A fisherman casts his net on a lake in Thailand.

PHOTO: AKE1150SB/ISTOCKPHOTO

Edited by **Jennifer Sills**

Poor fisheries struggle with U.S. import rule

IN THEIR POLICY Forum "U.S. seafood import restriction presents opportunity and risk" (16 December, p. 1372), R. Williams *et al.* describe some possible effects of the U.S. National Oceanic and Atmospheric Administration (NOAA) rule requiring that seafood imported into the United States must come from fisheries that comply with the U.S. Marine Mammal Protection Act (MMPA). Williams *et al.* point out that if fisheries are not adequately supported as they try to comply with the regulations, the rule could exacerbate difficulties experienced in poor fishing communities. We are an international group of marine mammal and fisheries scientists funded by NOAA's Office of International Affairs to assess the risk of marine mammal bycatch in small-scale fisheries in Southeast Asia (*1*). Based on our recent research trip to marine fisheries and research institutes in Thailand, Vietnam, and Malaysia, we believe that exporting nations will have trouble achieving and documenting compliance with the MMPA within the 5-year grace period.

From our work with local authorities, scientists, and fishing communities in these developing nations, we believe that the first hurdle will be galvanizing action from government agencies, fishery managers, and fishers. Conservation-driven policies will likely hold little weight with these constituents, given the intense economic needs in these countries. Because top-down management approaches may be met with resistance, the United States needs to work closely with regional partners to ensure that the benefits of MMPA rule compliance are understood across all levels, from management through to single fish suppliers and fishers.

The second hurdle relates to the considerable data requirements needed within the 5-year grace period to fulfill MMPA standards, such as the calculation of the Potential Biological Removal of species at risk. To our knowledge, this has only been reported for one marine mammal species in Southeast Asia (*2*). This knowledge gap is compounded by the largely unreported nature of marine mammal bycatches and marine mammal population distributions (*3*). A lack of robust quantitative data should not, however, mean that management (*4*) and data collection cannot begin now. Local capacity strengthening should guide regional monitoring programs and the identification of at-risk locations over the next 5 years.

Most of the countries exporting to the United States are dominated by a small number of fish products (*5*), which does generate hope for future compliance. Whether this compliance happens before 2022 remains questionable, given that clear product identifications, certifications, and traceability are also still widely lacking.

Low MMPA compliance after the grace period could mean economic losses for these exporting fisheries and an overall increase in fishing effort to compensate for new trades with less lucrative markets than the United States. This will have clear negative impacts on both marine mammal and fish populations. Greater collaboration between government fisheries and conservation departments will be essential to codevelop locally supported strategies that regulate fisheries, specifically to design a suite of approaches to measure and mitigate bycatch of marine mammals.

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Fossil data lacking for insects and fungi

IN THEIR REVIEW "Merging paleobiology with conservation biology to guide the future of terrestrial ecosystems" (10 February, p. 594), A. D. Barnosky *et al.* describe the value of using paleobiological information for conservation management. Paleobiological information can be useful to understand how ecosystems can be maintained or restored, but lack of fossil data for many important taxa (particularly insects and fungi) hampers a full ecosystem approach.

Insects represent 80% of the described species (and probably even more of the undescribed species). They play vital roles that exceed the function of vertebrates in many ecosystems (*1*). Other neglected taxa, such as fungi, are also crucial for ecosystem function (*2*). Focusing on paleobiological information alone would neglect the majority of species. A simplified view on ecosystem function (using taxon-free measures that ignore species identities) may even justify the biotic homogenization of ecosystems in different locations. Replacing unique communities of species by functional equivalents may be easy, but would not halt biodiversity loss. As Barnosky *et al.* suggest, tackling the underlying drivers of biodiversity loss (particularly controlling human

Insects, such as this mountain grasshopper (*Cophopodisma pyrenaea*), are among the most important primary consumers in many ecosystems, but paleobiological information about them is lacking.

PHOTO: AXEL HOCHKIRCH

population growth) is crucial to reaching global conservation targets.

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Mexico's ambiguous invasive species plan

ON 7 DECEMBER 2016, the federal government of Mexico published an Agreement listing Exotic Invasive Species for Mexico (*1*). However, the report contains inaccurate information about the species and ambiguous measures regarding the prevention, control, and eradication of these species. Presenting such imprecise information could undermine the goals of the report.

The Agreement will not be effective until it provides more information. For example, it must accurately delineate both the native ranges and the areas of invasion, particularly for the 46 native taxa listed. It should link to a database of synonyms that can help policy-makers and wildlife law enforcement agents deal with the dynamic nature of taxonomy. It should provide temporal baselines of invasion, including information about when each species arrived in Mexico, as well as degree of invasiveness (not all exotic species become invasive) (*2*). The current version of the list omits several very damaging species. The Agreement does not address conflict with other national and international legislation (*3*–*6*). Finally, the report should clearly specify a procedure for dealing with exotic invasive species (*7*).

Two examples serve to illustrate these issues. First, *Boa constrictor,* listed as an exotic invasive, is suspected to have been introduced in Cozumel Island, but is native to both coasts of the country. Since the place of invasion is not specified, eradication measures might be erroneously implemented in its native range. Alternatively, it could be invasive and remain unchecked on Cozumel because it is also on the Mexican official list of threatened species (*4*) and in CITES Appendix II (*6*).

Second, there are several exotic invasive fishes not listed in the agreement, such as cichlids and carps that were introduced for aquaculture under government initiatives (*8*). They are very profitable, with ~US$20 million in sales of carp alone in 2014 (*9*). These fish should be added to the Agreement's list so that adequate measures, such as their contained production and environmental assessments of the potentially threatened species, can be implemented. This would allow the aquaculture efforts to continue while ensuring that the fish do not cause damage to native fish and endemic ambystomatid salamanders (*10*).

These issues require urgent attention for the Mexican government's initiative to be effective. We call on the authorities to take action.

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ERRATA

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