
Polar bears stranded on melting ice (from Science Blogs)

When it comes to climate change, lawyers and policymakers (and scientists too) have been guilty of emphasizing greenhouse gas emission reduction, almost to the exclusion of everything else. Adapting to climate change has taken a distant back seat, even as it has become increasingly clear that the world is already committed to some pretty dramatic changes.

That's beginning to change. Earlier this summer, the U.S. Global Change Research Program issued a major report detailing the present and expected future impacts of climate change in the U.S. Scientific studies with troubling data continue to pile up, like this one published this week by researchers from the US Geological Survey's Western Ecological Research Center finding that large-diameter trees are declining in Yosemite National Park, an effect they attribute primarily to water stress and expect to accelerate as California warms. (Hat tip: LA Times Greenspace) The findings of this study are similar to another I blogged about in January finding surprisingly high mortality rates in old-growth trees across the west.

Policymakers are beginning to catch on as well. The Waxman-Markey climate bill addresses the need for adaptation planning, although not in much detail, as Alejandro Camacho and I explained here. Always one step ahead of the curve, California has now issued the first state-level draft climate adaptation strategy for managing climate risks. At this point, the draft is mostly a call for more study and planning, at large and small scales, calling for example for state agencies to identify habitats that could change significantly in the next century, and for consideration at the state and local level of "project alternatives that avoid significant new development in areas that cannot be adequately protected from flooding due to climate change."

A planning approach makes sense. At a general level, the big problem with climate change for human communities is that it changes features of landscapes that we count on being stable, such as water levels, fire risks, flooding risks, crop suitability, etc. Adaptation to those sorts of changes is mostly a matter of being aware of the impending changes in advance, so that we don't commit to development patterns or other investments that count on illusory stability.

Adaptation for conservation is a trickier philosophical nut to crack. We can't just tell the pika or the polar bear that its habitat is about to disappear and expect it to plan accordingly. Scientists are starting to talk about "assisted migration" or "managed relocation," moving

species or entire assemblages to places where they are more likely to find suitable conditions in the future. That's a tricky technical problem of course, in terms of timing, techniques, and identifying the right target locations. And it isn't likely to help either the pika or the polar bear, whose specialized habitats may simply disappear from the earth. But even if it is technically possible and offers hope for a species we care about, it's not clear its the right thing to do. Species moved to new places may threaten the current inhabitants, behaving like the invasive species we're currently battling around the globe, many of which are themselves spreading in part because of global climate change. It's very hard to know how to balance the potential benefits and potential risks of strategies like assisted migration, or to know how they fit in with our traditional large-scale conservation goal of protecting "naturalness." And to make it even tougher, evolutionary biologists tell us that some species can and do evolve rapidly, on time scales of just a few generations, in response to strong selective pressures like those that climate change brings. Carl Zimmer, writing in Yale Environment 360, explains the possibility of an evolutionary explosion in response to climate change. From a technical perspective, that prompts the question of whether it is possible to predict which species may be able to evolve quickly enough to deal with the climate changes we have set in motion. From a philosophical one, it raises the question of whether passively waiting for species to evolve is a "better" response to this century's conservation challenges than actively moving them around the changing globe.

I don't pretend to have answers to those questions, but I'm troubled that there is so little talk about them. They are nowhere to be seen in the halting efforts at adaptation so far, at the state or federal level. I wish California, Congress, the Obama administration, the National Research Council, the Pew Centers or someone else would impanel an interdisciplinary group of scientists, lawyers, resource managers, philosophers, and others to start developing a framework for asking and answering the key questions about conservation goals and strategies that are becoming harder and harder to avoid.