LETTERS

edited by Jennifer Sills

Working the Crowd

THE NEWS FOCUS STORY BY J. TRAVIS ("SCIENCE BY THE MASSES" 28 March, p. 1750) describes the application of crowd-sourcing in research and development. This approach consists of gathering a mass of people to seek out new ideas or solutions, and paying profits to seekers and solvers. A related idea is crowd-funding, a bottom-up model of financing used for various purposes, from software development to political campaigns.

We suggest crowd-funding as a possible strategy to cope with the lack of investments in research, as well as to increase democratization in the sciences. Projects seeking funding could be stored in an online repository. Each project would include a description of its objectives, duration, and requested contribution. Investors (either people or funding agencies) could decide which projects to fund.

For such a service to be successful, several challenges would need to be addressed: (i) Evaluating the quality of the proposals. To assist (nonspecialist) investors in deciding the awarding of contributions (and to audit thereafter), a peer-review procedure could be used. (ii) Potential for fraud. Fraud could be prevented by implementing a reputation system (*1*) and by indicating the scientific track record of the proponent. (iii) Intellectual property management. Intellectual property issues could be managed by allowing proponents to choose the appropriate level of protection of their ideas—for example, by using Creative Commons licenses (*2*). (iv) Investor rewards. Investors could be motivated by the prospect of earning shares (for profit-making research programs) or by the acknowledgment of their contribution (for nonprofit research programs).

Public investing. Allowing the public to invest in research may help alleviate the funding shortage.

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Southern Ocean Not So Pristine

THE REPORT "A GLOBAL MAP OF HUMAN impact on marine ecosystems" (B. S. Halpern *et al*., 15 February, p. 948) provides a timely overview of anthropogenic effects on even the farthest reaches of Earth's oceans. However, we contend that, for at least one region, using data from only the past decade leads to misleading results.

A widespread perception exists that waters south of the Antarctic Polar Frontal Zone—i.e., the Southern Ocean (SO)—are still nearly pristine (*1*, *2*). In fact, the northern portion of the SO saw virtually all cetacean populations removed long ago (*3*), and in subsequent years (1960s to 1980s) the largest stocks of demersal fish in the Indian Ocean and Scotia Sea/Atlantic Ocean sectors were also fished to commercial extinction (*4*, *5*). Historically exploited fish species and cetaceans show little signs of recovery in the SO, and recent legal commercial fishing activity has been correspondingly low (*6*). It is thus no surprise that the modeling used by Halpern *et al*. shows little anthropogenic impact in these sectors apart from that of climate change. The authors acknowledge that accounting for current illegal, unregulated, and unreported fishing in these waters might show increased human impacts. The additional consideration of historical data should cause Halpern *et al*. to temper their conclusion that for the world's oceans "large areas of relatively little human impact remain, particularly near the poles."

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Diminishing Sea Ice

IN THEIR USEFUL REPORT, "A GLOBAL MAP OF human impact on marine ecosystems" (15 February, p. 948), B. S. Halpern *et al*. wrote that "large areas of relatively little human impact remain, particularly near the poles." They failed to take into account sea-ice diminishment, which may already be responsible for substantial local, regional, and global effects (*1*, *2*).

Arctic and Antarctic sea-ice ecosystems, together covering 7% of Earth, comprise "one of the largest biomes on Earth" (*3*), providing

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