

## How to defend environmental misdeeds

A US Federal Judge ruled in March 2002 that the US Navy is illegally killing songbirds (in violation of the Migratory Bird Treaty Act) by bombing (for practice) Farallon de Medinilla, a small Pacific island north of Guam (<http://www.biologicaldiversity.org/swcbd/press/military2-20-02.html>). The Navy had been dropping 2000-lb bombs and firing missiles and rockets at the island regularly, without any permit from the US Fish and Wildlife Service. In defense of the Navy, US Justice Department lawyers argued that the plaintiffs had suffered insufficient injury because, by killing birds, the Navy was making those birds rarer, and bird-watchers get more pleasure from spotting a rare bird than a common bird. Hence, bird-watchers should be happy with Navy's program for rarifying birds.

Not surprisingly, the Judge presiding over the case sternly scolded the federal lawyers for this 'frivolous argument'. At least the government lawyers did not argue there was insufficient evidence that the bombs and rockets were killing the birds. *PK*

## Evolutionary biologists need a synthesis center

Science leaders in the USA have concluded that there is a national need for a special 'evolutionary synthesis center', modeled after the very successful National Center for Ecological Analysis and Synthesis (NCEAS). The mechanism being copied from NCEAS is the fluid working group, in which a wide range of scientists and data are brought together to combine data and tools in fresh ways that solve important problems. Because no new data are collected, and the activities focus on what information is already known, the appeal and call for such synthesis centers emphasizes the point that our ignorance often stems from not knowing what information we have, rather than not having the information in the first place. This evolutionary synthesis center is envisaged as both helping to further unify biological sciences, as well as provide useful insights to policy makers, government agencies, and society at large (<http://frog.biology.yale.edu/esc>).

The sorts of practical problem the center could inform on include the formulation of

vaccines that more effectively frustrate counterevolution on the part of pathogens, and promoting a natural world that maintains evolutionary processes capable of responding to profound global change. *PK*

## Biodiversity treaty threatens research

Increasing numbers of biologists have concluded that the Convention on Biological Diversity (CBD) is seriously impeding vital research in the developing world. The CBD, which was framed in 1993 and included 183 signatories, was designed to protect the rights of nations to genetic and other biological resources found within their borders. By attempting to ensure that nations reap direct financial rewards for their biodiversity, the CBD was intended to promote conservation and sustainable development.

But many now believe the CBD is being mis-applied in several developing countries, creating almost insurmountable hurdles for basic and applied research. Allegations of 'biopiracy' have proven politically popular in countries such as Brazil, which is still smarting over the loss of its lucrative rubber monopoly to the UK in the 19th century.

Current and planned regulations are intended to control research by drug and biotechnology companies, but are often applied in a broad manner to anyone conducting genetic or molecular studies or seeking to export biological material. Protracted delays and restrictions have caused many scientists to forego research in extremely diverse areas in Amazonia, Borneo, and elsewhere. The problem, say biologists, is that fundamental research in taxonomy, biogeography and conservation is foundering whilst destructive development still continues apace. *WFL*

## Missouri River is again most endangered river in USA

In its annual 'most endangered rivers report', American Rivers named the Missouri River as the most endangered river in the USA. The report lays most of the blame on the US Army Corps of Engineers for the way in which it operates six major dams, interfering with flows necessary for the river's fish and wildlife (<http://www.amrivers.org/pressrelease/2002missouri.htm>). Much benefit could be

achieved by changing dam operations, rather than removing dams altogether. The report points out that the Army Corps of Engineers institutionally fails again and again to consider environmental issues, a conclusion echoed by two National Academy of Science panels.

Recognizing that 'saving wildlife' does not always rally the public around a cause, American Rivers calls for a cost-benefit analysis that compares the economic bottom-line of current practices with a more environmentally friendly Missouri River, which, as a result, has enhanced recreational and fishing opportunities. *PK*

## Asian air pollution clouds western USA

The foolishness of environmental isolationism has been vividly exposed by recent reports of elevated smog levels in California, Oregon and Washington State because of wind borne pollution from China and other Asian countries, although that is not to say that North American cities are not responsible for much of their own air pollution. But, during certain days, as much as 75% of the particle pollution has been traced to Asia (<http://www.bayarea.com/mld/bayarea/news/local/3142786.htm>). The bottom line is that this Asian dust will cause some cities to fail to meet air-quality standards on days on which they would otherwise have been judged to be healthy. Much of the dust comes from China, where deforestation, overgrazing and poor farming practices (many of which are legacies of Mao's regime) have led to huge dust storms that has the Chinese environmental protection agency concerned. This export of pollution across the Pacific Ocean is yet another example of the globalization of environmental problems. It is these types of problem that argue for strong international environmental treaties and conventions. *PK*

## Prestigious journal at centre of transgenes in Mexican maize controversy

The journal *Nature*, and biologists Ignacio Chapela and David Quest at the University of California, Berkeley, are in the spotlight again for reports about transgenes in native Mexican maize. In November 2001, *Nature*

published an article by Chapela and Quest that raised a great deal of environmental alarm regarding the recombinant transgenes appearing in Mexican maize. No one disputes that transgenic pollen (even though it was supposedly banned in Mexico) has delivered transgenes to native maize. The debate focuses on whether those genes have fragmented and spread throughout the corn genome – which would be worrying, because it would imply very unusual gene behavior. In April 2002, *Nature* published a paper by plant and microbial biologists, also from Berkeley, that forcibly accuses Chapela and Quest of drawing ‘unfounded’ conclusions. The science gets personal, because Chapela is up for tenure, and because there

is so much suspicion surrounding any debate about genetically engineered plants. For example, Daniel Pinero, a geneticist from the National Autonomous University of Mexico agrees that Chapela’s claims might have been exaggerated, but also worries that ‘*Nature* has a lot of advertising from multinationals and there may have been pressure on the magazine’ (<http://www.ecoamericas.com/english/story.asp?storyid=357>).

*Nature’s* handling of the dispute has pleased no one. Chapela and Quest feel that *Nature’s* editor is wrong to have placed a statement on the journal’s website claiming effectively that *Nature* should not have published the original article; meanwhile, critics of the original study feel that *Nature*

should have retracted the paper outright (<http://pewagbiotech.org/newsroom/summaries/display.php3?NewsID=135>). Although there is no evidence of ‘external pressures’ or ‘conspiracies’, it is certainly clear that any scientist who publishes an influential paper challenging biotechnology is sure to be quickly and severely attacked in the scientific literature by peers of differing views. PK

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## Letters

### Ecosystem engineering: a trivialized concept?

In a recent review in *TREE* [1], Reichman and Seabloom discuss the important impacts of burrowing mammals as keystone ecosystem engineers. The article eloquently explains the importance of one group of ecosystem engineers, but, in restricting the term ‘ecosystem engineer’ to keystone species, I believe that it seriously understates the value of the concept.

Reichman and Seabloom’s definition requires that the ‘change to the physical environment should be distinctive from processes that are strictly abiotic...and large relative to purely physical processes operating in the system’. They also state that ‘discussions of ecosystem engineering have become trivialized by characterizing any influence on the environment as engineering because all plants and animals affect the physical environment in some way’. I have strong reservations about these two statements.

I do not believe that the definition of ecosystem engineering should be based purely on the physical effect. As explicitly stated in the original definitions of ecosystem engineering, the physical effects caused by engineers should ‘modulate the availability of resources to other organisms’ [2]. The key point is that the changes in resource flow caused by

ecosystem engineering affect other organisms. Thus, the value of the ecosystem-engineering concept lies in its formalization of interactions among organisms that are mediated by the physical environment, and that were hitherto not included in ecological theory. It is an additional class of interactions that should be integrated with trophic ecology to give us a more complete understanding of interspecific interactions [3,4].

Far from trivializing the concept, the fact that all organisms affect the physical environment in some way emphasizes the possible ubiquity of ecosystem engineering. All organisms also have trophic interactions, but does this trivialize trophic ecology? Should we restrict discussions of trophic interactions to those interactions involving keystone species? If most species do turn out to have ecosystem engineering interactions with other species, then the label ‘ecosystem engineer’ will be trivial, but the engineering processes definitely are not. Indeed, in concentrating on the identification of keystone engineers, rather than on the engineering processes that they control and their generality, we risk an ‘accumulation of “just-so” stories’ that was warned against when the concept was introduced [2].

In Box 1 of their article, Reichman and Seabloom explain how soil excavation and herbivory by pocket gophers *Thomomys bottae* interact with competitive

interactions among plant species to govern vegetation composition and spatial pattern. Thus, the authors summarize a considerable body of work that describes pocket gophers in terms of the impact of their herbivory and soil disturbance on plant community structure. From this process perspective, ecosystem-engineering effects, alongside trophic effects, are described in such a way that allows comparison of species in similar or dissimilar ecosystems. I suggest that such an integrative approach is the way forward for the study of ecosystem engineering. Our goal should be to elucidate how widespread and important ecosystem engineering interactions are, rather than restricting ourselves to the most apparent examples from the outset.

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