Climate Change

As a conservation biologist I am continually frustrated by all the attention given to climate change by the media and politicians. After all, biological scientists almost unanimously agree that the greatest proximal threat to biodiversity, globally and in North America, is the direct conversion, fragmentation, and degradation of natural and seminatural areas by humans. So why aren't the media and the politicians warning us about the dangers of improper land use?

Will mountain goats have nowhere left to go? © Florian Shultz

The fact is that land conservation—the cornerstone of the conservation movement—is even more essential and urgent in a time of rapidly changing climate. Politicians and environmentalists are not talking as much about land conservation these days because it is, ironically, more controversial than doing something about global warming. Global warming is a direct threat to human health and economic well-being, as well as a threat to biodiversity. Destructive land use, on the other hand, is fueled by the growth of the human population and growth of the economy—the former a forbidden topic and the latter almost universally thought to be a good thing. Although habitat destruction also can harm people, for example by compromising ecosystem services, the biggest losers are native plants and animals. Who cares about them? Not many, it seems.

Although the problem of global warming cannot be addressed without a comprehensive plan that addresses carbon sources and sinks on a global scale, it is now recognized that global warming would continue for many decades, at least, even if we stopped all burning of fossil fuels today and planted trees over vast areas. There is inertia in the climate system—once headed in a particular direction, it is hard to turn around, in large part because of pervasive positive feedbacks (for example, melting ice caps reflect less sunlight, thereby increasing warming). Therefore, the greatest immediate priority in a rapidly warming world is adaptation—figuring out ways which human society and native species can adjust to warmer temperatures, higher sea levels, and altered precipitation regimes.

What are some ways that we can help nature adjust to a new climate with minimal loss of species and other components of biodiversity? The following are a few relatively promising strategies for biological adaptation.

Stop habitat fragmentation

The fossil record tells us that most species have adjusted to past climate changes not by in situ evolution, but by changes in distribution through dispersal. It is reasonable to speculate that the current rate of global warming would not be so catastrophic to biodiversity were it not for habitat fragmentation at multiple spatial scales. The combination of habitat fragmentation and rapid climate change is devastating because fragmentation makes it difficult for many species to respond to changing climatic conditions through dispersal. Necessary movements include latitudinal range adjustments (i.e., dispersing toward the poles), dispersal from coastal to inland areas, upslope movements, and finer-scale movements to milder microclimates associated with particular topographic positions (e.g., coves or north slopes as opposed to ridges and south slopes) or moisture conditions.

Intensifies Need for Land Conservation

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Provide connectivity

Connectivity is the opposite of fragmentation. Habitat connectivity at all spatial scales is important in order to allow organisms to move to more favorable climates and microclimates during global warming. The best way to provide connectivity at a regional scale is to maintain intact networks of protected lands, for example along the length of the Cascades (at all elevations), from the Olympics to the Cascades, and from the Cascades to the Rockies and northward—just the kind of strategy that Conservation Northwest, Yellowstone to Yukon, and other enlightened conservation groups have been pursuing for years. At strategic locations where habitat corridors intersect human transportation corridors (such as highways) well designed wildlife crossings should be constructed.

Maintain intact gradients

For organisms to shift distributions upslope or to more favorable microhabitats requires the maintenance of intact environmental gradients—elevation gradients, soil moisture gradients, and so on. Roads, clearcuts, exurban and urban development, and other human activities break up the continuity of habitat along environmental gradients and make it difficult for animals and plants to shift distributions in response to climate change. Protection of large roadless areas and other areas with minimal development is key to an intelligent adaptation strategy for climate change.

Identify and protect refugia

The limited mobility of many species means that they will not be able to disperse long distances in response to climate change. Evidence is accumulating that many species have weathered past (and current) warm periods in climatic refugia, ranging from crevices in rock outcrops to sheltered ravines, to talus slopes lying above ice caves, to topographically and edaphically (soil-related) complex areas in general, where microhabitat diversity is high. When cooler conditions return (which they will, albeit centuries from now) populations can expand out from these refugia and recolonize former habitats. Again, protecting large complex mountain landscapes, as Conservation Northwest has long sought to do, is fundamental to this strategy.

The above four strategies are obviously related—they all have to do with maintaining wild intact landscapes and connecting them within and across regions, as well as maintaining the integrity of habitat conditions within landscapes by minimizing intrusions and practicing good ecosystem management. Land conservation on a vast scale is our best hope for adapting to climate change.

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Receding glaciers and snowlines are perhaps only the most visible of coming dramatic changes. © Jasmine Minbashian