



# IUCN's Science Bulletin

# August 2010

## SCIENCE FOR IUCN'S PROGRAMMES



### Global Biodiversity: Indicators of Recent Declines [\[abstract\]](#)

The authors reviewed results from 31 indicators as a means to review progress towards the 2010 biodiversity target. They report that most indicators indicate lack of progress towards the target of reducing biodiversity loss, although several local success stories are also highlighted including both state and trends in biodiversity as well as enhanced responses to biodiversity loss. Nevertheless, the increasing trends in pressures on biodiversity coupled with declining trends in responses to biodiversity loss confirm that without a significant change, global efforts to conserve biodiversity are inadequate. Required changes include fully integrating biodiversity into broad-scale land-use planning, incorporating its economic value adequately into decision making, and sufficiently targeting, funding and implementing policies that tackle biodiversity loss along with sustained investment in coherent global biodiversity monitoring to track responses to these measures.

Butchart, Stuart H. M., Matt Walpole, Ben Collen, *et al.*, (2010). *Science* 328:1164-1168.

### Conservation-reliant species and the future of conservation [\[abstract\]](#)

As the numbers of species threatened with extinction increases and the ranks of the IUCN Red List of Threatened Species expand, there is growing recognition that efforts to bring these species out of threat status will not be enough to conserve them in perpetuity. Many will require long-term conservation support to continue to exist, i.e. they are 'conservation reliant'. As a case in point, the authors reviewed species listed in the US Endangered Species Act and determined that 84% were 'conservation reliant' with little difference across taxa. If this pattern were globalised there is an important message about the need for long term planning and funding for biodiversity conservation globally.

Scott, J. Michael, Dale D. Goble, Aaron M. Haines, *et al.* (2010). *Conservation Letters* 3: 91-97.

### Pragmatic population viability targets in a rapidly changing world [\[abstract\]](#)

Survival of species' populations requires enough individuals in a population to withstand the many threats of today's world. Conservationists use the concept of Minimum Viable Population (MVP) as an estimate of the lowest number of individuals required for survival in its natural environment. This review reports that thousands (not hundreds) of individuals are required for MVPs but that most of today's conservation policy does not appear to reflect these findings. The authors lament that there is "no obvious resolution other than a more explicit acceptance of the trade-offs implied when population viability requirements are ignored".

Trall. Lochran A., Barry W. Brook, Richard R. Frankham, *et al.* (2010). *Biological Conservation* 143 (2010) 28-34

### High and Far: Biases in the Location of Protected Areas [\[open access\]](#)

Protected areas are promoted as a vital element of biodiversity conservation and ~ 1/8 of the earth's land surface is in protected areas (PAs). But the contribution of PAs to conservation and climate change mitigation and adaptation is dependent on the locations they occupy. The authors report that across 147 nations PA networks are biased towards places that are unlikely to face land conversion pressures even in the absence of protection and that the significant majority of national PA networks are biased to higher elevations, steeper slopes and greater distances to roads and cities. They conclude that PAs are biased towards where they can least address threats to biodiversity such as land conversion (even if they offer perfect protection). Therefore, future PA planning should consider locating such areas in order to address such threats.

Joppa LN, and Pfaff A (2009) *PLoS ONE* 4(12): e8273.

## FUN TO KNOW

**More than 50% of canid species are used in traditional medicines around the world.** [\[abstract\]](#)

Alves, RRN., R R D Barboza and W M S Souto. (2010). A Global overview of canids used in traditional medicines. *Biodiversity and Conservation* 19:1513-1522

**Red-eyed Tree Frogs communicate by shaking their trees** [\[abstract\]](#)

Caldwell, MS, G R. Johnston, J. G McDaniel, and K M. Warkentin. (2010) Vibrational Signaling in the Agonistic Interactions of Red-Eyed Treefrogs. *Current Biology*, May 20, 2010 DOI:

**Estuarine crocodiles 'surf' river currents of the southeast Pacific**

Campbell, Hamish A., Matthew E. Watts, Scott Sullivan *et al.* (2010). Estuarine crocodiles ride surface currents to facilitate long-distance travel. *Journal of Animal Ecology* [e-view doi: 10.1111/j.1365-2656.2010.01709.x]

**Our noise is overwhelming the underwater symphony of the seas** [\[abstract\]](#)

Slabbekoorn, Hans, Niels Bouton, Ilse van Opzeeland, *et al.*, (2010). A noisy spring: the impact of globally rising underwater sound levels on fish. *Trends in Ecology & Evolution* 25: 419-427 .

### How similar are national red lists and the IUCN Red List? [\[abstract\]](#)

To assess how similar, or how different, national red lists are from the global IUCN Red List, national lists of 4 countries were compared with the 2008 IUCN Red List and differences fell into three categories: (1) species have been listed nationally as threatened, but have yet to be globally assessed, (2) species considered globally threatened by IUCN, but not listed nationally, and (3) species not considered globally threatened, but assessed nationally threatened. Reasons for these differences include taxonomic interpretations, scope of taxa covered in national vs. global lists and lack of clarity on whether species not on lists are not threatened or not assessed. The authors conclude by highlighting that many countries use national red lists as a direct priority for conservation action, whereas the global IUCN Red List's sole objective is prediction of extinction risk.

Brito, Daniel, Ruth Grace Ambal, Thomas Brooks, *et al.* (2010). *Biological Conservation* 143 : 1154- 1158



### Deforestation driven by urban population growth and agricultural trade in the twenty-first century [\[abstract\]](#)

Reducing atmospheric carbon emissions from tropical deforestation is at present considered a cost-effective option for mitigating climate change. Using two methods of analysis, the authors show that forest loss is positively correlated with urban population growth and exports of agricultural products for this time period. They therefore suggest that policies to reduce deforestation among local, rural populations will not address the main cause of deforestation in the future. Rather, efforts need to focus on reducing deforestation for industrial-scale, export-oriented agricultural production, concomitant with efforts to increase yields in non-forested lands to satisfy demands for agricultural products.

DeFries, Ruth, Thomas Rudel, Maria Uriarte and Matthew Hansen. (2010). *Nature Geoscience* 3: 178-181.

### The Greenhouse Gas Value of Ecosystems [\[abstract\]](#)

Effective climate change mitigation needs knowledge of the full greenhouse gas (GHG) effects of land use decisions. The authors propose the concept of greenhouse gas value (GHGV) of ecosystems, which accounts for potential GHG release upon clearing of stored organic matter, annual GHG flux, and probable GHG exchanges resulting from disturbance and in a time-sensitive manner. Estimates of the GHGV of various biome types are presented (highest - tropical peat forest; lowest – wetland rice cultivation) and key conclusions are i) natural ecosystems generally have high GHGV's, whereas managed ecosystems generally have lower or negative GHGV's; ii) GHGV decreases with increasing probability of disturbance, and that decisions on the treatment of time can be important, affecting some ecosystem types more strongly than others.

Anderson-Teixeira, Kristina J. and Evan H. DeLucia. (2010). *Global Change Biology* [ pub online 19 May 2010]

### Global congruence of carbon storage and biodiversity in terrestrial ecosystems [\[open access\]](#)

REDD, as an incentive for climate change mitigation, will potentially attract significantly more funds to biodiversity conservation than ever before. The authors investigate the potential co-benefits of such investment on both terrestrial biodiversity conservation and carbon storage. They report a strong association ( $r_s = 0.82$ ) between carbon stocks and species richness suggesting that synergy of climate mitigation and conservation through REDD would be high, but note that this would be unevenly distributed geographically. They caution that some high-biodiversity regions would not benefit from carbon-focused conservation, and could come under increased pressure if REDD is implemented.

Strassburg, BNN, Annabel Kelly, Andrew Balmford *et al.* (2010). *Conservation Letters* 3: 98–105

### A framework for community interactions under climate change [\[abstract\]](#)

Predictions of climate impact routinely focus on the direct effects on individual species, yet interactions between species can strongly influence these effects. The authors propose a framework based on ideas from global-change biology, community ecology, and invasion biology that uses community modules to assess how species interactions shape responses to climate change.

Gilman, Sarah E., Mark C. Urban, Joshua Tewksbury, *et al.* (2010). *Trends in Ecology and Evolution* 25: 325-331

## Managing knowledge

### Conflict or interaction? How you say it matters. [\[abstract\]](#)

The authors review > 400 publications on 'human-wildlife conflict' and report that rather than direct conflict these were about complex interactions between people and nature. They propose that by naming these interactions conflict, wildlife is portrayed as an antagonist not an ecosystem co-habitant that can also provide benefits.

Peterson, M. Nils, Jessie L. Birkhead, Kirsten Leong, *et al.* (2010). Rarticulating the myth of human-wildlife conflict *Conservation Letters* 3: 74-82.

### Bias in sources of species data [\[open access\]](#)

A review of 5 sources of species data for Galliformes: museum collections, scientific literature, ringing records, ornithological atlases, and "citizen scientists" website reports. Museum data had the most comprehensive historical coverage of species' ranges but was time-intensive to collect. Literature records have increased in their number and coverage but tend to focus on threatened species and protected areas. Ringing, atlas, and website data are almost exclusively restricted to recent decades.

Boakes EH, McGowan PJK, Fuller RA, *et al.* (2010). Distorted Views of Biodiversity: Spatial and Temporal Bias in Species Occurrence Data. *PLoS Biol* 8(6): e1000385.



## Naturally Energising the Future

### A Methodology for Assessing the Sustainability of Hydrogen Production from Solid Fuels [\[open access\]](#)

The authors present a methodology for assessing the sustainability of hydrogen production including three sustainability dimensions (ecological, sociological and technological). They illustrate application of the methodology using the example of hydrogen production from two sources: coal and biomass and report that biomasses have better sustainability than coals, both for ecological indicators alone as well as for the three dimensions together. The sustainability assessment methodology presented is highly qualitative but could be made increasingly quantitative and extended to other energy systems with additional research and development.

Gnanapragasam, Nirmal V., Bale V. Reddy and Marc A. Rosen (2010). *Sustainability* 2: 1472-1491.

### Finance for renewable energy: an empirical analysis of developing and transition economies [\[article\]](#)

Transition to a global energy mix that includes a higher proportion of energy from renewable sources requires both supportive policies and financial mechanisms. In this paper, Brunnschweiler examines the role of the financial sector in renewable energy (RE) development, especially in non-OECD countries. Her review confirms the influence of financial sector development on the use of renewable energy resources on up to 119 non-OECD countries for 1980–2006. She reports that commercial banking, in particular, had a significant positive effect on the amount of RE produced, and the impact is especially large when we consider non-hydropower RE such as wind, solar, geothermal and biomass. She also reports on the impact of rising prices for fossil fuels – decreasing RE use in oil producing countries while increasing it in non-oil producing countries. Finally, she provides evidence that the development of the RE sector has been influenced significantly by the adoption of the Kyoto Protocol.

Brunnschweiler, Christa M. (2010). *Environment and Development Economics* 15: 241–274



## Managing Ecosystems for human well-being

### Ecosystem services: an evolutionary perspective on the links between biodiversity and human well-being [\[abstract\]](#)

The authors consider some of the benefits and disadvantages of an ecosystem services approach to biodiversity conservation and suggest that such an approach does not adequately reflect existence and other non-use values or additional current and future services, the latter sometimes referred to as 'option values'. They propose, as a complement to ecosystem services, the concept of 'evosystem services' and a phylogenetic diversity measure can help us to quantify these current and potential future benefits. Evosystem services would also take into account services that result from ongoing evolution and not currently available. The authors conclude that, together, these reflect a fuller range of the services supported by biodiversity, and thereby provide a sounder basis for conservation planning and decision-making.

Faith, Daniel P, Susana Magallo, Andrew P Hendry *et al.* (2010) *Current Opinion in Environmental Sustainability* 2:66–74

### Leaf structure as well as function provides lessons for harvesting energy from light [\[article\]](#)

A natural leaf is a synergy of elaborate structure and function in order harvest light and produce energy. Currently, biomimicry for photosynthesis has focused on function but Zhou *et al* demonstrate that attention to leaf structure can improve efficiency.

Zhou, Han, Xufan Li, Tongxiang Fan, *et al.* (2010). Artificial Inorganic Leaves for Efficient Photochemical Hydrogen Production Inspired by Natural Photosynthesis. *Adv. Mater.* 2010, 22, 951–956

**Mirid Bug Outbreaks in Multiple Crops Correlated with Wide-Scale Adoption of Bt Cotton in China** [[abstract](#)]

Lu *et al.* reviewed 10 years of data looking at pests of cotton crops in northern China. They report that while Bt cotton effectively managed target pests, non-target species actually increased and acquired pest status in cotton and multiple other crops, which the authors conclude is related to drops in insecticide use in this crop. Hence, alterations of pest management regimes in Bt cotton could be responsible for the appearance and subsequent spread of non-target pests at an agro-landscape level.

LU, Y. Kongming Wu, Yuying Jiang *et al.* (2010). *Science* 328: 1151-1154

**Ecological and human community resilience in response to natural disasters.** [[open access](#)]

Gunderson uses the concepts of ecological resilience, adaptive cycles, and panarchy across ecological and human community systems and identifies five important findings, namely, 1) Both systems demonstrate resilience in terms of both recovery time from disturbances and the capacity to absorb them. 2) Both systems recognize the role of diversity in contributing to resilience. 3) The role of different forms of capital is highlighted as is 4) the importance of cross-scale interactions. 5) The comparison reveals the need for experimentation and learning to build adaptive capacities.

Gunderson, L. 2010. *Ecology and Society* 15(2): 18.



**Smoke, mirrors, and mislabeled cod: poor transparency in the European seafood industry** [[abstract](#)]

Following on similar work in the US, the authors report that 39 out of 156 (25%) cod and haddock products, randomly sampled from supermarkets, fishmongers' shops, and take-away restaurants throughout Dublin, Ireland, were genetically identified as entirely different species from that indicated on the product labels. Therefore, since the strict EU policies currently in place to regulate seafood labeling do not appear to be adequately implemented and enforced, it is possible that consumer choices resulting from mislabeling may hamper conservation efforts to allow depleted stocks of some species to recover.

Miller, Dana D. & Stefano Mariani. (2010) *Frontiers in Ecology & the Environment* e-view doi:10.1890/090212

**Trends and future potential of payment for ecosystem services to alleviate rural poverty in developing countries.** [[open access](#)]

As the application of payment for ecosystem services (PES) approaches increases, the potential for low income households and communities to have access to such approaches is reviewed. The authors analyze current PES schemes to evaluate its future potential to benefit rural people in developing countries and they estimate that by the year 2030, markets for biodiversity conservation could benefit 10–15 million low-income households in developing countries, carbon markets could benefit 25–50 million, markets for watershed protection could benefit 80–100 million, and markets for landscape beauty and recreation could benefit 5–8 million. They conclude that if payments and markets reach these potentials, they could provide a non-negligible contribution to poverty alleviation at the global level.

Milder, J. C., S. J. Scherr, and C. Bracer. 2010. *Ecology and Society* 15(2): 4.

**The challenge of regulating private wildlife ranches for conservation in South Africa.** [[open access](#)]

Cousins *et al.* provide an overview of the conservation issues relating to private wildlife ranches in South Africa and then consider these in the context of new attempts at regulating these ranches to manage their conservation impacts. Their data were obtained through a desk-based study of legal documents and interviews with key stakeholders. They report that new regulations address some of South Africa's international obligations and national policy on biodiversity conservation but note that, in practice, the regulations are a significant source of tension among stakeholders and will be challenging to implement. A key issue is competing agendas between incentive driven ranchers and conservationist aims and the authors suggest that the new regulations may encourage some ranchers to convert their land away from conservation friendly land use.

Cousins, J. A., J. P. Sadler, and J. Evans. 2010. *Ecology and Society* 15(2): 28

**IUCN Science bulletin**

This Bulletin provides a quick overview of the recent peer-reviewed literature relevant to IUCN's programme. It is not intended as an exhaustive reflection of what is happening in conservation science but rather to stimulate further exploration of science relevant to IUCN's Programme.

Many thanks to contributors for this issue including:  
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**Feedback welcome!**

Any comments on the bulletin format and content? Send your thoughts to [iucnscience@iucn.org](mailto:iucnscience@iucn.org).

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