

# Food webs essential for nature conservation efforts in the future

November 28 2018

---



Lake Constance. Credit: University of Jyväskylä

Lake ecosystems make annual environmental changes more predictable. Nature conservation should not focus on individual species but on whole food webs, because the protection of their functioning is important for the predictability of species, especially when global warming is increasing environmental variability.

The environment varies drastically from year to year. Yet the variation of species in natural populations is positively correlated so that consecutive years tend to be fairly similar. Traditional population models cannot explain this phenomenon. Researchers have for long been wondering what the explanation could be, but they have now discovered a mechanism that translates various environmental variations into positive correlations in [natural populations](#).

## **A new, more predictable food web model**

A team of Finnish and US researchers used a [food](#) web model to simulate daily biomass development of plankton and [fish species](#) in Lake Constance. The model accounted for the prey–[predator](#) interactions and the age structure of fishes. The food web was subjected to environmental variation in terms of algal growth, that is, in the lake's primary production. Such variation can be caused by annual changes in temperature, for example.

"This model differed from earlier ones, as it depicted a whole food web dynamics with 30 different species or age categories and altogether 133 prey–predator interaction links," says Associate Professor Anna Kuparinen from the Department of Biological and Environmental Science in the University of Jyväskylä, Finland.

## **Global warming intensifies the changes**

The researchers observed that algae reflected the variations entered in the model, but as the variations move upward in the food web from algae to animal plankton and further to fish, the variation of species became positively correlated. The transition of biomass in the food web through prey–predator interactions from primary producers up to fishes may be a central mechanism causing positive correlation. Complex food webs are

thus able to mitigate environmental variation and make it more predictable.

"The functioning of food webs composed of photosynthesising plants, herbivores and predators is an important moderating factor in environmental and climatic changes," Kuparinen says. "We should not focus only on protecting individual species but more broadly on whole functional food webs."

**More information:** Anna Kuparinen et al. Environmentally-induced noise dampens and reddens with increasing trophic level in a complex food web, *Oikos* (2018). [DOI: 10.1111/oik.05575](https://doi.org/10.1111/oik.05575)

Provided by University of Jyväskylä

Citation: Food webs essential for nature conservation efforts in the future (2018, November 28) retrieved 26 April 2024 from <https://phys.org/news/2018-11-food-webs-essential-nature-efforts.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.