

NRRI Mission:

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

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From the Editor:

NRRI Wildlife Biologist Michael Joyce is using trail cameras to monitor 100 fisher den boxes he and his team have installed in the north woods.

They want to know if they can increase fisher populations by giving them a safe place to live and breed.

And fishers are using some of the boxes. But other critters are checking them out, too. They've captured images of porcupines, squirrels, chipmunks, martens, a variety of birds -- and the big guy pictured below. Luckily, the researchers are using super strong cable to hold up the boxes!

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Can beaver and trout share streams? Sometimes.

While anglers may curse the busy beavers that dam up a popular trout stream, there can be positive benefits from the ponds created by dams.

Beaver ponds attract a wide variety of other animals – ducks, muskrats, frogs, and a variety of predators attracted to concentrations of wildlife. Deep ponds provide winter refuge for fish. Dams are also used as a bridge by bears, deer, fox, wolves, and many other forest mammals.

“More species show up where there are ponds and not just streams on the landscape,” explained NRRI Scientist Josh Dumke. “There’s a whole network of changes that happen in a forest when a pond is there.”

Beaver can live almost anywhere there’s water. Trout, on the other hand, are limited to relatively few cold-water streams, and the dams and ponds may not always improve conditions for trout.

“That’s why it’s such a complicated topic,” said Dumke.

Currently, the Minnesota Department of Natural Resources policy is to remove beavers from the main-stem of some trout streams to allow upstream migrations of spawning fishes from Lake Superior. Dumke’s research – part of a two-year project led by [UMD professor Karen Gran](#) and funded by Minnesota Sea Grant – set out to understand if beaver dams in north shore streams are impeding movement of trout and other fish. The study design included mildly shocking fish to catch them around beaver dams on the Knife and French rivers, marking them, and setting them loose again. If a marked fish was recaptured later on the other side of a dam, he’ll know that fish was able to move beyond the dam, and whether it moved up or downstream.

Simple, right? Well, not really.

No two streams are alike, and no two dams are alike. The dam and pond systems are constantly in flux from beaver activity and flooding. The variables at each site make it hard to have a blanket policy of removing beavers and dams, or not. This has led to differing opinions on whether beavers are a good or



NRRI researchers Josh Dumke and Bob Hell collect trout on a stream section in northern Minnesota for the beaver-trout study in 2019.

bad thing in trout streams.

“Both opinions can be right,” Dumke said. “Land managers have to assess each situation separately.”

But because so little was known about the interactions of fish and beaver dams in Minnesota, the data he gathered is very helpful.

Unable to physically collect fish behind large dams – the water is too high – the researchers studied dams three feet high or less. They observed that, at least at that height, high water flow after a rain event can flow over the dams allowing for fish movement. Land managers also have to consider water flow conditions. In low flow streams, sometimes the only water in it is the beaver pond, offering refuge to fish until the flow improves. Consideration should also be given to the stream’s

temperature and whether the pond is creating water that’s too warm for trout.

Sometimes it does, sometimes it doesn’t.

Land managers also must consider the desires of the landowners – whether publicly held or private. Some landowners want beavers in their streams. Others don’t.

With one field season of data and 1,200 marked fish – of which 248 were recaptured – 90 percent did not move from the stream section they were captured in. The team went back to look at time-lapse photos set up at the dam sites. They found that the 10 percent of fish that did move likely used big rain events that sent water over the dam.

“So yes, fish are able to move past dams because we got some big rain events” said Dumke. “But we don’t know how fish respond to larger dams.”

NRRI Business Development Team manages clients, grows base

Tim Hagen knows agglomeration. He knows how to take fine materials and make them into useful and transportable products. As a Senior Research Engineer at NRRI, Hagen is in his element developing novel and innovative ideas for businesses of all sizes.

What he’s not is an expert in business development – the focus on developing customer relationships, understanding their needs, while seeking new opportunities and protecting potential innovations. As an applied research organization within the University of Minnesota, NRRI has taken on an “industry approach” to business development, which gives researchers more time to do what they do best.

“NRRI has to be as nimble as our business and industry partners,” explained Rolf Weberg, NRRI executive director. “Business Development, done right, requires specific skillsets and time. Asking our talented scientists and engineers to also build and manage client relationships and opportunities isn’t a good use of their time.”

Weberg has assigned business development responsibilities to Tim White and Kevin Kangas. Both came to NRRI in the last few years with extensive industry experience. White has nearly 20 years of experience in new product development focused on aerospace, mining, and consumer durables. Kangas has 26 years of industry and professional consulting experience mainly in the forest products, iron ore and steel industries.

When companies or entrepreneurs come to NRRI for assistance, it’s often their first time working with a University entity. White and Kangas walk customers through complex topics like intellectual property, confidentiality and licensing up front. “In the university system, it often takes longer to get things done than what industry is used to,” said Hagen. “But now they can see that we have a team to build a program that meets their needs.”

Hagen relies on White’s expertise to identify intellectual property opportunities at the beginning of client discussions. White lays out the customer’s role, what NRRI can offer and how they’ll protect the innovations with non-disclosure agreements. University paperwork can get unwieldy, so White manages the paper trail, making sure all i’s are dotted and t’s are crossed.

NRRI Metallurgical Engineer Brett Spigarelli has a client with a lot of ideas to explore. He uses the White/Kangas team to figure out whether a straight-forward service contract is in order or a sponsored project submitted through the U’s Office of the Vice



Tim White and Kevin Kangas stand socially distanced at NRRI Duluth.

President for Research.

“For example, we’re working with a grid energy storage company that needed us to characterize an iron bearing feed material for their innovative process,” said Spigarelli. “The work is more developmental, exploratory, bouncing ideas off the client. So for that, we need to work through the U’s Sponsored Project Administration.”

Spigarelli appreciates that White and Kangas work with the client upfront to describe the SPA contracting options and process to determine the best approach. Putting the client first sets the stage for a productive and efficient working relationship.

Managing client touchpoints and keeping communication lines open can be tricky. White and Kangas are currently tracking 99 opportunities – a number that grows by the day – using the Zoho Customer Relationship Management tool. This program allows teams to collaborate on all new business opportunities while communicating efficiently, following-up with customers in a timely manner, and ultimately securing more business.

With an entrepreneurial focus, the Business Development duo manages a Business Assistance Fund that provides funding assistance for small business access to NRRI’s expertise and equipment. NRRI is also a commercialization partner in the collaborative Enterprise for Strategic Resources, working closely with the Minnesota Department of Iron Range Resources & Rehabilitation (DIRRR).