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## Rising Sea Surface Temperatures and Tipping Points for Seabird Colonies

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Title: Rising Sea Surface Temperatures and Tipping Points for Seabird Colonies

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Abstract: Changes in sea surface temperature (SST) are associated with changes in reproductive and feeding tactics in colonial seabirds at Protection Island National Wildlife Refuge, Washington, USA, in the Salish Sea. In years of higher SST, the colony tends to exhibit higher rates of egg cannibalism, higher levels of every-other-day clutch-initiation synchrony, and longer egg-laying seasons, with earlier onset of egg laying, than in years of lower SST. We hypothesize that decreased fish availability associated with high SST is correlated with the rise in cannibalism, and that egg-laying synchrony is a response to cannibalism. Proof-of-concept models illustrate the conditions under which these hypotheses are supported and show that prolonged rises in SST can create tipping points that allow colony collapse.