



RESEARCH SERVICES SECTION

TECHNICAL SUMMARY

Technical Liaison:

Kenneth Graeve, Mn/DOT
kenneth.graeve@dot.state.mn.us

Administrative Liaison:

Dan Warzala, Mn/DOT
dan.warzala@dot.state.mn.us

Principal Investigators:

Brock McMillan
Minnesota State University—Mankato
Bradley Cook
Minnesota State University—Mankato

PROJECT COST:

\$99,132



Reed canarygrass has been increasingly invading Minnesota's wetlands.

Investigating the Effects on Wildlife of Reed Canarygrass Infestation of Minnesota Wetlands

What Was the Need?

Wetlands are known for their susceptibility to invasive plants. During the past few decades, diversity and complexity of native plant communities in southern Minnesota wetlands have become threatened by reed canarygrass, a perennial, cool-season grass that outcompetes native vegetation. This invasion is often associated with disturbances such as ditch building and stream channeling sedimentation, and with intentional planting for forage and erosion control.

Mn/DOT is often required to manage reed canarygrass when preserving and restoring wetlands. Wetland mitigation agreements with regulators such as Minnesota's Board of Water and Soil Resources and the U.S. Army Corps of Engineers are becoming stricter, and there is increasing pressure on Mn/DOT to manage this invasive plant. Mn/DOT needs to understand any cascading effects of the invasion of reed canarygrass as it manages its wetland mitigation efforts in Minnesota.

The diversity of animals in any habitat is related to the structure, complexity and diversity of vegetation. Habitats that contain reed canarygrass have been found to have a less diverse mix of traditional native plants, so it is reasonable to expect that reed canarygrass will have a corresponding negative effect on wildlife. While some studies have demonstrated this impact, Mn/DOT knows little about the specific effects on Minnesota wildlife.

What Was Our Goal?

The objective of this study was to determine the effects of reed canarygrass by comparing the ability of sites invaded by reed canarygrass to support wildlife with sites dominated by native vegetation. Specifically, researchers wanted to compare these sites with respect to the composition, diversity and production of plant species, and the composition and diversity of wildlife species.

What Did We Do?

Researchers established sampling plots at eight paired sites in five counties of the farmland region of southern Minnesota. They selected four wetlands dominated by reed canarygrass and four sites with native wetland vegetation that were close in proximity and similar in size and landscape position. Locating healthy, nonimpacted wetlands was difficult; reed canarygrass was present, to some degree, in at least two of the native sites. Data was collected at sampling plots beginning in the spring of 2006 through the fall of 2007.

Researchers evaluated the effects of reed canarygrass invasion on plants, birds, mammals and invertebrates (chiefly, insects). They hypothesized that all four communities would be negatively affected by the invasion of reed canarygrass and expected to find effects more evident for organisms lower on the food chain (green plants) than for those higher up (that is, herbivores, then carnivores).

What Did We Learn?

Results of the study did not consistently support the researchers' hypothesis that the invasion by reed canarygrass will have a negative effect on wildlife. Study results indicated that:

“The fact that we were unable to find four native study sites completely free of reed canarygrass highlights the significance of this problem.”

—Kenneth Graeve,
Botanist/Plant Ecologist,
Mn/DOT Office of
Environmental Services

“An interesting and unexpected result of this study was that invaded areas were not a monoculture of reed canarygrass; most of the plant species were still there, but not in abundance.”

—Brock McMillan,
Professor, Minnesota
State University—
Mankato Department of
Biological Sciences

Produced by CTC & Associates for:

Minnesota Department
of Transportation
Research Services Section
MS 330, First Floor
395 John Ireland Blvd.
St. Paul, MN 55155-1899
(651) 366-3780
www.research.dot.state.mn.us



Two of the sites used to study the effects of reed canarygrass invasion on wildlife: The Rasmussen Lake study area (left) has been invaded by reed canarygrass, while the Ottawa study area (right) is dominated by native vegetation.

- In 2007, a significant loss in plant species richness and diversity was noted in sites invaded by reed canarygrass as compared with other sites. (For 2006, the sampling method was not designed to make this comparison, measuring instead the total diversity.)
- There was no evidence that the bird community was negatively influenced by the invasion of reed canarygrass. The only significant finding indicated that the number of species of birds was actually greater at sites invaded by reed canarygrass in one of the two study years, suggesting that bird diversity is influenced more by structure than plant diversity; since invaded sites have more structure, they would have richer bird diversity.
- Diversity of small mammals was lower at sites invaded by reed canarygrass during 2006, but not during 2007. Researchers indicated that a single difference during a single year suggests that the relationship between invasive reed canarygrass and small mammals may not be strong in the sampling plots.
- As researchers expected, the effects of reed canarygrass invasion were more evident for organisms lower on the food chain. Study results indicated lower richness and diversity of insects at sites invaded by reed canarygrass.

What's Next?

The results of this study do not demonstrate a clear negative impact on wildlife from the invasion of reed canarygrass. Researchers did note that the effects of reed canarygrass were more evident for organisms lower on the food chain, negatively influencing the plant and invertebrate communities. This study suggests that more comprehensive research of the vertebrate community is needed—examining more sites over a longer study period—to determine whether there are clear and consistent effects of reed canarygrass invasion on wildlife levels.