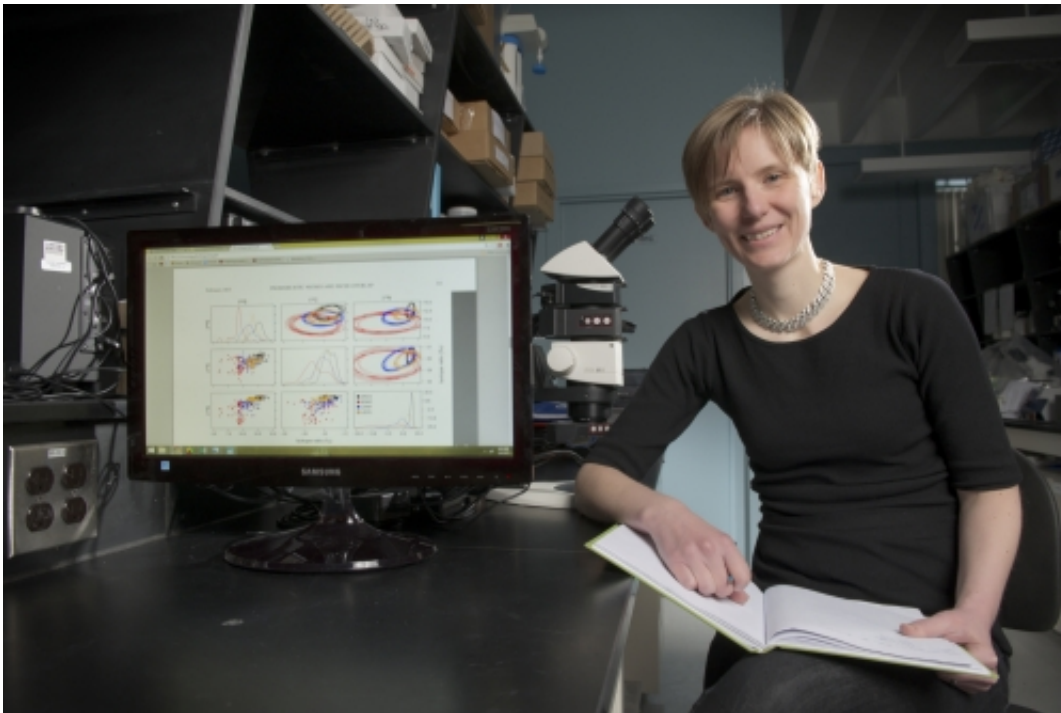


# Cutting-edge tool to help predict impact of invasive species

March 19 2015

---



Heidi Swanson. Credit: Martin Schwalbe

Researchers at the University of Waterloo have published results of a powerful new tool that could give ecologists new ways of tackling problems posed by deadly invasive species like Asian carp and Zebra mussels.

Invasive [species](#) cost us more in environmental, economic, and health-

care related damages than all other natural disasters combined. Being able to predict how a species 'fits' into an environment - the so-called species niche - can help managers prevent, predict, and manage the next big invasion.

Biology professors Heidi Swanson and Michael Power and Statistics and Actuarial Science professor Martin Lysy have created a new statistical tool that gives ecologists an innovative way to quantify species niches and how they overlap with each other.

"Ecology is increasingly becoming a quantitative discipline. We as ecologists don't always have the mathematical or statistical background necessary to solve quantitative ecological problems," said Swanson. "I was lucky enough to meet Martin Lysy at a new faculty social when we both arrived at University of Waterloo and we developed a really great collaboration."

Their statistical tool, nicheROVER, is able to analyse multiple, customizable [ecological niche](#) parameters and identify the overlap between species.

Their results are presented this month in the journal *Ecology*. The authors also include PhD student Ashley Stasko and scientists from Fisheries and Oceans Canada.

In recent years, ecologists have increasingly relied on [stable isotope ratios](#) to define and quantify part of an organism's niche. Stable isotope ratios of carbon and nitrogen are especially popular in ecological studies.

The problem is that nearly all off-the-shelf statistical packages that evolved from using isotopes only allow for analysis in two dimensions.

Niches are a fundamental concept in ecology and were defined by G.

Evelyn Hutchison in 1957 as an n-dimensional hyper volume, meaning that parameters – where and when a species lives, eats, and spawns – can be mapped and compared between species.

Results from nicheROVER can show whether a species occupies a specific part of the ecosystem or if it overlaps and potentially competes directly with other species for food, space and spawning grounds. Ecologists can now combine classic stable isotopic tracers with any number of parameters, like temperature range, salinity, or newly discovered isotopic tracers.

Niche overlap is especially important in the context of [invasive species](#). Managers can use the results to make more informed predictions about how native species will be affected by an invasion or even how species ranges may be extended due to climate change.

Swanson cautions that although nicheROVER is more flexible and more powerful than other niche analysis tools, it's up to the ecologist to get the most meaningful results.

**More information:** "A new probabilistic method for quantifying n-dimensional ecological niches and niche overlap." *Ecology* 96:318–324. [dx.doi.org/10.1890/14-0235.1](https://doi.org/10.1890/14-0235.1)

Provided by University of Waterloo

Citation: Cutting-edge tool to help predict impact of invasive species (2015, March 19) retrieved 11 May 2024 from <https://phys.org/news/2015-03-cutting-edge-tool-impact-invasive-species.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.