What is an ecological regime shift?
An ecological regime shift is a sudden reorganization of an environment caused by complex interactions of changing ecological dynamics. The recent intensification of human-induced environmental stressors has lead to an increase in worldwide chance of these kinds of large-scale transformations. Naturally, it is of extreme importance to those in the field of ecosystem management to be able to predict how environments will change in order to stay as up-to-date as possible on the current state of the ecosystem and thus produce the most effective programs.

What is the relationship between fisheries and ecological regime shifts?
Decreases in the catch yield of commercial fisheries often occur simultaneously with ecological regime shifts, making the fishing industry a well-documented avenue for the study of ecological indicators of large-scale environmental changes. In this study, we used records from crustacean fisheries in the Bering Sea and the Gulf of Alaska beginning in the 1970s and continuing through the 1990s, a period of time during which these industries saw several major collapses.

What were the results?
Our original theoretical approach to this study also cited changes in catch skewness as a potential indicator of impending fishery collapse. Our statistical analysis, however, could not support this prediction; further investigation into this area will be necessary before any kind of meaning can be determined.

Which type of management approach do our results support?
According to these results, it would be possible for creators of fisheries legislation to base their program designs on a single ecological indicator of oncoming environmental regime shifts: increased spatial variability.

Caveat
In terms of individual trends, only 4 of the 12 fisheries showed significant changes in variability; therefore, it is preferable to analyze data across multiple fisheries in order to accurately predict collapses. Moreover, there are many ecosystem models that do not show significant changes among ecological indicators before a regime shift. For the most part, empirical evidence of these indicators’ accuracy has had to take place in a simulated lab setting, and thus the efficacy of environmental indicators as a prediction of ecological regime shifts is relatively unknown.

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