NC NEWS
NORTH CENTRAL FOREST EXPERIMENT STATION
March 1999

In the News

Editor's Note: *Forgive us as we brag a bit about our latest award winners. Naturally, we're proud, but it's also a good way for us to report on their lifelong body of research, their future plans, and their unique approach to science.*

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Seeing With New Eyes: Crow Wins Distinguished Science Award

When I asked Tom Crow which of his many awards he is most proud of, he said this one—the North Central Distinguished Science Award. It honors a lifetime of scientific rigor, intellectual risk-taking, and selfless mentoring of employees.

Director Linda Donoghue congratulates Tom Crow.

For more than 20 years, Crow has been a leading light not only at this Station, but far beyond the boundaries of a single agency or region. His influence, felt in management circles throughout the world, has helped bring about a monumental shift in the way we treat and think about natural resources. One of the "lenses" that forever changed the way we look at forested ecosystems is a field of knowledge that Crow helped establish, called landscape ecology.

The View From Above

Long before assessments were regional in scope, or plans were conducted on a watershed basis, the basic unit of resource management was the forest stand. "We studied the forest from inside it," Crow said. "I realized that we needed a new perspective when I attended a controversial planning meeting on the Chequamegon National Forest. Our traditional approach was not answering the complex questions being asked by appellants." With controversy as their catalyst, Crow and his colleagues began looking for a way to manage landscapes across spatial and temporal scales, as a complement to traditional approaches.

"Landscape ecology allowed us to view the forest from above rather than inside," Crow said. This new point of view proved extremely powerful, enabling managers to see spatial patterns and ecological processes in a landscape context, and to consider cumulative impacts of human activities. When Crow first ventured into this emerging field, there were no ready-made intellectual templates. His Landscape Ecology unit was the first of its kind in the Federal government.

Embracing an Ecological Approach

For Crow, landscape ecology was the right tool for a much larger task—the paradigm shift to ecosystem management. Again, Crow was instrumental in the early days—serving on "think tanks" and writing seminal papers that helped the Forest Service evolve from a single-commodity focus toward a more holistic management approach. The very tough, yet historic, job of defining ecosystem management is an effort he is still engaged in.

Along with this important conceptual work, Crow has always promoted practical, ecological approaches to silviculture, beginning with his early work on red oak. Longtime collaborator Burton Barnes, professor at the University of Michigan, appreciates Crow's ability to translate research to users. "I rely on Tom to get the word out, and he has done so regionally and nationally, better than anyone I can think of."

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RESEARCH NATURAL AREAS

How to Choose Nature's Classrooms

Nature really is the best teacher, which is why we designate places in our national forests where natural processes can take priority, and we can take our cues. Research natural areas (RNAs) are high-quality examples of regional ecosystems that can provide a baseline for research and monitoring. Since national forests are finite, and pressures for land uses are keen, the question becomes: how many and which RNAs should we designate to arrive at a representative sample of ecological communities?

Postdoctoral scientist Stephanie Snyder, working with Station scientist Bob Haight and regional RNA Coordinator Lucy Tyrrell, has developed a helpful decisionmaking tool. It's a computer model that can do what's difficult for the human brain—it can analyze ecosystem and area attributes of a potential RNA site while keeping in "mind" the attributes of other potential candidates. Then, given a particular goal (e.g., represent as many ecosystems as possible), it can assess the tradeoffs between the number of ecological communities within a set of potential RNAs and the total area covered by the RNAs.

Lucy Tyrrell

Kawishiwi Pines, a potential candidate RNA on the Superior National Forest.

The team put the model to the test using 33 sites on the Superior National Forest in Minnesota. These sites ranged in size from 200 to 7,000 hectares. Each contained one or more ecosystems that would be of benefit to the RNA program because they are relatively undisturbed.

The model quickly generated information about which sets of RNAs would be selected given a particular goal. Probably the most important finding was that there were many solutions to the problem of designing a set of RNAs that included the maximum of 63 ecological communities. Solutions ranged from a set of all 33 sites to a set of 21 sites. Within this range, managers can choose the best mix of sites—given other land management planning issues—without compromising representational goals.

You can read about the model in the August 1999 issue of Forest Science.

Information contributed by Lucy Tyrrell and Bob Haight

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What makes Crow such a persuasive spokesperson for ecosystem management? According to Eric Gustafson, the Landscape Ecology project leader who succeeded Crow, "It would be difficult to find someone more universally respected by his peers and employees." One of the things people respect is Crow's ability to direct a work unit while conducting original science. He's been at the helm for more than 20 years, beginning with the Northern Hardwoods unit in Marquette, Michigan, and then the Landscape Ecology unit in Rhinelander. When you add professional society leadership and technology transfer to his very full plate, it's hard to believe that Crow had time to produce 110 publications, 67 of which are senior-authored publications!

Seeding the Next Generation

Characteristically, Crow also found time to do what he considers the best part of his job—encouraging those around him to reach their potential. "I have personally benefited greatly by his beyond-the-call-of-duty effort to develop and recognize young scientists," Gustafson said.

These days, he's busy inspiring students at the School of Natural Resources at the University of Michigan, where he is the Theodore Roosevelt Chair of Ecosystem Management. Besides imparting technical knowledge, Crow makes sure his students understand the larger philosophical questions of resource management—the social and economic drivers of change. Crow has spent a lifetime framing those kinds of questions within the context of policy-relevant research. This award is a way of saying "Thanks, Tom Crow, for helping us think beyond our traditional paradigms during a time of great transition."

People on the Move

Congratualtions!

Richard Buech, *Grand Rapids*; **Dennis May**, *St. Paul*; and **Terry Strong**, *Rhinelander*, were promoted.

Mike Prouty, *St. Paul*, received an award from the Washington Office for demonstrating excellent leadership in advancing development research in the Forest Service by serving on the R&D Task Group.

Moving on...

Craig Echt, *Rhinelander*, and **Andrea Jenkins**, *Columbia*, resigned.

Presidential Award Winner Palik Leads with "Integrative" Thinking

At the colloquium for winners of the Presidential Early Career Award for Scientists and Engineers, something dawned on Brian Palik, research ecologist with the Riparian Project in Grand Rapids. "The keynote speaker said that multi-disciplinary studies were the best way to solve the complex problems of our time," Palik recalled. "Later, several scientists told me this was a new idea to them. It made me realize that North Central, and the natural resources profession in general, is a step ahead in this integrated approach to science."

If we're a step ahead, it's because scientists like Palik are in the lead, a fact that Forest Service Chief Mike Dombeck underscored when he nominated the ecologist for his "outstanding breadth of scientific research."

Palik's aptitude for integrative thinking began with his first job out of graduate school, at the Joseph W. Jones Ecological Research Center in Newton, Georgia. There, he led a multidisciplinary study of canopy disturbances and competition in longleaf pine ecosystems. According to co-worker Steve Golladay, "Brian hit the ground running. It was a new ecosystem for him, a new culture, but he quickly got his projects up and running. He showed real intellectual leadership. In his spare time, he worked with me on aquatic invertebrates, riparian interactions, etc. It was impressive."

Finding Common Threads

Palik brought this same energy to NC, where he is collaborating in a multiorganizational study to test and improve Minnesota's forest management practices for riparian areas. It too is highly integrative, looking at connections among: in-stream communities, water chemistry, terrestrial vegetation, soils, geomorphology, economics, harvest practices, and archeology. For his part, Brian hopes to better describe relationships between geomorphology and riparian plant communities, and to devise a way to delineate riparian boundaries based on system function.

Palik's co-workers on the project value his contribution to study design. According to Professor Jim Perry of the University of Minnesota Department of Forest Resources, "Brian is capable of conceptual flips that allow you to see how your work links to a different discipline. How, for instance, the amount of woody debris entering a stream—something that's important to aquatic communities—is affected by forest management. He's also good at involving scientists who have not traditionally participated in biological studies." For instance, when Jim Mattson, project leader of NC's Forest Engineering unit in Houghton, wanted to look at harvest disturbance, Palik suggested Mattson take his measurements along the same transects used to study riparian vegetation. That way, effects on soil and effects on vegetation could be meaningfully correlated.

Co-investigator Charlie Blinn of the University of Minnesota's Department of Forest Resources describes Palik as a natural-born leader. "Brian doesn't let ego get in the way. The fact that he gets along with so many different people makes him essential. He's the one who threads the needle and keeps the group together."

Jim Perry agrees: "Brian can articulate why people should work together, and even sacrifice a bit of 'turf' for their mutual benefit. He also has a knack for involving practitioners—explaining to a logger, for instance, why it's important to study herbaceous vegetation as well as trees."

A New Role as Science Leader

These skills will come in handy in Palik's new role as science leader of NC's new "Sustaining Riparian Ecosystems" integrated program. One of the most challenging aspects is how to structure the integration. "One plausible model is the one used by the National Science Foundation's Long-Term Ecological Research program," Palik said. "Each site has its own mission, but the network as a whole is trying to address a few, very large questions. In the same way, our program could employ a hybrid of (1) place-based integration—scientists from many disciplines working in the same watershed, and (2) concept-based integration—we pose a few core questions and invite each research work unit to amend or enlarge their own studies to address these questions. Ultimately, this could stretch us all in positive ways, while allowing us to answer questions we couldn't have tackled alone," Palik said.

Palik's award comes with 5 years of funding in the project of his choice—giving him a chance to sharpen his already considerable talents, and push the envelope of integrated studies even further. Congratulations, Brian!

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Award-Winning Bug Team Answers Pine Shoot Beetle Call

Minnesota extension specialist Mel Baughman calls the Pine Shoot Beetle Team "the primary source of research information about this serious forest pest." Six years ago, there was no primary source, because the pine shoot beetle (*Tomicus piniperda*) was not yet a threat in this country. As soon as inspectors found it here, Forest Insects project leader Bob Haack, together with postdoctoral research entomologists Robert Lawrence and Therese Poland, and biological technicians George Heaton and Toby Petrice, formed an entomological SWAT team (no pun intended). They conducted research under pressure, and transferred it with grace, a feat that earned them this year's North Central Award for Excellence in Technology Transfer.

Quick Response on Short Notice

The Pine Shoot Beetle Team's intense, 6-year effort began with a bad-news phone call to Bob Haack. It was July of 1992, and the exotic pine shoot beetle had just been discovered at a Christmas-tree farm near Cleveland, Ohio.

The stakes were high. In its native Europe and Asia, *Tomicus piniperda* is a serious pest of pines. An outbreak in this country would threaten the health of several multimillion dollar industries including forest products, Christmas trees, and commercial nurseries. Aware that biological information would be the key to eradication, USDA APHIS (Animal and Plant Health Inspection Service) asked Haack to serve on its Pine Shoot Beetle New Pest Advisory Committee and Science Panel.

By November 1992, the beetle had been found in six states from Illinois to New York. A quarantine was issued restricting the movement of pine logs, Christmas trees, and nursery stock. This was quite a financial hardship for affected industries. Before modifications could be made to the Federal quarantine, several information gaps had to be filled.

Haack's team worked quickly, conducting original research on: (1) timing of fall shoot departure; (2) timing of spring flight; (3) development of regional maps from historical weather records to show average first date of spring flight and fall shoot departure; (4) location of beetles along the trunk during winter; (5) influence of tree species, felling date, and log exposure on subsequent beetle colonization; (6) influence of trap log diameter, length, and bark texture on subsequent attack density; (7) best trapping techniques, including types of traps and lures; (8) host range for shoot feeding and reproduction; (9) within-tree colonization pattern on different species of pine; (10) non-target impacts of introducing a predatory beetle from Europe; (11) effects of chipping and log burial depth on beetle survival; (12) dispersal of adults at sawmills; and (13) ability of adults to survive indoors on cut Christmas trees.

Bob Haack

Pine shoot beetle.

Getting the Word Out

The team's findings were first transferred to APHIS through interim reports, publications, conference calls, workshops, committee work, and scientific meetings. As a result, several regulations were relaxed to facilitate trade. For example, a 4-month-long "open season" was set for the free movement of pine logs from infested to uninfested areas.

The Pine Shoot Beetle Team also hustled to get the word out to State Departments of Agriculture personnel, State Departments of Natural Resources personnel, Christmas Tree Associations, Nursery Associations, the National Plant Board, sawmill managers, and others. Team members made more than 55 presentations to lay and scientific audiences, and published more than 20 popular or scientific articles on *Tomicus piniperda*.

According to Deborah McCullough, associate professor of entomology at Michigan State University, "The importance of their data and research results, and the efficiency with which they obtained critical information, was essential in helping regulators and producers deal with this situation."

The effort continues. In search of new management tools such as chemical inhibitors and pheromone lures, the Pine Shoot Beetle Team is cooperating with researchers at Michigan State University, Purdue University, the State University of New York at Syracuse, the University of Georgia, and IPM Technologies of Portland, Oregon.

Whatever the partners find, we can be sure that people who need this information will be the first to know. Congratulations on making technology transfer a seamless part of your research efforts!