

POPULATION VARIABILITY IN EXPERIMENTAL ECOSYSTEMS

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SUMMARY

A widespread change in ecosystems has been the alteration of food webs through human impacts on large-bodied predators. These changes should have strong effects on the abundance and the temporal variability of other components of the food web, but there have been few experimental tests at large scales. We evaluated population variability in response to whole-lake food web manipulations using a 7-year time series of zooplankton abundances in three lakes. Food webs were altered by manipulating fish populations in two lakes, and one lake served as a reference system. The variability of zooplankton populations was higher in the manipulated lakes relative to the reference system. The food web manipulations in the two experimental lakes differed in frequency and strength. Population variability was similar, however, in the two systems and not related to the experimental perturbations imposed. The most variable zooplankton populations were those most susceptible to fish predation. Ecosystem level changes clearly affect population dynamics, and shifts in populations can have strong impacts on ecosystem processes such as primary production. Integration of population and ecosystem studies should lead to improved understanding and prediction of the dynamics of ecological systems.