Loss of rare species can harm ecosystems

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Matthew Bracken, assistant professor of biology, surveys biodiversity along a rocky shore in Nahant. Credit: Michael Hutson.

(PhysOrg.com) -- Here's another reason to cheer for the little guy. A new study co-authored by Matthew Bracken, assistant professor of biology in Northeastern's College of Science, has found that rare species from the bottom of the food chain can have a large impact on an ecosystem's health.

The findings were published in March in the online edition of the scientific journal Ecology Letters.

Bracken and Brown University student Natalie Low conducted several experiments that analyzed the impact of removing seaweed and sessile animals, such as mussels and barnacles, from the rocky shores of Northeastern's Marine Science Center in Nahant, Mass. The experiments

were designed to mimic naturally occurring changes in biodiversity on rocky shores.

The findings were startling. “We have shown that the loss of these extremely rare species — which collectively represent less than 10 percent of the seaweed and animal biomass at the base of the food web — causes major declines in the abundance and diversity of animals, such as snails, crabs and other mobile animals,” Bracken said.

Prior research on the extirpation of rare species from a particular ecosystem focused on how the loss of top predators — often referred to as “keystone” species — affects plants and animals at the bottom of the food chain. Bracken and Low, on the other hand, have shown that the loss of rare species from the base of the food chain, which they call “cornerstone” species, can also reshape marine systems.

A pattern of decline emerged after only three weeks of experiments and persisted for the remainder of the five–week study. “Previous work on the effects of rare predator removals took months to years to show strong effects,” Bracken said. “We found strong effects of rare seaweed removals after only a few weeks.”

Provided by Northeastern University