

I feel like I'm nothing without wildlife. They are the stars. I feel awkward without them. ~ Bindi Irwin

The Invaders

Newsletter of
The Wildlife Society
Invasive Species
Working Group



Vol. 4 Issue 1: February 2015

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TWS 2014 Conference ISWG Reception

The ISWG hosted a reception during the TWS Conference on Tuesday, October 28 at The Sharp Edge Bistro On Penn. Board members enjoyed a lively discussion with our current membership and other interested parties about several different invasive species topics. We look forward to seeing everyone in Winnipeg at TWS 2015.



TWS ISWG has over 185 twitter followers!

The ISWG twitter feed, @Invasive_TWS, has served to bring together invasive species researchers from all over the world. One of those researchers, James Russell, is our featured story in the current newsletter.

Over-Invasion

A useful concept in biological invasions?

By James Russell

Invasive species are becoming ever more common in the ecosystems we research and manage. There is now a strong body of literature demonstrating how these species interact directly and indirectly with one another, and how this affects native species in the communities. With so many invasive species it is not surprising that in many locations very similar invasive species will be present. From a broader community impact perspective the subtleties among impacts of similar invasive species may be negligible, but interactions among very functionally similar invasive species could nonetheless have important outcomes.

Through my own work on three invasive rat species over the past ten years I became interested in what may cause the checkerboard distribution of these rat species on islands across the Pacific, and what the outcomes of this may be for island biodiversity. Although the difference in impacts between cats and rats on islands is clear (e.g. see the useful review by Towns et al in *Seabird Predators* book), the difference in impacts of



Dr. James Russell on Antipodes Island, New Zealand live-trapping

black rats from brown rats is also important (e.g. see the review by Jones et al in *Conservation Biology*). Previous work on invasive species interactions (e.g. mesopredator release and hyperpredation) had used coupled differential equations to explore the outcomes. These simplified population models allow an opportunity to explore theoretical outcomes in biological systems.

At the same time, I had been working in the field

on a number of islands where rat invasions had very recently occurred. On Tetiaroa atoll in French Polynesia black rats arrived about 50 years ago and displaced (though not made extinct) Pacific rats on many motu (islands). On Pearl Island in New Zealand two species of rats reinvaded after eradication, but the brown rat finally dominated over the black rat. I thought clearly there must be an underlying mechanistic

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process which could help understand these island invasion outcomes. And so with statistics and mathematics colleagues from the University of Auckland, New Zealand, we investigated models which might lead to one invasive species displacing a very



Dr. James Russell in his makeshift field laboratory on Antipodes Island, New Zealand.

similar invasive species, a process we described as a sort of 'over-invasion'.

The results of the exercise revealed two forms of over-invasion. A propagule pressure effect occurs when two invasive species are simultaneously colonising, but one finally dominates, even if it is less competitively superior, though a numerical advantage. An incumbent advantage effect occurs when where one invasive species resists invasion by another, even if the incoming one is competitively superior. The concepts of propagule pressure and incumbent advantage (aka priority effects) are not new to Invasion Biology or Community Ecology, but their application to the interactions among multiple invasive species and their management is



Dr. James Russell is a Senior Lecturer at the University of Auckland – New Zealand.

an interesting one. Indeed the outcomes of multiple rat species interactions may affect the success of rat eradication operations on islands.

Over-invasion is surprisingly common across biomes and invasive taxa,

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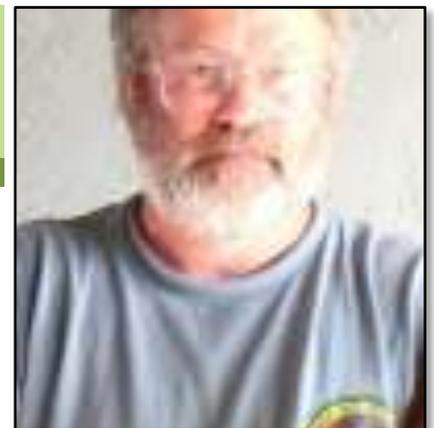
Book Review: Island Invasives: Eradication and Management

By Gary Witmer

It has articles on invasive plants, invertebrates, and vertebrates. And there is coverage of many aspects of addressing invasive species, including proposals, new techniques, results and outcomes, prevention, and policy and people. And the

best part is that ISSG (the Invasive Species Specialist Group) has made all the articles available **FREE** at their website:

http://www.issg.org/pdf/publications/Island_Invasives/pdfwebview/Table_of_Contents.pdf



Dr. Gary Witmer is a Research Wildlife Biologist with NWRC.

Invasive Species Week

February 22-28, 2015



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and although numerical (i.e. abundance) effects are the most easily determined (e.g. complete exclusion of one invasive species), many other subtle effects could occur, such as changes in behaviour, niche or morphology of one or both invasive species. Through my own field work I am continuing to investigate some of these other outcomes in the population dynamics of invasive rat populations on islands. I think research in this area for other invasive species could be fruitful and provide a novel perspective on considering the outcomes of biological invasions. The initial study is just published in *Ecology* doi: <http://dx.doi.org/10.1890/13-1672.1>

The National Invasive Species Awareness Week will occur February 22-28. To celebrate this week and to

help create more awareness for invasive species, ISWG would like to hear your stories involving invasive species. If you know of anyone doing a great job helping to spread awareness of invasive species to the public, please nominate them for our annual award. The winner receives a one-year membership to TWS and ISWG. Please send a summary of the proposed project, highlighting the outreach component (audience type and number present), to erin.myers@fltws.org by March 4th.

INVASIVE IN SHORT

Invasive Species Research – Hot Off The Press



Crayfish limit macrophyte recovery potential

Baldrige, A. K., and D. M. Lodge. 2014. Long-term studies of crayfish-invaded lakes reveal limited potential for macrophyte recovery from the seed bank. *Freshwater Science*, 33 (3), 788-797.

In situ seed banks are a promising avenue for restoration of plant communities damaged by anthropogenic changes. The invasive rusty crayfish (*Orconectes rusticus*) has had well documented effects on macrophytes in north temperate lakes. To understand mechanisms of macrophyte recovery from the seed bank, we examined seed banks from lakes with different durations of exposure to *O. rusticus* and compared these findings to long term macrophyte surveys. We cored littoral-zone sediments at sediment depths of 0–5, 5–10, and 10–15 cm to test whether deeper layers hold viable seeds that can be used to restore macrophytes. The seed bank in uninvaded lakes contained a higher number and richness of viable seeds than did the seed bank in invaded lakes. Number and richness of viable seeds decreased with sediment depth in all lake categories, and most seeds were found in the top 10 cm. Among all lakes, at most, 33% of the species recorded in field surveys of standing vegetation were represented in the seed bank. We conclude that the seed bank has only modest potential to contribute to natural recovery. Natural regeneration of the macrophyte community is more likely to rely upon vegetative propagules from remnant stands in invaded lakes, especially from very soft-bottom areas avoided by crayfish. Our results emphasize the importance of preventing destruction of macrophytes, especially in lakes without habitats likely to constitute a refuge for macrophytes.

The Invaders Article Submission

Want to share your invasive species work, training, conferences, or other contribution with our TWS ISWG members? Contact the newsletter editor, Nicole Wood, to submit articles, short write-ups to announce conferences and training, or get your voice heard about your experiences with invasive species. We are also looking for informational articles related to invasive species. The ISWG appreciates your input and wants to make this working group a useful tool for everyone dealing with invasive species.

Send articles to twsiswg@yahoo.com

Thank you for helping us to grow!



Get connected with TWS ISWG



twsiswg@yahoo.com



TWS Invasive Species Working Group



@Invasive_TWS



TWS ISWG Website

<http://wildlife.org/invasive/>

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