Natural Resources Research Institute
University of Minnesota Duluth
Driven to Discover

NRRI *Now*

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NRRI Mission:
Deliver research solutions to balance our economy, resources and environment for resilient communities.

www.nrri.umn.edu

From the Editor:

State supported base funding makes NRRI possible. It attracts and retains top scientist and engineers. It provides the equipment and facilities for research that's relevant. It improves NRRI's return on the state's 35 year investment.

With a final legislative effort to bring NRRI's base funding to functional levels, NRRI can deliver on its strategic mission to propare the state for the challenges of the future.

How can the Iron Range transition to new ore bodies? What is the impact of toxic algae in our lakes? Are there possibilities for high value materials from low value biomass? What can we do to help businesses and entrepreneurs prosper?

Minnesota is counting on NRRI to be looking ahead. NRRI is preparing for the future.

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Scattered or clumped? Harvest guidelines leave loggers stumped

"I thought this project would be so simple. But it's been one of the more complicated ones to tease out."

NRRI Wildlife Ecologist Alexis Grinde set out to answer a question about forest harvesting. Is it better to leave single trees scattered around the harvest site or leave some stands of trees clumped together around the site?

Here's the backstory. In the 1990s, the Minnesota Forest Resources Council developed voluntary guidelines to balance ecological health with industry needs. One of the recommendations to loggers was to leave some trees on the harvest site for wildlife – either scattered or clumped.

"And there's a lot of evidence gathered since the 1990s that, yes, leaving some trees is a best practice for wildlife," said Grinde. "But people started asking, is one better than the other? Scattered or clumped?"

What seemed like a simple research proposal soon got complicated.

First they needed high-tech laser surveying (LiDAR) to get detailed information about harvest sites with scattered or clumped trees. Turns out, foresters often practice a combination of the two. And, when they do clump, not all clumps are created equal. Lowland conifer or black ash swamp clumps have more biodiversity than, say, a red pine plantation clump. Can the clumps be compared?

And what's truly best for wildlife? Are the clumps an ecological trap, attracting birds but then leaving them vulnerable to predators? Are scattered trees apt to blow down in wind storms?

Once the sites were identified, the research team set about gathering information – diversity of species and abundance – on the birds and small mammals using the two habitats.

And they learned something – to clump or to scatter is not an either/or question. Preliminary data shows that small mammals, an important part of the wildlife food chain, are more abundant in the clumped tree stands. Birds, however, use both scenarios, depending on the species. The golden-winged warbler, identified as a Species in Greatest Conservation Need by the Minnesota Dept. of Natural Resources, prefers the scattered configurations. But the more mature trees in clumped stands are more attractive to species such as chestnut-sided warbler, Canada warbler and American redstart.

Example of "clumped" forest harvesting practice in Minnesota.

And that led to even more questions as the team begins Phase Two of the research. Does the size of the clump matter? Are two quarter acre clumps better or worse than one half acre? How do the two scenarios influence tree regeneration?

"We still have a lot to tease out. Which might lead to even more questions, but that's what makes my job exciting," said Grinde. "Ultimately, we'll be able to provide practical forest management options for ecologically sustainable timber resources while maximizing benefits for wildlife."

The final results of this three year study will be available June 2019. Funding for this research was provided by the Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources.

Passion for rocks leads student to UMD and geology variety at NRRI

A summer youth camp to encourage interest in science worked. It got Jackie Drazan hooked on rocks.

"They were targeting minorities and girls, to get them excited about STEM fields, but for me it was just really fun," said Drazan. "We went all across Texas and New Mexico just learning about geology."

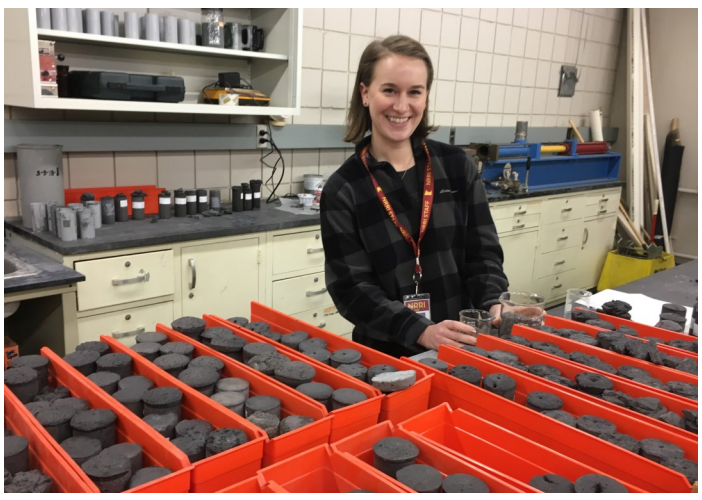
It made choosing a major in college easy. But it was when she came north to Minnesota for her Master's degree at UMD that Drazan got to spend time with her favorite rocks – the beautiful and complicated igneous rocks formed by molten magma.

Drazan is now working on her thesis in the Earth & Environmental Sciences Department focused on some of Minnesota's ancient peperite deposits and Iceland's modern peperite deposits. Peperite in those two regions formed as the molten magma interacted with water or wet sediments making a unique texture "like if you threw hot oil into water and it splattered, but it's preserved in the rock," Drazan explained. By comparing ancient deposits with modern, she hopes to learn more about the mechanisms of how peperites form, adding to the story of how Minnesota formed some 2.7 million years ago.

And then, just to add variety to her studies and earn a bit of income, Drazan took a summer job at NRRI working with Larry Zanko to further develop and demonstrate a road repair product made from waste taconite resources.

"I thought this was a great idea. It turns mining waste into something positive," she said. "And when I teach undergrad classes, I can talk about ideas for excess material, and get them thinking about the full life cycle."

She enjoyed experimenting to make the product better, testing efficient ways to deploy the materials and scouting out potholes for demo sites. And before she graduates in May, Drazan hopes to have the NRRI minerals lab in tip-top shape.



Jackie Drazan works in NRRI's minerals lab surrounded by test samples of taconite road patch

Having NRRI's lead geologist, George Hudak, as an advisor led her to the NRRI job, as well as extensive peperite deposits data both in Minnesota and Iceland. Better yet, to the hidden outcroppings that give geologists a peek at what lies beneath.

"I think it's good to do a variety of things," said Drazan. "I really like all aspects of geology. Working at NRRI is a cool way to show I'm a multi-faceted geologist."