In Brief

Sustaining seascapes?

Large-scale conservation of marine ecosystems has become a major focus of academic conservation biology over the past decade. However, the melding of science with real conservation action remains quite rare. To illuminate how science might be used in on-the-ground marine management, the American Museum of Natural History is sponsoring a March 2002 symposium on the science and policy of marine resource management (http://research.amnh.org/biodiversity/symposia/seascapes/).

What makes this symposium distinctive is that it will have several practical experiences of marine conservation to go on. Thus, in addition to the usual academic litany regarding threatened marine communities, it will also include talks from the Superintendent of the Florida Keys Marine Sanctuary, the head of Kenya's wetland monitoring program, representatives of the US National Park Service, and numerous environmental activists. It will be interesting to learn what from the 'theory of marine conservation' has ended up having pragmatic value in actual conservation practice. *PK*

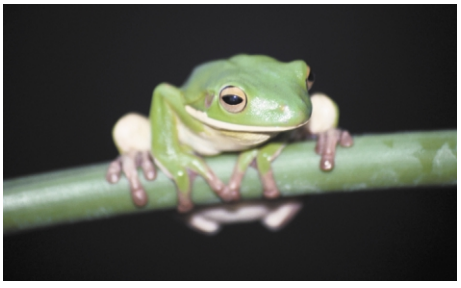
What cost endangered species recovery?

There are >3000 possibly extinct or imperiled species in the USA, with >1000 having been granted legal protection under the US Endangered Species Act. Each year, the USA invests millions of dollars in recovering these species, but it has long been thought that these expenditures are too small for the task and that the undersized budget actually limits species recovery. That idea has now been tested by a group of biologists from the University of Idaho who analysed 243 recovery plans for threatened or endangered species. From these they obtained estimates of the expected costs of recovery as well as the actual State and Federal expenditures on behalf of each species. The median percent of requested funds that was actually received was <20%. Although it is no surprise that actual budgets fall short of requests, the interesting finding was that the status of species improved markedly with an increase in the proportion of requested funding that was actually received. The bottom line is that more money helps.

But, this still begs the question of what it might cost society to fund conservation efforts to the extent needed for successful recovery of species. Boldly, the authors of this study suggest that US$650 million y^{-1} would adequately fund recovery of threatened and endangered species, which, in the context of other USA expenditures, is miniscule (http://www.doi.gov/budget/toc.html). *PK*

Neotropical amphibian declines

The neotropics harbor half of the world's amphibian species, but decline and extinction of amphibians appear to be more devastating in this region than in anywhere else on the planet. In spite of the gravity of this situation, the peril of amphibians in Latin America is poorly documented and not at all well understood. Following up on a successful series of monitoring workshops (http://www2.open.ac.uk/biology/froglog/FROGLOG-37-1.html), Bruce Young and colleagues have received National Science Foundation funding to coordinate researchers investigating possible causes of amphibian declines in Latin America. This research network (RANA) will highlight crucial gaps in our knowledge and will assemble data in a comprehensive database (http://www.infonatura.org), creating the opportunity for making sense of geographical patterns relating to risk factors.



It has become clear already that high-altitude amphibians are distinctive for experiencing declines in the absence of habitat destruction. Possible causes that will be examined include diseases, climate change, nonindigenous predators (such as trout), and UV-B radiation. Of course, amphibian deformities and declines have captured the attention of scientists (http://www.open.ac.uk/daptf/) and even schoolchildren (http://www.kie.berkeley.edu/KIE/web/frogs/) worldwide, and the RANA network will link up with these other international efforts, whilst building its own on-the-ground exchange of primary experimental and monitoring data. What makes the neotropic effort special is the huge diversity of amphibians and amphibian habitats that it represents, which provides numerous contrasts for testing hypotheses about possible causal factors. *PK*

Mega-project threatens Peruvian Amazon

A planned US$2.7-billion natural gas project could dramatically alter one of the most pristine and biologically important areas of Peruvian Amazonia. Slated to begin imminently, the Camisea Project will involve large-scale development in the remote Lower Urubamba Region in eastern Peru, as well as construction of a 700-km pipeline from the drill site to Lima.

Field surveys by Smithsonian Institution scientists have shown that the Lower Urubamba area is among the world's most biologically rich areas, supporting up to 160 mammal species and a diversity of other wildlife. Although the proponents of the project claim otherwise, many are concerned that roads and clearings created during pipeline construction will facilitate invasions of loggers, hunters and slash-and-burn farmers into the region. The pipeline will cut across a large swath of the Amazon rainforest before ascending the Andes Mountains en route to Lima.

Financing for the Camisea Project is being arranged by Citigroup, the world's largest financial institution and a top funder of the fossil fuel and logging industries. Citigroup has been heavily criticized by many non-governmental organizations for failing to incorporate adequate environmental and social standards in its investment decisions. *WFL*

New butterfly species discovered in the UK

For the first time in 110 years, a new butterfly species has been found in UK – the wood white butterfly *Leptidia reali*. This species, which was first documented in 1988 in the French Pyrenees, has so far been found elsewhere only Ireland. Interestingly, it is not rare in Ireland, but occurs widely throughout open habitat. Whereas a closely related sister species *Leptidea sinapsis* has been declining rapidly in the UK, because its

preferred woodland habitat is disappearing, it appears that some human activities might favor the new species, which is often found in road verges. The tracking of butterfly species is a favorite activity of naturalists throughout the world, with the group, Butterfly Conservation, having 10 000 members in Europe alone (http://www.butterfly-conservation.org). The happy excitement that greeted the discovery of a new butterfly in the UK reminds us that there sometimes appears to be 'good biodiversity' and 'not so good biodiversity.' One has to wonder whether, if it had been a new mosquito rather than a butterfly that had been discovered, we would not instead be telling horror stories about invasive species… *PK*

Dutch Wadden Sea might not be doing so well

The Wadden Sea of The Netherlands, a country that prides itself on its environmental policy, is one of the world's most frequently visited wetlands, and is also among Europe's highest priority conservation sites. Unfortunately, recent reports suggest that cockle dredging might be altering this sea in irreversible ways, with severely impaired bivalve recruitment (*J. Appl. Ecol.* 38, 976–990). Other signs of ecosystem degradation include the death of at least 20 000 eider ducks in the winter of 2000, declines in oystercatchers, and increases in some aromatic hydrocarbons (http://www.interwad.nl). This extraordinarily valuable ecosystem is visited on foot by >75 000 people each year, and is meant to be under the protection of the Dutch Government. Several ecologists, however, feel that the Government has been remiss in its policy, because it is unwilling to take necessary actions, such as restricting cockle dredging, without incontrovertible proof that dredging is causing serious harm. Thus, instead of being precautionary in its protection of this remarkable wetland, the Government is being precautionary about protecting an important fishery. This is an old story, but one that nevertheless deserves the attention of ecologists and conservation biologists. *PK*

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Letter

Penis-biting slugs: wild claims and confusions

The occasional habit in hermaphroditic banana slugs *Ariolimax* of biting off their partner's penis after copulation (apophally) seems to catch biologists' imaginations (Fig. 1). Unfortunately, their imaginations can go beyond the facts. Thus, in a recent book review in *TREE*, Steve Jones [1] mentioned that slugs bite off their own penises and insert them into their own female aperture to avoid alien sperm. Earlier, he claimed that the severed penis was left in the partner to act as a mating plug [2]. In fact, the everted penises are inserted reciprocally or unilaterally into the other's female tract, but published accounts describe slugs trying hard to retract their penis before one or both partners resort to biting [3]. The female reproductive tract has a special muscle that appears suited to gripping the penis [4], and the severed penises are eaten by the recipient (J.L. Leonard, pers. commun.). So, if getting stuck is an adaptation, it would seem to serve the recipient rather than the amputee, either as a nutrient source, or by preventing the amputee from mating for the period during which sperm competition is a risk, or at least from mating as a male, which could divert resources from egg production.

This is what Birkhead [5] proposed, but he confounded apophally in banana slugs, whose sperm exchange is internal, with the external sperm exchange between intertwined penises in certain other slug genera. *Deroceras laeve* is a species with external sperm transfer in which some individuals lack a penis. In such species, because the penis is needed for sperm receipt, it seems likely that aphallics can reproduce only uniparentally. So, it is misleading that some authors call aphallics of *D. laeve* female [6] and make the blanket assumption that aphallics of all species have the option to mate as females [7,8] (this is possible in some species with phally polymorphisms). This relates to apophally, because the only reported example other than the banana slugs is *D. laeve*: an intriguing but overlooked paper describes how, after copulation, some individuals bite off their own penis, which is then eaten by their partner [9]. The paper further suggests that this is the origin of aphallics in this species. However, in other populations of *D. laeve* studied, the aphallic individuals have never grown a penis (V. Barth and H. Reise, pers. obs.), and it looks possible that a congener was misidentified as *D. laeve*.†

Fig. 1. Penis biting in slugs. After a double penetration mating, two banana slugs *Ariolimax dolichophallus* are taking turns gnawing off the one stuck penis. Reproduced, with permission, from Dan and Alice Harper.

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