Wild Cats and Climate Change

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The 1,300 km² lowland, secondary, tropical forest in Way Kambas National Park on Sumatra's (Indonesia) southeast coast normally receives 286 mm of rain per month. But during the 1997 El Nino, the park received less than 10% of normal. Neil Franklin (2002) observed seawater intruding in the waterways 16 km in from the coast; fires burned over 55% of the park; poaching pressure increased; and the total estimated tiger density was 4.6/100 km² in 1997, 2.6 in 1998, 1.1 in 1999, then 2.6 in 2000. While some tigers died in the fires, the results of the fires on prey populations and direct mortality from poaching could not be separated. The park is a habitat island surrounded by human settlement and cultivation; options for connecting it through corridors with other protected areas such as Berbak, Tessi Nilo, or Bukit Barisan are no longer available. For now, Way Kambas continues to limp along on. A new El Nino event will again threaten, or even overwhelm, the small populations of Sumatran tiger, rhino, elephant, clouded leopards, flat-headed cat, golden cat, and fishing cat, and the multitude of other plants and animals that live is this tiny vestige of what was once the great lowland rainforest of Sumatra. Way Kambas is set up for a catastrophic event and there isn't much anyone can do about it.

Unlike Way Kambas, the temperate deciduous and boreal forests of the Russian Far East (RFE) are extensive. We have estimated there is 269, 979 km² in the RFE-China Tiger Conservation Landscape (Dinerstein *et al.* 2006); the largest habitat patch is 183,237 km². The area of land actually occupied by the remaining 500 or so Amur tigers is about 160,000 km² (Miquelle *et al.* 1999). Like Way Kambas, the region is severely threatened by wild fires that appear to peak during El Niño events, and are expected to intensify with global warming. Tatiana Loboda is modeling the "Impacts of climate and land use change on wildfire frequencies and the Amur tiger" for her PhD at the University of Maryland. This is one part of a major joint University of Maryland, University of Virginia, and Wildlife Conservation Society project funded by NASA.

With global warming, scientists are finding Amur tigers living further north than they have in past (A. Kulikov, pers. comm. 2007). Tigers adjust their range occupancy in response to that of their primary prey – deer, especially red deer, and wild pigs. The distributions of deer and pigs and tigers is thought to be related to winter snow depth (Miquelle 1999), which appears to be decreasing.

We find big cats moving north following the deer in North America. Ramona Maraj (pers. comm. 2006), senior carnivore biologist for the Yukon Department of Environment, tells me they are sighting cougars more often in the southern Yukon as they see increasing numbers of white-tailed and mule deer responding to climate warming in the Yukon. We expect Canada lynx to change their range in response to warming climate. Nils Stenseth *et al.* (2004) modeled how differential snow conditions, such as surface hardness determined by the frequencies of warm spells, influenced lynx interactions with the snowshoe hare. Variation in snow conditions are influenced by North Atlantic Oscillation (NAO)-linked periodicity. Changes in the NAO in periodicity and intensity will alter spatial, ecological, and genetic structuring of the lynx population Stenseth *et al.* (2005) predict.

The tigers living in the 10,000 km² Sundarbans mangrove forests will probably not survive the expected rise in sea level with global warming. This forest is the interface where the great rivers Ganges, Brahmaputra, and Meghna join the Bay of Bengal. But the Sundarbans will also be negatively impacted by changes in glacier and snow melt in the Himalayas. Himalayan glaciers, only exceeded by the polar ice in volume, are often called the water towers of the Ganges plain, are melting as a consequence of global warming. This is of course a concern for all the people living on the Ganges plain. It is also of great concern for those interested in the conservation of snow leopards, the cat of high altitude Himalaya and central Asia. Changes in river hydrology with reduced runoff will impact the forests and elephant grasslands found along the outer range of the Himalayas, in the Sivalik Hills, and the associated narrow strips of lowland forests in the bhabar and the terai. This is a 49,000 km² Tiger Conservation Landscape stretching a 1000 km, from Corbett National Park in India to Chitwan National Park in Nepal (Dinerstein *et al.* 2006), parts of which were so artfully described by Jim Corbett.

With these few examples, we see that, depending on the species of wild cat, there will be loss of critical habitats and range fragmentations, contractions, and expansion resulting from climate change. We have no choice but to learn to live with and work with these changes. I suspect most wild cats will not fare well, but we know so little about most wild cat species that making predictions is speculation. I do think we can confidently predict that the domestic cat will be just fine.

References

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