

Appendix 3-6: ESRA's Native Seed Mix for Revegetation

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MANITOBA EAST SIDE ROAD AUTHORITY RE-VEGETATION STRATEGY

1.1 Executive Summary

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1.1.1 Overview

As part of its overall construction program Manitoba East Side Road Authority (ESRA) is committed to the restoration, re-vegetation and re-naturalization of its construction areas with native plant species. ESRA achieves this through a tailor made, long term strategy of creating a robust native seed stock and developing re-vegetation specifications designed for the species used and the field conditions specific to the east side of Lake Winnipeg. The strategy is designed to be continually improved and to minimize long term costs. ESRA's re-vegetation strategy can be broken down into the following components:

- Consultation with re-vegetation specialists;
- Custom seed mixes/seeding rates/seeding specification;
- Other re-vegetation strategies;
- Targeted weed control programs;
- Field supervision;
- Specialized construction related specifications and practices;
- Native seed programs and varietal field trials; and
- Ongoing evaluation and improvement.

1.1.2 Consultation with Re-Vegetation Specialists

The scope of ESRA's re-vegetation needs necessitated the inclusion of consultants with the necessary training and experience to develop and oversee the re-vegetation program. Through an open tender process, ESRA entered into a 3 year contract with Scatliff + Miller + Murray (SMM) in March of 2012. During its 3 year contract SMM was instrumental in developing, refining, and overseeing every aspect of ESRA's re-vegetation strategy. Below is a brief synopsis of the program.

1.1.3 Custom Seed Mixes/Seeding Rates/Seeding Specifications

SMM needed to develop seed mixes that satisfied 6 main constraints:

1. The seed mixes need to consist of native grass species. The goal is to prevent the introduction/spread of invasive/non-native species.
2. The seed mixes need to consist of species that are either commercially available or can be obtained/produced through ESRA's capture/harvest or capture/sow programs.

3. The seed mixes need to consist of species that would thrive in planting locations/conditions needed for ESRA projects.
4. The seed mixes need to consist of an adequate variety of species to fill many different soil conditions within a planting area.
5. The seed mixes need to consist of species that are not cost prohibitive. A key cost control measure was the development of seeding rates and specification that achieve a successful planting with a very low seeding rate.
6. The seed mixes need to provide a significant level of erosion control quickly.

Originally, SMM developed four seed mixes: a high prairie mix for higher and drier areas, a right of way (standard) mix, a wet meadow mix for use in ditches, and a shoulder mix that was similar to the right of way mix but without tall species. Over time, the standard right of way mix replaced the use of shoulder mix as it was found the tall species in the standard right of way mix didn't grow to heights that impede sight lines, and conditions along the PR304 to Berens River All-Season Road project were found to be not ideal for the high prairie mix. The species lists for each of the two seed mixes in current use are as follows:

Ditch Mix Species: Canada wild rye, Virginia wild rye, Fowl blue grass, Slough grass, Western wheat grass, Slender wheat grass, Tufted hair grass, Tall manna, Burreed, Alpine rush.

ROW Species: Northern wheat grass, Western wheat grass, Slender wheat grass, Awned wheat grass, Nodding brome, Fowl blue grass, Canada wild rye, Hairy wild rye, Virginia wild rye.

In sensitive and erosion prone areas, oats were added to the seed mix to provide a quick germinating, non- competing cover crop.

1.1.4 Other Re-Vegetation Strategies

Due to the large variety of soil, moisture and terrain conditions, other re-vegetation strategies have been implemented. The two main types are the use of bio bags and the transplanting of propagules. Bio bags consist of small jute bags filled with soil and grass seed. They are used to stabilize steep slopes and to act as ditch checks. Propagules are marsh reeds/grasses and can be harvested locally and transplanted either by hand or by heavy equipment. Both bio bags and propagules transplant establish quickly and offer quick erosion controls.

1.1.5 Targeted Weed Control Programs

Part of the ESRA seeding specification is a targeted and well timed weed control program consisting of one pre-planting herbicide application and up to two post emergent applications with Lontrel 360, MCPA Arnine or Glyphosate via a boom sprayer. The goal of the program is to control the growth of

undesirable species during the planting year, allowing the seedlings to establish. Once established, the native species out compete non-native species.

1.1.6 Field Supervision

The use of different seed mixes, low application rates and detailed seeding specifications necessitates field supervision of seeding activity. Both SMM and ESRA provided staff to oversee and direct the work. Their duties included: determination of mix design, calibration of equipment, area measurements, approval of seed bed preparation, directing herbicide applications, ongoing quality assurance checks, and on site seed inventory control.

1.1.7 Specialized Construction Related Specifications and Practices

Overall the strategy is to take practical steps to maximize the likelihood of a successful planting, while controlling the cost of every step, including:

- Minimizing seed bed preparation work by overseeing the road/bridge contractors to ensure specifications related to final site conditions are achieved;
- Specifying the equipment to be used and the final seed placement criteria in order to maximise the final seed establishment rate;
- Creating performance specification for the seeding contractor;
- Scheduling the work within proven seeding window; and
- Implementing a well timed weed control program that targets undesirable species present in order to minimise the amounts and types of herbicides used.

1.1.8 Native Seed Programs & Varietal Field Trials

Many of the plant species selected are not available commercially or in the hardiness zone required. A native seed capture program was developed and implemented in the summer of 2012 through to 2014 by SMM along the Rice River Road, in the Bloodvein River area and in the north Interlake region. The seed collected was allocated to propagation programs to increase ESRA's native seed inventory, direct addition to current seed mixes, northern field trials at the Northeast Agriculture Research Foundation Research Farm in Melfort Saskatchewan.

Desirable species that would likely be good candidates for inclusion in the seed mixes were identified by SMM. They located promising harvest sites through field surveys, then organised capture operations. The capture program within ESRA's planning area was supervised by SMM and carried out by local community members from Bloodvein, Berens River and Hollow Water. Samples from many species collected were sent to the Melfort research farm for a 3 year field trial to determine long term viability of commercially increasing specific species. Depending on the species and quantity collected, the remainder of captured seed was either mixed into current seed mixes or sent out to commercial growers to increase ESRA's seed bank.

1.1.9 Ongoing Evaluation and Improvement

SMM and ESRA provided ongoing evaluation of the re-vegetation process in order to continually improve the process to better fit ESRA's requirements. This included refinements to ESRA's construction and seeding specifications. SMM also provided follow up inspections and reporting on both the success of the planting and of the planting process. Areas that required remedial work were identified and a course of action would be provided. Construction issues and successes were discussed in order to improve the process moving forward.