

Academy of Natural Sciences: Job Cuts

JOCELYN KAISER'S ARTICLE ON JOB CUTS AT THE Academy of Natural Sciences in Philadelphia ("Philadelphia institution forced to cut curators," *News of the Week*, 7 Jan., p. 28) exemplifies a disturbing trend that threatens our understanding of biological diversity. At a time when species are thought to be going extinct at record rates (*I*), our capacity to describe that diversity is being severely undermined. The situation in Philadelphia demonstrates that the very institutions charged with this cause are now also being threatened with extinction.

Academy President D. James Baker does not seem to understand this, and his vision for the institution is a frightening prospect for the entire natural history museum community. Efforts to focus Academy research on noncollections-based programs such as watershed management are misdirected. Such programs already exist at universities and environmental consulting firms around the country, and reproducing them devalues the very thing that makes the Academy unique—its biological collections. The Academy is a taxonomic institution and that should remain its central focus. The history of the Academy suggests that, once a curator is lost, the associated collection falls into obscurity, and now ornithology at the Academy is threatened. Furthermore, Baker's implication that a taxonomic focus cannot bring in outside research dollars is a fallacy. At the same time, systematists cannot be expected to bear the burden of fixing their institution's financial situation. What the Academy needs is enthusiastic leadership that understands its institution's taxonomic mission. Baker and the Academy board seem to lack this understanding.

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THE ACADEMY OF NATURAL SCIENCES IN Philadelphia is one of the most important research museums in the world, with a rich tradition going back to Audubon and beyond. Unfortunately, its stature is now in grave jeopardy because of cuts in staff ("Philadelphia institution forced to cut curators," J. Kaiser, *News of the Week*, 7 Jan., p. 28).

Reductions in Academy staff were necessary because of a severe budget deficit, but the nature of the cuts signifies a major problem in leadership at the institution. In scrambling for dollars, the Academy's directors have lost sight of the institution's fundamental mission. The budget cuts disproportionately slashed basic museum research. For example, the bird collection must now operate without a research head for the first time in almost 200 years. What remains after the cuts are mostly cash-cows, namely, exhibits and applied research in environmental and biomedical science. Although exhibits are important to the Academy's mission, applied programs are not. The Academy is a natural history museum, not the Environmental Protection Agency or the Centers for Disease Control.

Heads should roll at the Academy, that is clear, but not the heads of employees who are fulfilling the mission of the institution.

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IN HER NEWS OF THE WEEK ARTICLE "Philadelphia institution forced to cut curators" (7 Jan., p. 28), J. Kaiser reports on budget shortfalls at the Academy of Natural Sciences in Philadelphia. In my discussions with Kaiser, I emphasized that the cutbacks mentioned in the article were made to reduce the Academy's budget deficit and should not be construed as reflecting negatively on the individuals concerned. It was unfortunate that the article gave the names of the curators who received notice and implied that these individuals were laid off because of unsatisfactory performance.

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The Recreational Fisher's Perspective

IN THEIR REPORT "THE IMPACT OF UNITED States recreational fishers on marine fish populations" (Reports, published online 26 Aug. 2004, DOI 10.1126/science.1100397; 24 Sept. 2004, p. 1958), F. C. Coleman *et al.* suggest that the overfished condition of marine fish stocks rests on the shoulders of the recreational angler. In reality, the study merely confirms what fishery scientists,

Letters to the Editor

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managers, and anglers themselves have known for decades—recreational catches comprise a significant share of some U.S. fisheries. Unfortunately, the authors have mischaracterized marine fisheries by pointing out just the current proportion of recreational landings of a few "populations of concern." What the authors fail to consider in the study is how most of these species arrived at their current condition—through years of commercial overfishing.

Image not available for online use.

A bocaccio

For example, the authors say that in 2002, anglers landed 87% of the total harvest of bocaccio, or approximately 200,000 pounds. What the authors fail to explain is that of the total 104 million pounds of bocaccio landed in the previous 20 years, commercial fisherman landed 89 million pounds, more than 85% of the total. In other words, over the same period, recreational landings account for less than 15% of the total (*I*). It is the sustained commercial overfishing of bocaccio (see figure in Supporting Online Material) (2) that is the primary reason for driving this species into decline.

The authors also fail to accurately represent the reality of the Gulf of Mexico red snapper fishery. To state that recreational anglers take half of the total red snapper harvest is to ignore the most significant part of the story. The authors never mention the source of mortality that has the greatest impact on red snapper stock recovery: mortality of juvenile snapper caused by shrimp trawl bycatch. The reality is that even if all sportfishing—and commercial fishing, for that matter—ended today, the stock will never recover without addressing this major source of mortality.

In the United States, saltwater recreational anglers are highly regulated by state, interstate, and federal bag limits; size limits; and seasons, the same tools that have successfully managed freshwater anglers for many years. The anglers, and the industry they support, have a strong tradition of supporting and paying for good fisheries management. This study does nothing more than malign this community and mislead the American public at a time when we all need to be working cooperatively to rebuild our fisheries.

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Response

IT IS OUR VIEW, BASED ON THE DATA, THAT THE same tools used to manage freshwater anglers have not proved effective in constraining the cumulative effect of saltwater recreational fishing, nor has the entire toolbox used in freshwater management been applied in saltwater, including lotteries and annual bag limits. Such facts point to the need for better (not more) regulations that effectively stop overfishing so that both recreational fishing and commercial fishing are sustainable enterprises.

Nussman contends that we "suggest that the overfished condition of marine fish stocks rests on the shoulders of the recreational angler." To the contrary, we simply point out that recreational fishing takes 23% of these overfished stocks, based on U.S. National Marine Fisheries Service (NMFS) data and on the NMFS's most recent status report on U.S. fisheries (1). Clearly, commercial fishing plays a significant role in taking the remaining 77%. Further, commercial fishing has

played a significant role in the catch histories of individual species.

Many, indeed most, of the overfished stocks can be attributed to commercial fishing. However, this is not the case for all species. In the Gulf of Mexico, four of the five most productive species that are overfished are taken primarily by recreational anglers and have been for over most of the past 22 years. (On the Atlantic coast, bluefish catch has steadily declined to 18% of 1981 levels and has been primarily recreational, while black sea bass shifts back and forth between the two.)

Nussman states that we inaccurately depict the red snapper fishery by not addressing bycatch. The directed red snapper fishery typically points to bycatch of juvenile red snapper as the single most important factor inhibiting recovery, while the shrimp fishery suggests that the directed fishery is to blame for removing the largest, oldest, and most fecund individuals, thus truncating the age and size structure of the population. This argument has persisted now for decades, but could be more clearly resolved by improving the poor estimates of natural mortality in both juvenile and adult stages. Recent stock reduction analyses (2, 3) suggest that shrimp trawl bycatch of juvenile red snapper has had relatively little impact on the depletion of the red snapper stock, and indicate instead that the mortality rates from commercial and recreational fishing have caused the large depletions in stock abundance.

Our objective in conducting this body of work was to inform the public that both commercial and recreational sectors contribute to overfishing. The ecological and economic sustainability of these sectors depends on acceptance of this shared responsibility; knowledge of all sources of mortality (including agricultural pollution, industrial pollution, and coastal development); and cooperation to rebuild healthy populations and ecosystems.

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2. M. McAllister, personal communication.
3. C. Walters, personal communication.

Global Impact of Recreational Fisheries

F. C. COLEMAN ET AL.'S ANALYSIS OF THE IMPACT of recreational fisheries on marine fish populations in the United States ("The impact of United States recreational fisheries on marine fish populations," Reports, published online, 26 Aug. 2004; DOI 10.1126/science.1100397; 24 Sept. 2004, p. 1958) constitutes a timely contribution about the potential biological importance of this fisheries sector. However, the evidence presented is only a cursory acknowledgment of the global impact of recreational fisheries.

The authors present time series of total harvest and percentages of landings (i.e., the share that recreational anglers have of the total harvest in the marine environment as compared with commercial fisheries), which illustrates that recreational fisheries can and do sometimes contribute substantially to total harvest, particularly among some top predators of the food webs. However, the recognition that some marine species were primarily harvested by recreational anglers does not explicitly suggest that recreational fishing can have "serious ecological and economic consequences on fished populations," as Coleman *et al.* state. It is not possible to derive conclusions about ecological impacts on the basis of harvest ratios alone, let alone the economic perspective. Although we "believe" that the author's contention may be correct, it would be more appropriate to restrict their conclusions to those clearly supported and warranted by the data.

In this way, it is clear that the total harvest of recreational fisheries is decreasing over time in all stocks except in the Gulf of Mexico (their fig. 1C) and that the general share on total landings has been stable since the 1990s (fig. 1A). Does this mean that the impact of recreational fisheries is decreasing, or at least not increasing? We simply do not know yet.

There is another issue that needs to be addressed in the future. In all review papers recently published on the future of the world's fisheries [e.g., (1, 2)], only commercial marine fisheries have been considered, whereas inland fisheries have not been accounted for appropriately. However, in inland fisheries of all industrialized societies, commercial fisheries have largely been replaced by recreational fisheries (3, 4). Therefore, harvest ratio studies (e.g., Coleman *et al.*) would provide little insight, as fishing is conducted primarily recreationally. But does this indicate that the impact of recreational fishing is negligible in freshwater ecosystems? As much of the

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world's ichthyofaunal diversity is confined to the freshwater environment, intensive, typically highly selective recreational fishing and discard mortality [e.g., (5)] coupled with deleterious recreational fisheries management actions such as harmful stocking practices (3, 6) may often lead to much stronger negative ecological and possibly evolutionary impacts of leisure fisheries in freshwater. Although the Coleman *et al.* paper is focused on marine fisheries in a specific jurisdiction, we contend that this type of analysis is required on a more global and inclusive scale, incorporating inland fisheries. A recent article (7) supports Coleman *et al.*'s position that global fisheries impacts are indeed greater than previously assumed if recreational fisheries are considered. Intensified and long-term research efforts are needed in all aquatic environments to answer this and other questions surrounding recreational fisheries, to improve fisheries management and conservation, and to move fisheries towards sustainability on a global scale.

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7. S. J. Cooke, I. G. Cowx, *BioScience* **54**, 857 (2004).

Response

ARLINGHAUS AND COOKE FIND OUR PAPER meaningful in that it points to a need for a more critical examination of recreational fisheries management. Their main objections seem to address issues outside the scope of our paper. We never intended to offer a global view of recreational fisheries, freshwater fishing, or stock enhancement. Instead, we presented a time series of landings in metric tons (not percentages) of all federally managed stocks in the continental United States and then presented regional landings of only those stocks considered overfished or experiencing overfishing. We did not include in the regional assessment any species not falling into this category, whether primarily taken by recreational

fishers or not. The fact that these species are already considered overfished by the U.S. government implies that they are suffering serious ecological and economic consequences of intense fishing pressure. That many of those species are primarily taken by recreational fishermen does not in and of itself fault the recreational fishery sector. In some cases, the recreational percentage of landings rises primarily as a result of commercial fishery declines; this is particularly obvious in the northeast and Pacific. But in the Gulf of Mexico and the South Atlantic, the recreational component has been consistently large over the last 20 years, and in the Pacific, the recreational landings doubled between 2001 and 2002.

Our point is that scientists and managers must develop methods to constrain exploitation, whether commercial or recreational, if they are to achieve the societal goal of sustainable fisheries. If this is not the goal, then laissez les bons temps rouler.

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The Discoverers of Glass

I FOUND THE ESSAY "A WORLD OF GLASS" BY A. Macfarlane and G. Martin (3 Sept. 2004, p. 1407) interesting and informative. However, the section titled "A Brief History of Glass" perpetuated a common piece of misinformation, namely, the origin of glass-making. They stated that "[glass] may have appeared first in the Middle East and regions such as Egypt and Mesopotamia around 3000 to 2000 B.C. ... Glass was almost certainly discovered by accident... by Phoenician traders, who apparently noticed that a clear liquid formed when the nitrate blocks on which they placed their cooking pots melted and mixed with sand from the beach."

In his book *The Glass Makers*, Samuel Kurinsky (1) establishes that the early Hebrews were the first to discover the art of glassmaking from raw materials and that they maintained that secret exclusively for an extended period of time. This was recognized

by many rulers from Egypt to Rome for 3000 years. The Hebrew contribution to the advancement of civilization in developing the ability to make glass from raw material was not acknowledged by the Essay authors.

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A New Climate Research Center in Italy

THE NEWS ITEM ABOUT THE ITALIAN CLIMATE Research Center that will be located at the University of Lecce in Bologna ("Italy hosts a climate research center," *ScienceScope*, 24 Dec. 2004, p. 2171) unfortunately does not tell the whole story. The center was established without significant input from the Italian climate research community. A call for proposals was issued in 2001, and two groups responded. The review process that awarded the center to Lecce was never explained. The Ministry of the

Environment simply made an informal announcement that the appropriation would go to the National Institute of Geophysics and Vulcanology, which will coordinate the center. At the moment, nothing is known about the center's programs, whether it will open to the larger climate research community, or how these programs will be funded. The initial program presented by the director suggests that the Center will be limited to oceanographers and marine ecosystem researchers in the Bologna area.

Italy has allowed its National Climate Research Program to languish, and unless significant changes are made in the scope and mission of the Climate Research Center, it will be useless. First, it seems designed to produce a climate model that closely resembles those already developed elsewhere, reminiscent of Wittgenstein's philosophy that it is better to buy several copies of the same newspaper to be nearest the truth. Second, without the involvement of the larger climate academic community, the program will have no impact on higher education in the rest of the country.

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