



# Research Brief

## A Roadmap for the Future



### *What are some of the predicted effects of global climate change?*

Scientists predict significant global temperature increases due to rising greenhouse gas concentrations. Much of this heat will continue to be absorbed by the oceans, exacerbating other anticipated physical changes such as decreased sea ice mass and rising sea levels. These environmental changes are likely to have a notable impact on the dynamics of both marine and terrestrial ecosystems. Consequently, it is necessary for scientists to provide policymakers with information on the effects of climate change.

### *What role do seabirds play in the study of the effects of climate change on the natural world?*

Seabirds are unique in that they live at the barrier between the ocean and the atmosphere and rely on both terrestrial and marine habitats. Because of this, seabirds are both good indicators of global climate change. Seabirds rely on krill, copepods, fish, and squid for food; these species are highly susceptible to climatic variation, so seabird productivity also reflects climate change through effects of food availability.



### *What was the goal of our analysis?*

We prepared a literature review for a variety of studies to lay out past, present, and possible future developments of the effects of climate change on seabird populations. We used studies from both hemispheres that focused on a host of factors, including timing of breeding and migration, habitat choice, range, demographic traits, food habits, and community structure. We analyzed results from these papers in order to identify patterns and explore possible inconsistencies, thus providing a comprehensive view of how climate change is affecting seabirds.

### *What did we conclude?*

It is clear that seabirds are responding to climate change on a global scale and thus can be of use to demonstrate the potential future effects of this phenomenon. However, the methods by which scientists study these species could be adjusted in order to provide a more comprehensive view, linking climate, oceanographic conditions, food resources, and seabird responses. Integrated ecosystem science is the future of accurately predicting changes in seabird populations.

### *Caveat*

Although many of the studies included in this analysis are highly credible and respected, not all of them have the duration to eliminate the chance that the variation is due to expected decadal variability rather than human-caused climate change. To address this, we recommend that data continue to be collected about seabirds so that scientists can make statistically significant inferences.

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