



IUCN's Science Bulletin

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SCIENCE FOR IUCN'S PROGRAMMES



Conserving Biodiversity

Valuing Common Species (<http://www.sciencemaq.org/cqi/content/summary/327/5962/154>)

In this brief editorial perspective, Kevin Gaston of Sheffield University highlights the importance of all components of biodiversity – even the –run-of-the-mill backyard variety – in maintaining ecosystems and notes that the common species are often more heavily affected by threats to biodiversity and are therefore just as at risk as more threatened species.

Gaston, Kevin J. (2010) *Valuing Common Species*. *Science* 327: 154 – 155, DOI: 10.1126/science.1182818.

Can the IUCN criteria be effectively applied to peripheral isolated plant populations?

(<http://www.springerlink.com/content/d37670755077x4q3/>)

Thomas Abeli and his colleagues evaluated several 'peripheral isolated plant populations' and under the existing Red List criteria. They suggest that assessment for such plant populations using criterion A (population decline) or D (small population) provides a reasonable assessment but that assessment under criterion B (decline in range) often resulted in overestimation and under criterion C (declining & small population) underestimation of extinction risk. [NB. Looking for a refresher course on the IUCN Red List categories / criteria? Try www.iucnredlist.org]

Abeli, Thomas, Rodolfo Gentili, Graziano Rossi, Gianni Bedini, & Bruno Foggi. (2009) *Can the IUCN criteria be effectively applied to peripheral isolated plant populations?* *Biodiversity and Conservation* 18:3877–3890.

Environmental Synergisms and Extinctions of Tropical Species

(<http://www3.interscience.wiley.com/journal/123190996/abstract>)

This issue of *Conservation Biology* has a special focus on tropical biodiversity conservation including this article on the multiplying effects of several threats acting on species at the same time. Using IUCN Red List data, the authors determined that threats occurred in 'clumps' with the most common being agriculture and hunting, followed by agriculture and urban sprawl, then urban sprawl and hunting. They suggest that such threat synergisms are likely very common and conservation actions should take this cascading impact of threats into consideration when designing interventions.

Laurance, William F., & Diana C. Useche. (2009) *Environmental Synergisms and Extinctions of Tropical Species*. *Conservation Biology* 23(6): 1427-1437. DOI: 10.1111/j.1523-1739.2009.01336.

Beyond marine reserves: exploring the approach of selecting areas where fishing is permitted, rather than prohibited.

(<http://www.plosone.org/article/info:doi/10.1371/journal.pone.0006258>)

The authors propose an alternative to conventional fisheries planning by designation of fishing areas as opposed to non-fishing areas (or marine protected areas). Using 13 commercial fisheries in British Columbia they determined that 95% of current catch could be obtained in only 70-80% of areas currently fished. They suggest that there are viable options to the fisheries management status quo.

Ban NC, & Amanda CJ Vincent, (2009) *Beyond Marine Reserves: Exploring the Approach of Selecting Areas where Fishing Is Permitted, Rather than Prohibited*. *PLoS ONE* 4(7): e6258. doi:10.1371/journal.pone.0006258.

FUN TO KNOW

Former IUCN staffer, Jim Thorsell honoured by having an Eocene-era marsupial (*Chulpasia jimthorselli*) named after him. See where a career at IUCN could lead!

Sigé, Bernard, Michael Archer, Jean-Yves Crochet, Henk Godthelp, Suzanne Hand & Robin Beck. (2009) *Chulpasia and Thylacotinga, late Paleocene-earliest Eocene trans-Antarctic Gondwanan bunodont marsupials: New data from Australia*. *Geobios*: 42 (6) 813-823

Networks are the way to go - Even slime molds build them!

Tero, Atsushi, Seiji Takagi, Tetsu Saigusa, Kentaro Ito, Dan P. Bebber, Mark D. Fricker, Kenji Yumiki, Ryo Kobayashi, Toshiyuki Nakagaki. (2010). *Rules for Biologically Inspired Adaptive Network Design*. *Science* 327: 439-442. DOI: 10.1126/science.1177894

Llamas on the front line of war on bio-terrorism – produce antibodies to detect botulinum neurotoxin.

Conway JO, Sherwood LJ, Collazo MT, Garza JA, & Hayhurst A. (2010) *Llama Single Domain Antibodies Specific for the 7 Botulinum Neurotoxin Serotypes as Heptaplex Immunoreagents*. *PLoS ONE* 5(1): e8818. doi:10.1371/journal.pone.0008818

Ain't no mountain high enough: plant invasions reaching new elevations

(<http://www.esajournals.org/doi/abs/10.1890/080072>)

The Millennium Ecosystem Assessment reported that mountain environments were at lower risk from invasive species because of their harsher climate and lower level of human disturbance. However, the authors warn that as a result of climate change and increasing human use of mountain habitats, this will change and conservationists need to act now to prevent loss of threatened mountain biodiversity.

Pauchard, Anibal, Christoph Kueffer, Hansjörg Dietz, Curtis C Daehler, Jake Alexander, et al (2009) *Ain't no mountain high enough: plant invasions reaching new elevations*. *Frontiers in Ecology and the Environment*: 7(9): 479-486

Dietary diversity is important for bees too! One in three bites we take is thanks to the work of pollinators - we need to worry about their health to maintain our own.

Alaux, Cédric , François Ducloz, Didier Crauser & Yves Le Conte. (2010) *Diet effects on honeybee immunocompetence*. *Biology Letters*. doi: 10.1098/rsbl.2009.0986



Changing the Climate Forecast

The Velocity of Climate Change (<http://www.nature.com/nature/journal/v462/n7276/abs/nature08649.html>)

Scott Loarie and colleagues estimated the velocity with which climate change may advance across a landscape and used this to determine 'residence' time in protected areas as one means of determining the speed with which biodiversity may be able to adapt to changes. They determined that the flatter biomes had higher velocities of change compared to mountains and they calculated that only 8% of protected areas have the potential to continue to support the current biodiversity for at least a 100 yr time frame. They conclude that strategies to minimize biodiversity loss from climate change for all but montane systems (as they have the slowest velocity of change) need more than expanded protected area networks and should also include reduced emissions and support for species to adapt.

Loarie, Scott, R., Philip B. Duffy, Healy Hamilton, Gregory P. Asner, Christopher B. Field & David D. Ackerly. (2009) *The velocity of climate change*. *Nature* **462**: 1052-1055, doi:10.1038/nature08649.

The Value of Rehabilitating Logged Rainforest for Birds.

(<http://www3.interscience.wiley.com/journal/122604673/abstract>)

In Borneo's Yayasan Sabah logging concession, which combines selectively logged, naturally regenerating and unlogged forest within one area, researchers assessed species richness across the 3 landscapes and determined that, as expected, the unlogged forest had higher levels of biodiversity but that that forests that have been rehabilitated had levels of species richness and diversity closer to that of unlogged forest. Nature-based solutions for climate change, such as forest restoration, will not only help with carbon sequestration but will also help conserve biodiversity.

Edwards, David P., Felicity A. Ansell, Abdul H. Ahmad, Reuben Nilus, & Keith C. Hamer. (2009) *The Value of Rehabilitating Logged Rainforest for Birds*. *Conservation Biology* 23(6): 1628-1633. DOI: 10.1111/j.1523-1739.2009.01330.x

Global warming increases flood risk in mountainous areas

(<http://www.agu.org/pubs/crossref/2009/2009GL041395.shtml>)

Mountains are home to more than 800 million people as well as the source of the great rivers of the world. The authors analysed data from the Swiss Alps and determined that flooding risk increased with temperature, precipitation and altitude. We have known that coastal populations are at risk from climate impacts relating to sea level rise and the urgency to implement climate adaptation strategies in these locations but this evidence suggests that adaptation will be equally important for those living in mountains.

Allamano, P., P. Claps, & F. Laio (2009) *Global warming increases flood risk in mountainous areas*. *Geophys. Res. Lett.*, 36, L24404, doi:10.1029/2009GL041395.

Managing knowledge

It's not what you know but how you phrase

it...(<http://pss.sagepub.com/content/early/2009/12/14/0956797609355572>)

David Hardisty and colleagues studied the effect of using words like offset vs. tax on an audience that included declared Republicans, Democrats and independents. Results may not be surprising (eg. Republicans would pay offsets but not taxes) but confirm that the words you use are important tools to get things done.

Hardisty, David J., Eric J. Johnson & Elke U. Weber. (2010) *A Dirty Word or a Dirty World? Attribute Framing, Political Affiliation, and Query Theory*. *Psychological Science* 21: 86-92, doi:10.1177/0956797609355572



Naturally Energising the Future

What is the impact of wind farms on birds? A case study in southern Spain

(<http://www.springerlink.com/content/a47n1427t0k12731/>)

Using the Sierra de Aguas wind farm as a study area, the research team looked at impacts on birds in the area and determined that although the wind farm area did not show an increase in mortality, nor did it seem to have any particular effect on the passerine populations, there was evidence that the raptors home ranges were displaced.

Farfán, M. A., J. M. Vargas, J. Duarte, & R. Real. (2009). *What is the impact of wind farms on birds? A case study in southern Spain*. *Biodivers Conserv* 18:3743–3758. DOI 10.1007/s10531-009-9677-4

The Water Footprint of Biofuels: A Drink or Drive Issue? (<http://pubs.acs.org/doi/abs/10.1021/es802162x>)

The authors point out that the imperative to increase energy production through biofuel cultivation could have implications for water security both in terms of water amount and water quality (fertilizers for biofuel crops could contribute to pollution). The impact is dependent on the particular location and existing water demands and will be complicated by the impacts of climate change.

Dominguez-Faus, R., Susan E. Powers, Joel G. Burken, & Pedro J. Alvarez. (2009) *The Water Footprint of Biofuels: A Drink or Drive Issue?* *Environ. Sci. Technol.*, 2009, 43 (9), 3005-3010 • DOI: 10.1021/es802162x



Managing Ecosystems for human well-being

Addressing Trade-offs: Experiences from Conservation and Development Initiatives in the Mkuze Wetlands, South Africa (<http://www.ecologyandsociety.org/vol14/iss2/art37/>)

Annika Dahlberg and Catie Burlando ask some searching questions about how trade-offs are negotiated and implemented in conservation based on a case study from a protected wetland. They show that poorly communicated objectives, unequal power relations and lingering mistrust from past experience of exclusionary conservation are amongst the problems that impede finding sustainable and acceptable alternatives to local exploitation of the protected area. Their conclusions include: *For a trade-off to be accepted in the long term, it has to be transparent and regarded as the outcome of fair negotiations.*

Dahlberg, A. C. and C. Burlando (2009). *Addressing Trade-offs: Experiences from Conservation and Development Initiatives in the Mkuze Wetlands, South Africa*. *Ecology and Society* 14(2): 37 [online]

Marine mussels fixing your teeth

Dental researchers are taking a look at marine organisms such as mussels to see how they create such hard and durable substances that maintain these properties even in salt water.

Holten-Andersen, N. J. H. Waite. (2008) *Mussel-designed Protective Coatings for Compliant Substrates*. *J Dent Res* 87; 701.

Venus Flytrap inspires nuclear waste management option

Researchers have developed a mechanism to selectively trap dangerous Cesium particles in nuclear waste using a mechanism inspired by the Venus flytrap plant.

Nan Ding & Mercuri G. Kanatzidis. (2010) *Selective incarceration of caesium ions by Venus flytrap action of a flexible framework sulfide*. *Nature Chemistry*, DOI: 10.1038/nchem.519

Looking for more examples of biomimicry – check out AskNature at www.asknature.org

Sustainable Floodplains Through Large-Scale Reconnection to Rivers

(<http://www.sciencemaq.org/cqj/content/summary/326/5959/1487>)

Flooding is one of the most damaging natural disasters and projections relating to climate change and land use change suggest that flooding will increase in the future. Opperman and colleagues note that current use of physical infrastructure for flood control results in decreased riverine habitat and filling in of wetlands. They argue that making wiser use of existing floodplains could both decrease risk to people while also supporting delivery of ecosystem services. IUCN has called for nature-based solutions to risk management for human well-being and this article can add to the body of evidence.

Opperman, Jeffrey J., Gerald E. Galloway, Joseph Fargione, Jeffrey F. Mount, Brian D. Richter, & Silvia Secchi (2009). *Sustainable Floodplains Through Large-Scale Reconnection to Rivers*. *Science* 326:1487. DOI:10.1126/science.1178256



Conserving wild fish in a sea of market-based efforts.

(<http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=6829468>)

The authors note that despite efforts to influence consumers to make wise choices at the fish market, marine fish populations are not recovering due to problems such as differing definitions of sustainability among certifiers, consumer confusion and lack of traceability. However, they suggest that current work on increasing public awareness and influencing consumer choices should continue but through, inter alia, focusing higher on the demand chain (large retailers as opposed to individuals) and removing fisheries subsidies.

Jacquet, Jennifer, John Hocevar, Sherman Lai, Patricia Majluf, Nathan Pelletier, Tony Pitcher, Enric Sala, Rashid Sumaila & Daniel Pauly. (2010). *Conserving wild fish in a sea of market-based efforts*. *Oryx* 44(1): 45-56. doi:10.1017/S0030605309990470

A revised conceptual framework for payments for environmental services

(<http://www.ecologyandsociety.org/vol14/iss2/art34/>)

This article questions the most commonly accepted definition of payments for environmental services (PES) and offers an alternative theoretical framework. The criteria used in the original PES definition (Wunder, 2005) can be reduced to just two: i) the scheme involves the use of positive incentives, and ii) the payment is made conditional on the delivery of the service. The framework is then complemented with two guiding principles, namely environmental additionality and the need to ensure consistency with the institutional context. The authors propose a simpler theoretical scope of PES that reinforces key considerations such as the need to ensure that incentives reach the individuals providing the services (e.g. by avoiding elite capture), to consider payments as being more than financial transfers (e.g. the potential to use land tenure security as a form of payment), and the inherent complexities of monitoring PES schemes for their additionality.

Sommerville, M. M., J. P.G. Jones, and E. J. Milner-Gulland. (2009). *A revised conceptual framework for payments for environmental services*. *Ecology and Society* 14(2): 34 [online].

IUCN Science bulletin

This Bulletin provides a quick overview of some 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:

Tim Badman
James Gordon,
Geoffrey Howard
David Huberman

Feedback welcome!

Any comments on the bulletin format and content?

Have recent articles you think the rest of us need to know about?

Please send in your contributions for the next bulletin to iucnscience@iucn.org.

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