, University of NSW. He has focussed his research over about the last 20 years on the waterbirds, wetlands and rivers of arid Australia, including the Lake Eyre Basin. He also researches the impacts of water resource development. He is a member of the Australian Government's Environmental Flows Scientific Advisory Panel and the Lake Eyre Basin Scientific Advisory Panel.

Session 1 Speakers Panel – Questions and Discussion

How critical is the measuring / monitoring of cumulative impacts to a region such as the LEB?

Multiple things are going on at the same time, can be hard to differentiate who caused what. Long term monitoring can help with this and is important. Impacts are real, need to be led by government, has not been managed well in the past.

There should be no other form of impact considered. The current state of the region should be a starting point, giving context to proposed impacts from developments. Monitoring is self-evident as important. We need to understand how to respond with a small data set. Technical community has not been stressed on that. Decisions are being made without baselines; need to consider how to inform decision makers in the absence of baselines.

It's important to think in temporal and spatial dimensions. It is a problem in complex systems as it is an 'out' for government and companies. In highly variable systems it is a danger because you need long term data sets. Gathering data over time will assist decision making in the future.

In big Coal Seam Gas (CSG) projects in Queensland, businesses have taken on the management and responsibility of springs within their region. Springs have been allocated amongst operating companies, who are responsible to any changes due to CSG operations. Cumulative impacts on bores have also been allocated to a company. This has been done in a process that utilises ground water modelling with 3-yearly reviews. The companies accept responsibility to changes in the model, including future predictions.

Why was there no Environmental Impact Statement for the Lady Annie mine site?

The Environmental Management Plan was thought to be sufficient.

There was a size threshold to trigger the need to undertake an Environmental Impact Statement, the per cent a mine changes its production size affects this.

Is your company (Santos) considering your role in the research and development of regulatory processes?

We want to support further research and development, however, when we sponsor there are concerns that the outcomes may be clouded. Using an intermediary, like the CSIRO, has mitigated this in the past. In some areas we operate above regulatory requirements to ensure highest quality. For example, the Coongie Lakes are within a Santos tenement and the company elected for it to be protected and not mined.

Cumulative social benefit and research integrity are being supported by Santos as well.

There are good models for stakeholder participation, particularly in relation to research at GISERA (Gas Industry Social & Environmental Research Alliance) which allows input into setting the research agenda. There are other examples with University of Queensland research where stakeholder participation with governments and companies is leading to good outcomes.

Peter Watts, Arabana man - the LEB will one day run out; springs in our country (Arabana country) have already run out. We were the ones that managed this country. This has been taken away now and is managed by government and businesses. We have the data. We need to manage this more sensibly and move towards a better way of operating and protect the Kati Thanda basin.

In the CAC we're trying to build stronger relations with companies. At what level should we be trying to engage with companies, through ministers, through government channels or direct to companies?

All of the above and more, Trevor (Santos and member of LEB Community Advisory Committee) would be a good conduit, also send me (Colin Cruikshank) an email and I can assist.

There is a question of specificity, being specific on the data required can help with receiving data.

Stygofauna (the life in groundwater) is a forgotten part of the ecosystem. How can we find out more about these and the impacts?

Stygofauna is the life under the earth's surface. It is a major gap in our understanding of ground water systems and ecology. Part of the bioregion assessment is to look at stygofauna, its location and diversity. It does need addressing.

There are issues with chemistry changes, stygofauna are highly susceptible to changes in the chemistry of ground water. Needs to be addressed, it is an important issue.

The Office of Water Science has recommended research priorities for the Minister, one being further research on stygofauna.

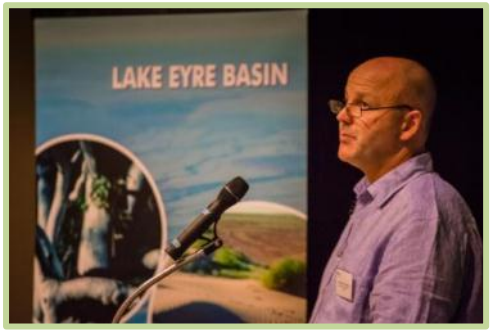
This is the first time I've heard of sustainability being defined as taking from one place to benefit another. How do you weigh up costs of impacts on local Arabana people to feed people in China?

The first point of call is economics; there are arguments of weak vs. strong sustainability. There is a lot of literature available on the issue, however, it is an ongoing challenge. There is a need to manage impacts when they occur and suitably remunerate and provide royalties. The difficulty is the difference in the values of remuneration and royalties between local communities, companies and government.

There is a need for greater negotiation practices. The term 'consultation' may be out-dated in this space; perhaps 'negotiation' should be used instead of 'consultation'? Internationally there are examples of social development (e.g. increased infant survival, access to drinking water, economy building) through resource flows. In other places there is a need for transparency by government in how money from mining is being spent within the region it comes from. The Extractive Industries Transparency Initiative (EITI) was developed for transparency of money flows from resource development of a country/region. Australia is testing EITI here.

Short Film Presentations

Lake Eyre Basin: People and Passion short films were shown at intervals throughout the conference schedule. The short films are part of the *Lake Eyre Basin: People and Passion* series and showcase the history, individuals, communities and environment of the LEB. *People and Passion* is a joint project by Desert Channels Queensland, the Lake Eyre Basin Community Advisory Committee and Territory Natural Resource Management and funded by the Queensland Government – Regional Natural Resource Management Investment Program, the Lake Eyre Basin Ministerial Forum and Territory Natural Resource Management. The films can be viewed online at www.dcq.org.au/lakeeyrebasin.



Mr Andrew Harper - Australian Desert Expeditions

Biography

Andrew Harper has completed 12 walks across the Simpson Desert, never following the same path, always accompanied by his pack camels.

In 2007 he founded Australian Desert Expeditions, a not-for-profit environmental organisation that partners with national and state institutions, and leading universities to conduct scientific and ecological surveys in the most isolated desert regions that are inaccessible by conventional means. Using pack camels, Australian Desert Expeditions provides the ideal means for scientists and travellers to explore the desert in a sustainable and ecologically sensible manner on foot. Walking is paramount to fully observe and record changes in landscape, flora & fauna and importantly, to facilitate discovery.

These surveys provide a direct connection to country, offering the scientific community and the ecotourism sector a valuable and robust opportunity to conduct remote desert research combined with an instructive and distinctive ecotourism experience, whilst contributing to our knowledge of the desert environment.