RESEARCH CONNECTIONS

AUSTRALIA AND NEW ZEALAND

SOUTH AUSTRALIAN GEOLOGY AND THE STATE HERITAGE REGISTER: AN EXAMPLE OF GEOCONSERVATION OF THE NARACOORTE CAVES COMPLEX AND KARST ENVIRONMENT (2019)

Author I D Lewis

Abstract South Australia's State Heritage Register contains 2294 listed places, the majority of which are from the *built* environment, ranging from settlers' huts, community buildings and historical industrial sites to magnificent stone mansions. Only 96 places are linked to the *natural* environment. The Register listings protect heritage places from alteration, damage or removal without formal prior consultation, compulsory under the South Australian Development Act. Natural environments are landscape-based and oriented towards Geological, Archaeological, Palaeontological and Speleological heritage (GAPS heritage). A process to provide a greater balance between *natural* and *built* listings has initiated a series of State Heritage Natural environment assessments, mostly of single sites. Two individual caves in the Naracoorte Caves National Park are already entered in the State Heritage Register as single sites. However, an innovative broader multiple-site nomination has focused on the many different but significant GAPS features contained within the 25 caves of the Naracoorte Caves National Park, providing a further level of protection for the land and the caves' exteriors and interiors. The example of the Naracoorte Caves draws attention to the number of important land and coastal karst (limestone) features across South Australia that were generated by steady geological uplift of three large sections of Oligocene–Miocene limestone—the Nullarbor Plain, the Murray Basin and the Gambier Karstfield (which includes Naracoorte and Mount Gambier), resulting in specific karst forms worthy of a broader coordinating management approach across South Australian karst parks.

Published Australian Journal of Earth Sciences. Vol 66. Iss 6. 2019

Download doi.org/10.1080/08120099.2019.1608300

Cost $51 (US)

MAPPING CHANGE IN KEY SOIL PROPERTIES DUE TO CLIMATE CHANGE OVER SOUTH-EASTERN AUSTRALIA (2019)

Authors Jonathan M Gray & Thomas F A Bishop

Abstract Climate change will lead to altered soil conditions that will impact on plant growth in both agricultural and native ecosystems. Additionally, changes in soil carbon storage will influence carbon accounting schemes that may play a role in climate change mitigation programs. We applied a digital soil mapping approach to examine and map (at 100-m resolution) potential changes in three important soil properties – soil organic carbon (SOC), pH and sum-of-bases (common macro-nutrients) – resulting from projected climate change over south-eastern Australia until ~2070. Four global climate models were downscaled with three regional models to give 12 climate models, which were used to derive changes for the three properties across the province, at 0–30 and 30–100 cm depth intervals. The SOC stocks were projected to decline over the province, while pH and sum-of-bases were projected to increase; however, the extent of change varied throughout the province and with different climate models. The average changes primarily reflected the complex interplay of changing temperatures and rainfall throughout the province. The changes were also influenced by the operating environmental conditions, with a uniform pattern of change particularly demonstrated for SOC over 36 combinations of current climate, parent material and land use. For example, the mean decline of SOC predicted for the upper depth interval was 15.6 Mg ha–1 for wet–mafic–native vegetation regimes but only 3.1 Mg ha–1 for dry–highly siliceous–cropping regimes. The predicted changes reflected only those attributable to the projected climate change and did not consider the influence of ongoing and changing land management practices.

Published Soil Research 57(5), pp 467-481

Download doi.org/10.1071/SR18139

Cost $25 (AU)

NATURE ACTIVITIES AND WELLBEING IN CHILDREN AND YOUNG PEOPLE: A SYSTEMATIC LITERATURE REVIEW (2019)

Authors Anna Roberts, Joe Hinds & Paul M Camic

Abstract Research suggests that experience of the natural environment may have a range of beneficial outcomes for children and young people. A systematic review of the peer-reviewed empirical literature focused on research involving direct interaction with nature amongst children and young people and its impact on wellbeing; 14 papers, within the domains of childhood and adolescence, were identified for inclusion in the review. Within these domains, a range of wellbeing outcomes were identified and grouped into thematic areas of self-esteem and confidence, positive and negative affect, stress reduction and restoration, social benefits, and resilience. Findings related to wellbeing outcomes were synthesised and critiqued, and research and clinical implications discussed.

Published Journal of Adventure Education and Outdoor Learning

Download doi.org/10.1080/14729679.2019.1660195

Cost $44 (US)

CONSERVATION TRANSLOCATION: AN INCREASINGLY VIABLE OPTION FOR MANAGING THREATENED PLANT SPECIES (2019)

Authors Heidi C Zimmer, Tony D Auld, Peter Cuneo, Catherine A Offord & Lucy E Commander

Abstract Translocation is the establishment and augmentation of plant populations using ex situ material, and can reduce extinction risk. Historically, translocation has been considered to be high cost and high risk, but today, translocation is increasingly recognised as a necessary option for managing many threatened plant species. To examine the viability of translocation as a management action, we analysed the frequency of it being a recommended management action, its estimated cost over time, and its perceived likelihood of success as compared with other management actions. We did this using the 368 threatened plant species in the New South Wales state register of threatened species management strategies (the Saving our Species (SOS) database). Translocation was recommended as a management action for 30% of threatened plants (112 species), mostly in response to demographic

threats (i.e. threats affecting species with small population sizes/restricted distributions, for example, environmental and demographic stochasticity or low genetic diversity). The estimated cost of translocation per species was similar to other common management actions. However, expert elicitation data (in the SoS database) indicated that translocation was less certain of a beneficial outcome, compared with almost all other management actions. Based on these findings, we create a decision framework, which uses the principles of extinction risk assessment to assist conservation managers in determining when translocation is most likely to be beneficial. We suggest that the use of translocation to mitigate the risk of extinction associated with small population sizes/restricted ranges is supported by the principles of extinction risk assessment. With a growing knowledge base, and costs comparable to other management actions, translocation is becoming an increasingly viable option for the conservation management of threatened plants, provided best practice guidelines are followed.
Published Australian Journal of Botany 67 (7), pp 501-509
Download doi.Org/10.1071/BT19083
Cost $25 (AU)

AVIAN-BOTULISM RISK IN WATERBIRD BREEDING COLONIES AND IMPLICATIONS FOR ENVIRONMENTAL WATER MANAGEMENT (2019)

Authors K J Brandis, J Spencer, B Wolfenden & D Palmer
Abstract Avian botulism poses a significant risk to waterbird health in Australian wetlands. This paralytic, often fatal, disease occurs when birds ingest a neurotoxin produced by the bacterium Clostridium botulinum. Our current understanding of avian botulism comes largely from studies in the northern hemisphere, with many of these studies linking outbreaks of avian botulism with poor water quality. The Murray–Darling Basin provides the most important breeding habitat for colonial waterbirds in Australia, but the frequency of large-scale breeding events has declined, and waterbird populations are near record-low numbers. Avian botulism has the capacity to have significant impacts on waterbird recruitment if not managed appropriately. We propose that environmental water-management strategies that aim to maintain water quality through flow delivery to waterbird colonies could mitigate the risk of botulism outbreaks and contribute to waterbird population recovery.
Published Marine and Freshwater Research 71(2), pp 179-190
Download doi.org/10.1071/MF18446
Cost $25 (AU)

SAND MINING ON NORTH STRADBROKE ISLAND: AN ISLANDER VIEW OF THE REHABILITATION OF THE LANDS (2020)

Author Shelley Burgin
Abstract Sand mining on North Stradbroke Island has ceased 70 years after it became the Island's major industry. This article reports conversations with local indigenous people who have lived on the Island all their lives, together with long-term residents – people who have lived with, and worked (directly or indirectly) for the mines, and now must live with the legacy. Views on sand mining changed over time. Initially beach mining was considered benign – tides restored scars, and sand was whiter. Subsequent mining adjacent to the beach and inland resulted in degraded landscapes – failed rehabilitation, introduced plant species, and uncharacteristically-shaped dunes. More recent mine support for Islanders and landscape rehabilitation were considered 'perfect'. Post-mining issues included unemployment, emigration of younger family members to seek work, depressed house prices trapping people, and tourists destroying the landscape. No Islander interviewed wanted sand mining to cease.
Published International Journal of Environmental Studies
Download doi.org/10.1080/00207233.2020.1727232
Cost $44 (US)

SITUATING (IN)SIGNIFICANCE (2020)

Authors Tracy Ireland, Steve Brown & John Schofield
Abstract In this paper we introduce the concept of "(in)significance" as a way to think about values in heritage, and in the attribution, recording, description, assessment and categorisation practices that characterise heritage processes. Our aim is to throw light on how this concept shapes, and is shaped by, contemporary heritage practices and outcomes. We consider the history of the idea of significance, particularly as it is defined in the Burra Charter, and trace its inheritance lines in settler nation states and capitalist economic structures, and highlight its retention of concepts of heritage value as both intrinsic and culturally attributed. Using international, mainly Anglophone examples, we review a range of case studies and examples of significance and insignificance, of significance assessment in practice, and the tensions between expert, institutional or *official* values and broader concepts of heritage and attachment. We suggest that the dual or layered concept of (in) significance might allow for heritage practices that interact with emotions, memory, place and things in ways that are often not possible in the context of official heritage regimes because of rigid aesthetic and conservation paradigms, as well as identity and ownership claims and deeply invested national narratives.
Published International Journal of Heritage Studies. Published online.
Download doi.org/10.1080/13527258.2020.1755882
Cost FREE

EVALUATING THE USE OF RISK ASSESSMENT FRAMEWORKS IN THE IDENTIFICATION OF POPULATION UNITS FOR BIODIVERSITY CONSERVATION (2020)

Authors Erin Liddell, Carly N Cook & Paul Sunnucks
Abstract Managing small, isolated populations requires conservation practitioners to weigh up the risks of inbreeding depression and outbreeding depression when assessing alternative management actions aimed at preventing species extinction. Accordingly, it is important that research intended to guide these management decisions provides the relevant evidence to inform them. *Aims:* To determine the extent to which studies that use genetic analyses to characterise population units for conservation consider the key theoretical concepts necessary for making sound management recommendations regarding the desirability of gene flow among units, notably the consequences and relative risks of inbreeding depression and outbreeding depression. *Methods:* A systematic search was conducted of peer-reviewed literature for studies that attempted to identify population units of threatened birds and mammals. Using content analysis, the theoretical framing of these studies was assessed, based on the discussion of key concepts concerning differences among populations. *Key results:* There has been a significant increase over time in the number of published studies that use genetics to identify population units for conservation. Many do not consider theoretical concepts relevant to the effective management of fragmented populations of threatened species. Mammals were more common than

birds as focal species of studies, but the number of concepts used in the framing of the studies was similar for these two taxa, despite differences in their ecology and biology that might be expected to affect perceptions of distinctiveness. Nevertheless, species of greater conservation concern tended to have a slightly more comprehensive theoretical framing. *Conclusions:* There is great potential for more studies to implement theoretical guidelines and practical decision support tools when considering the best course of action for identifying appropriate population units for conservation management.
Published Wildlife Research 47 (3) 208-216
Download doi.org/10.1071/WR18170
Cost FREE

PARADOXICAL POPULATION RESILIENCE OF A KEYSTONE PREDATOR TO A TOXIC INVASIVE SPECIES

Authors J Sean Doody, David Rhind & Simon Clulow
Abstract The invasive cane toad (Rhinella marina) has decimated populations of a keystone predator, the yellow-spotted monitor (Varanus panoptes), causing trophic cascades in Australian animal communities. Paradoxically, some V. panoptes populations coexist with toads. Demonstrating patterns in heterogeneous population-level impacts could reveal mechanisms that mediate individual effects, and provide managers with the ability to predict future impacts and assist in population recovery. *Aims:* The aim of the present study was to search for spatial patterns of population resilience of V. panoptes to invasive cane toads. *Methods:* Published literature, unpublished data, reports and anecdotal information from trained herpetologists were used to test the emerging hypothesis that resilient predator populations are mainly coastal, whereas non-resilient populations are mostly inland. *Key results:* Post-toad invasion data from 23 V. panoptes populations supported the idea that toad impacts on V. panoptes were heterogeneous; roughly half the populations could be designated as resilient (n = 13) and half as non-resilient (n = 10). Resilient populations had longer times since toad invasion than did non-resilient populations (39 versus 9 years respectively), supporting the idea that some recovery can occur. Non-resilient populations were exclusively inland (n = 10), whereas resilient populations were split between inland (n = 5) and coastal (n = 8) populations. Resilient inland populations, however, were mainly confined to areas in which decades had passed since toad invasion. *Conclusions:* The findings suggest that coastal V. panoptes populations fare much better than inland populations when it comes to surviving invading cane toads.
Published Wildlife Research 47 (3) 260-266
Download doi.org/10.1071/WR19150
Cost $25 (AU)

USING THE SCIENTIFIC LISTING PROCESS TO BETTER UNDERSTAND CLIMATE CHANGE RISK TO THREATENED SPECIES AND ECOLOGICAL COMMUNITIES IN NEW SOUTH WALES (2019)

Authors Claire A Laws, Nola Hancock & Michelle R Leishman
Abstract Anthropogenic climate change presents a major threat to all levels of biodiversity — from populations to ecosystems. Threatened species and ecological communities are particularly at risk because they generally possess characteristics that increase their vulnerability to extinction. Here we review the conservation assessments of 414 threatened species and 108 ecological communities in the state of New South Wales (NSW) Australia, to explore climate change extinction risk. We found only 13 percent of threatened species and 24 percent of threatened ecological communities have climate change identified as a threat. Amphibians had the highest proportion of species with a climate change threat identified (37%), followed by mammals (25%), birds (17%), reptiles (15%) and plants (10%). The sample sizes of freshwater algae and marine mammals were too small to be considered. Threatened species and ecological communities that had climate change listed as a threat were predominately associated with wet and montane habitats, highlighting the vulnerability of these environments. The estimates of the extinction threat from climate change to species and ecological communities in NSW are likely to be highly conservative. We suggest that climate change adaptation strategies be incorporated into all levels of biodiversity management, from threatened species management plans to landscape level management.
Published Pacific Conservation Biology 26(2), pp 173-181
Download doi.org/10.1071/PC19021
Cost $25 (AU)

INTERNATIONAL

COMMUNITY SYSTEMS MODELS AND DEVELOPMENT SCENARIOS FOR INTEGRATED PLANNING: LESSONS LEARNED FROM A PARTICIPATORY APPROACH (2020)

Authors Robert Newell, Ian Picketts & Ann Dale
Abstract Systems models can support community planning, and by engaging local government and community stakeholders, these models can be designed to capture a comprehensive but manageable range of key interests, concerns, and values. This study explores a participatory approach for designing a community systems modelling exercise. The research involved convening focus groups of local government and diverse community stakeholders in Squamish, Canada, in order to discuss local issues and possible futures for the community. Focus group feedback was used to inform the development of a model of relationships between development paths (reflecting different densities) and multiple community outcomes, such as access to amenities and education, walkability, parks/trails, food and farm systems, public transit, housing affordability, and local employment. A participatory approach to modelling yielded many benefits, including alignment with normative participatory planning concepts, effective model scoping, accessing additional information sources, and enhancing local social capital and investment in the project.
Published Community Development
Download doi.org/10.1080/15575330.2020.1772334
Cost $44 (US)

CALL FOR ARTICLE ABSTRACTS

Abstracts of research projects of interest to PLA members are always welcomed on forthcoming themes, in particular research relating to Events, Tourism and the Arts, including:

- Linking recreation and tourism
- Economic and social impact of events
- Community engagement
- Art installations
- Cultural events
- Dance events
- Major events

Abstracts are required no later than 1 September 2020. Please forward submissions or enquiries to John Wood at *jwcs@bigpond.net.au*