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Policy 2016

Sarkki, S., J. Niemelä, R. Tinch, J.-P. Jäppinen, M. Nummelin, H. Toivonen, and M. Von Weissenberg. 2016. Are national biodiversity strategies and action plans appropriate for building responsibilities for mainstreaming biodiversity across policy sectors? The case of Finland. *Journal of Environmental Planning and Management* **59**:1377-1396.

(Abstract)

The Convention on Biological Diversity's national biodiversity strategies and action plans (NBSAPs) are major mechanisms for mainstreaming biodiversity into national policies. This article examines whether and how the NBSAPs contribute to mainstreaming biodiversity across policy sectors in Finland in order to halt biodiversity loss. We have developed an innovative analytical framework where the concept of responsibility addresses how motivations for mainstreaming can be built, and the concept of social learning outcomes addresses the extent of institutional changes for biodiversity. The Finnish NBSAP processes have been able to build diverse forms of responsibility (liability, accountability, responsiveness and care) in different policy sectors by providing new knowledge, careful process design and developing institutional linkages. Despite pro-biodiversity outcomes in the targeted policy sectors, the responsibilities do not diffuse from the environmental administration to other policy sectors to a sufficient extent. Closing this 'responsibility gap' is a key challenge for building effective environmental policies.

Lewis M. 2016. AEWA at Twenty: An Appraisal of the African-Eurasian Waterbird Agreement and Its Unique Place in International Environmental Law. *Journal of International Wildlife Law & Policy* **19** (1):22-61.

(No abstract available)

Policy 2015

Degteva, S. V., V. I. Ponomarev, S. W. Eisenman, and V. Dushenkov. 2015. Striking the balance: Challenges and perspectives for the protected areas network in northeastern European Russia. *Ambio* **44**:473–490.

(Abstract)

Increasing anthropogenic pressure on the largest remaining tracts of old-growth boreal forest in Europe necessitates additional conservation of ecosystems and biodiversity in northeastern European Russia. In a regional network comprising 8% of the Nenets Autonomous District and

13.5 % of the Komi Republic, 248 areas have varying protected statuses as state nature reserves (zapovedniks), national parks, reserves/sanctuaries (zakazniks), or natural monuments. Due to increased natural resource extraction in this relatively pristine area, designation of additional protected areas is critical for the protection of key ecological sites. The history of ecological preservation in these regions is herein described, and recent recommendations for incorporating additional ecologically representative areas into the regional network are presented. If the protected area network can be expanded, the overall environmental stability in these globally significant ecosystems may remain intact, and can help Russia meet the 2020 Aichi conservation targets, as set forth by the Convention of Biological Diversity.

Wallace, P. 2015. The Reduced Effect of International Conservation Agreements: A New Zealand Case Study. *Journal of Environmental Law* **27**:489–516.

(Abstract)

Despite proliferation of law and policy directed at halting global biodiversity decline, it is a common concern that decline continues. Using a case study of six New Zealand birds, this article demonstrates reasons for the reduced effect of the law in the context of three international agreements: the Convention on Wetlands of International Importance; the Convention on Biological Diversity; and the Convention on Migratory Species of Wild Animals. The article concludes that the agreements are deficient in terms of obligation and consistency, and that these deficiencies are compounded by insufficient implementation and siloed approaches at the national level. Success is also compromised by the ways in which the law privileges resource use to the detriment of species due to insufficient environment standards, sectoral defences, and widespread externalities. Ironically for birds, mobility which in evolutionary terms has been a survival strategy, may become a liability in the Anthropocene.

Barry, T., and C. Price. 2015. Arctic biodiversity: from science to policy. *J Environ Stud Sci* **5**:283–287.

(Abstract)

In 2013, the Conservation of Arctic Flora and Fauna (CAFF) and the biodiversity working group of the Arctic Council released the Arctic Biodiversity Assessment (ABA), a report containing the best available science informed by traditional ecological knowledge on the status and trends of Arctic biodiversity and accompanying policy recommendations (ABA 2013a) for biodiversity conservation. This text provides a summary of the ABA recommendations and a discussion on their path from key scientific findings to policy and subsequent actions.

Mauerhofer, V., R. E. Kim, and C. Stevens. 2015. When implementation works: A comparison of Ramsar Convention implementation in different continents. *Environmental Science and Policy***51**:95-105.

(Abstract)

What are the processes that shape implementation of multilateral environmental agreements (MEAs) in multilevel governance? In an attempt to address this question, we move from a top-down view of implementation as compliance with international rules to viewing it as a dynamic process shaped by action at various levels. The Ramsar Convention on Wetlands offers an important context to understand the mechanisms that shape multilevel implementation outcomes. We examine Ramsar Convention implementation in Austria, Mexico, and the Republic of Korea in order to identify relevant processes that define multilevel implementation. These cases represent three different types of government, and shed light on the ways in which international law is implemented by respective governments. The Austrian case, a federal government, illustrates the ways in which subnational authorities (the provinces) are influenced by binding regional institutions (EU-rules) to create a more robust context for protection in terms of designation of Ramsar sites. The Mexican case, a semi-federal government, shows how spurred involvement by local NGOs, states, and scientists can result in significant expansion of efforts. The Korean case, a unitary government, demonstrates the ways in which aligning institutional interests (in this case local governments with national ministries) can lead to strong implementation. Analysis of these cases provides two robust findings and one deserving additional study. First, overlapping governance efforts where activity has ties with multiple regional and international biodiversity efforts tend to see cumulative implementation. Second, institutional and organizational complexity can provide opportunities for local actors to drive the implementation agenda through a mix of processes of coordination and contentious politics. A third, more tentative finding, is that multilevel funding sources can ease implementation.

Sun, Z., W. Sun, C. Tong, C. Zeng, X. Yu, and X. Mou. 2015. China's coastal wetlands: Conservation history, implementation efforts, existing issues and strategies for future improvement. *Environment International* **79**:25–41.

(Abstract)

China has approximately 5.80×106 ha coastal wetlands by 2014, accounting for 10.82% of the total area of natural wetlands. Healthy coastal wetland ecosystems play an important role in guaranteeing the territory ecological security and the sustainable development of coastal zone in China. In this paper, the natural geography and the past and present status of China's coastal wetlands were introduced and the five stages (1950s–1970s, 1980s–1991, 1992–2002, 2003–2010 and 2011–present) of China's coastal wetlands conservation from the foundation

of the People's Republic in 1949 to present were distinguished and reviewed. Over the past decades, China has made great efforts in coastal wetland conservation, as signified by the implementation of coastal wetland restoration projects, the construction of coastal wetland nature reserves, the practice of routine ecological monitoring and two national wetland surveys, the promulgation of local wetland conservation statutes and specific regulations, the coordination mechanism to enhance management capacity, the wide development of coastal wetland research and public participation, and the extensive communication to strengthen international cooperation. Nonetheless, six major issues recently emerged in China's coastal wetland conservation are evidently existed, including the increasing threats of pollution and human activities, the increasing adverse effects of threaten factors on ecosystem function, the increasing threats of coastal erosion and sea-level rising, the insufficient funding for coastal wetlands conservation, the imperfect legal and management system for coastal wetlands, and the insufficient education, research and international cooperation. Although the threats and pressures on coastal wetlands conservation are still apparent, the future of China's coastal wetlands looks promising since the Chinese government understands that the sustainable development in coastal zone requires new attitudes, sound policies and concerted efforts at all levels. The major strategies for future improvement of China's coastal wetland conservation include: exploring effective measures in response to major threaten factors; improving the conservation and compensation system for coastal wetlands; strengthening coastal wetland legislation and management; increasing funds for coastal wetland conservation and research; and strengthening coastal wetland education and international cooperation.

McDonald, J. A., J. Carwardine, L. N. Joseph, C. Klein, T. M. Rout, J. E. M. Watson, S. T. Garnett, M. A. McCarthy, and H. P. Possingham. 2015. Improving policy efficiency and effectiveness to save more species: A case study of the megadiverse country Australia. *Biological Conservation***182**:102–108.

(Abstract)

Native flora and fauna species continue to decline in the megadiverse, wealthy, economically and politically stable nation of Australia despite current efforts in policy and management. Ongoing research is examining these declines, their causes and the adequacy of current policy, but strategies for improving the outcomes for threatened species have attracted less attention. We discuss several key aspects of Australia's national threatened species management approach that potentially hinder the efficiency and effectiveness of management: the threatened species listing process is lengthy and biased; recovery plan development is resource intensive, restricted to a subset of species and often not effective; funding for threatened species management is not allocated efficiently or transparently; and management is not designed to incorporate uncertainties and adapt to changing future threats. Based on these issues we recommend four changes to current process: rationalize listing and assessment processes; develop approaches to prioritize species-based and threat-based responses cost-effectively; estimate funds required to recover species and secure longer term funding; and accommodate uncertainties and new threats into the current planning framework.

Cost-effective prioritization for species and threats identifies which actions are likely to achieve the greatest benefits to species per unit cost, thereby managing more species and threats with available funds. These improvements can be made without legislative reform, additional funding or socio-economic shifts. If implemented, we believe more Australian threatened species will benefit from current efforts. Many of the challenges facing Australia are analogous to issues in other countries including the United States, Canada and the United Kingdom and these recommendations could assist in improving threatened species management.

Policy 2014

Tittensor, D. P., M. Walpole, S. L. Hill, D. G. Boyce, G. L. Britten, N. D. Burgess, S. H. M. Butchart, P. W. Leadley, E. C. Regan, R. Alkemade, R. Baumung, C. Bellard, L. Bouwman, N. J. Bowles-Newark, A. M. Chenery, W. W. L. Cheung, V. Christensen, H. D. Cooper, A. R. Crowther, M. J. R. Dixon, A. Galli, V. Gaveau, R. D. Gregory, N. L. Gutierrez, T. L. Hirsch, R. Höft, S. R. Januchowski-Hartley, M. Karmann, C. B. Krug, F. Leverington, J. Loh, R. Kutsch Lojenga, K. Malsch, A. Marques, D. H. W. Morgan, P. J. Mumby, T. Newbold, K. Noonan-Mooney, S. N. Pagad, B. C. Parks, H. M. Pereira, T. Robertson, C. Rondinini, L. Santini, J. P. W. Scharlemann, S. Schindler, U. R. Sumaila, L. S. L. Teh, J. van Kolck, P. Visconti, and Y. Ye. 2014. A mid-term analysis of progress toward international biodiversity targets. *Science* **346**:241-244.

(Abstract)

In 2010 the international community, under the auspices of the Convention on Biological Diversity, agreed on 20 biodiversity-related “Aichi Targets” to be achieved within a decade. We provide a comprehensive mid-term assessment of progress toward these global targets using 55 indicator data sets. We projected indicator trends to 2020 using an adaptive statistical framework that incorporated the specific properties of individual time series. On current trajectories, results suggest that despite accelerating policy and management responses to the biodiversity crisis, the impacts of these efforts are unlikely to be reflected in improved trends in the state of biodiversity by 2020. We highlight areas of societal endeavor requiring additional efforts to achieve the Aichi Targets, and provide a baseline against which to assess future progress.

Wang W, Liu H, Li Y, Su J. 2014. Development and management of land reclamation in China. *Ocean & Coastal Management* **102,** 415-425

(Abstract)

In recent decades, sea enclosing and land reclamation has become an important way in China

to accommodate the increasing need of space for living and development. In this article, it is shown that land reclamation has brought about serious impact on China's coastal ecosystems and their services, including: reduction of coastal wetland area by slightly over 50%, significant coastal landscape fragmentation and loss of biodiversity, destruction of habitats for fish and feeding grounds for shorebirds, decline of bird species and fisheries resources, reduced water purification ability from narrowing and even disappearance of gulfs and bays, increased water pollution and frequent harmful algal blooms, etc. To address these problems, since 2001 the Chinese government has issued a series of laws and policies to strengthen land reclamation management. However, the pace of China's land reclamation has been rising continuously that the worsening trend of its detrimental impacts on the coastal ecosystems and their services has not been turned around. It is argued that China should strengthen the laws and regulations, improve marine spatial planning, fully evaluate the negative impact of reclamation, and enhance ocean awareness and public involvement in reclamation management, so that better management of land reclamation can be achieved.

Hohman, W. L., E. B. Lindstrom, B. S. Rashford, and J. H. Devries. 2014. Opportunities and challenges to waterfowl habitat conservation on private land. *Wildfowl* **4**:368–406.

(Abstract)

The future of North American waterfowl populations is inseparably tied to management of private land in the United States (U.S.) and Canada. Private land ownership in major waterfowl habitat regions such as the Northern Great Plains, Lower Mississippi Alluvial Valley, Gulf Coast and California's Central Valley generally exceeds 90%, with agriculture being the dominant land-use in these regions. Planning and implementing avian conservation on private land in a strategic manner is complicated by a wide array of social, economic, political, administrative and scientific-technical issues. Prominent among these challenges are changing economic drivers influencing land-use decisions, integration of bird conservation objectives at various scales, reconciling differences in wildlife habitat objectives between bird conservationists and land-users, administrative impediments to conservation planning and implementation, technology and scientific information gaps, and inadequate personnel capacity and financial constraints to effectively plan and deliver conservation. Given these unprecedented challenges to waterfowl habitat conservation, the need for effective public-private partnerships and collaboration has never been greater. With the goal of advancing collaborative waterfowl conservation on private land, the broad goals of this paper are to: (1) increase stakeholder awareness of opportunities and challenges to waterfowl habitat conservation on private land, and (2) showcase examples of collaborative efforts that have successfully addressed these challenges. To accomplish these goals this paper is organised into three sections: (1) importance of agricultural policy to private land conservation, (2) habitat potential on agricultural working land, and (3) strategic approaches to waterfowl habitat conservation. U.S. Department of Agriculture conservation programmes authorised through the Conservation Title of the 1985 Food Security Act (hereafter, Farm Bill) and subsequent farm bills have provided unequalled potential for waterfowl habitat conservation on private land. Passage of

the 2014 Farm Bill provides unique opportunities and alternative approaches to promote working land conservation strategies that are economically profitable and wildlife friendly. However, reductions in private land conservation funding will require more effective targeting to maximise resource benefits. For example, in addition to conserving and restoring traditional habitats, we must work collaboratively to identify and promote working agricultural systems that are waterfowl-friendly and provide environmental services in addition to the production of food and fibre. Cultivation of rice Oryza sativa and winter cereals described below potentially represent two such situations. For over a quarter of a century the North American Waterfowl Management Plan (NAWMP) has served as a transformative model of partnership-based, landscape-scale conservation (DOI & EC 1986). Whereas the original plan and subsequent updates established abundant waterfowl populations as the plan's ultimate goal, the 2012 NAWMP revision seeks a formal integration of these objectives with societal needs and desires (DOI et al. 2012). The current plan recognises the critical importance of private working land; however, details are lacking, especially with respect to strategic targeting of conservation on private land. For example, the development of truly strategic plans to target waterfowl conservation on private land will require estimates of the benefits of various conservation alternatives, conservation costs, and the threat of habitat loss or conversion. We suggest development of spatially explicit models that inform landowners and managers at the field-level about the cost effectiveness of conservation and land-use options is critically needed.

Whitney K. 2014. Domesticating nature?: Surveillance and conservation of migratory shorebirds in the ‘‘Atlantic Flyway’’. *Studies in History and Philosophy of Biological and Biomedical Sciences* **45**, 78–87.

(Abstract)

Using a recent environmental controversy on the U.S. east coast over the conservation of red knots (*Calidris canutus rufa*) as a lens, I present a history of North American efforts to understand and conserve migratory shorebirds. Focusing on a few signal pieces of American legislation and their associated bureaucracies, I show the ways in which migratory wildlife have been thoroughly enrolled in efforts to quantify and protect their populations. Interactions between wildlife biologists and endangered species have been described by some scholars as‘‘domestication’’—a level of surveillance and intervention into nonhuman nature that constitutes a form of dependence. I pause to reflect on this historical trajectory, pointing out the breaks and continuities with older forms of natural history. Using the oft-mobilized Foucauldian metaphor of the panopticon as a foil, I question the utility and ethics of too-easily declaring ‘‘domesticated’’ wildlife an act of ‘‘biopower.’’ Instead, I argue that Jacob von Uexküll's ‘‘umwelt’’ from early ecology and ethology, and more contemporary Science and Technology Studies (STS) analyses emphasizing multiple ontologies, offer more illuminating accounts of endangered species science. Neither science, conservation, nor history are well-served by the conflation of wildlife ‘‘surveillance’’ with the language of Foucauldian discipline.

Wang C-M, Chen L-S, Ting K-H, Lin K-L, Jhan H-T, Chen J-Y, Liu W-H. 2014. Institutional arrangements for the management of marine protected areas in Taiwan. *Ocean & Coastal Management* **98**, 62-69.

(Abstract)

With the growth of population and rapid development of economy in Taiwan, problems including the reduced number of marine habitats and increased sea pollution have continued to harm marine bioresources and diversity. Although the Taiwanese government has established several kind of marine protected areas (MPAs) but the management performance is dissatisfactory. Therefore, the management arrangements of MPAs in Taiwan are discussed in this study, based on 3 institutional arrangement elements: governmental organization, legal basis, and non-governmental organizations (NGOs). A questionnaire survey was administered to 4 groups (industrial, governmental, scholar, and NGO) to understand how these groups perceive the institutional arrangements of the management of MPAs in Taiwan. Finally, the institutional arrangements of the management of the MPAs discussed. The research findings showed that most survey participants believed that governmental organizations most required improvement, particularly in “monitoring standard” and “financial budget allotment.” Other than “stability,” the participants disapproved of the legal basis in the institutional arrangements of the management of MPAs. Among the 4 participating groups, only NGOs agreed that NGOs should be involved in the institutional arrangements of the management for MPAs in Taiwan. All 4 groups approved the institutional arrangements regarding “participation and cooperation,” and none of the 4 groups approved the institutional arrangements regarding “more responsible behavior.”

Berger J, Cain SL, Cheng E, Dratch P, Ellison K, Francis J, Frost HC, Gende S, Groves C, Karesh WA, Leslie E, Machlis G, Medellin RA, Noss RF, Redford KH, Soukup M, Wilcove DS, Zack S. 2014. Optimism and Challenge for Science-Based Conservation of Migratory Species in and out of U.S. National Parks. *Conservation Biology* **28**, 4–12.

(Abstract)

Using Public agencies sometimes seek outside guidance when capacity to achieve their mission is limited. Through a cooperative agreement and collaborations with the U.S. National Park Service (NPS), we developed recommendations for a conservation program for migratory species. Although NPS manages ~36 million hectares of land and water in 401 units, there is no centralized program to conserve wild animals reliant on NPS units that also migrate hundreds to thousands of kilometers beyond parks. Migrations are imperiled by habitat destruction, unsustainable harvest, climate change, and other impediments. A successful program to counter these challenges requires public support, national and international outreach, and flourishing migrant populations. We recommended two initial steps. First, in the

short term, launch or build on a suite of projects for high-profile migratory species that can serve as proof to demonstrate the centrality of NPS units to conservation at different scales. Second, over the longer term, build new capacity to conserve migratory species. Capacity building will entail increasing the limited knowledge among park staff about how and where species or populations migrate, conditions that enable migration, and identifying species' needs and resolving them both within and beyond parks. Building capacity will also require ensuring that park superintendents and staff at all levels support conservation beyond statutory borders. Until additional diverse stakeholders and a broader American public realize what can be lost and do more to protect it and engage more with land management agencies to implement actions that facilitate conservation, long distance migrations are increasingly likely to become phenomena of the past.

Danielsen F, Pirhofer-Walzl K, Adrian TP, Kapijimpanga DR, Burgess ND, Jensen PM, Bonney R, Funder M, Landa A, Levermann N, Madsen J. 2014. Linking public participation in scientific research to the indicators and needs of international environmental agreements. *Conservation Letters* **7,** 12-24.

(Abstract)

Different monitoring approaches collect data that can measure progress toward achieving global environmental indicators. These indicators can: (1) Audit management actions; (2) Inform policy choices; and (3) Raise awareness among the public and policy makers. We present a generic, empirically based, framework of different environmental monitoring approaches, ranging from scientist-driven to those undertaken by local people. This framework is used to assess monitoring possibilities for the Convention on Biological Diversity "2020" indicators, and those of 11 other international environmental agreements. Of the 186 indicators in these 12 environmental agreements, 69 (37%) require monitoring by professional scientists, whereas 117 (63%) can involve community members as "citizen scientists." Promoting "community-based" and "citizen science" approaches could significantly enrich monitoring progress within global environmental conventions. It would also link environmental monitoring to awareness raising and enhanced decision-making at all levels of resource management.

Policy 2013

Dellas E, Pattberg P. 2013. Assessing the political feasibility of global options to reduce biodiversity loss. *International Journal of Biodiversity Science, Ecosystem Services & Management* **9** (4):347-363.

(Abstract)

This article systematically assesses the likelihood of effective implementation of several key options to reduce global biodiversity loss, including 'conventional' biodiversity policies, such as expanding protected areas, and policies primarily developed for other purposes but with potential positive side effects for biodiversity, such as ambitious climate change mitigation efforts, forest protection, and sustainable fishing practices. While existing studies highlight the technical feasibility of implementing such policy options, their political feasibility is rarely considered in detail. Political feasibility refers to the constraints that either make agreement on policies difficult in the first place for limit or prohibit the effective implementation of agreed policies. Drawing on a broader research project that models the effectiveness of international environmental regimes based on the robust findings of regime theory, we utilize a novel assessment framework to study the political barriers and opportunities to the implementation of biodiversity policies at the global level. The analysis suggests that focusing on those options that are technically less ambitious is more likely to be implemented in the short term. In conclusion, the article highlights the importance of analyzing the institutional and governance-related aspects of policies to reduce biodiversity loss.

Yeh ET. 2013. The politics of conservation in contemporary rural China. *The Journal of Peasant Studies* **40**, 1165-1188.

(Abstract)

Placing conservation within a broad framework of agrarian and environmental politics, this review article argues that natural resource governance is fundamental to rural politics in China. Much of the environmental literature adopts a technocratic approach, ignoring the political nature of the redistribution of access to and control over natural resources, and of knowledge vis-à-vis degradation. Reading the managerial literature with and against the grain of political ecological studies, the essay reviews contemporary environmental issues including Payments for Ecosystem Services and other market-based approaches, the establishment of national parks and resettlement schemes justified through ecological rationales. The first section following the introduction focuses on two of the largest forest rehabilitation schemes in the world. Next, the paper reviews work on China's rapidly growing number of nature reserves, examining their role as enclosures and their entanglement with tourism income generation. This is followed by a discussion of research on the politics of rangeland degradation and property rights. The inclusion of pastoralism within the scope of rural politics is sometimes obscured by the fact that China's extensive rangelands coincide almost completely with its minority populations. The misrecognition of rural politics over resources and the environment as ethnic politics is addressed in the concluding section.

Ogato GS. 2013. The Human Ecology of Wetlands in Least Developed Countries in Time of

Climate Change: Policy and Strategy Implications for Wise Use and Conservation of Wetlands. *American Journal of Human Ecology* **2**, 127-138.

(Abstract)

This article is an outcome of the desk study on “The Human Ecology of Wetlands in Least Developed Countries (LDCs) in Time of Climate Chang: Policy Implications for Wise Use and Conservation of Wetlands.” Wetlands are among the most important ecosystems on Earth because of their unique hydrologic conditions and their role as ecotones between terrestrial and aquatic systems. Although many uses and values of wetlands are evident, historically wetlands have been regarded as wastelands which if possible, should be turned into something else that would be more useful. As a result, wetlands have been drained, turned into agricultural land, and commercial and residential developments at an alarming rate. The general objective of the study is to evaluate the status of wetlands in LDCs in time of climate change and identify policy and strategy implications. The findings of the study confirm that mainstreaming climate change adaptation and mitigation into sustainable development and natural resources conservation efforts of least developed countries (LDCs) is of paramount importance for conservation and sustainable utilization of wetlands in time of climate change. In conclusion, this review confirmed that deep wetlands generally capture carbon dioxide from and release methane to the atmosphere and the combination of these two fluxes determines whether these countervailing processes make a wetland system an overall contributor to the greenhouse effect. Moreover, both natural processes and human activities are responsible for the predicted wetland losses in least developed countries. Least Developed Countries may benefit from sustainable utilization and conservation of wetlands by responding to implications like anticipatory and systematic ‘Climate Change integrated Conservation Strategies’ in time of climate change.

Williams JH, Madsen J. 2013. Stakeholder Perspectives and Values when Setting Waterbird Population Targets: Implications for Flyway Management Planning in a European Context. *PLoS ONE* **8**, e81836.

(Abstract)

Managing and controlling wildlife species within Europe is an acknowledged part of conservation management, yet deciding and setting a population target in order to control a population is perceived to be conceptually very challenging. We interviewed stakeholders, within a variety of governmental and non-governmental organizations, to evaluate their perspectives about setting population targets as part of waterbird management for controlling population sizes. We conclude that the setting of a quantifiable population target is beneficial as a measurable objective for monitoring and evaluating management actions. However, it must be recognised as just one possible measurable objective and there may well be multiple supporting objectives that encapsulate the management aims of different stakeholders. When considering wide-scale control of waterbirds species, where it is likely that population size matters, any population target should be coupled to the issues being addressed. We highlight

that it is important to actively engage with stakeholders as part of the decision-making process, not only to gain consensus but to share knowledge. A clear understanding of the context and the rationale for controlling a waterbird species is needed to align the interests of diverse stakeholders. The provision of scientific data and the continuous monitoring of management actions is viewed as beneficial and demanded by stakeholders, as part of any decision-making process when setting population targets. This facilitates effective evaluation of management actions, helping managers make wise decisions as well as enabling the continued development of management plans.

Cook CN, Mascia MB, Schwartz MW, Possingham HP, Fuller RA (2013) Achieving Conservation Science that Bridges the Knowledge–Action Boundary. *Conservation Biology* **27,** 669–678.

(Abstract)

There are many barriers to using science to inform conservation policy and practice. Conservation scientists wishing to produce management-relevant science must balance this goal with the imperative of demonstrating novelty and rigor in their science. Decision makers seeking to make evidence-based decisions must balance a desire for knowledge with the need to act despite uncertainty. Generating science that will effectively inform management decisions requires that the production of information (the components of knowledge) be salient (relevant and timely), credible (authoritative, believable, and trusted), and legitimate (developed via a process that considers the values and perspectives of all relevant actors) in the eyes of both researchers and decision makers. We perceive 3 key challenges for those hoping to generate conservation science that achieves all 3 of these information characteristics. First, scientific and management audiences can have contrasting perceptions about the salience of research. Second, the pursuit of scientific credibility can come at the cost of salience and legitimacy in the eyes of decision makers, and, third, different actors can have conflicting views about what constitutes legitimate information. We highlight 4 institutional frameworks that can facilitate science that will inform management: boundary organizations (environmental organizations that span the boundary between science and management), research scientists embedded in resource management agencies, formal links between decision makers and scientists at research-focused institutions, and training programs for conservation professionals. Although these are not the only approaches to generating boundary-spanning science, nor are they mutually exclusive, they provide mechanisms for promoting communication, translation, and mediation across the knowledge–action boundary. We believe that despite the challenges, conservation science should strive to be a boundary science, which both advances scientific understanding and contributes to decision making.

2012

Sutherland, W. J., L. Bellingan, J. R. Bellingham, J. J. Blackstock, R. M. Bloomfield, M. Bravo, V. M. Cadman, D. D. Cleevely, A. Clements, A. S. Cohen, D. R. Cope, A. A. Daemmrich, C. Devecchi, L. Diaz Anadon, S. Denegri, R. Doubleday, N. R. Dusic, R. J. Evans, W. Y. Feng, C. J. Godfray, P. Harris, S. E. Hartley, A. J. Hester, J. Holmes, A. Hughes, M. Hulme, C. Irwin, R. C. Jennings, G. S. Kass, P. Littlejohns, T. M. Marteau, G. McKee, E. P. Millstone, W. J. Nuttall, S. Owens, M. M. Parker, S. Pearson, J. Petts, R. Ploszek, A. S. Pullin, G. Reid, K. S. Richards, J. G. Robinson, L. Shaxson, L. Sierra, B. G. Smith, D. J. Spiegelhalter, J. Stilgoe, A. Stirling, C. P. Tyler, D. E. Winickoff, and R. L. Zimmern. 2012. A Collaboratively-Derived Science-Policy Research Agenda. *PLoS ONE* **7**:e31824.

(Abstract)

The need for policy makers to understand science and for scientists to understand policy processes is widely recognised. However, the science-policy relationship is sometimes difficult and occasionally dysfunctional; it is also increasingly visible, because it must deal with contentious issues, or itself becomes a matter of public controversy, or both. We suggest that identifying key unanswered questions on the relationship between science and policy will catalyse and focus research in this field. To identify these questions, a collaborative procedure was employed with 52 participants selected to cover a wide range of experience in both science and policy, including people from government, non-governmental organisations, academia and industry. These participants consulted with colleagues and submitted 239 questions. An initial round of voting was followed by a workshop in which 40 of the most important questions were identified by further discussion and voting. The resulting list includes questions about the effectiveness of science-based decision-making structures; the nature and legitimacy of expertise; the consequences of changes such as increasing transparency; choices among different sources of evidence; the implications of new means of characterising and representing uncertainties; and ways in which policy and political processes affect what counts as authoritative evidence. We expect this exercise to identify important theoretical questions and to help improve the mutual understanding and effectiveness of those working at the interface of science and policy.

Takahashi, M. A. 2012. Migratory Bird Treaties' Issues and Potentials: Are They Valuable Tools or Just Curios in the Box. *Environmental Law* **42**:609-626.

(Abstract)

This Essay explores the achievements, issues, and potentials of bilateral migratory bird treaties (MBTs). MBTs have been successful in strengthening domestic laws and facilitating international cooperation for avian conservation. However, the merits of MBTs are mostly limited to migratory bird species in a limited number of countries. Multinational treaties, such

as the Bonn Convention, are likely to be capable of addressing these weak points. Nevertheless, MBTs are still a beneficial tool since multinational treaties tend to be inflexible, cumbersome, and politically driven. This Essay recommends expanding the network of MBTs geographically (which may become ancillary agreements of the Bonn Convention), as well broadening their scope to include all birds, including non-migratory species.

Cook CN, Carter RW, Fuller RA, Hockings M. 2012. Managers consider multiple lines of evidence important for biodiversity management decisions. *Journal of Environmental Management* **113**, 341-346.

(Abstract)

Protected area managers often fail to use empirical evidence for their management decisions, yet it is unclear whether this arises from a lack of available data, difficulty in interpreting scientific information for management application, or because managers do not value science for their decisions. To better understand the use of evidence for management decisions, we asked protected area managers in Australia what information is important when making decisions, the types of evidence they find most valuable, and the types of evidence they have for their protected areas. Managers described a complex array of information needed for management decisions, with nine different factors representing decisions about individual management issues and how to prioritize management actions. While managers reported less access to empirical evidence than other sources, this is not because they do not value it, reporting it to be the most valuable source of evidence. Instead, they make up the shortfall in empirical evidence with experience and information synthesized from multiple lines of evidence, which can provide important context for their decisions. We conclude that managers value a diversity of evidence because they face complex conservation decisions. Therefore, while empirical evidence can play an important role, alone this cannot provide all the knowledge managers need.

2011

Chandra, A., and A. Idrisova. 2011. Convention on Biological Diversity: a review of national challenges and opportunities for implementation. *Biodiversity and Conservation* **20**:3295–3316.

(Abstract)

The Convention on Biological Diversity (CBD) lies at the heart of biodiversity conservation initiatives. It offers opportunities to address global issues at the national level through locally grown solutions and measures. This article reviews the national challenges and opportunities in meeting requirements of the CBD by analysing twenty Third National Reports (TNRs),

covering five different CBD regional clusters from the three global economic groups. While there is a plethora of challenges, the predominant ones discussed in this study include: institutional and capacity, knowledge and accessible information, economic policy and financial resources, cooperation and stakeholder involvement, and mainstreaming and integration of biodiversity. The underlying problem is that limited capacity in developing countries and transition economies undermines conservation initiatives. Lack of capacity in science, coordination, administration, legislation, and monitoring are barriers to on-ground implementation of biodiversity programmes. Opportunities to overcome these challenges embrace use of knowledge products, information-sharing mechanisms, participatory platforms, educational programmes, multi-level governance, and policy coherence. Innovative market-based instruments are also being trialled in various countries, which seek to offer incentives to local communities. The article concludes that conservation measures should be supported by multiple sectors and secure high level political support. Political, economical, and legislative sectors are more likely to show interest in CBD implementation and use it as a tool for managing biodiversity when they know the Convention processes and perceive it as a benefit. Modest investments in capacity building and training, and engaging different sectors in setting priorities would have a significant pay-off.

Sutherland, W. J., E. Fleishman, M. B. Mascia, J. Pretty, and M. A. Rudd. 2011. Methods for collaboratively identifying research priorities and emerging issues in science and policy. *Methods in Ecology and Evolution* **2**:238–247.

1. There is a widely recognized gap between the data generated by researchers and the information required by policy makers. In an effort to bridge the gap between conservation policy and science, we have convened in several countries multiple groups of policy makers, practitioners and researchers to identify priority information needs that can be met by new research in the social and natural sciences.

2. The exercises we have coordinated included identification of priority policy-relevant research questions in specific geographies (UK, USA, Canada); questions relating to global conservation; questions relating to global agriculture; policy opportunities in the United Kingdom; and emerging global conservation issues or ‘horizon scanning’.

3. We outline the exercises and describe our methods, which are based on principles of inclusivity, openness and democracy. Methods to maximize inclusiveness and rigour in such exercises include solicitation of questions and priorities from an extensive community, online collation of material, repeated voting and engagement with policy networks to foster uptake and application of the results.

4. These methods are transferable to a wide range of policy or research areas within and beyond the conservation sciences.

2010

Runhaar, H., and K. van Nieuwaal. 2010. Understanding the use of science in decision-making on cockle fisheries and gas mining in the Dutch Wadden Sea: Putting the science–policy interface in a wider perspective. *Environmental Science and Policy* **13**:239-248.

(Abstract)

The use of science to inform and underpin decision-making on natural resources is not self-evident as stakeholders often use science in a selective and strategic way. Scientific analyses of science utilisation often focus on how the science–policy interface is organised and from this perspective provide recommendations to scientists about how they can increase their contribution to decision-making. Yet in this paper we argue that a wider perspective on the science–policy interface, in particular by analysing the roles and interactions of actors other than those directly involved, provides both additional explanations and new points of application for strategies aimed at enhancing science utilisation. We illustrate our claim by means of an analysis of decision-making on cockle fisheries and gas-mining in the Dutch Wadden Sea between the 1990s and 2004. For many years, scientific studies addressing the ecological effects of these activities were not used to meaningfully contribute to decision-making. In 2004 this situation changed radically. Explanations include the role of intermediaries between scientists, stakeholders and decision-makers and new legislation. Scientists could enhance the chances of knowledge utilisation both by creating a more open science–policy interface and by reframing the policy problems at issue.

2006

McBeath J, McBeath JH. 2006. Biodiversity Conservation in China: Policies and Practice. *Journal of International Wildlife Law & Policy* **9** (4):293-317.

(Abstract)

This article has surveyed biodiversity conservation policies and practice in China, one of the world's 17 "mega-diversity" countries. Because of China's vast size, varied ecological regions, and ancient centers of evolution, it contains huge stores of diverse chordate, plant, and other species. China's charismatic mega-fauna, such as the Giant Panda, are treasured globally, and because their numbers are growing, many say they are reasonably well protected domestically. However, most endangered and threatened species lack adequate protection, and potential for species loss is great. We described the elements of China's biodiversity protection regime—the large number of laws and regulations pertaining to species and ecosystem preservation. We reviewed the expansive system of protected areas—over 2,000 in 2005, covering 15 percent of China's lands—and considered China's participation in international biodiversity conventions. By number of elements, this regime is impressive and

complex, yet it lacks comprehensiveness and falls short of a strategic plan. For implementation of conservation efforts, China employs a broad array of central ministries and bureaus, which specify goals, objectives, and priorities. As is the case in economic development activities of the reform era, China has devolved conservation responsibility to provincial and local environmental protection bureaus. As a result, the actual practices of species preservation are uneven, in many areas differing considerably from national goals. The State has become heavily reliant on international funding to support conservation programs. It has also permitted NGOs to operate so long as they do not threaten authoritarian rule. China's biodiversity protection regime faces serious challenges. The regime is not yet nested within an integrated framework of law, while the "rule of law" in China remains at a developmental level. Managing species preservation requires greater horizontal and vertical integration than has been attained to date. Confronting far greater pressures to develop China's poor regions and alleviate poverty, the state has been unable to allocate sufficient resources to species preservation, and is reliant on foreign donor support. Many of those who administer laws and enforce regulations lack information and training in the biological sciences and ecology, and they have few incentives to preserve species. Finally, the entire enterprise of biodiversity conservation conflicts with the state's priority goal of economic development. Chinese scientists, environmental activists, and government officials are aware of these problems, and have taken important steps to address them. This can be seen in an emergent "Chinese approach" to biodiversity conservation. Huge obstacles remain in resolving this set of sustainability issues, but the adoption of preservationist attitudes by many in China's new elite is a promising development.