Scientists urge new research policies in wake of Gulf disaster

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Scientists are having a difficult time gauging the recovery of marine species from the Deepwater Horizon oil spill in the Gulf of Mexico because they lack sufficient data about historical population size and the distribution, growth rates and reproduction rates of many species.

In a forum paper published this week in the journal *Science*, they call for a new research agenda that prioritizes systematic acquisition of baseline data for marine species.

"It is impossible to diagnose whether a species is recovering or floundering if you don't have good data on their status and trends," said Selina Heppell, an Oregon State University fisheries biologist and one of the authors of the article. "Too much of the funding in this country goes toward putting fires out instead of gaining basic biological information, which is what resource managers need to identify and diagnose changes at the population level.

"This is not just about the Gulf of Mexico," Heppell added. "It is a problem for protected species everywhere."

Heppell, lead author Karen Bjorndal from the University of Florida, and eight other authors point to the 1989 Exxon Valdez oil spill in Alaska, where scientists encountered difficulty evaluating the effects on wildlife because of limited data on abundance and demography – the rates of survival, growth and reproduction that are primary indicators of population change.

"Sadly," they wrote, "the situation in the (Gulf of Mexico) is similar more than 20 years later."

Heppell, who is a professor in the Department of Fisheries and Wildlife at Oregon State University, said doing an ecological and biological assessment of all marine species would be difficult and expensive. Therefore, she says, the emphasis should be on those species that are the most endangered, or those that have an economic impact, such as those creatures that interact with important fisheries.

"We spend millions of dollars assessing fish stocks," she said. "If we want to monitor endangered species in the same way, we need to focus resources on the aspects of biology that provide the best information about population recovery. That involves research on demography, not just efforts to count individuals."

In their *Science* article, the authors describe the assessment of sea turtle populations as a microcosm of the larger issue. Sea turtle populations are monitored almost exclusively by counting nests on beaches, but when those populations increase or decrease, scientists often don't know why because nesting females are such a tiny fraction of the total population. In Florida, the number of loggerhead turtles, for example, increased from 1989-98, then plummeted.

Several factors could have contributed, but a lack of knowledge about age distribution, reproduction rates, mortality rates and other data have made it difficult to determine what triggered the changes – and impossible to create management strategies to deal with them, noted Heppell, who has worked with the National Marine Fisheries Service on turtle conservation issues since 1995.

In contrast, Australian researchers have logged 30 years of demographic data on loggerhead turtles and when a steep decline in their population

on the Great Barrier Reef took place in the 1980s and 1990s, they were able to attribute it to predation by foxes on nests and incidental capture in trawl fisheries.

"Both hazards have now been mitigated by government agencies," the authors wrote," resulting in an apparently recovering stock."

The authors list seven elements that should be considered in crafting new research priorities for protected marine species, including sea birds and mammals, as well as turtles:

- Integrate demography with abundance trends for the species at all life stages and determine environmental effects on those parameters;
- Emphasize analyses of cumulative effects instead of focusing on individual threats such as pollution, bycatch or habitat loss;
- Elucidate links among and within populations since oceans have greater movement, genetic exchange and dispersal than terrestrial systems;
- Revise permitting processes to allow more rapid and flexible response to environmental concerns;
- Encourage data sharing and increase access to data as a prerequisite for funding;
- Improve assessment tools for evaluating anthropogenic impacts on populations;
- Prioritize investments to focus on long-term population

management needs.

"We know that hundreds, possibly thousands, of endangered Kemp's Ridley sea turtles were killed or injured by the Gulf spill," Heppell said. "That species had been recovering rapidly – a great conservation success story. What we don't know, and can't determine with available data, is how detrimental the spill effects will be on that recovery.

"We can use money from the resulting fines to develop a new strategy for monitoring and assessment that can identify the specific causes of population decline and make management more efficient," she added.

Shifting the priorities of federal agencies to focus on research that emphasizes how and why populations change over time is a key, the authors say.

Conclude the authors: "In the wake of the BP oil spill, the need for this policy shift is as clear as it is compelling. If the largest offshore oil spill in U.S. history is not enough to effect this policy shift, what would it take?"

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