

Innovation and
the future

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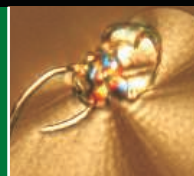
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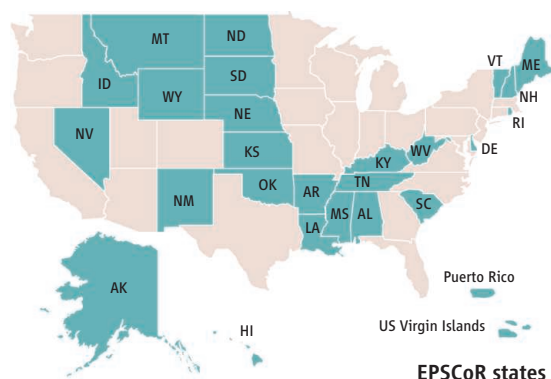


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LETTERS

edited by Jennifer Sills

Grants on the Run



EPSCoR states

THE EXPERIMENTAL PROGRAM TO Stimulate Competitive Research (EPSCoR) was designed to help U.S. states with limited facilities improve their research infrastructure in order to make them more competitive for nationwide grants, such as the R01. Twenty-seven states and territories (including Puerto Rico and the U.S. Virgin Islands) have been designated EPSCoR states (1). In a recent Letter (“Declines in NIH R01 research grant funding,” 10 October

2008, p. 189), H. G. Mandel and E. S. Vesell presented the current funding statistics for R01 grants. These findings and other changes in policy (2) demonstrate the difficulty in getting R01 grants funded in the current climate. The existing funding situation encourages investigators from EPSCoR states to take their R01 grants and leave for better institutions because better institutions have the resources to obtain new R01 grants and renew R01 grants.

How can institutions in EPSCoR states retain their scientists with R01 grants under these difficult conditions? It may be necessary to offer extremely competitive financial packages to scientists from elsewhere with R01s or to change the promotion and tenure policies. Perhaps scientists who have R01s could receive early promotion and tenure, or the tenure clock could be extended to give scientists more time to obtain an R01.

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Fishing for More Effective Incentives

IN THEIR REPORT “CAN CATCH SHARES PREVENT fisheries collapse?” (19 September 2008, p. 1678), C. Costello *et al.* present empirical evidence to support the view that providing incentives for fishers by allocating them shares in the catch [individual transferable quotas (ITQs)] can halt, or even reverse, the trend toward increasing collapse

of fisheries. We do not dispute that correct incentives are important in solving fishery problems, but we urge caution in interpreting and acting on these results.

Adoption of ITQs does not always prevent overfishing, as illustrated by several stocks managed by ITQs in Australia and New Zealand (1). ITQs are a blunt economic instrument and may actually create perverse incentives. For example, “high-grading” (discarding fish of lower market value to maximize returns from the catch share) is a

common feature of such systems. Partial rights allocation (a common feature where fish cross jurisdictional boundaries) can result in both misreporting and failure to control catches (2). In multispecies fisheries, restrictions on quota species can lead to targeting and overfishing on commercial species not in the quota system. Placing all species in the quota system leads to very expensive fishery management systems, and rights allocation tends to be an irreversible decision short of complete government buy-out of a fishery. Furthermore, like other management regimes based on strong property rights, ITQ management can lead to litigious behavior and attract speculators.

Costello *et al.* focus on overfishing of target species, but fishery managers now have to consider and manage broader ecological impacts of fishing (3), and it is not clear that catch shares create incentives to deal with these problems. For example, major global issues include both bycatch (catch and discarding of noncommercial species) and the impacts of fishing on benthic habitats and communities (4, 5). Once private property rights have been allocated, it may prove difficult for regulators to protect benthic habitats and associated and dependent noncommercial species (6).

Concerns about overfishing and wider ecological impacts of fishing have prompted a variety of solutions to the fisheries management problem. Those who despair of traditional approaches tend to favor alternatives such as widespread use of areas closed to fishing (e.g., marine protected areas) (7). Those

Letters to the Editor

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with more direct experience of fisheries tend to stress the importance of incentives, of which catch shares are the most common (but not only) example (2). We agree with the importance of incentives but distrust any single-factor solutions to overfishing and other fishery issues. In our experience, solutions to most real-world fisheries problems are likely to comprise a package of measures, including (where appropriate) ITQs, spatial management, effort and gear restrictions, as well as removal of excessive subsidies.

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Diverse Fisheries Require Diverse Solutions

WE APPLAUD C. COSTELLO *ET AL.*'S REPORT "CAN catch shares prevent fisheries collapse?" (19 September 2008, p. 1678) for empirically evaluating one solution to fisheries collapses—individual transferable quotas (ITQs)—but worry about promoting a single, prescriptive solution for diverse global fisheries based on the overly simplistic premise of "getting incentives right" (1–3). Examples of ITQs considered by Costello *et al.* come from developed countries with strong governance and temperate or subtropical ecosystems with low relative diversity; these conditions favor single-species fisheries. Hence, the results do not represent catch shares generally and cannot be extrapolated globally to model the recovery of the world's predominantly small-scale and data-poor fisheries.

ITQs raise social issues that should not be ignored, such as the effects of consolidation, lost livelihoods, restricted resource access, allocation by historical privilege, and reduced local investment (4). These undermine the local stewardship and "individual incentives" necessary for successful implementation of ITQs (3). Without solutions to issues of equity, population growth coupled with increases in ITQ-managed fisheries could

lead fishers displaced from formerly open-access areas to pursue illegal, unregulated, and unreported fishing or to fish other species within ITQ zones.

To stem collapse and begin recovery, the world's fisheries need diverse and practical management measures, including ITQs as well as marine protected areas, traditional user rights, and minimum/maximum size limits, among others (5, 6).

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Response

OUR REPORT (BY J.L., C.C., AND S.D.G.) should not be read as a blinkered push for individual transferable quotas (ITQs). We agree that ITQs are not a panacea; we simply used them as a convenient subset of rights-based management to test whether Worm *et al.*'s prediction (1) of 100% collapse holds true for rights-based fisheries. The data used by Worm *et al.* are aggregated over large spatial areas, and ITQ fisheries are the only rights-based fisheries that are implemented on a similar scale.

We showed in our Report that, on average, ITQ-managed fisheries are significantly less prone to collapse than are non-ITQ fisheries. However, simply switching to ITQs does not guarantee ecological and social benefits: Total allowable catches (TACs) must still be set appropriately, and design must account for social objectives. Fisheries are complex interactions between ecosystems and human societies where market incentives can fail for a variety of reasons. For example, when enforcement is inadequate, species with little economic value may still be discarded. Quota holders may support the depletion rather than

the sustainable harvest of species with exceptionally low productivity. Separation between those who harvest the fish and those who set the quota can compromise the incentives for sustainable harvesting. Component populations may be depleted if the geographic scale of management exceeds the geographic scale of these populations.

Smith *et al.* raise a range of valid concerns about the ecological impacts of ITQs (such as bycatch and high-grading). However, ITQs can result in quota holders encouraging more restrictive TACs, reducing levels of bycatch, and supporting conservation measures such as marine protected areas (2–4). Branch *et al.* (5) found no evidence that ITQs cause an increase in high-grading. In Canada, multispecies ITQs were observed to be no more expensive to enforce than existing regulations (6). Learning from this rich range of experience is fundamental to improving fisheries management generally and to applying rights-based mechanisms in particular.

Similarly, Ban *et al.* raise justifiable concerns about the socioeconomic impacts of ITQ implementation. Potential for consolidation and lost livelihoods should be part of any discussion on implementing rights-based management and balanced against expected societal gains from enhanced management. As noted by our Report, there are many rights-based alternatives to ITQs.

Despite these caveats, we strongly disagree that "getting incentives right" is an overly simplistic premise. Our Report tested and validated Hilborn *et al.*'s (7) hypothesis that sustainable fishing will occur when institutional incentives encourage participants to behave in ways that society considers beneficial. Other premises (such as Ban *et al.*'s argument that equity is essential for sustainability) should also be tested with the same degree of rigor.

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A Question of Ethics

IN "DO WE NEED 'SYNTHETIC BIOETHICS'?" (Policy Forum, 12 September 2008, p. 1449), E. Parens *et al.* warn of a further "balkanization" of bioethics: the tendency to divide bioethics into ever more subfields (such as gen-ethics and neuro-ethics), each of which lacks awareness of the general ethical questions common to all areas. According to the Policy Forum, the ethics of synthetic biology is just the latest offspring in a line of ethical enterprises of debatable value. Parens *et al.* use our commentary on synthetic biology's ethical implications (*1*) as an example of this trend.

We did not call for the inauguration of "synthetic bioethics" as a new field of inquiry. However, we do claim that the ethical issues raised by synthetic biology differ from those raised by genetic engineering. Synthetic biology constitutes a shift from

manipulation (the optimization of known organisms) to creation (the vision of nature as blank space to be filled with whatever organisms one might devise). We must integrate synthetic biology's specific characteristics with the thornier questions of general ethical provenance.

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Response

WE REGRET THAT BOLDT AND MÜLLER INTERPRETED our Policy Forum as charging them with balkanizing bioethics and calling for such a subfield; they do not call for this, nor did we say that they do.

Boldt and Müller do claim that synthetic biology raises new ethical issues, and on this we differ. We think that "creating" life in the context of synthetic biology raises the same ethical question that is raised by "manipulat-

ing" life in the context of genetic engineering (and in contexts such as assisted human reproduction, embryonic stem cell research, or animal-human chimeras). The question is: Should there be any in-principle limits on our capacity to transform ourselves and the rest of the natural world?

If Boldt and Müller are right and synthetic biology raises fundamentally new ethical issues, then someone would have solid ground on which to argue for a new bioethical subfield. If we are right, it makes better sense to just drill down with this thorny old question.

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CORRECTIONS AND CLARIFICATIONS

News of the Week: "European Union floats tighter animal-research rules" by G. Vogel (14 November 2008, p. 1037). The article referred to lampreys as invertebrates. Lampreys, however, have backbones. The new European Union regulations regarding animal research list Cyclostomes as "invertebrate species" that should be regulated. Cyclostomes include hagfish (which lack a vertebral column) and lampreys.

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