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Managing Nature Reserves Using Ecological Disturbances Can Easily Go Wrong

Ecological disturbances are not necessarily a bad thing -- deliberate disturbances can actually be used to preserve or even increase biodiversity in a nature reserve. The outcome depends on countless different factors, but many mistakes are made by those working with ecological disturbances and biodiversity, claims a researcher from the University of Gothenburg (Sweden).

"Nobody knows exactly what biodiversity is, and so different researchers test different measures of it and can draw completely different conclusions depending on the measures they've used," says Robin Svensson from the Department of Marine Ecology at the University of Gothenburg.

"If you test a hypothesis about the change in the number of species with a measure of how evenly species are distributed, rather than how many there are, you'll always be in trouble. It's rather like when comedian Kurt Olsson famously asked record-breaking high-jumper Patrik Sjöberg how 'wide' he'd jumped -- or counting the number of apples on a pear tree!" Ecological disturbances can come in many different forms and have very different effects on biodiversity. Common disturbances in nature include forest fires, storms, floods, waves, trawling, pollution, drought, ice cover and driftwood scraping species off rocky shores. Biological disturbances can also be included under this term, in other words animals that eat other animals and plants or stamp out other living creatures in their path.

The most concrete and manageable definition is that a disturbance must kill or remove organisms in a community (an area with co-existing species), so making it easier for

new species to become established. The seemingly innocuous sub-clause about the establishment of new species has proved surprisingly important when testing ecological explanatory models for disturbances and biodiversity. The effects of a disturbance depend on what kind of disturbance it is, how it is measured, and which species are in the community when it occurs. Also playing a role when testing hypotheses about biodiversity and disturbances are the degree of competition between species and establishment of new species, and the measure of biodiversity used in the study.

"If you don't know how disturbances work and how they will affect the community where they are introduced, they can easily have the opposite to the desired effect," says Svensson. "How you calculate the effect will naturally have a major impact when managing nature reserves with the help of ecological disturbances." The best-known example of this type of management can be found in Yellowstone, the world's oldest national park. In Sweden the method is used at Alvaret on the island of Öland, where the landscape is kept clear by grazing (a form of biological disturbance), and on the Koster Islands in the Kosterhavet national park off western Sweden.