

News Article: Closely Linked Ecosystems Vulnerable to Change

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SAN FRANCISCO, California, October 15, 2002 (ENS) - Ecological systems are more closely related than once believed, a new study suggests, making them more vulnerable to change.

A team of scientists led by researchers at San Francisco State University's (SFSU) Romberg Tiburon Center for Environmental Studies has demonstrated that natural habitats are more connected, and more fragile, than researchers have thought.

Led by SFSU's Dr. Neo Martinez, assistant professor of biology, Dr. Richard Williams, adjunct professor of biology, and Dr. Jennifer Dunne, postdoctoral fellow in collaboration with the Santa Fe Institute for complexity studies, the scientists combined computer network models with ecological data to analyze food webs - the prey/predator relationships - in a variety of land and water ecosystems.

They demonstrated that species within large communities are on average just two links apart, with greater than 95 percent of species within three links of each other.

Prior to this research, ecologists believed that many, if not most, species were four or more links away from each other and much less likely to impact one another in the event of extinction, invasion by predatory species or changes in population.

"Our findings show that invasions by other species, loss of biodiversity and other changes in populations have the potential to affect many more of the species in the same habitat than was previously believed," said Martinez. "These ongoing analyses are powerful tools for exploring how robust or fragile ecosystems are, and can help us determine what aspects of a system contribute to robustness."

The research appears in the current issue of the "Proceedings of the National Academy of Sciences."

In a second report in the same issue of the journal, the SFSU researchers demonstrate that, while food webs have some patterns consistent with small world networks such as Internet e-mail groups, in general they are not as cliquish or clustered as most small world networks. Instead, food web connections are more widespread and interdependent.

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