

DECISION POINT

Connecting conservation policy
makers, researchers and practitioners

Issue #85 / February 2015



Offset this
The prickly issue of
different national
approaches to offsetting



Fighting the impact of chytridiomycosis



**Making better use of Data
Deficient species**



**Fishing enforcement and
conservation**

Decision Point

Decision Point is the monthly magazine of the Environmental Decisions Group (EDG). It presents news and views on environmental decision making, biodiversity, conservation planning and monitoring. See the back cover for more info on the EDG. *Decision Point* is available free from <http://www.decision-point.com.au/>

Plus

Untangling the pretzel logic of conservation
Comparing biodiversity offset methodologies
Communicating to conservatives
Sustainable fish and chips

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Introducing *Decision Point en Español*



A desert hedgehog, a native of Uzbekistan. In this issue we compare offset policies from around the world and how they might work in providing better environmental outcomes for creatures such as the desert hedgehog. See the story on page 6. (Photo by Joe Bull)

On the point

If

If we acknowledged the pretzel logic of current conservation thinking – attempting to preserve a historically intact nature while managing it to be futuristically flexible – would we open space for more effective outcomes? Nicole Heller and Richard Hobbs believe it's worth a shot. (see page 4)

If we applied offset policies from different countries to one case study in Uzbekistan, would they yield the same outcomes (after all, they all share the same basic goal: no net loss)? Joe Bull tried it, and they don't! (See page 6)

If we attempted to include Data Deficient species (it's an IUCN Red List category) into our conservation analysis, would it alter our perception of conservation risk? Lucie Bland looked into it and it makes an enormous difference. (see page 8)

If enforcement of fishing rights was more widely practiced along Chile's coastline, would conservation benefit? Katrina Davis thinks it would. (see page 10)

If environmental researchers made more of an effort to communicate to conservatives, would it make a difference? Winnifred Louis makes a compelling argument that it's worth a go. (See page 12)

If you were attending a conservation conference, would you ask if the fish being served was sustainably sourced? Carissa Klein did some checking and, on average, you probably don't. (See page 14)

If Decision Point was to appear in Spanish, how many more potential readers might we reach? Duan Biggs estimates around 500 million; so we're putting out a Spanish version. (see page 15)

And if everyone with an interest in conservation outcomes were to read Decision Point cover to cover, would the world be a better place? Undoubtedly! 🍷

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DECISION POINT

Decision Point is the monthly magazine of the Environmental Decision Group (EDG). The EDG is a network of conservation researchers working on the science of effective decision making to better conserve biodiversity. Our members are largely based at the University of Queensland, the Australian National University, the University of Melbourne, the University of Western Australia, RMIT and CSIRO.

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Developing an environmental offsets policy

Environmental offsetting involves compensating for the residual adverse impacts of an action on the environment by generating an equivalent benefit elsewhere. As the prevalence of environmental offsetting grows, so does the challenge of translating no-net-loss goals to workable policy. From 2011–2012, the Australian Government developed an Environmental Offsets Policy and an accompanying metric (the Offsets Assessment Guide) to support decision making about offset requirements under the Environment Protection and Biodiversity Conservation Act 1999. Through extensive stakeholder consultation and in collaboration with academic researchers, the Guide was developed with the aim of accounting appropriately for ecological equivalence in a transparent and flexible manner. (For background on this see [Decision Point #69](#))

This paper outlines the development of the Australian Government's environmental offset policy. The Guide explicitly estimates the extent to which an offset will improve the target biota and/or avert future losses, the degree of confidence that the offset will be implemented successfully, and the time it will take to deliver a conservation benefit.

Since implementation of the Environmental Offsets Policy and the Guide, there has been a shift in focus from estimating offset requirements based on simplistic area ratios, toward directly evaluating the components of an offset action that determine its environmental performance. Achieving a balance between scientific robustness and policy workability is an ongoing challenge. The Environmental Offsets Policy and Guide represent an important step towards consistency and transparency in environmental offset decision-making. 🍌

Reference

Miller KL, JA Trezise, S Kraus, K Dripps, MC Evans, P Gibbons, HP Possingham & M Maron (2015). The development of the Australian environmental offsets policy: from theory to practice. *Environmental Conservation*
DOI: <http://dx.doi.org/10.1017/S037689291400040X>

Fighting the impact of chytridiomycosis

Despite the rise of disease as a key conservation challenge, the management of wildlife diseases affecting biodiversity, especially non-mammals, remains in its infancy. Chytridiomycosis, for example, caused by the pathogenic skin fungus *Batrachochytrium dendrobatidis*, has devastated amphibian communities globally and is considered the worst recorded wildlife disease. Infection has been detected in 42% of amphibian species sampled, and a conservative estimate suggests that chytridiomycosis has caused the severe decline or extinction of over 200 species. Despite the diagnosis of chytridiomycosis as an important driver of global amphibian declines 15 years ago, researchers have yet to devise effective large-scale responses (other than biosecurity measures) to mitigate the spread of the disease. Nor have they been able to establish captive assurance colonies that are disease-free prior to or during disease outbreaks.

Ben Scheele and colleagues examined the development of management actions that can be implemented after an epidemic in surviving populations. They developed a conceptual framework with clear interventions to guide experimental management so that further extinctions of amphibian species threatened by chytridiomycosis might be prevented.

Under-the-radar impacts of development

Identifying the deleterious ecological effects of developments, such as roads, mining, and urban expansion, is essential for informing decisions surrounding these developments and identifying appropriate forms of mitigation. Impact evaluations tend to reduce complex impacts of human activity to simple, user-friendly metrics to streamline integration of economic and environmental concerns in decision making. They are usually limited in scope to impacts on a predetermined subset of environmental values. Impact evaluations are also limited by the knowledge and tools available for identifying impacts, the skills, interests, and motivations of the people conducting, approving, and auditing evaluations, and political dynamics.

As a consequence of these limitations, there are many types of ecological impacts that slip 'under the radar' of conventional impact evaluations and undermine the potential for successful impact mitigation (including offsets). These 'enigmatic' impacts can be cumulative, offsite, cryptic, or secondary. They include those that are small but act cumulatively; those outside of the area directly considered in the evaluation; those not detectable with the methods, paradigms, or spatiotemporal scales used to detect them; those facilitated, but not directly caused, by development; and synergistic impact interactions.

In this review, Keren Raiter and colleagues propose a framework for conceptualising enigmatic impacts and discuss ways to address them. Potential solutions include improved strategic and cumulative assessments, no-development and restricted access zones, addressing historical impacts, improving professional and ethical practice and decision-making processes, and adopting environmental insurance schemes. Ultimately, it is reasonable to expect a fair accounting process whereby the beneficiaries of development are responsible for the full environmental costs of those developments, including costs that are currently borne by the broader society and future generations. 🍌

Reference

Raiter KG, HP Possingham, SM Prober and RJ Hobbs (2014). Under the radar: mitigating enigmatic ecological impacts. *Trends in Ecology & Evolution* 29: 635-644.
<http://www.sciencedirect.com/science/article/pii/S0169534714001980>

Within their framework there are two management approaches: reducing *Batrachochytrium dendrobatidis* in the environment or on amphibians and increasing the capacity of populations to persist despite increased mortality from disease. The latter approach emphasizes that mitigation does not necessarily need to focus on reducing disease-associated mortality. They propose promising management actions that can be implemented and tested based on current knowledge and that include habitat manipulation, antifungal treatments, animal translocation, bioaugmentation, head starting, and selection for resistance. Case studies where these strategies are being implemented will demonstrate their potential to save critically endangered species of amphibians. 🍌

Reference

Scheele BC, DA Hunter, LF Grogan, L Berger, JE Kolby, MS Mcfadden, G Marantelli, LF Skerratt and DA Driscoll (2014). Interventions for Reducing Extinction Risk in Chytridiomycosis-Threatened Amphibians. *Conservation Biology* 28(5):1195-1205.
<http://onlinelibrary.wiley.com/doi/10.1111/cobi.12322/abstract>

Adapting conservation goals to global change

Untangling the pretzel logic of conservation?

By Nicole Heller (Dwight Center for Conservation Science, California) and Richard Hobbs (EDG, UWA)

Conservation goals at the start of the 21st century reflect a combination of contrasting ideas. 'Ideal nature' is something that is historically intact, but at the same time, futuristically flexible. Ideal nature is independent from humans, but also, because of the pervasiveness of human impacts, only able to reach expression, or maintain itself, through human management. It's very pretzel-like in its logic (see box on 'Pretzel logic').

In a recent reflection on this conundrum, we attempted to make sense of these inherent tensions in an effort to understand what are appropriate goals for conservation in a time of rapid global change (Heller and Hobbs, 2014). Our exploration led to the development of an approach that we have called 'natural practice'.

Pretzel logic

- "Those days are gone forever
- Over a long time ago, oh yeah"
- *Pretzel Logic*, Steely Dan (1974)
- Steely Dan wasn't writing about climate change back in 1974; that was a notion that still lay in the future. What the band was referring to was how things change over time, and how yesterday's dreams and goals can become irrelevant as the world moves on – yesterday's goals may even create today's problems. We felt this was a useful way to regard conservation goals because our engagement with these goals is becoming 'pretzel-like' – wrapping around in a twisted logic (Figure 1).
- The reason for the pretzel status is understandable. Scientists and managers are struggling to accommodate old and new scientific and cultural thinking, while at the same time implementing legal mandates from the past to preserve particular species in particular places. Conservation rhetoric seems to paradoxically ask that managers allow for change so that ecosystems can adapt, while at the same time not permit change so that systems can remain intact (ie, not damaged or impaired).
- Consider discussions surrounding adaptation to climate change. On the one hand there are recommendations suggesting that biodiversity managers intervene dramatically to resist change and maintain species populations. At the same time managers are encouraged to broaden their notions of what belongs and what is resilient. Conservation managers may increasingly find themselves having to choose or find a balance between future-looking management emphasizing change, and past-looking management emphasizing persistence. Is a balance possible in practice?

Benchmarks of naturalness

Common management goals to maintain ecosystems in a desired state – goals such as integrity, wilderness and resilience – rely on native, historic communities as indicators. All goals share a conceptual coupling of place and historical species composition as an indicator of naturalness (eg, native, historical = normal, healthy, independent from humans). This is the case regardless of whether the goals are looking forward and focused on sustainability and change (such as resilience), or looking back and focused on the persistence and restoration (such as integrity) (see Figure 2). The coupling creates 'essentialisms' about how ecosystems should be (eg, what species should be there) in order to be considered 'natural'. Yet, ecosystems are changing and indeed must change as they evolve in response to global change.

We argue that, from a strategic perspective, our dependence on historic states as benchmarks of naturalness is limiting options of managers to accommodate the dynamic, and often novel, response of ecosystems to global change. The critical question that we must ask then to succeed in biodiversity conservation in a time of rapid change is: How can we visualize intact, healthy nature that does not resemble known natural histories?

We need to ask at what point does the effort to conserve or restore all the parts and relationships, as described by human agents at particular points in time, undermine the resilience or self-expression of the whole? That is, does an approach aiming to maintain current assemblages in a particular place actually work against the adaptive behaviour of individual species and the formation of assemblages that are resilient to ongoing change?

Goals that focus on specific endpoints, reference states, and benchmarks create expectations about how and when ecosystems should change. Management thus requires human agents to intentionally control the degree and rate of change.

Beyond endpoint goals

To get out of this situation, we propose that that we move beyond endpoint goals and move toward establishing process goals. In particular, we advocate the development of process goals related to human behaviour in management, as a process to establish a framework for interventions, such as invasive species management, fire management, and restoration.

The reason to focus on human behaviour in management is that the way we interact with other species influences our ability to cultivate naturalness on the landscape. Specifically, we argue that the extent to which our interactions are similar to the interactions among other biotic organisms, and also reflect our conservation virtues (eg, humility, respect) will impact on whether 'naturalness' emerges.

Of course 'naturalness' is a subjective term that can be defined in different ways. Anything can be 'natural' depending on your definition. We use the term here in the sense that is strongly articulated in philosophy of conservation and environmental ethics – namely that nature is that which is independent of intentional human control, and is not regulated through deliberate human technological interventions.



Figure 1: Pretzel logic in conservation

“At what point does the effort to conserve or restore all the parts and relationships, as described by human agents at particular points in time, undermine the resilience or self-expression of the whole?”

Thus to cultivate naturalness, as an emergent property of an ecosystem, we need to stop being dominators and instead become participants. And our participation, just like other organisms, can either promote or prevent diversity through local behavioural interactions. By shifting our perspective on our role, we can think about how to interact positively with ecosystems to support both preservation and allow for transformation in response to global change.

Natural practice as a framework

We call this goal a ‘natural practice’ and propose it as a framework for prioritizing and formulating how, when, and where to intervene in this period of rapid change. Clues from ecology and ethics serve as guidelines for questions to be asked in defining a natural practice.

Ecological science provides many clues about how biotic agents behave within ecological communities, the scale and impact of behaviour, and what behaviours tend to produce diversity.

Conservation ethics provides clues about human character traits that are desirable and conducive to conservation (eg, humility, respect, restraint, care, reflection). These traits are important because they are distinctly different from the traits commonly expressed toward nature in modern industrial development that are at the root of biodiversity decline.

Natural practice is not about a specific set of recommendations, but envisions a process of debate and reflection that interrogates methods of management at the start of the 21st century. An intervention decision should include the question: What species assemblages are compatible with an appropriate set of practices? This shifts management methods from defining static endpoint targets and using almost any means possible to try to establish targets, to defining broad goals and the pursuit of human-non-human interactions that are deemed consistent with the natural biotic processes that are to be honored in conservation.

This requires thoughtful consideration of when and how to intervene and recognizes the need for prioritization of conservation interventions given the increasing number of species at risk.

Biodiversity conservation is a wicked and complex problem, replete with many undesirable trade-offs. We argue that change is increasingly the norm, so management for specific visions of what nature should be is becoming increasingly inappropriate because these visions are simply unattainable. To better accommodate global change and the dynamic response of ecosystems, management goals should expand from static endpoint targets to include norms of practice. Focusing on practice can contribute to a framework for prioritizing and formulating how, when, and where to intervene.

We suggest that this approach may help integrate the need for adaptation with the desire for preservation, thus ultimately protecting biodiversity better on long-time scales.

More info: Nicole Heller heller.nicole@gmail.com

Reference

Heller NE & Hobbs RJ (2014). Adapting conservation goals to global change by expanding them beyond endpoints. *Conservation Biology* 28: 696–704.

Past, present and future goals

- Past-looking orientations search for earlier times when nature was more fully expressed on the landscape. Industrial human activity (pre-European) is often seen as a critical break in nature.
- Authenticity, ecological integrity, and historical fidelity focus on

pre-industrial ecological conditions and the historical range of variability in recent centuries to situate nature.

Recognition of the transformative effect of indigenous humans on ecosystems motivates some people to look nature further back in time (pre-history). Re-wilding promotes the introduction of exotic animals from Africa to function as proxies for extinct mega-fauna in North America.

Present-focused biological management tends to focus on ecosystem health. This translates into controlling the most pressing threats to keep systems providing ecosystem services, and looking to reference states found in the present for guidelines. For example, the Index of Biotic Integrity assesses a site’s status relative to a similar undisturbed or the least-disturbed reference community in a region.

Future-looking orientations tend to focus on near-term sustainability and promote goals like resilience. Resilience seeks to diminish the possibilities for maladaptation that might occur if systems are manipulated to mimic the past when the environmental and social context of places has changed dramatically. The bottom of figure 2 shows a graph depicting a hypothetical line of the level of knowledge about ecosystem states across time. Knowledge about past conditions decays slowly at first, and then rapidly going further into the past. Future projections show average regional trends, but local realizations and rates of change are highly uncertain in the near and distant future.

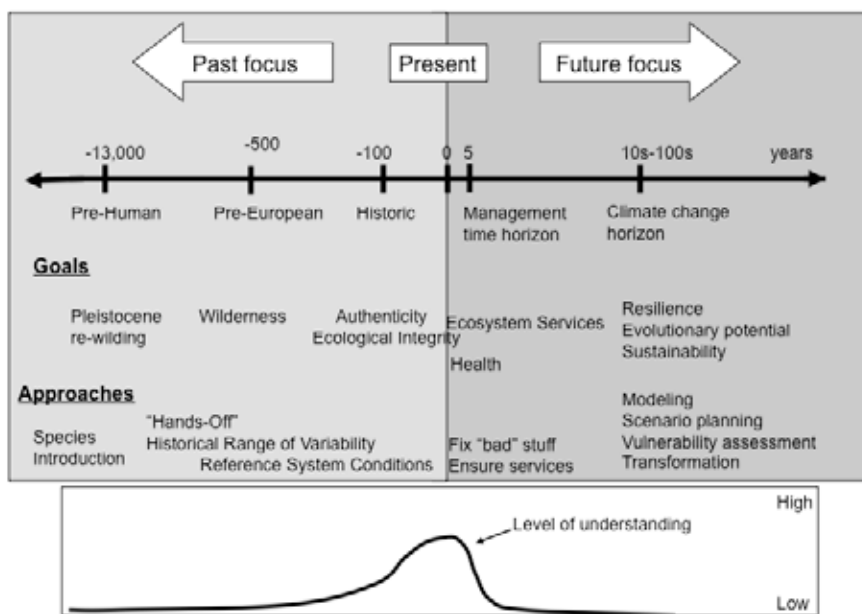


Figure 2: Some examples of common management goals are shown with their orientation in time (with examples of typical approaches). (From Heller & Hobbs 2014).

Comparing biodiversity offset methodologies

Divergence in securing ‘no net loss’

By Joseph Bull (Imperial College London, UK)

There are at least 45 ‘biodiversity offset’ programmes and policies currently in place around the world. The common fundamental principle – that unites what is, in fact, a disparate array of related policies – is the need to ensure that there is ‘no net loss’ of biodiversity alongside economic development. That is to say, biodiversity gains achieved through offset interventions should, as a minimum, be greater than the residual biodiversity losses caused as a result of development impacts for a given project.

Whilst this concept of no net loss might seem relatively straightforward in theory, actually achieving it is something different entirely. One key challenge, assuming that the negative impacts of development are known with some degree of accuracy (which is certainly not always the case), is then deciding how to calculate the requisite biodiversity gains that would result in no net loss.

The various policies that do exist have established different methodologies that tell you exactly how large your gains need to be. Since the basic goal of all of these methodologies is the same – that is, no net loss – one might hope that they would give similar answers if they were applied to a common case study. Well, we tested this approach and it turns out they don’t (Bull et al., 2014). This analysis highlights how different the philosophy behind biodiversity offsetting in different countries can be.

Different approaches, same case study

The comparison analysis came about because we had collected data on the habitat impacts of oil and gas development for a region in northwest Uzbekistan (discussed in [Decision Point #17](#)). A separate initiative is underway to develop a biodiversity offset policy for Uzbekistan, and colleagues from the United Nations Development Programme and state institutions were asking us what biodiversity offset methodology we would recommend (ie, how to calculate the requisite habitat restoration gains). In response to this, we decided to see what would happen if we applied a range of biodiversity offset calculation methods to the same Uzbek case study.

As offset methodologies are designed for different habitats in different countries, we focused on the general principles underlying each methodology. We chose to apply the following to Uzbekistan:

US wetland banking, US conservation banking, Victorian native grassland compensation, a version of the Victorian native grassland compensation specially adapted to the Uzbek landscape, Canadian fish habitat compensation, and the relatively new UK biodiversity offset method. The details of how we applied each different approach, and estimated the impact on fauna and flora resulting from the oil and gas activities, are contained within the paper itself and supplementary materials.

The take away message is that applying different methods for calculating the required offset activities resulted in highly divergent outcomes for biodiversity (which was expressed as habitat condition x area, or ‘weighted area’ in Table 1). The differences are even starker if you calculate net biodiversity outcomes over time – we assumed a 40 year period, which is the same length of time as these oil and gas reserves have been exploited (Figure 1).

Explaining divergence

There are various reasons for the divergence in outcomes (as seen in Figure 1). One is that some offset methodologies have multipliers incorporated into the basic metric, which require gains to be multiplied by some factor to account for restoration uncertainty and time lags (eg, the UK metric) whereas others do not (eg, US wetlands).

A second is that some metrics are highly prescriptive (eg, Victorian grasslands) whilst others are almost completely open to interpretation (eg, Canadian fish habitat – although note that this policy has recently been revised). This means that methods such as the one used in Victoria are strongly tied to Australian habitats, which in turn makes them relatively hard to transfer to a different set of habitats without adaptation – a finding that would seem trivial, were it not for the fact that there are instances of decision makers attempting to transfer the Victorian method wholesale to completely different regions.

A third reason for the divergence is that some of the methodologies permitted exploration of ‘out-of-kind’ offsets (eg, the application of the Canadian method to fauna): we allowed vegetation losses to be compensated with gains in habitat for priority fauna species, and calculated net outcomes using a rough equivalency scale. Although

Offset policy	Target	Weighted area [km ²]	Uncertainty [km ²]
1. Area only (US)	Habitat	220	± 19
2. Area and condition (Victoria)	Habitat	125	± 11
3. Area and condition (UK)	Habitat	396	± 34
4a. Area and functionality (Canada)	Habitat	220	± 19
4b. Area and functionality (Canada)	Species	532	± 46
5. Area and condition (US)	Species	532	± 46
6. Area based (US)	Species	9023	± 779
7. Area & condition (Victoria adapted)	Habitat	227	± 20
A proposed protected area in the region	Saiga antelope habitat	7352	n/a

Table 1: Comparison of aggregated offset requirements across different methodologies, expressed as the weighted area within which conservation actions must be applied, under a static appraisal of 40 years of oil and gas development. Uncertainty represents the potential range in spatial extent of oil and gas infrastructure. Saiga habitat is, for context, the area of a proposed reserve available for restoration of habitat condition under species-based offsetting.

“These reasons for the divergence in outcomes link back ultimately to the philosophy behind offsetting, and how this varies between different jurisdictions.”

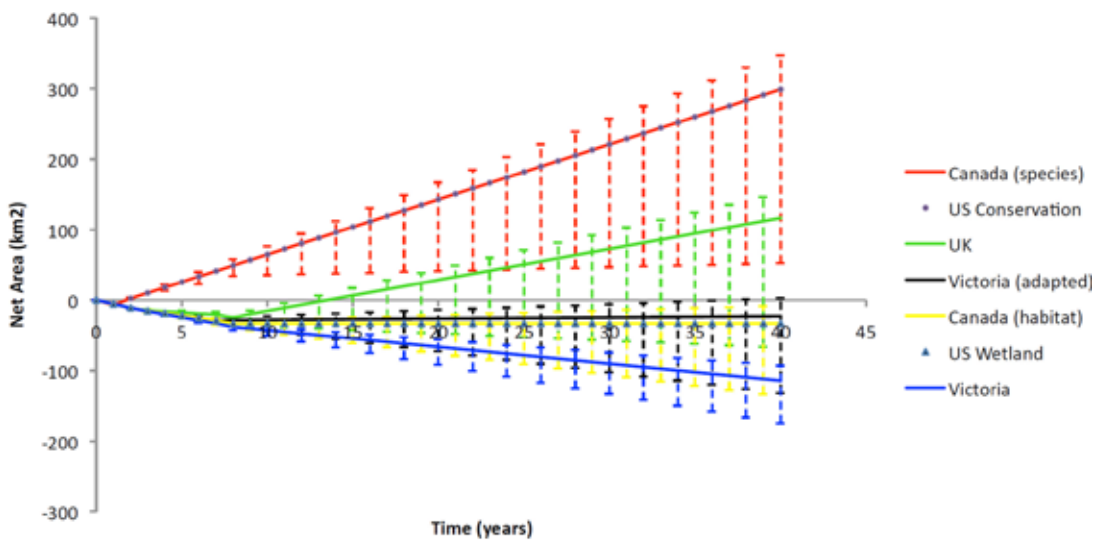


Figure 1: Plot of net weighted area of land at benchmark condition (in km²) against time (in years) resulting from hypothetical offsets in Uzbekistan, using different methodologies. The Canadian method applied to species and US Conservation methods are exactly aligned, and represent 'out-of-kind' offsetting here. Upper and lower bounds reflect uncertainty in both estimation of impacts and, for the lower bound, the possibility of up to 50% non-compliance.

this analysis was illustrative only, it does provide at least some support to the argument for considering out-of-kind biodiversity offsetting.

The consequences of divergence

All of these reasons for the divergence in outcomes link back ultimately to the philosophy behind offsetting, and how this varies between different jurisdictions. Whilst some societies might allow out-of-kind offsetting for practical reasons, others might simply deem it inappropriate or even potentially immoral; part of the reason for the recent fuss about offsetting in the UK media.

Alternatively, some social or institutional contexts might favour a more prescriptive approach (I get the impression from colleagues



Oil and gas activity results in a variety of known impacts upon the Ustyurt habitat, including clearance of vegetation, disturbance to fauna, pollution of soils, increased natural resource use (particularly water, which is in short supply), and facilitation of poaching. However, it also provides sorely needed employment and income to those living in the region. (Photo by Joe Bull)

there that this would be the case in Uzbekistan), whereas others value the freedom to interpret policy individually.

In any case, the findings highlight that the method used to quantify losses and gains strongly influences the biodiversity outcomes of offsetting, which is interesting in itself. In turn, this may imply that offsets generated using different methodologies are not directly transferable between jurisdictions. The latter conclusion is not purely academic, as there have been mumbblings for some time now about the potential for trans-jurisdictional (eg, international) biodiversity offset credit trades.

Again, the fundamental point of biodiversity offset policies is generally to ensure 'no net loss'. But it is far from clear, or at least far from clearly stated, what

exactly different jurisdictions are trying to achieve no net loss of. In fact, a lack of clarity and definition over what we actually want to conserve – species diversity, habitat diversity, ecosystem functions, ecosystem services, ecosystem stability or resilience, some or all of the above – is a wider challenge for conservation science.

By designing methodologies to achieve even a seemingly objective goal such as 'no net loss', we inevitably encode subjective values into the policy. This is perhaps not always recognized. Analyses such as ours highlight the importance of this topic. ●

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References

Bull JW, EJ Milner-Gulland, KB Suttle & NJ Singh (2014). Applying different biodiversity offset calculation methodologies to a case study in Uzbekistan. *Biological Conservation* 178: 2–10. <http://www.sciencedirect.com/science/article/pii/S0006320714002663>



Despite the flat, open and rather bleak nature of the Ustyurt landscape, it hosts all kinds of species - such as this rather shy species of desert hedgehog, who reluctantly posed for photos after we fed it a hard-boiled egg. (Photo by Joe Bull)

Monitoring changes in biodiversity with limited data

Predicting the conservation status of IUCN Data Deficient species

By Lucie Bland (University of Melbourne)

In 2010 Conservation International launched its *Search for lost frogs*, in an attempt to find a hundred amphibian species not seen in over a decade. Only four of those one hundred species were re-discovered, highlighting both the increasing risk of extinction to amphibian species, and the limited knowledge of their survival status. Millions of species remain to be discovered, and we lack ecological and distribution information for most of the world's described species. Given this paucity of knowledge, how can we effectively conserve biodiversity?

My PhD attempted to solve this question by studying one of the world's foremost conservation tools: the IUCN Red List of Threatened Species. The Red List assigns a category of extinction risk to species based on quantitative criteria, and so far has assessed more than 74,000 species.

After an internship at the IUCN Headquarters in Switzerland in 2009, I became interested in the data (or lack thereof) underpinning the Red List. Indeed, one in six species on the Red List are assessed as Data Deficient due to limited knowledge of their ecology,



Data Deficient species are predominantly brown and well hidden. The Bornean ferret badger (*Melogale everetti*) is listed as Data Deficient as the impact of potential threats is unknown (Photo: Arkive).

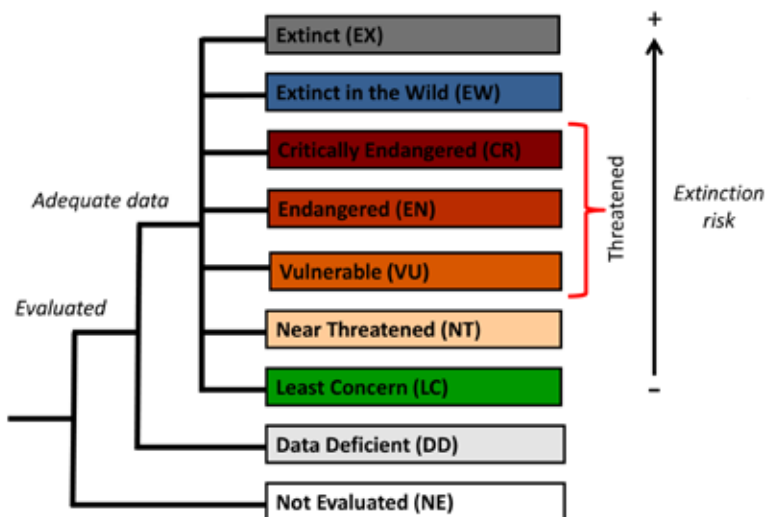


Figure 1: the IUCN Red List categories (Figure by Lucie Bland).

Being Data Deficient

Around one sixth of the species assessed by the IUCN are classified as Data Deficient. This assessment is due to a lack of information in a number of categories including taxonomy, geographic distribution, population status or threats. Around 15% of mammals, 25% of amphibians, 19% of reptiles and 49% of freshwater crabs are classified as Data Deficient. Where do you prioritise your conservation effort for freshwater crabs when every other species has insufficient data to enable its conservation status to be determined?

Uncertainty within many groups about the true level of extinction risk of Data Deficient species considerably influences our understanding of patterns of threat because the distribution of Data Deficient species is often taxonomically and spatially biased. Genuinely threatened Data Deficient species may be neglected by conservation programs due to their uncertain conservation status.

distribution and population status (see the box on being Data Deficient and figure 1). At this stage it was not known how much Data Deficient species influenced conservation priorities derived from the Red List. In 2010 I embarked on a PhD at the Zoological Society of London and Imperial College London to resolve this question.

Uncertain global patterns of extinction risk

I first studied the potential effect of Data Deficient species on perceived patterns of extinction risk in freshwater invertebrates (Bland et al., 2012). Freshwater invertebrates (crayfish, dragonflies and freshwater crabs) have recently been assessed by the IUCN, but show very high levels of data deficiency: 30-49% of species are assessed as Data Deficient.

I simulated the effects of three scenarios concerning Data Deficient species on patterns of extinction risk. The first scenario assumed no Data Deficient species were actually threatened, the second that Data Deficient species were as threatened as other species, and the third had all Data Deficient species as being threatened.

Globally, patterns of extinction risk among geographical regions and invertebrate families didn't change much. However within continents, Data Deficient species completely masked any pattern identifying over-threatened families or countries which could have benefited from conservation actions. Data Deficient species are therefore a considerable source of uncertainty for the Red List.

Predicting extinction risk

Although insufficient for formal red listing, some data do exist on Data Deficient species. For example, we know the distribution of many Data Deficient species, so we can infer exposure to large-scale threats by combining distribution maps with spatial data on human population density or deforestation. We can also collect data on species' body size or ecology from species descriptions and museum specimens. Predicting extinction risk from such basic data could help us rapidly understand the conservation status of thousands of species worldwide.

“Globally, patterns of extinction risk among geographical regions and invertebrate families didn’t change much. Within continents, however, Data Deficient species completely masked any pattern identifying over-threatened families or countries which could have benefited from conservation actions.”

I first tested this idea on mammals. I collected data for species of known conservation status, and predicted their IUCN Red List status with seven different Machine Learning models (Bland et al., 2014). Machine learning models are flexible and powerful tools for finding patterns in data sets (see the box on machine learning). The models correctly predicted the status of 94% of threatened species, and correctly predicted the global distribution of threatened mammals.

When applied to Data Deficient species, the models predicted 64% of Data Deficient mammals to be at risk, increasing the proportion of threatened mammals from 22 to 27%. This means that we may have underestimated threat levels in mammals, because poorly-known species tend to be at very high risk of extinction.

Poorly-known species typically have small range sizes, and occur in remote areas that can be subject to large threats (eg, deforestation and mining). Geographic regions containing large numbers of potentially threatened Data Deficient mammals are already conservation priorities, suggesting that poorly-known species are reasonably well covered by conservation schemes.

A cost-effective IUCN Red List

In 2013 I visited two CEED hubs (The University of Melbourne and The University of Queensland) to apply my models in a decision-theoretic framework. Surveying and re-assessing all Data Deficient species would cost a minimum of US \$300 million, but funding towards poorly-known and uncharismatic species is very scarce. Cost-effectively understanding the conservation status of Data Deficient is therefore a priority.



Zimmermann's poison frog (*Ranitomeya variabilis*) is assessed as Data Deficient as it has recently been distinguished from another similar species. The genus *Ranitomeya* is very poorly-understood and may contain many more new species. (Photo: Arkive)

I focused on cost-effectively estimating risk levels in Data Deficient species with the right balance of IUCN and model-based conservation assessments. I extended the method to amphibians, reptiles and crayfish, and also looked at the effect of poor data quality on model outputs. I concluded that models and decision theory could provide large monetary savings for the IUCN Red List (up to 69%). This would enable the cost-effective monitoring of progress towards international biodiversity targets, such as the 2020 Aichi Targets.

I am currently collaborating with CEED hubs to prioritize individual Data Deficient mammal species for field surveys and IUCN Red List assessments. I will use Liana Joseph's Project Prioritization Protocol to allocate money to Data Deficient most in need of conservation attention. I will take into account species' predicted extinction risk, their evolutionary value, and the financial costs and anticipated success of field surveys.

Known unknowns

Data Deficient species can also represent global patterns of conservation knowledge deficiency. Because the Data Deficient category is similarly applied among different animal and plant groups, we can determine how conservation knowledge is accumulating within each of these groups.

I found that global patterns of conservation knowledge deficiency were very different among groups, and that these were caused by different institutional and historical factors. I also found that Data Deficient species could be used as surrogates of undiscovered species for conservation planning.

Monitoring biodiversity change with limited data is an important challenge for international biodiversity targets. Global indicators such as the IUCN Red List require large amounts of data and funds so would benefit most from cost-effective approaches. 🍀

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References

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Bland LM, B Collen, CDL Orme & J Bielby (2014). Predicting the Conservation Status of Data-Deficient Species. *Conservation Biology*. doi: 10.1111/cobi.12372

Machine learning

- Species data sets frequently contain many variables with nonlinear relationships, complex interactions, and missing values. As such, traditional statistical methods may lack the predictive ability we need. Machine learning methods are derived from research into artificial intelligence, and are flexible and powerful tools for finding patterns in data.
- They rely on few assumptions and can accommodate large amounts of data. A wide range of machine learning algorithms are now available, and their relative performance depends on the study objectives and available data.
- Some machine learning algorithms output the likelihood of occurrence of a given outcome, which allow easy interpretation of uncertainty in predicting complex processes.
- As a result of these properties, machine learning algorithms represent a robust approach for deriving rules of thumb to predict extinction risk in Data Deficient species.

Of nets, fisher rights and net benefits

Enforcement and marine management: maximising conservation & economic value

By Katrina Davis, Marit Kragt, Stefan Gelcich, Steven Schilizzi and David Pannell (Stefan Gelcich is from the Pontificia Universidad Católica de Chile, the other authors are from the University of Western Australia.)

One of the biggest threats to the sustainability of the world's oceans is the over-exploitation of marine resources. To manage this threat, which is largely a product of over-fishing and other extractive activities, governments restrict the activities that can occur in their marine areas. These restrictions include regulation of fishing effort in certain locations, or the creation of no-take zones (areas where fishing or other extractive activities are prohibited).

Spatial optimisation models can help policy makers plan the best use of marine areas amongst these different activities. Each activity will carry different opportunity and management costs while producing different levels of ecological or economic benefit. The data that is available on the spatial distribution of these benefits and costs can be incorporated into spatial optimisation models to determine the best allocation of area amongst the different activities. The aim is to maximise conservation or economic value; while meeting some objective such as a conservation target or economic constraint.

Chilean TURF

In Chile, marine species such as the Chilean-abalone or 'loco' are managed through a Territorial User Rights for Fisheries (TURF) program (see the box on TURF and conservation). This gives artisanal fishers property or user rights over a defined coastal area. To be part of this program organisations must comply with limits on total allowable catch, carry out annual population surveys for key species in their management area, and be responsible for all management costs.

Management costs in Chile are all about enforcement – the costs of monitoring to deter poachers. Research has shown that species' abundance levels are higher in enforced areas; a trend attributed to decreased catch.

In this analysis we collected data on the costs of enforcing the existing TURF program and no-take areas in Chile to develop a spatial distribution of enforcement costs across an area in the central marine region (Figure 1). We then incorporated these costs into a spatial optimisation model to determine the best allocation of the area amongst activities like fishing, no-take areas, and open access areas with no management (Davis et al., 2014). Our objective was to understand how the revenue of artisanal fishers in Chile could be maximised while meeting conservation targets.

We used data on the equilibrium abundance levels of five commercially exploited species – two invertebrates and three reef fish – to estimate potential fisher revenue under five different zones. Each zone allowed different activities (fishing or no fishing)

“There are net benefits from enforcing marine areas; fisher revenue was higher when fishing areas were enforced to prevent poaching. We also found that enforcement was important for conservation.”

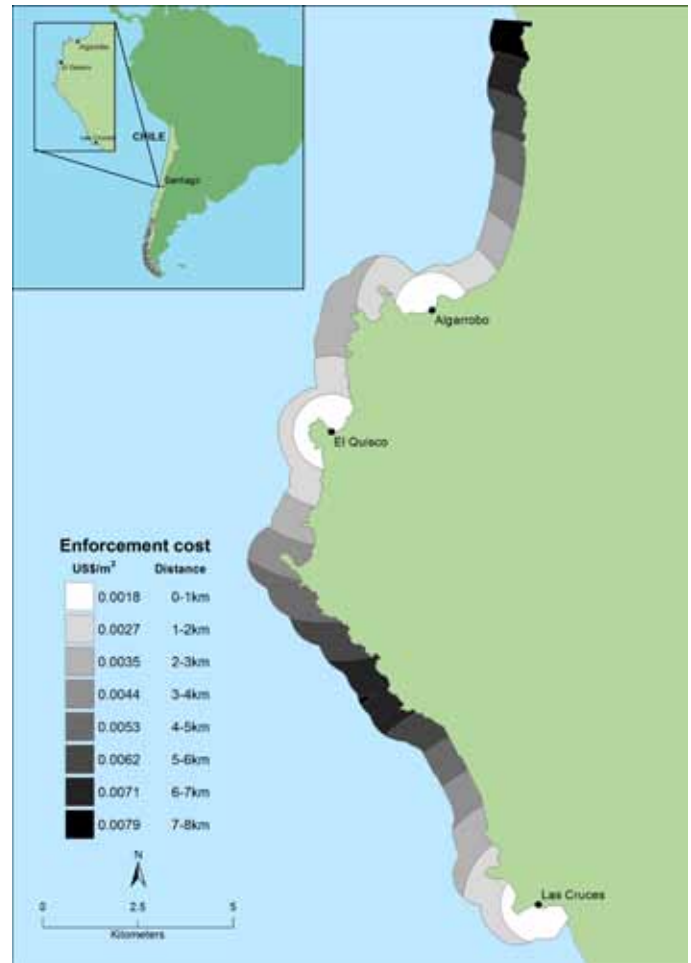


Figure 1. Enforcement costs in the central marine region of Chile; fishing organisations are indicated. Inset describes location of study area on the Chilean coast.

and had a specific catch restriction. These zones were: open access (which had no restriction on what activities could occur in the area); TURF fishing areas; no-take areas where extractive activities were prohibited; and TURF and no-take zones which were enforced and therefore incurred an enforcement cost. We restricted the catch that could occur in TURF areas to reflect current catch limits in Chile, assumed no catch in no-take areas, and matched catch in open access areas to the exploitable stock level of each species – the proportion of the population large enough to catch.

Best management of the study area

We found that to make the most money for fishers (maximise fisher revenue), the best strategy was to allocate the whole study area to the enforced-TURF zone (Figure 2). This strategy changed only slightly when conservation targets were included; under this second scenario optimal spatial management included no-take areas as well.

Further analysis of the data allowed us to ascertain how cost-effective enforcement was – we wanted to know whether the higher abundance found in enforced zones translated into net benefits when you considered how much it cost to enforce. What we found was that for every \$1 (2012 USD equivalent) spent enforcing, fisher revenue increased between \$4 and \$9 – a massive return on investment.

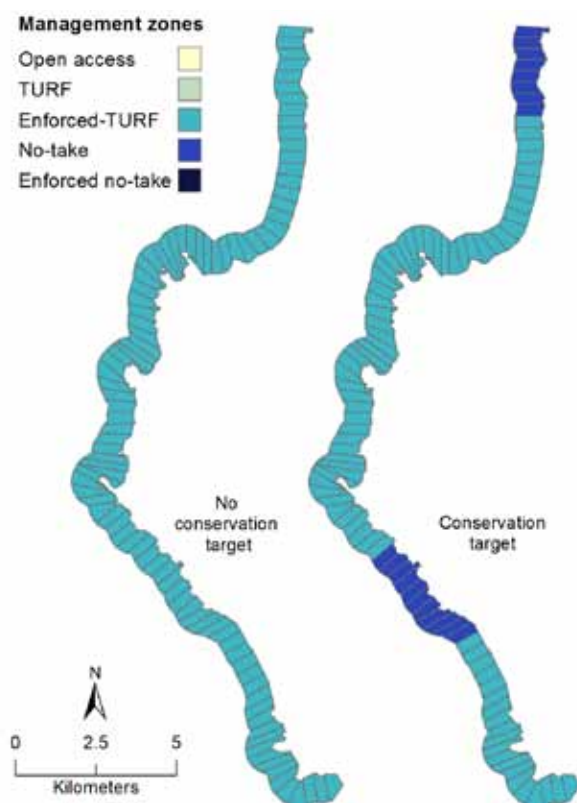


Figure 2. Optimal spatial allocation of the study area amongst different management zones with (left), and without (right) a conservation target.

Enforcement has net benefits

Our analysis demonstrated that there are net benefits from enforcing marine areas; fisher revenue was higher when fishing areas were enforced to prevent poaching. We also found that enforcement was important for conservation; much higher conservation targets could be met if marine areas were enforced. Our results demonstrated that investment in management, which provides conservation benefits, could be justified by greater economic returns for fishers.

Although our research demonstrated that enforcement of fishing areas is in fishers' best interests, roughly one third of the TURF management areas currently allocated in Chile are not being enforced. This contradiction may be explained by several factors – including lack of money or time on the part of fisher organisations.

Comments from fishers in the study area indicate that enforcing represents a significant safety risk for guards, and that it may be associated with social costs. Many poachers will be members of the local community and fishing has traditionally been a safety-net for these community members when other income streams have failed.

Our results have indicated that there can be large net benefits from the enforcement of marine management areas: fishers' income was increased, and higher species' abundance levels were observed when marine management was enforced. Understanding what influences the decision of artisanal fishers in Chile to enforce their TURF management areas should be a high priority for the future. 🍷

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References

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www.onlinelibrary.wiley.com/doi/10.1111/cobi.12358/abstract

TURF and conservation

Territorial user rights for fisheries (TURF) has the potential for significant conservation outcomes. Agreements on TURF assign spatial user rights to groups of fishers for the sustainable management of a species or group of species. The rationale for establishing user rights is based on the theory of common property, which assumes that securing access and sharing control over resources can create incentives for sustainable institutional arrangements among fishers, who will then manage and harvest collectively and sustainably. In addition, TURFs are expected to contribute to sustainability by increasing fishers' likelihood of compliance.

Chile has a national TURF policy. Through this policy the undersecretary of fisheries assigns exclusive-access diving rights to fisher organizations. To be granted a TURF, Chilean artisanal fisher organizations must develop, with the technical assistance, 5-year management plans, which must be approved by the undersecretary of fisheries. Fishers are also responsible for surveillance and enforcement of anti-poaching measures.

The first TURF in Chile was established in 1997 and currently there are 707 TURFs. They apply to over 1100 km² of shallow coastal ecosystems and are on average 100 ha and 4–10 km apart. In Chile, TURF management plans consider economically important benthic species, such as the loco, key-hole limpets and sea urchins. In areas with TURF agreements, extractions of species not included in the TURF management plan are forbidden.

In areas in Chile with well-enforced TURF agreements the density and size of managed species has increased substantially relative to open-access areas.

Reference

Gelcich S, M Fernandez, N Godoy, A Canepa, L Prado & JC Castilla (2012). Territorial user rights for fisheries as ancillary instruments for marine coastal conservation in Chile. *Conservation Biology* 26:1005-1015.



Loco fishing boats on the coast of Chile. Territorial user rights have provided both economic and conservation benefits in these fisheries.

Communicating environmental science to conservatives

Why and how

By Winnifred Louis (University of Queensland)

I want to make six points here, which together spell out that it's important to reach conservatives about environmental science, and that we need to change tactics to do this.

1. What works when we advocate for evidence-based policy?

Just as there is a need for evidence-based policy, so there is also a need for evidence that our advocacy of such policy is effective. This should be an easy message to give to environmental scientists, a group that is constantly telling us that policy should be evidence-based.

What's more, after several decades of communicating environmental science (and in particular after several years communicating the urgency on climate change), there is an evidence base for evaluating environmental campaigns. And looking at this evidence we have to say these campaigns often don't work. Indeed, they sometimes even decrease support for sustainable change.

2. Acknowledge prior attitudes and identities

The reason that environmental campaigns often don't work is that it turns out that the effectiveness of campaigns depends on audiences' existing attitudes and identities. Scientists tend to communicate about science using journal articles, jargon, and statistics, and that works well for other scientists. People who are already pro-sustainability or who identify as 'green'-minded tend to design environmental campaigns that work well for other people who are already pro-sustainability and who see themselves as 'green*'. But it's important to acknowledge that these approaches don't work for everyone. ('Green' means different things to different people. For some it signifies environmentally-sensitive life styles, for others it's a label for an environmentally progressive political party and a political leaning. In this article the term is used to suggest all these things.)

3. Existing advocacy tactics often don't work

A lot of the tactics that environmental campaigns use have been shown not to work well in reaching the apathetic centre and the conservative right wing. For example, mentioning science in an environmental campaign actually decreases willingness to engage with the message among people who are sceptical. Some people see scientists as biased.

Similarly, evidence shows that messages about widespread problem behaviours only decrease the problem behaviour if readers don't feel similar to the group that is described. If audiences identify with the description, then reading about the problem behaviour (for example: "Australians waste energy!") actually increases the problem behaviour. Oops!

Finding out that groups have conflicting views about the environment, or reading a message about how what is being done

“The reason that environmental campaigns often don't work is that it turns out that the effectiveness of campaigns depends on audiences' existing attitudes and identities.”



EDG conservation scientists share perspectives on how they might reframe the communication of their science to engage with conservatives at a recent communication workshop (see box).

now conflicts with what should be done, only energises people who already have strong views in favour of change. Among people who are apathetic or sceptical, it can actually reduce motivation to change. Darn it!

4. Partisanship can bring problems

Partly because of the intensity of advocacy in the last few years, people who are sympathetic to the green message have become more and more committed to their view, and more intense about the need for urgent change. Sometimes more left-leaning politicians and policy makers have brought about policy change in favour of environmental sustainability. But the lack of bipartisan consensus for change often sees these advances being reversed when there is a change in government, even where the change of government was for other reasons (such as leadership disputes). This has horrendous costs for effective environmental policy. It creates a cycle of increasingly frustrated, urgent Green-left advocates, met with increasing alienation and scepticism on the part of the centre/apathetic voters, and increasingly unsustainable policy choices when the right-wing takes power. And this leads to even more urgency and frustration.

5. There is a need for consensus

There will always be a political debate between parties, and it is great to have a Green party that speaks strongly for environmental issues and attracts the most committed environmental voters. But there are many reasons to vote Coalition that are not about environmental choices; traditionally the Coalition has pitched to voters on fiscal responsibility, national security, and protecting heritage and tradition. Just as there is now bipartisan consensus about the undesirability of DDT, regardless of political party affiliation, we can imagine a time when there is bipartisan consensus about the utility of renewable energy, safe levels of carbon emission reduction, and protection and habitat conservation in the oceans and on land. The sooner we get to that consensus, the better.

6. Persuasion and a path to consensus

Changing the environmental views of conservatives will require many things. It will involve a division of labour among environmentalists, intermediaries and networks. It will require the

“One of the most robust findings in the psychology of communication is that persuasion depends on the relationship between the source and the audience as much as what people say.”

framing of messages and campaigns with regard to conservative values and policy dimensions. And it will reward concessions rather than savagely attacking them.

One of the most robust findings in the psychology of communication is that persuasion depends on the relationship between the source and the audience as much as what people say. Some people are so passionate about their Green partisanship, and so clearly labelled as Green supporters, that they cannot communicate effectively with apathetic/neutral people, let alone Coalition policy makers and voters. These people can continue on in what I will flippantly call *Team Savage Attack* – aggressively critiquing the status quo, condemning half-measures, and stridently drawing attention to the need for change. They may mobilise pro-environmentalists to take action, but in so doing it's also likely they will alienate and fail to influence neutrals and conservatives, which is the problem I'm trying to address.

To me, it seems clear that the sense of urgency and commitment among Greens has pushed communicators farther and farther to the Green left. This has decreased our ability to communicate with centre and conservative voters and decision-makers. There is an urgent need for environmentalists to step up to fill the vacuum in environmental leadership for the right wing – I will call this group *Team Centre Forward*. Team Centre Forward may have the same goals as Team Savage Attack, but their tactics should be evidence-based around what works to influence conservatives.

Persuasion requires a degree of trust and perceived similarity. Accordingly, Team Centre Forward should refrain from condemnation of conservatives or conservative leaders. If anything they should seek to express (genuine) praise and points of agreement where possible. Rather than saying what is wrong with the centre/right position, advocates should focus on the desired positive change. While keeping the end goal in mind, half-measures and incremental steps put forward by other centre/right sources should be welcomed. Shades of grey should be clearly differentiated, and the better options and candidates should be publicly labelled as such.

Team Centre Forward advocates should try to pitch the applied implications of environmental science to conservatives in terms of the core dimensions of their policy concerns: the case that fiscal stability in the long term requires risk management and investment; that national security requires us to orient towards new challenges and opportunities; and that protecting Australia's heritage requires us to take action because that heritage is faced by external threats. Focusing on fairness and the suffering of animals addresses values that are more left wing, according to research, which is not core to the constituency Team Centre is trying to reach.

Finally, to bridge the credibility gap to the other side of politics, intermediary groups are helpful. For example, scientists could work to convince the Queensland Farmers Federation who could convince farmers, who could convince the Nationals, who could convince the Liberal National Party. Team Centre should identify conservative forces in industry who are impacted by climate change (eg, insurance, agriculture), and science-friendly conservatives (eg, medicine, law), and work to persuade these intermediaries, who might in turn have credibility to persuade others.

The psychology of communicating environmental science effectively

(University of Queensland, Nov 2014)

Could it be that, with the best of intentions, our efforts to communicate our conservation science are failing? Even worse, could we be actually turning some decision makers away from the outcomes we strive for? These uncomfortable questions were posed by UQ psychologist Dr Winnifred Louis when she gave a seminar to the EDG last year. The response from our scientists was an overwhelming “we want to know more”, which led to the staging of a whole day workshop on the psychology of communicating environmental Science effectively. The workshop was led by Winnifred and colleague Dr Kelly Fielding.

Winnifred's article in this issue of *Decision Point* explores some of the arguments she presented at the workshop. In addition, workshop participants were given an overview of the psychological theory and research that can inform strategies for the effective communication of environmental and conservation science. Themes presented included framing your message for different audiences and media formats (what works and what does not work), targeting conservative audiences, and evidence-based advocacy.

The workshop was coordinated by Hawthorne Beyer from EDG and jointly run by CEED, the School of Psychology (UQ), the Network of Environmental Social Scientists, and the Centre for Research in Social Psychology. Online videos will soon be available of the sessions run on the day.

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Kelly Fielding (on the left) and Winnifred Louis lead the workshop on the psychology of effective communication.

In general, a message for everyone persuades no one. Team Centre Forward advocates should look at audiences who are receptive but more right wing than they are, and try to convince them not only of the message, but also of the need to carry the message further to the right.

The natural members of Team Centre Forward, it seems to me, are people who are frustrated by politics (like many neutrals) or by the perception that some Green left politicians are insensitive to financial and practical constraints (like many right-wing voters). I suspect that many members of the Environmental Decision Group might qualify, while still being extremely committed to pro-environmental policy change as quickly as possible.

So, what about it? Someone needs to pick up the ball for Team Centre Forward, and the sooner the better. I look forward to any responses. 🍷

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Sustainable fish & chips

Think global, act local, and think before you eat

By Carissa Klein (University of Queensland)

Whether it's fish and chips by the seaside or prawns on the barbie at Christmas, Aussies love their seafood. For most of us it's basic to our way of life. For a country that has such a love affair with the ocean and the food we harvest from it, I find it perplexing that we eat so much unsustainable seafood.

The bottom line is that the health of the world's oceans and its fisheries are in decline (and this includes our own Great Barrier Reef, one of Australia's most precious icons). There are a range of actions that are required to reverse this situation, but one of the simplest things anyone can do is to simply stop eating unsustainable seafood.

Why isn't this already happening? Basically there's a lack of awareness and action in the general community. The good news, however, is that there are easy things we can do about it.

Sustainable seafood can be defined in various ways, but as [Australia's Sustainable Seafood Guide](#) (and its counterparts around the world) makes clear, sustainability is not only about the status of individual species stocks, but the impact of fishing on our oceans, which includes the broader effects of fishing on habitats and ecosystems.

There are two key steps needed if we are to shift Australia's love for seafood from unsustainable to sustainable: accessibility to sustainable seafood and better labelling.

Easily accessible sustainable seafood

As a consumer of seafood, I want sustainable options. However, I usually find that the average fish and chip shop or restaurant has few (sometimes no) sustainable options on the menu.

There are restaurants that specialize in sourcing sustainable seafood but they are all too rare. What we need is to be able to head to the local fish-and-chip shop and reliably find sustainable choices.

And as much as we need easy access to sustainable seafood, we also need there to be no access to clearly unsustainable seafood. For example, it's common to see orange roughy on menus, despite it being listed widely as an unsustainable choice and even listed as 'conservation dependent' under Australia's Environmental Protection and Biodiversity Conservation Act.

Another problem with sourcing sustainable seafood is inconsistency in seafood guides. Fish that your local supermarket claims is sustainable may not be labelled as such in other guides. Who do you trust? I usually end up walking away empty-handed, but who can blame shoppers for going ahead and buying it anyway if they're told it's a responsible choice?

In some ways, the problem is similar to the difficulty of finding a range of organic vegetables at the local fruit and veg shop or supermarket. One way that this has been addressed in agriculture is through 'fruit-and-veg box' schemes, in which you choose a provider you trust to supply you with sustainably grown (organic and local) vegetables. Similar schemes for seafood are rare. There's no doubt that a project like this would help consumers in Australia eat more sustainable seafood.

Stronger labelling laws

Unlike in Europe, Australia's seafood labelling laws are weak. When you order cooked seafood, you can't be sure of where it is coming from (Australia or overseas) or what species you are eating, despite what the vendor tells you.

“One of the simplest things anyone can do is to simply stop eating unsustainable seafood.”

Walking the talk

As a marine conservation scientist, I'm continuously struck by the prevalence of unsustainable and/or unlabelled seafood at conferences and workshops of conservation scientists. This observation prompted me and Renata Ferrari to assess the sustainability of seafood served at seven marine ecology and conservation meetings held in Australia (attended by over 4000 people from around the world). To score them, we used a publicly available [guide](#) which considers population stock status and the impact of fishing or aquaculture method.

Our results showed that seafood was served at all the meetings, and at more than half of the meetings at least one unsustainable species was on offer (Klein and Ferrari, 2014). Only about a third of the meetings offered a sustainable choice. If marine conservationists struggle to eat sustainable seafood at their own meetings, what hope is there for everyone else? Marine scientists and conservationists urgently need to turn science into action, and to lead by personal example.

Reference

Klein CJ and R Ferrari (2014). Walk the talk, don't eat it: a call for sustainable seafood leadership from marine scientists. *Environmental Conservation*, available on CJO2014. doi:10.1017/S0376892914000253.

You may have thought your last order of barramundi was a good local choice – either sustainably farmed or locally caught. Two thirds of the barramundi consumed in Australia is imported, and even the barramundi farmed/caught in Australia has varying degrees of sustainability, depending on where it was farmed or caught.

If we can't rely on labels in fish and chip shops or restaurants, how can we choose sustainable options? This is the focus of one Australian focused environmental program called Label My Fish.

Australia is viewed as a global leader in marine conservation by many other countries, primarily due to the rezoning of the Great Barrier Reef Marine Park in 2004, which set aside 33% of its area as no-take zones. This reputation is now at stake.

Australia could be a leader in sustainable seafood production. But first we have to care what's on our plate. 🍷



Decision Point goes Spanish

In an effort to engage more people with our environmental decision science, *Decision Point* is going Spanish. It makes a lot of sense if you think about it. Spanish is spoken by over 500 million people in the Americas, the Caribbean, and the Iberian Peninsula. And the Spanish speaking world encompasses some of the most biodiverse regions of the planet with many areas critical to the conservation of global biodiversity.

On top of this, there are many Spanish speakers currently in the Environmental Decision Group so we have both the capacity and the enthusiasm to at least give it a go. In the first instance we're bringing out a special Spanish issue – *Decision Point en Español* (Decision Point in Spanish) – which will contain Spanish translations of recent *Decision Point* stories with a connection to the Spanish-speaking world.

Decision Point en Español is an initiative being led by Duan Biggs, an EDG post doc at the University of Queensland. Duan spent many months on exchange at Universidad Catolica in Santiago, Chile, in 2012 and 2013 as part of CEED's Early Career Researcher Exchange scheme. During this time, Duan became aware of the linguistic divide and how research findings and knowledge generated in the English speaking world are quite inaccessible where there is limited knowledge of English.

"We need to engage more pro-actively with conservation managers and policy makers in the Spanish-speaking world," says Duan. "And I think an excellent step in this direction is to provide them with a Spanish version of *Decision Point*."

"This became abundantly clear to me in 2013 at the Conference of the Ecological Society of Chile and Argentina. I interacted with many students and researchers, and it was great to see the extent to which *Decision Point* is read and loved in this part of the world. However, it was only really accessible to people with a good grasp of English."

The interactions at this conference inspired Duan to ask around to see if there were other people in the EDG interested in assisting him produce a special issue in Spanish.

"For me, Spanish is a second language," Duan explains. "I needed the help of native speakers to really make it work. Fortunately, the EDG is a very international research group, with doctoral students and research fellows from all over the world including many Spanish speaking countries. We had enthusiastic volunteers working on the project from Spain, Mexico, Colombia, Costa Rica and Chile, and I think the result speaks for itself!"

Decision Point en Español will be available in the coming weeks. You can download it from the [Decision Point homepage](#). If you'd be interested in receiving news about future issues in Spanish, please send Duan your contact details. 🍷

More info: Duan Biggs d.biggs@uq.edu.au



The team behind *Decision Point en Español* are (from the left) Andres Felipe Castro, Marta Pascual Altares, Rocio Ponce Reyes, Duan Biggs, Cristina Romero, Hernan Caceres, Roberto Salguero-Gomez and Eduardo Gallo Cajiao. Not at this meeting but also part of the team are Gurutzeta Guillera-Arroita, Jose Lahoz-Monfort, Ruben Vanegas, Diego Correa and Virgilio Herosmo. Assisting with the design and layout is Michelle Baker.

Dbytes

Dbytes is EDG's internal eNewsletter. It gets sent to members and associates of EDG each week, and consists of small snippets of information relating to environmental decision making. They might be government documents, research articles, blogs or reports from other research groups. Here are six bytes from recent issues. If you would like to receive the *Dbytes* eNewsletter, email David.Salt@anu.edu.au

1. Trends in vertebrates conservation status

This study found that more than 50% of the global deterioration in the conservation status of birds, mammals and amphibians is concentrated in less than 1% of the surface area, 39 out of 1098 ecoregions (4%) and eight out of 195 countries (4%).

<http://www.plosone.org/article/info:doi/10.1371/journal.pone.0113934#s4>

2. National security and nature

This ABC Environment story makes the case that preserving intact ecosystems in the world's marine and national parks is key to global security.

<http://www.abc.net.au/environment/articles/2015/01/08/4158774.htm>

3. Design for efficient conservation programs

Highlights 10 design elements synthesized from economic studies that should be considered when developing policy to implement more efficient conservation programs.

http://ageconsearch.umn.edu/bitstream/156623/2/Zilberman-Segerson_final.pdf

4. Land use change to save Aust wildlife

This WWF report uses nearly 40 years of satellite imagery, land use mapping and other databases to quantify the impact that land clearing and degradation due to land use change have had on native species.

http://www.wwf.org.au/news_resources/resource_library/?11441/Changing-land-use-to-save-Australian-wildlife

5. GBR generates \$20 bill every year

A recent research paper delivered by the NERP Tropical Ecosystems Hub

<http://www.sciencedirect.com/science/article/pii/S2212041614001077>

6. Important bird areas are in danger

In Australia, BirdLife Australia has identified fourteen IBAs (Important Bird and Biodiversity Areas) under levels of threat rated as Very High in Australia.

<http://www.birdlife.org.au/ibas-in-danger>

7. COMPADRE Plant Matrix Database

Contains demographic information for over 1,000 plant species, with demographic records of survival, growth and reproduction.

<http://www.compadre-db.org/Compadre/Home>

Speaking in Spanish

Who speaks Spanish? A good proportion of the planet actually, around 500 million people. What's more, Spanish speakers manage some of the world's most biodiverse regions. And the EDG is lucky enough to have many Spanish speakers in its ranks. All of which has led to a bold new venture – the creation of Spanish issue of *Decision Point*. See page 15 on how it came to be.



Introducing Decision Point en Español, the magazine that aims to connect conservation policy makers, researchers and practitioners - in Spanish! A mock up of the cover is on the left and the map above shows the regions of the planet where Spanish is the official language (in red, with Spanish as a co-official language in blue). Map by Ichwan Palongengi - Data based on Map-Hispano.png on Wikipedia Project. Licensed under CC BY-SA 3.0 via Wikimedia Commons.



ENVIRONMENTAL DECISIONS GROUP

The Environmental Decision Group (EDG) is a network of conservation researchers working on the science of effective decision making to better conserve biodiversity. Our members are largely based at the University of Queensland, the Australian National University, the University of Melbourne, the University of Western Australia, RMIT and CSIRO.

The EDG is jointly funded by the Australian Government's National Environmental Research Program and the Australian Research Council's Centre of Excellence program.

Decision Point is the monthly magazine of the EDG. The funding of the research presented in this issue of *Decision Point*, like most research, comes from multiple sources and is identified in the original papers on which the stories are based (references are provided in each story). In terms of CEED and NERP ED, the research on pretzel logic (p4,5) was supported by NERP and CEED; and the work on fishing and enforcement (p10,11) was supported by CEED.

To contact the EDG please visit our websites at: <http://ceed.edu.au/> or <http://www.nerpdecisions.edu.au/>

What's the point?

Going for Green!

The IUCN has composed a new list. Unlike its Red Lists (of threatened species or threatened ecosystems) this is one is a good one to be on. It's the IUCN Green List of Protected Areas and it provides a new global standard of good practice for protected areas. Announced at last year's World Parks Congress in Sydney, the first 23 successful sites have been selected among 50 candidates put forward by the eight countries as part of the first phase of the Green List.

The sites have been evaluated against a set of demanding criteria, including the quality of protection of natural values. They should demonstrate fair and transparent sharing of the costs and benefits of conservation, effective management and long-lasting conservation outcomes. These criteria are measured according to the challenges and opportunities faced in each country.

In Australia, three reserves managed by the NSW National Parks and Wildlife Service have been accepted to the IUCN Green List: Arakwal National Park, Cape Byron State Conservation Area, and Montague Island Nature Reserve.

More info: https://www.iucn.org/about/work/programmes/gpap_home/gpap_quality/gpap_greenlist/



Yellow-tailed black cockatoo in Australia's Arakwal National Park (Photo by Environment & Heritage NSW)

