

EIANZ Environment Update May 2010

Issue 1

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Special topic: Biodiversity

2010 is the International Year of Biodiversity and with the International Day of Biodiversity coming up on the 22nd of May we thought it would be fitting to feature a good selection of articles on this topic.

Social acceptability of a duty of care for biodiversity. Earl, G. et al. *Australasian Journal of Environmental Management*; Mar 2010, Vol. 17 (1), p.8-17

Biodiversity in Australia continues to decline despite substantial government efforts to promote conservation. A statutory duty of care for biodiversity could promote positive outcomes and complement existing regulatory and voluntary approaches. Interest in a duty of care has been persistent, but progress elusive. Two inter-related issues around the social acceptability of a statutory duty of care are impeding progress: (a) the absence of a practical framework to facilitate its implementation, and (b) concerns about the acceptability of a legal instrument to landholders. In this paper, we present research that, for the first time in Australia, addresses the social acceptability of a duty of care for biodiversity, drawing on data from surveys in two Victorian regions. Our findings suggest that there is broad acceptance of 'duty of care' as an abstract concept, but diminished support for its detailed implications. Farmers, in particular, are concerned about the potential for wider community input, the prospect of a legally defined instrument, and the use of industry standards as a surrogate measure for compliance with a duty of care. These findings suggest that efforts to introduce a statutory duty of care need to engage farmers closely.

**This is the quarterly journal published by EIANZ*

Code: Env01/01

Biodiversity offsets: Two New Zealand case studies and an assessment framework.

Norton, David. *Environmental Management*; Apr 2009, Vol. 43 (4), p.698-706

Code: Env 01/02

Some issues and options for the conservation of native biodiversity in rural New Zealand.

Norton, David A.; Miller, Craig J. *Ecological Management & Restoration*; Apr 2000,

Vol. 1 (1), p.26-34

Code: Env 01/03

Body mass and extinction risk in Australian marsupials: The 'Critical Weight Range' revisited.

Johnson, Christopher N.; Isaac, Joanne L. *Austral Ecology*, Feb 2009, Vol. 34 (1),

p.35-40

Code: Env 01/04

Life histories, dispersal, invasions, and global change: Progress and prospects in New Zealand ecology, 1989-2029.

Dave Kelly, Jon J Sullivan. *New Zealand Journal of Ecology*;

2010, Vol. 34, (1), p.207, (11 p.)

We highlight three areas of significant progress in ecology since 1989 which are particularly relevant to New Zealand, and three major challenges for the next two decades. Progress: (1) The unusual life histories of New Zealand organisms, including extreme longevity and low reproductive rates, are now seen as efficient responses to the low-disturbance environment present before the arrival of large mammals, including humans. (2) Recent data show that long distance dispersal has been far more common than previously supposed, changing our image of New Zealand from a Gondwanan ark to the "flypaper of the Pacific". (3) Greatly improved techniques for pest control, and innovative species management, have stabilised numbers of many of the most charismatic of New Zealand's threatened species. Problems: (1) Native species continue to decline, including many previously thought to be stable, and improved phylogenetics and new discoveries have added threatened species. (2) Despite increased emphasis on biosecurity, biological invasions are continuing, driven by increased trade and lags in naturalisation. (3) Conservation efforts risk being overwhelmed by the direct effects of increasing human population, resource use, invasions, and global climate change at a time when human food supplies and economies are coming under increasing pressure from environmental constraints. Conclusions: (1) We need improved ecological understanding and more management tools for invasive and threatened species, especially for species other than birds. (2) In these decades of rapid climate change and habitat conversion, there is an urgent need for more widespread and sustainable integration of native species into New Zealand's rural and urban lowland landscapes.

Code: Env 01/05

Putting a price on nature.

Nicholls, Mark. *Environmental Finance*; Jan 2010, Vol. 11 (3),

p.56 (1p.)

Pavan Sukhdev is aiming to do for the economics of biodiversity what Nicholas Stern did for climate change. He talks to Mark Nicholls.

Code: Env 01/06

Human land use, agriculture, pesticides and losses of imperiled species. Gibbs, Katherine E.; Mackey, R. L. et al. *Diversity & Distributions*; Mar 2009, Vol. 15 (2), p.242-253
Code: Env 01/07

Indicator taxa revisited: Useful for conservation planning? Larsen, Frank Wugt; Blatt, Jesper. et al. *Diversity & Distributions*, Jan 2009, Vol. 15 (1), p.70-79
Code: Env 01/08

Conserving biodiversity and ecosystem function through limited development: An empirical evaluation. Milder, Jeffrey C. et al. *Conservation Biology*; Feb 2008, Vol. 22 (1), p.70-79
Code: Env 01/09

Riparian protection and on-farm best management practices for restoration of a lowland stream in an intensive dairy farming catchment: A case study. Wilcock, R. J. et al. *New Zealand Journal of Marine & Freshwater Research*; Jun 2009, Vol. 43 (3), p.803-818
The article presents a study on the best management practices (BMP) for the restoration of the Waiokura Stream in New Zealand. The study aimed to provide the dairy farmers of riparian management techniques that would result in a better environmental performance such as a better stream water quality and long-term sustainability of dairy farming. It suggests that the absence of forest streams near the Waiokura Stream hinders the improvements in biological community structure.
Code: Env 01/10

The consultant ecologist's role in the New South Wales (Australia) approach to biodiversity offsets: "BioBanking". Wotherspoon, Danny; Burgin, Shelley. *Local Environment*; Jan 2009, Vol. 14 (1), p.61-71
Code: Env 01/11

Biodiversity loss and the taxonomic bottleneck: Emerging biodiversity science. Ke Chung Kim; Byrne, Loren B. *Ecological Research*; Nov 2006, Vol. 21 (6), p.794-810
Code: Env 01/12

Linking ecosystem services, rehabilitation, and river hydrogeomorphology. Flotemersch, Joseph E. et al. *Bioscience*, Jan 2010, Vol. 60 (1), p.67-74
Code: Env 01/13

The crucial role of information exchange and research for effective responses to biological invasions. Browne, M. et al. *Weed Research*; Feb 2009, Vol. 49 (1), p.6-18
Code: Env 01/14

Genes in streams: Using DNA to understand the movement of freshwater fauna and their riverine habitat. Schmidt, Daniel J. et al. *Bioscience*; Jul/Aug 2009, Vol. 59 (7), p.573-583

Code: Env 01/15

How can we preserve and restore species richness of pollinating insects on agricultural land? Franzén, Markus; Nilsson, Sven G. *Ecography*, Dec 2008, Vol. 31 (6), p.698-708

During recent decades, concern about the loss of biodiversity on agricultural land has increased, and semi-natural grasslands have been highlighted as critical habitats. Temperate European agricultural landscapes require distinct and appropriate management to prevent further impoverishment of the flora and fauna. This is especially urgent for pollinating insects that provide important ecosystem services. Our aim was to examine how species richness of three important groups of pollinating insects; solitary bees, butterflies and burnet moths are related to different farm characteristics, and if there are any differences between these three groups. A further aim was to test if red-listed species are related to any farm characteristics. Species richness of solitary bees, butterflies and burnets was measured on all semi-natural grasslands at 16 farms in a forest-dominated area of 50 km² in southern Sweden, using systematic transect walks in April to September 2003 (only butterflies and burnets) and 2005. Species richness of solitary bees and butterflies was intercorrelated, both before and after controlling for the area of semi-natural grassland. Species richness of solitary bees increased with the area of semi-natural grassland. After controlling for the effect of the area of semi-natural grassland species richness was strongly positively related with the density of the plant *Knautia arvensis* and negatively related with the proportion of grazed grassland. The results were similar for solitary bees and butterflies. The number of red-listed solitary bees was positively related to the proportion of meadows with late harvest (after mid-July) and decreased with increased farm isolation. The number of burnet species (all red-listed) was positively related to vegetation height, flower density and the proportion of meadows with late harvest on a farm. Areas with a high density of *K. arvensis* and with traditional hay-meadow with late harvest present, harbour most species. Promoting traditional hay-meadows, late extensive grazing and the herb *K. arvensis*, people managing agricultural biodiversity can encompass high species richness of pollinating insects and support red-listed species. Further, we suggest that the density of *K. arvensis* at a farm can be used as a biodiversity indicator, at least for pollinating insects.

Code: Env 01/16

Delaying conservation actions for improved knowledge: How long should we wait? Grantham, Hedley S. et al. *Ecology Letters*; Apr 2009, Vol. 12 (4), p.293-301

Code: Env 01/17

Interpretation and application of the Precautionary Principle: Australia's contribution. Peel, Jacqueline. *Review of European Community & International Environmental Law*; 2009, Vol. 18 (1), p.11-25

Code: Env 01/18

Chapter 10: Making the Precautionary Principle work for biodiversity: Avoiding perverse outcomes in decision-making under uncertainty. Moyle, Brendan. From the book, *Biodiversity & the Precautionary Principle*. (2005) London: Earthscan, p.157-172
Code: Env 01/19

Conservation of native vegetation

A method for evaluating outcomes of restoration when no reference sites exist. Brewer, J. Stephen; Menzel, Timothy. *Restoration Ecology*; Jan 2009, Vol. 17 (1), p.4-11
Code: Env 01/20

Expansion dynamics of monospecific, temperate mangroves and sedimentation in two embayments of a barrier-enclosed lagoon, Tauranga Harbour, New Zealand. Stokes, Debra J. et al. *Journal of Coastal Research*; Jan 2010, Vol. 26 (1), p.113-122
Code: Env 01/21

Challenges and experiences in implementing a management effectiveness evaluation program in a protected area system. Growcock, A. J. et al. *Australasian Journal of Environmental Management**; Dec 2009, Vol. 16 (4), p.218-226

Evaluation of management effectiveness in protected areas is increasingly being recognised as a management imperative. Such evaluations facilitate adaptive management to help improve planning processes, provide greater clarity to managers in determining priorities, and support the decision-making process through continuous learning. However, there are considerable challenges in implementing an evaluation program of an entire protected area system: ownership of the evaluation process must occur at all levels of the management agency; a reliable process needs to be developed; a system for information sharing is required; a culture of learning needs to be encouraged and supported; and an appreciation of the range of useful qualitative and quantitative evidence has to be fostered. In NSW, this evaluation process has been established through a State of the Parks program. This article explores some of the key challenges associated with the development of this program and identifies some of the lessons that have been learned.

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Code: Env 01/22

Modelling the time course of shade, temperature, and wood recovery in streams with riparian forest restoration. Davies-Colley, Robert J. et al. *New Zealand Journal of Marine & Freshwater Research*; Jun 2009, Vol. 43 (3), p.673-688

The article focuses on a research that models recovery trajectories of three restoration strategies to develop native New Zealand podocarp-hardwood forest. It states that a forest model and a wood model were used for the study. It adds that simulations were conducted for the Waihaha area of Pureora Forest Park in New Zealand. Results show that stream shade recovery can be obtained within decades while stream wood recovery may take centuries.

Code: Env 01/23

The conservation (protected area) status of New Zealand's indigenous grasslands: An update. Mark, A. F. et al. *New Zealand Journal of Botany*; Mar 2009, Vol. 47 (1), p.53-60
Code: Env 01/24

Public environmental reporting and sustainability reporting

Words of action: The centrist and pragmatic discourse of sustainable development reporting. Milne, Markus J. et al. *Academy of Management Proceedings*; 2008, p.1-6
Code: Env 01/25

Web content mining for comparing corporate and third-party online reporting: A case study on solid waste management. Pollach, Irene et al. *Business Strategy & the Environment*; Mar 2009, Vol. 18 (3), p.137-148
Code: Env 01/26

Examining quality of environmental objectives, targets and indicators in environmental reports prepared for strategic environmental assessment. Donnelly, A. et al. *Journal of Environmental Assessment Policy & Management*; Dec 2008, Vol. 10 (4), p.381-401
Code: Env 01/27

Building institutions based on information disclosure: Lessons from GRI's sustainability reporting. Halina Szejnwald Brown et al. *Journal of Cleaner Production*; Vol. 17 (6), Apr 2009, p.571-580

Global Reporting Initiative (GRI) is the best-known framework for voluntary reporting of environmental and social performance by business worldwide. Using extensive empirical data, including interviews and documentary analysis, we examine GRI's organizational field and conclude that since its modest beginnings in 1999 GRI has been by several measures a successful institutionalization project. But the institutional logic of this new entity, as an instrument for corporate sustainability management, leaves out one of the central elements of the initial vision for GRI: as a mobilizing agent for many societal actors. This emergent logic reflects GRI's dominant constituency – large global companies and financial institutions and international business management consultancies – and not the less active civil society organizations and organized labor. We attribute these developments to factors such as building GRI within the existing institutional structures; the highly inclusive multistakeholder process; and the underdeveloped base of information users. From the institutional theory perspective, this case shows how the process of institutionalization is deeply affected by initial strategies of the founders, and how it reproduces existing power relations. From the governance perspective, this case leads us to question the power of commodified information to mobilize civil society and to strengthen governance based on partnerships.

Code: Env 01/28

Managing stakeholders or the environment? The challenge of relating indicators in practice. Brunklaus, Birgit et al. *Corporate Social Responsibility & Environmental Management*; Jan/Feb 2009, Vol. 16 (1), p.27-37
Code: Env 01/29

Public participation in environmental decision making

Creating environmental stakeholder profiles: A tool for dispute management. Deborah F. Shmueli; Michal Ben Gal. *Environmental Practice*; Sep 2005, Vol. 7 (3), p.165-175
Code: Env 01/30

Promoting community involvement at brownfields sites in socio-economically disadvantaged neighbourhoods. Gallagher, Deborah Rigling; Jackson, Sarah E. *Journal of Environmental Planning & Management*; Sep 2008, Vol. 51 (5), p.615-630
Code: Env 01/31

Real-time hydro-environmental modeling and visualization system for public engagement. Lee, Joseph Hun-wei; Choi, K. W. *Environmental Fluid Mechanics*; May 2008, Vol. 8 (5-6), p.411-421
Code: Env 01/32

Sustainability

Integrated policies for environmental resilience and sustainability. Hunt, J. *Institution of Civil Engineers: Proceedings: Engineering Sustainability*; Vol. 162 (3) Sept 2009, p.155-167
Policies for resilience against disasters use forecasts for short and longer term environment hazards, both natural and artificial. Although the methods used are increasing in reliability, significant uncertainties remain in the underpinning science and in the data. The vulnerability of communities to environmental risk is increasing because of economic and social factors, which also need to be better understood. This paper shows why, over the long term, engineering, medical and social policies for improving resilience are most effective when they are firmly linked to those for sustainable development. Policies need to be coordinated globally to meet agreed United Nations objectives and also to ensure that environmental actions in one region can benefit and do not damage sustainable development in other areas. Analyses and simulations of emerging and other possible scenarios, using economics and complex systems modelling, can test and propose strategies for resilience and sustainability, including the merits of different types of integration. This approach provides new insights for public discussion and decision making. There are new ways that universities, research institutes, non-governmental organisations and the private sector can contribute to multi-disciplinary technical advances and to promoting public participation in the complex changes affecting communities everywhere.
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Code: Env 01/33

Sustainability in the New Zealand wine industry: Drivers, stakeholders and practices.

Barbora Gabzdylova et al. *Journal of Cleaner Production*; Vol. 17 (11), Jul 2009, p.992-998

This research aims to investigate various sustainability issues in the New Zealand wine industry. Namely, the study examines (1) what drives the industry to engage in sustainability practices, (2) the role of stakeholders in the company's decision-making, and (3) environmental practices related to water utilization, chemicals and waste management. A qualitative research approach supplemented by quantitative measures was adopted to answer the research questions. Twenty-four wineries were studied. The research found that the most important drivers for sustainable practices are personal values, preferences and satisfaction with the profession (i.e., enjoyment of the work itself), followed by product quality and customers' demand. Size of firm also appears to be an important factor. New Zealand wine companies are also driven by the market, but companies do not receive a price premium for grapes grown sustainably or organically grown. The study proposes a typology matrix that differentiates wineries' involvement in sustainability based on the extent of sustainability practices and sustainability drivers.

Code: Env 01/34

Determinant factors in the degree of implementation of Local Agenda 21 in the European Union.

Garcia-Sanchez, I. M.; Prado-Lorenzo, J.-M. *Sustainable Development*, Jan/Feb 2008, Vol. 16 (1), p.17-34

Code: Env 01/35

Sustainable development from rhetoric to practice? A New Zealand perspective.

Freeman, Claire. *International Planning Studies*; Nov 2004, Vol. 9 (4), p.307-326

Code: Env 01/36

Water

Carbon footprint analysis for increasing water supply and sanitation in South Africa: A case study.

E. Friedrich et al. *Journal of Cleaner Production*; Vol. 17 (1), Jan 2009, p.1-12
This study investigates the environmental burdens due to the provision of potable water and sanitation in the eThekweni Municipality (Durban), South Africa. This was achieved by employing LCA studies for the individual parts of the urban water system (impoundment, water treatment, distribution, collection, sewage treatment and water recycling). Based on the results of the individual LCAs a base case was constructed. For the provision of potable water and sanitation to new customers, which have not been previously served, two different scenarios (200 000 new customers in an urban environment with waterborne sewage and in a peri-urban environment with on-site sanitation) and three different options (maximising use of existing assets, recycling water and building new infrastructure) were considered and analysed. With regard to the impact scores calculated for both scenarios (urban and peri-urban), the recycling of water is followed by maximising the use of existing assets as the most environmentally friendly options. The construction of new infrastructure carries a higher environmental burden and the use of bottled water for drinking (an additional scenario) carries the highest environmental burden.

Code: Env 01/37

Enhancing potential for integrated catchment management in New Zealand: A multi-scalar, strategic perspective. Memon, A. et al. *Australasian Journal of Environmental Management*; Vol. 17 (1), Mar 2010, p.35-44

An integrated, collaborative approach to natural resource management at the catchment scale is a strong theme in recent environmental management and planning literature. In New Zealand, integrated water resource management is undertaken by regional councils within the framework of a devolved legislative mandate, the Resource Management Act 1991 (RMA). For some time, these councils have experienced difficulties discharging this role effectively, in particular with respect to the catchment scale. We argue for a multi-scalar, national policy framework, encapsulating bottom-up and top-down water governance strategies, in order to enhance the potential of integrated catchment management.

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Code: Env 01/38

Icon lakes in New Zealand: Managing the tension between land development and water resource protection. Edgar, Nicholas B. *Society & Natural Resources*; Jan 2009, Vol. 22 (1), p.1-11

Code: Env 01/39

Sustainable application of renewable sources in water pumping systems: Optimized energy system configuration. J. S. Ramos; H. M. Ramos. *Energy Policy*; Vol. 37 (2), Feb 2009, p.633-643

Eighteen years ago, in Portugal, the expenses in a water supply system associated with energy consumption were quite low. However, with the successive crises of energy fuel and the increase of the energy tariff as well as the water demand, the energy consumption is becoming a larger and a more important part of the total budget of water supply pumping systems. Also, new governmental policies, essentially in developed countries, are trying to implement renewable energies. For these reasons, a case-study in Portugal of a water pumping system was analysed to operate connected to solar and wind energy sources. A stand-alone and a grid-connected systems were tested. The stand alone was compared with the cost of extending the national electric grid. In the grid-connected system two solutions were analysed, one with a water turbine and another without. To be able to implement a water turbine, a larger water pump was needed to pump the necessary water as for consumption as for energy production. For the case analysed the system without a water turbine proved to be more cost-effective because the energy tariff is not yet so competitive as well as the cost of water turbines.

Code: Env 01/40

Community governance for sustainability: Exploring benefits of community water schemes? Marquardt, M.; Russell, S. *Local Environment*; Vol. 12 (4), Aug 2007, p.437-445

Code: Env 01/41

Deliberation and actor-networks: The "practical" implications of social theory for the assessment of large dams and other interventions. Lockie, Stewart. *Society & Natural Resources*; Vol. 20 (9), Oct 2007, p.785-799

Code: Env 01/42

Productivity and efficiency in the water industry. Malcolm Abbott; Bruce Cohen. *Utilities Policy*; Vol. 17 (3-4), Sept-Dec 2009, p.233-244

Over the past twenty years there has been increasing interest in the productivity and efficiency of, and the optimal structures for, the water supply and wastewater industries. In part this interest has manifested itself in the increased use of numerous statistical techniques to determine the productivity and efficiency of the water sector in a variety of countries. The purpose of this paper is threefold. First it briefly reviews the various measures that have been used to gauge the levels of productivity and efficiency in the water sector, with particular reference to input and output data requirements of these measures. Second it summarises the key structural findings that have been determined from this research, particularly with respect to economies of scale and scope, public versus private ownership and the impact of regulation. Third, it considers potential areas for potential future research, such as the effect of environmental management activities (including water conservation) and regulation on productivity and efficiency, the role of wastewater as a potential source of potable or 'fit-for-purpose' water and the relationship between water supply and urban planning.

Code: Env 01/43

The use of an ecologic classification to improve water resource planning in New Zealand. Snelder, T. H.; Hughey, K. F. D. *Environmental Management*; Vol. 36 (5), Nov 2005, p.741-756

Code: Env 01/44

Energy

Hydropower's future, the environment, and global electricity systems. R. Sternberg. *Renewable and Sustainable Energy Reviews*; Vol. 14 (2), Feb 2010, p.713-723

Hydropower is a well established electricity system on the global scene. Global electricity needs by far exceed the amount of electricity that hydrosystems can provide to meet global electricity needs. Much of the world's hydropower remains to be brought into production. Improved technology, better calibrated environmental parameters for large projects have become the norm in the past 15 years. How and why does hydropower retain a prominent role in electricity production? How and why does hydropower find social acceptance in diverse social systems? How does hydropower project planning address issues beyond electricity generation? How does the systems approach to hydropower installations further analysis of comparative energy sources powering electricity systems? Attention to the environmental impact of hydropower facilities forms an integral part of systems analysis. Similarly, the technical, political and economic variables call for balanced analysis to identify the viability status of hydro projects. Economic competition among energy systems requires in context assessments as these shape decision making in planning of hydropower systems. Moreover, technological change has to be given a time frame during which the sector advances in productivity and share in expanding electricity generation. The low production costs per kWh assure hydropower at this juncture, 2009, a very viable future.

Code: Env 01/45

Linking energy policy, electricity generation and transmission using strong sustainability and co-optimization. Justin D.K. Bishop et al. *Electric Power Systems Research*; Vol. 80 (6), Jun 2010, p.633-641

The design of a sustainable electricity generation and transmission system is based on the established science of anthropogenic climate change and the realization that depending on imported fossil-fuels is becoming a measure of energy insecurity of supply. A model is proposed which integrates generation fuel mix composition, assignment of plants and optimized power flow, using Portugal as a case study. The result of this co-optimized approach is an overall set of generator types/fuels which increases the diversity of Portuguese electricity supply, lowers its dependency on imported fuels by 21.30% and moves the country towards meeting its regional and international obligations of 31% energy from renewables by 2020 and a 27% reduction in greenhouse gas emissions by 2012, respectively. The quantity and composition of power generation at each bus is specified, with particular focus on quantifying the amount of distributed generation. Based on other works, the resultant, overall distributed capacity penetration of 11.88% of total installed generation is expected to yield positive network benefits. Thus, the model demonstrates that national energy policy and technical deployment can be linked through sustainability and, moreover, that the respective goals may be mutually achieved via holistic, integrated design.

Code: Env 01/46

Commuting lives: Children's mobility and energy use. Freeman, Claire; Quigg, Robin. *Journal of Environmental Planning & Management*; Apr 2009, Vol. 52 (3), p.393-412

Code: Env 01/47

Sustainability assessment of energy technologies via social indicators: Results of a survey among European energy experts. Diana Gallego Carrera; Alexander Mack. *Energy Policy*; Vol. 38 (2), Feb 2010, p.1030-1039

Sustainability assessment of energy technologies oftentimes fails to account for social repercussions and long-term negative effects and benefits of energy systems. As part of the NEEDS1 project, an expert-based set of social indicators was developed and verified by the European stakeholders with the objective of contributing in the development of social indicators for the assessment of societal effects of energy systems. For this purpose, scientific experts from four sample countries France, Germany, Italy and Switzerland were interviewed to assess 16 different energy systems on a specific stakeholder reviewed indicator set. The indicator set covers the four main criteria: 'security and reliability of energy provision; 'political stability and legitimacy'; 'social and individual risks' and 'quality of life'. This article will review the process of indicator development and assessment and highlight results for today's most prominent and future energy technologies and some likely to make an impact in the future. Expert judgments varied considerably between countries and energy systems, with the exception of renewable technologies, which were overall positively assessed on almost all evaluation criteria.

Code: Env 01/48

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Climate change

Australia's environmental climate change challenge: Overview with reference to water resources. Newton, G. *Australasian Journal of Environmental Management*; Sep 2009, Vol. 16 (3), p.130-139

Anthropogenic warming of the global climate system is beyond doubt. Impacts from a changing climate are already occurring and the latest scientific research suggests that some aspects are locked in for centuries to come. Climate change therefore poses one of the greatest challenges to Australia's environment and water resources. Historical experience and past trends may no longer be a reliable predictor of the future. This article provides a brief overview of the latest scientific research and thinking on the climate change challenge. Observed changes and projections for temperature, rainfall, extreme events and ocean acidification are presented in an Australian context. The impacts of a range of climate change drivers are summarised, expanding upon the well-accepted general warming and drying trend for southern and eastern Australia. Current thinking regarding 'dangerous' climate change is that we are tracking on the higher end scale or above of the worst case scenario predictions reported by the IPCC Fourth Assessment Report (IPCC AR4) released in 2007. The implications for Australia's water resources, and in particular the Murray-Darling Basin, are significant. There appears to be a brief window of opportunity to act and adapt to enhance resilience to climate change; however, this requires an urgent and sustained commitment, and investment in Australia's environmental assets.

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Code: Env 01/49

Climate change, local government and the survey profession. Milne, Alan. *New Zealand Surveyor*; 01/12/2009 (299), p.3-6

Code: Env 01/50

The European Emissions Trading Scheme and International Emissions Trading - A comparative analysis. Lederer, Nicole. *New Zealand Journal of Environmental Law*; 2008 Vol. 12, p.1-37

Global warming is a major threat to human society in 2008 which changes the climate of our planet in an alarming way by causing natural disasters and therefore human tragedies. Besides the environmental impact, it is also seen as a huge economic problem. According to a report written by the former chief economist of the World Bank Sir Nicholas Stern, the environmental impact of global warming could displace up to 100 million people due to rising sea levels, water shortages could affect one sixth of the world's population, up to 40 per cent of the world's species could become extinct, and droughts could affect the water and food supply of tens or even hundreds of millions of people. In order to tackle climate change, emissions trading schemes have been developed all over the world. This paper assesses the strengths and weaknesses of the European Union Emissions Trading Scheme ("EU ETS") in order to determine whether or not it could serve as a model for the International Emissions Trading Scheme ("IET") under the Kyoto Protocol. This comparative analysis scrutinises the trading terms of the EU ETS in detail and shows similarities and differences between the IET under the Kyoto Protocol and the EU ETS. A future outlook for both emissions trading schemes will be presented.

Code: Env 01/51

Why climate change makes riparian restoration more important than ever: Recommendations for practice and research. Nathaniel E. Seavy et al. *Ecological Restoration*; Sep 2009, Vol. 27 (3), p.330-338
Code: Env 01/52

2.6: Limiting climate change to 450 ppm CO2 equivalent in the 21st century. Katherine Calvin et al. *Energy Economics*; Vol. 31 (Supp. 2), Dec 2009, p.S107-S120
The EMF 22 subgroup on Transition Scenarios explores a rich suite of potential future worlds in which climate change is limited to a variety of alternative radiative forcing levels. This paper focuses primarily on the requirements to limit radiative forcing from Kyoto gases to 2.6 W/m². Given that we estimate year 2005 radiative forcing to be 2.4 W/m², the 2.6 W/m² limit creates a non-trivial constraint. Allowing radiative forcing to exceed the long-term target level provides greater latitude in achieving the goal, but implies major changes to both global energy and land-use systems in the near term as well as the long term. In addition, delay on the part of major emitting parties creates potential "leakage" in both energy and land use. We estimate the challenging near-term and long-term deployment of new wind power, nuclear power and CO₂ capture and storage associated with the 2.6 W/m² limit.
Code: Env 01/53

Linking carbon markets: The climate change silver bullet? Gilbert, Alyssa. *Energy & Environment*; 2009, Vol. 20 (6), p.901-926
With the rising popularity of emissions trading schemes and the private sector call for a global carbon market, it seems as though there is the chance to solve climate change by simply providing a clear price signal. But how easy will this be, both technically and practically? This paper provides an overview of the challenges in policy design terms involved in directly linking existing emissions trading schemes, and the status of planned emissions trading schemes, in order to set the potential of establishing a policy framework for a global carbon market in a realistic frame. The paper begins by outlining what linking is and setting out the advantages and risks of linking schemes. The key criteria to consider in order to establish compatibility for linking are explored, and then a summary of existing or planned schemes is given to highlight some of the technical challenges involved in linking emissions trading schemes together. The paper goes on to describe how a linked scheme could be set up and then moves on to the political arena, looking more closely at the political benefits and risks of linking and then discussing whether or not linking emissions trading schemes is an element of, or an alternative to, a global climate policy.
Code: Env 01/54

Environmental management systems

Are EMS environmentally effective? The link between environmental management systems and environmental performance in European companies. Hertin, Julia et al. *Journal of Environmental Planning & Management*; Mar 2008, Vol. 51 (2), p.259-283
Code: Env 01/55

The road to cooperative supply-chain environmental management: trust and uncertainty among pro-active firms. Sharfman, Mark P. et al. *Business Strategy & the Environment*; Jan 2009, Vol. 18 (1), p.1-13
Code: Env 01/56

Signal dynamics: An industry level analysis of the diffusion of environmental management systems. Etzion, Dror. *Academy of Management Proceedings*; 2009, p.1-6
Code: Env 01/57

Selling sustainability: Savvy retailers enhance environmental performance through store design and environmental stewardship. Sherman, Frank. *Environmental Design & Construction*, May 2008, Vol. 11 (5), p.58-62
Code: Env 01/58

Towards a Sustainable Urban Environmental Management Approach (SUEMA): incorporating environmental management with Strategic Environmental Assessment (SEA). Alshuwaikhat, Habib M.; Abubakar, Ismaila. *Journal of Environmental Planning & Management*; Mar 2007, Vol. 50 (2), p.257-270
Code: Env 01/59

Toward environmental management systems in Australian agriculture to achieve better environmental outcomes at the catchment scale. Seymour, Eloise; Ridley, Anna. *Environmental Management*; Mar 2005, Vol. 35 (3), p.311-329
Code: Env 01/60

Codes of environmental management practice: Assessing their potential as a tool for change. Nash, Jennifer; Ehrenfeld, John. *Annual Review of Energy & the Environment*; 1997, Vol. 22 (1), p.487, (49p).
Code: Env 01/61

Environmental education and environmental practice

Environmental compliance and ethics: A case study at a facility of the US Army Corps of Engineers in Oregon. Jeffrey A. Hepler et al. *Environmental Practice*; Jun 2003. Vol. 5 (2), p.134-145
Code: Env 01/62

Three decades of the CEP Credential and Environmental Professional certification
Robert A. Michaels. *Environmental Practice*; Mar 2009. Vol. 11 (1), p.52-56
Code: Env 01/63

Environmental due diligence: A professional handbook. Rick Reibstein. *Environmental Practice*; Dec 2007. Vol. 9 (4), p.282-284

This is a review of the book, *Environmental Due Diligence: A Professional Handbook* (by Kenneth S. Tramm and Ernest C. Crosby. 2006. Infinity Publishing, West Conshohocken, PA).

Code: Env 01/64

Environmental professionalism as myth. Abeles, Tom P. *Greener Management International*; Spring 2005 (49), p.69-77

The author believes that the environmental profession is not real and is in fact a myth. He blames the human tendency to classify and categorise and discusses the problems that this can cause when it is not done with enough care.

Code: Env 01/65

Environmental management and audit schemes implementation as an educational tool for sustainability. A. J. D. Ferreira et al. *Journal of Cleaner Production*; Vol. 14, (9-11), 2006, p.973-982

The trail to sustainability requires a revolution on the way environmental professionals perceive and solve environmental problems. In a globalisation context, environmental professionals have to develop new personal, interpersonal, societal and technical skills to become active throughout their professional lives and to be of value in the quest for sustainability. Professionals have to develop open mindsets, a holistic perspective of the problems and integrated solutions. Current environmental engineer courses fail to provide the required skills, due to the traditional higher education structure. The role of implementation of an Environmental Management System on campus, in providing students with the 'hands-on', 'on-the-job' business skills that will make them useful in the search for sustainability is discussed.

Code: Env 01/66

Stream ecosystem health outcomes of providing information to farmers and adoption of best management practices. Rhodes, Heather M. et al. *Journal of Applied Ecology*; Dec 2007, Vol. 44 (6), p.1106-1115

Code: Env 01/67

A phenomenological perspective on ethical duty in environmental communication. Killingsworth, M. Jimmie. *Environmental Communication*; Jan 2007, Vol. 1 (1), p.58-63

Code: Env 01/68

Research for designing climate change education and communication strategies. Pruneau, Diane et al. *Conference Papers -- North American Association of Environmental Education*; 2008 Annual Meeting, p.1 (7p.)

Code: Env 01/69

Contemporary challenges and opportunities in environmental education: Where are we headed and what deserves our attention? Marcinkowski, Thomas J. *Journal of Environmental Education*; 2010, Vol. 41 (1), p.34-54
Code: Env 01/70

Business / Management

Three keys to getting an overseas assignment right. Clouse, Mark Alan; Watkins, Michael D. *Harvard Business Review*; Vol. 87 (10), Oct 2009, p.115-119

An international assignment can be among the most exciting and challenging transitions that an aspiring leader can undertake. With the right planning and attitudes, taking on that kind of leadership role can stretch capabilities, challenge assumptions, and steer both people and profits in a positive direction. But an expat assignment can also be a harrowing journey. Indeed, if they've never made an international move before, emerging leaders can fall into common traps that can severely stress their family bonds, negatively affect their performance at work, damage their businesses, and even lead to outright career derailment. In this article, Clouse, the managing director of Kraft Foods Brazil, and Watkins, the author of *The First 90 Days: Critical Success Strategies for New Leaders at All Levels*, offer three best practices for handling the personal-change challenges that go along with an overseas assignment. Settling the family in, adapting your communication style, and ensuring that you understand the new regulatory environment you're operating in are all critical for a successful transition, they advise.

Code: Env 01/71

The courage of self-examination. Baldoni, John. *Leader to Leader*; Winter 2009, Vol. 2009 (51), p.12-16

Code: Env 01/72

Mindful leadership. Sethi, Deepak. *Leader to Leader*; Winter 2009, Vol. 2009 (51), p.7-11

The author explains that concentration at work is a key leadership competency. He presents mindfulness to help the reader hone his or her concentration skills.

Code: Env 01/73

Visibility in the workplace: still an essential ingredient for career success? McDonald, Paula et al. *International Journal of Human Resource Management*; Dec 2008, Vol. 19 (12), p.2198-2215

Code: Env 01/74

How to write a technical paper. Whiteside, James D. *AACE International Transactions*; 2009, p.DEV.01.1-DEV.01.9

Code: Env 01/75

Citing practices in ecology: Can we believe our own words? Todd, Peter A. et al. *Oikos*; Sep 2007, Vol. 116 (9), p.1599-1601

Code: Env 01/76

Management consultants as professionals, or are they? Larry Greiner; Ilse Ennsfellner. *Organizational Dynamics*; Vol. 39 (1), Jan-Mar 2010, p.72-83

Code: Env 01/77

TransFormers in knowledge production: Building science-practice collaborations. Hoes, A.-C. et al. *Action Learning: Research & Practice*; Nov 2008, Vol. 5 (3), p.207-220

Code: Env 01/78

Strategic planning in local government -- an oxymoron? Winefield, Peter. *Planning Quarterly*; Mar 2007, (164), p.5-7

The article discusses strategic planning in the context of the requirements of the Local Government Act 2002 in New Zealand. It explains the relationship between this Act and the Resource Management Act (RMA), and outlines the challenges facing strategic planners in aligning strategic planning with the political and business realities of the organization.

Code: Env 01/79

Does it pay to be green? A systematic overview. Ambec, Stefan; Lanoie, Paul. *Academy of Management Perspectives*; Nov 2008, Vol. 22 (4), p.45-62

Code: Env 01/80

Describing volunteerism: The theory of unified responsibility. Dutta-Bergman, Mohan J. *Journal of Public Relations Research*; Oct 2004, Vol. 16 (4), p.353-369

Code: Env 01/81

Improving ethical behaviour by reducing time pressure. Hilmer, Fred. *Engineers Australia*; Oct 2009, Vol. 81 (10), p.66-67

Code: Env 01/82

