

# Research says biodiversity helps protect nature against human impacts

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New research published today in *Nature* suggests farmers and resource managers should not rely on seemingly stable but vulnerable single-crop monocultures. Instead they should encourage more kinds of plants in fields and woods as a buffer against sudden ecosystem disturbance.

"You don't know what you've got 'til it's collapsed." That's how University of Guelph integrative biologists might recast a line from an iconic folk tune for their new research paper warning about the perils of ecosystem breakdown.

Their research, published today as the cover story in *Nature*, suggests farmers and [resource managers](#) should not rely on seemingly stable but vulnerable single-crop monocultures. Instead they should encourage more kinds of plants in fields and woods as a buffer against sudden ecosystem disturbance.

Based on a 10-year study, their paper also lends scientific weight to esthetic and moral arguments for maintaining species biodiversity.

The study was written by Profs. Andrew MacDougall and Kevin McCann, graduate student Gabriel Gellner and Roy Turkington, a botany professor and member of the Biodiversity Research Centre at the University of British Columbia.

Their research confirms that having lots of species in an area helps ecosystems avoid irreversible collapse after human disturbances such as

[climate change](#) or pest invasion.

"Species are more important than we think," said MacDougall. "We need to protect biodiversity."

Unlike other scientists usually relying on short-term, artificial study plots, the researchers studied long-standing pasture [grasslands](#) on southern Vancouver Island for 10 years. The 10-hectare site owned by the Nature Conservancy of Canada consists of oak savannah where fires have been suppressed for about 150 years.

The team selectively burned plots to compare areas of mostly grasses with areas of mixed grasses and diverse [native plants](#).

They found that seemingly stable grassland plots collapsed in one growing season and were subsequently invaded by trees. More diverse sites resisted woody plant invasion.

Diversity also affected fire itself. More diverse areas had less persistent ground litter, making high-intensity fires less likely to recur than in single-species grasslands with more litter serving as fuel.

MacDougall said the study supports resource management strategies that increase biodiversity on land and in aquatic ecosystems. A monoculture stand of trees or crops might appear stable and productive, for example—but it's an ecosystem that is more vulnerable to collapse, he said, adding that this study helps explain why species diversity matters.

McCann, who studies food webs and ecosystem stability, said many ecosystems are at a "tipping point," including grasslands that may easily become either woodlands or deserts.

"They're a really productive ecosystem that produces year in and year

out and seems stable and then suddenly a major perturbation happens, and all of that biodiversity that was lost earlier is important now," said McCann.

MacDougall has studied the Vancouver Island site since 2000. European settlers planted grasslands there in the mid-1800s.

**More information:** [dx.doi.org/10.1038/nature11869](https://doi.org/10.1038/nature11869)

Provided by University of Guelph

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