



Sea Eagles as Biosentinels of Climate Change

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Acceptance of global climate threats to wildlife and the environment by the American public lags behind scientific awareness. However, as sensitive indicators of environmental problems, birds have been instrumental in raising public awareness for centuries (like canaries in coal mines). Nest timing is an effective measure of environmental alterations due to global climate change. For example, in Michigan bald eagles are laying eggs 2 weeks earlier than 20 years ago due to changing weather patterns!

IMPORTANCE

Eight species of sea eagles range across a wide array of latitudes and geographical regions. They provide some of the longest temporal and largest spatial data sets in the world. Noteworthy examples include: U.S. (bald eagle in Michigan, 50 years, >10,000 breeding outcomes), Sweden (white-tailed sea eagle, 45 years, >6,500 breeding outcomes), and Russia (Steller's sea eagle, 25 years, >3,000 breeding outcomes). With data like these, scientists are able to evaluate historic effects of global climate change, develop standardized monitoring protocols for measuring and modeling current effects, and test predictive hypotheses relating to the type and extent of future effects.

EXPECTED OUTCOMES

Sea eagle data provide actual population measures (not estimates) for a wide variety of biomes on a global scale. By developing sea



Bald Eagles

eagles as biosentinels of climate change, scientists will also be able to study potential impacts of climate change on individual species, habitats, and locations. These capabilities will propel the USFS co-led collaborative sea eagle effort to the forefront of wildlife-climate change research on a global scale, with the expected outcomes of actionable policies and monitoring protocols for U.S. and foreign government agencies, including the Inter-governmental Panel on Climate Change and the European Union.

PARTNERS AND COLLABORATORS

Working with Clemson University, Michigan State University, and the U.S. Fish and Wildlife Service, RMRS has been helping to develop the concept of using sea eagles as global indicators of environmental health for over 10 years. This international collaboration of federal, state, private, and academic institutions currently includes scientists from 16 countries on 4 continents... and it continues to grow!



Steller's Sea Eagles.