Project Abstract M.L. 2015, Chp. 76, Sec. 2, Subd. 6a
For the Period Ending June 30, 2020
Amended December 8, 2022

PROJECT TITLE: MITPPC #7: Tools to Distinguish Native from Exotic Reed Canary Grass
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FUNDING SOURCE: Environment and Natural Resources Trust Fund
LEGAL CITATION: M.L. 2015, Chp. 76, Sec. 2, Subd. 6a

APPROPRIATION AMOUNT: $263,273
AMOUNT SPENT: $263,273
AMOUNT REMAINING: $0

Sound bite of Project Outcomes and Results
This project used genetic techniques to find that most reed canarygrass in Minnesota is native to the state and not from Europe. Plant DNA was extracted from samples of reed canarygrass across the state. Due to this outcome, Tribal and State managers may choose to manage or preserve this species differently.

Overall Project Outcome and Results
The goal of this project was to use molecular markers to determine native vs. exotic reed canary grass status in various locations across Minnesota growing along rivers (Des Moines, Minnesota, Mississippi, Red, Roseau, St. Croix), in fields, as commercially-grown cultivars (forage, ornamental), and preserved historic specimens in herbaria (<1940, presumed native) and a corollary set of samples from rivers in the Czech Republic as exotic comparisons (Activity 1); along Minnesota transportation corridors (highways) existing during the 1920s-1930s (Dust Bowl era) and Minnesota lakes (Bush, Cedar, Como, Phalen, Mille Lacs, Minnetonka, Square, White Bear) and Central Park (Activity 2). Due to Covid-19 travel restrictions, we were unable to get permission to collect along additional lakes. The number of plants analyzed totaled 3,430 (Activities 1,2). Plant DNA was extracted from each sample to determine genomic markers of short DNA sequences (2,889 highly differentiated single nucleotide polymorphisms, SNPs, out of 16,902 total markers) to distinguish native vs. exotic status. Genetic analysis of reed canarygrass showed that river populations are native Minnesota or North American types. Herbarium samples as well those from a native, unplowed field (Roseau, MN) were genetically similar to wild collections from five Minnesota rivers; forage cultivars in commercial fields (Roseau, MN) and along the Roseau River formed a separate group. The exotic central European populations were distinctly different from all native MN groups. Most variation is within (98.8%), rather than among (1.2%), populations, suggesting little divergence and a high level of shared genetic markers. Across the state, Minnesota rivers had 2-32 genetic variants present, some of which were shared among rivers. Thus, the majority of Minnesota reed canarygrass, while invasive, is native in origin and not exotic (European). Thus, based on this study, all of MN reed canarygrass is native; Tribal and State managers may choose to preserve this species.

Project Results Use and Dissemination
Summary of Dissemination Activities.

How has the information from this project been used and/or disseminated?

Dissemination of native vs. exotic status of all *Phalaris* results from Activity 1 has been reported on the Department of Horticultural Science website (http://horticulture.umn.edu), that of the PIs (http://horticulture.umn.edu/directory/faculty/neil-oanderson), as well as in all PIs/co-PIs Experts at umn.edu links (https://experts.umn.edu/). As many as 11 abstracts were published in national and international meetings, along with corollary public posters sessions or seminar talks to varied audiences of academics, land managers, students, and/or the public-at-large. We have kept State and Tribal Land Managers informed on the native status of MN reed canarygrass and have initiated discussions on approaches to managing this native species yet invasive. The investment by the state on control measures for this invasive grass warrant careful consideration of best management approaches to maintaining the native genetic diversity yet not encouraging the invasive spread of this grass into managed areas. Results were also communicated to the scientific community in peer-reviewed journal articles.