

Science Sings the Blues: Other Words for Nothin' Left to Lose

Author: Lundmark, Cathy

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RARITY

The world's smallest living cetacean, the vaquita (Spanish for "little cow"), may be nearing extinction. This elusive 50-kilogram, 1.5-meter porpoise is endemic to the northwestern corner of the Gulf of California, off the northernmost shores of Mexico's Baja California (BC) peninsula. When last surveyed in 1997, the lone population of *Phocoena sinus* was estimated to consist of fewer than 600 individuals.

The vaquita, which has the smallest range of any living cetacean (4000 square kilometers), is one of the two most critically endangered small cetaceans in the world, the other being the baiji, or Yangtze River dolphin. A review by Lorenzo Rojas-Bracho, of the National Institute of Ecology in Ensenada, BC, and colleagues (*Mammal Review*, July 2006) offers a comprehensive look at the factors threatening the vaquita.

The biggest threat is not the degradation or loss of habitat but accidental mortality caused by fishing gear. The vaquita is one of six living phocoenid, or porpoise, species, all of which are vulnerable to becoming bycatch—that is, captured, and often killed, in gill nets set for commercially valuable species. Vaquitas are particularly vulnerable because they are limited to an area where fishing has long been the only source of income for many of the local people. Although estimates of bycatch rates are fraught with uncertainty, one estimate for the 1993–1994 fishing season for boats from one of the three main fishing ports was 84 vaquitas killed. For vaquitas to survive, it is generally agreed, the bycatch rate must be reduced to zero.

The authors detail the conservation efforts that have been enacted to date, including the creation in 1993 of a biosphere reserve (which designates a large

part, though not all, of the vaquita's range as a protected area) and the vaquita's listing as critically endangered by the World Conservation Union (IUCN) in 1996. The Mexican government created the International Committee for the Recovery of the Vaquita, or CIRVA, in 1996, but the committee's 1999 recommendations to extend the southern boundary of the biosphere reserve and ban gill nets and trawlers from the protected waters have largely been ignored. The effectiveness of a more recent effort to pay fishers not to fish has yet to be seen.

"Considering the limited resources of these isolated communities," the authors write, "their marginal status within the wider Mexican socio-economic and political structure, and the large amount of inertia behind fishing as a way of life, the search for practical, economically viable alternatives represents an enormous challenge."

CLIMATE CHANGE

Last year was the warmest year ever recorded for the continental United States, according to NOAA's National Climatic Data Center. December was particularly noteworthy: An El Niño in the equatorial Pacific helped make it the fourth warmest December on record—Minneapolis temperatures, for example, were 9.4°C (17°F) warmer than average.

Although temperatures have been recorded for over a century, the data are just now coming in on the effects of climate warming on plants and animals. Camille Parmesan, of the University of Texas–Austin, has compiled and reviewed over 800 articles on the ecological impacts of climate change (*Annual Review of Ecology, Evolution, and Systematics*, December 2006). Her analysis shows that in many cases, species aren't evolving fast

enough to keep up with the trends in climate.

Parmesan's review proffers a wealth of information. While a few studies go back a century, most have been published in the last decade, and as a whole they indicate that populations are responding to climate change as predicted. The timing of spring events, such as budding and flowering in plants and migration and breeding in animals, is advancing, by a matter of days per decade, by some estimates. Study after study—encompassing most taxonomic groups, though less comprehensive geographically—marks these phenological shifts. Range boundaries for many animal species have shifted poleward or upward in elevation, too. The shifts are significant: One meta-analysis for the Northern Hemisphere estimated an average range shift of 6 kilometers per decade northward or 6 meters per decade upward.

Cold-adapted species in polar regions have been hit particularly hard as their habitats shrink. Species with limited tolerances, such as corals, or restricted ranges, such as amphibians in tropical cloud forests, have been among the first to be lost. Those animal species that have coevolved to synchronize their behavior with the availability of food and other resources such as plant or prey species must adapt to the shifts in those species or, as has already happened in some cases, go extinct. Pests and diseases are also on the march, and warming trends are shortening their life cycles and increasing infection rates.

We should all know the tune by now, "for the times, they are a-changin'."

Cathy Lundmark (e-mail: clundmark@aibs.org).

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