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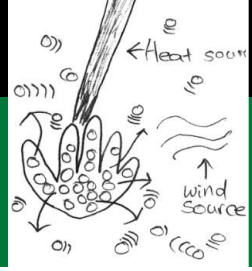

Learning by drawing
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LETTERS

edited by Jennifer Sills

Endangered Wolves Fall Prey to Politics

IN MAY 2011, THE NORTHERN ROCKY MOUNTAIN GRAY WOLF WAS REMOVED FROM THE FEDERAL List of Endangered and Threatened Wildlife in the first legislative delisting of an endangered species since the 1973 U.S. Endangered Species Act (*1*) was passed into law. The delisting decision excluded Wyoming because proposed management by that state was deemed insufficient to sustain its wolf population. In early August, Interior Secretary Salazar agreed to delist the wolf in Wyoming after the state agreed to sustain a minimum of 150 wolves in northwestern Wyoming (or at least 100 outside Yellowstone National Park, whichever is greater) and remove them everywhere else by any means necessary (*2*). This decision provides insufficient protection to Wyoming's wolves. The terms of the agreement—similar to those opposed in the past by federal courts as unjustified according to the best available science and the plain language of the Endangered Species Act (*3*, *4*)—are a response to pressure by western politicians, ranchers, and sport hunters (*3*).

These interest groups claim that continued protection will allow wolf populations to grow exponentially, serially extirpating elk populations and preying on livestock and people (*5*). Data do not support this argument; elk in Yellowstone National Park increased substantially before wolf reintroduction in 1995 and have decreased substantially since, but they have not been extirpated. In fact, state biologists say that Wyoming's elk herd should be reduced in order to maintain the health of the herd and the habitat (*6*). Meanwhile, the park's wolf population has not increased exponentially but rather declined 44% since 2003 and stabilized at fewer than 100 (*7*). Critics' concerns about livestock are also unfounded: Confirmed cattle deaths due to wolves in Wyoming, as well as the number of wolf packs responsible for cattle deaths, have declined steadily from 2006 through mid-2011, even as Wyoming's wolf population has increased (*7*). Overall, protecting the wolves has positively affected the ecosystem (*8*), which was a key intent of the 1973 Endangered Species Act (*1*).

Recent wolf population increases have resulted largely from wolf movement into new areas of public land with sufficient prey. Ecologists believe that such expansions will facilitate wolf-driven ecosystem restoration, as occurred in Yellowstone National Park (*8*), and that this would benefit western lands degraded by overbrowsing elk. Wyoming's removal plan and goal of reducing its 350 wolves by more than 40% (*2*) will reduce the degree and total geographic area of such trophic restoration. The fact that Idaho and Montana killed 525 wolves, or 32% of the population, by regulated hunting and control actions during the year (2009 to 2010) they were delisted (*7*) shows that Wyoming's goal is achievable. Such losses will likely result in ecologically ineffective—and possibly unsustainable—wolf populations (*3*).

There is increasing recognition that removing predators from natural ecosystems comes with serious consequences ("Trophic downgrading of planet Earth," J. A. Estes *et al*., Review, 15 July, p. 301). Rather than bowing to political pressure as the Interior Department's short-sighted plan does, we should focus on the many benefits of wolf restoration and expansion that established science has shown (*3*).

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Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the past 3 months or matters of general interest. Letters are not acknowledged upon receipt. Whether published in full or in part, Letters are subject to editing for clarity and space. Letters submitted, published, or posted elsewhere, in print or online, will be disqualified. To submit a Letter, go to www.submit2science.org.

Predators' Effects on Ecosystem Entropy

IN THEIR REVIEW "TROPHIC DOWNGRADING of planet Earth" (15 July, p. 301), J. A. Estes and coauthors highlight the far-reaching changes to ecosystems that result from the loss of apex consumers. In particular, they point out large reductions in vegetation brought about by unregulated herbivore populations in such systems. This leads me

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to point out yet another important consequence of losing large terrestrial predators and their top-down effects (*1*). When photosynthetic capacity is reduced, not only does atmospheric CO_2 increase, but heat dissipation through evapotranspiration is reduced. Some models estimate that evapotranspiration's contribution to global warming is greater than that of CO_2 by one to two orders of magnitude (*2*, *3*). The trophic downgrading discussed by Estes *et al*. thus not only alters ecosystems as they describe, but reduces the rate of entropy production, which increases surface temperature variation. These indirect effects may have substantial consequences for biodiversity and ecosystem functions.

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Looking to NSF as an NIH Model

M. ROSBASH'S EDITORIAL "A THREAT TO MEDICAL innovation" (8 July, p. 136) discusses the financial challenges faced by the U.S. National Institutes of Health (NIH). NIH must figure out how to fund a higher percentage of meritorious proposals and how to ensure that the funded proposals represent the best science performed by the best scientists. In addition to Rosbash's suggestions, NIH could look to the U.S. National Science Foundation (NSF) for solutions.

NIH should consider restricting the amount of investigator salaries charged to a grant, especially if the investigator already receives a salary. At NSF, funded salaries are usually limited to 2 months (*1*), whereas funded salaries at NIH are limited only by the NIH Salary Cap (*2*). Decreasing the share of grant budgets devoted to salaries would lead to substantial savings, which could be devoted to proposals that would go unfunded otherwise. Many would fight such salary restrictions, but the alternative of funding only 10 to 15% of grant applications, as cited by Rosbash, is far worse.

Most NIH Study Sections often do not have the breadth of expertise needed to cover all of the topics of the submitted proposals. As a result, ad hoc reviewers are added, usually one per proposal. Too much of the review decision is based on this one expert. At NSF, 3 to 10 experts (ad hoc reviewers) evaluate a proposal, and it is then reviewed by an NSF Program Officer and in many cases a review panel (*3*). Adopting a similar system at NIH would ensure that grant selections rewarded the best science.

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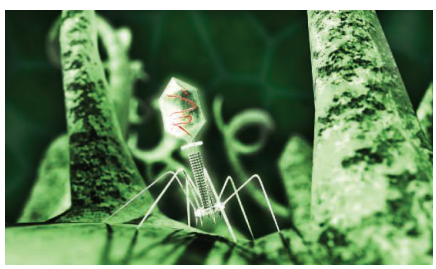
CORRECTIONS AND CLARIFICATIONS

Table of Contents: (24 June, p. 1475). The teaser for the Research Article by B. Marty *et al.* was incorrect. The correct teaser should read "Earth, the inner planets, and meteorites are about 40% enriched in the heavy nitrogen-15 isotope compared with the Sun and Jupiter."

Visualization Challenge: (18 February, p. 847). The honorable mention illustration, "Enterobacteria Phage T4," by J. Heras showed the virus with eight legs. The virus only has six legs. Heras's corrected image is shown here.



TECHNICAL COMMENT ABSTRACTS

Comment on "Drought-Induced Reduction in Global Terrestrial Net Primary Production from 2000 Through 2009"

Arindam Samanta, Marcos H. Costa, Edson L. Nunes, Simone A. Vieira, Liang Xu, Ranga B. Myneni

Zhao and Running (Reports, 20 August 2010, p. 940) reported a reduction in global terrestrial net primary production (NPP) from 2000 through 2009. We argue that the small trends, regional patterns, and interannual variations that they describe are artifacts of their NPP model. Satellite observations of vegetation activity show no statistically significant changes in more than 85% of the vegetated lands south of 70°N during the same 2000 to 2009 period.

Full text at www.sciencemag.org/cgi/content/full/333/6046/1093-c

Comment on "Drought-Induced Reduction in Global Terrestrial Net Primary Production from 2000 Through 2009"

Belinda E. Medlyn

Zhao and Running (Reports, 20 August 2010, p. 940) reported that global net primary production has declined over the past decade and that this reduction was caused by drought. However, their findings are not direct measurements, but rather are based on outcomes from models in which a strong temperature dependence is assumed. I examine the assumptions underlying their results and show that their findings can be explained as logical consequences of these assumptions.

Full text at www.sciencemag.org/cgi/content/full/333/6046/1093-d

Response to Comments on "Drought-Induced Reduction in Global Terrestrial Net Primary Production from 2000 Through 2009"

Maosheng Zhao and Steven W. Running

Samanta *et al*. and Medlyn challenge our report of reduced global terrestrial net primary production (NPP) from 2000 through 2009. Our new tests show that other vegetation indices had even stronger negative changes through the decade, and weakening temperature controls on water stress and respiration still did not produce a positive trend in NPP. These analyses strengthen the conclusion of drought-induced reduction in global NPP over the past decade.

Full text at www.sciencemag.org/cgi/content/full/333/6046/1093-e

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