

Biological Impacts of Anthropogenic Climate Change: Consequences, Complexities and Surprises

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There have been several global as well as regional meta-analyses of observed impacts of anthropogenic climate change on the distributions and phenologies of species around the world. I will give an overview of these results, focusing on the "big picture" trends that have emerged from changes across terrestrial, marine and freshwater systems. About half of all studied species have changed their distributions and about 2/3 of species have changed their spring phenologies in response to recent climate change. But to date, most of these changes have had relatively little negative impact on those species. Where we are seeing negative impacts tends to be what have been expected to be the most vulnerable species - *i.e.* those occurring solely in sensitive systems. But we are also seeing negative impacts in systems that have previously been highly impacted by other anthropogenic stressors. Recovering these vulnerable species under a changing climate may not always be possible. But where there is potential for recovery, robust conservation planning requires that we not only acknowledge and address threats and habitat needs of the past, but also recognize that anthropogenic climate change is a very dynamic process and will require rapid and frequent reassessment of conservation management as we move forward.