AGGP-Agroforestry

No. SASK-3

MAPPING AND QUANTIFICATION OF SHELTERBELTS IN SASKATCHEWAN

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The Government of Canada's farm assistance programs have affected >80% of Canada's agricultural land base. Since 1901, the Prairie Shelterbelt Program (PSP) was important in the Prairie Provinces providing a means to protect farmyard infrastructure and reduce soil erosion through tree planting (Figure 1). Shelterbelts also serve as wildlife habitat, improve biodiversity and water quality, and capture and store atmospheric carbon as a direct result of the growth of shelterbelt trees, thus, presenting an additional opportunity for climate change mitigation.

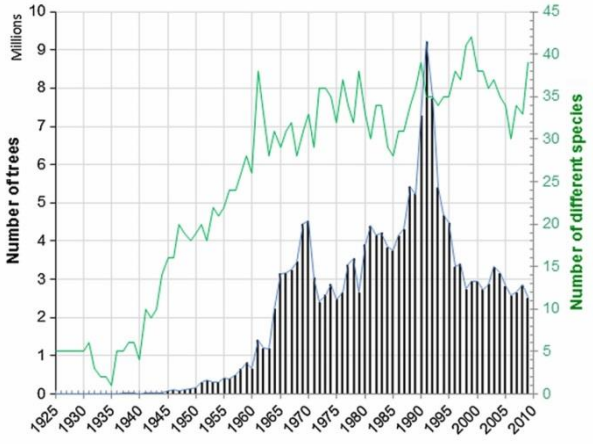

Figure 1. Historical records of the number of shelterbelt trees and species ordered through the PSP in Indian Head, Saskatchewan.

THE 3-W'S OF SHELTERBELT MAPPING: WHERE, WHEN, AND WHAT SPECIES

Where: A unique land clustering approach spanning five soil zones was designed and utilized.

When: Novel, decadal time-lapse series of shelterbelt distribution maps were created across millions of hectares of agricultural land in order to identify important historical factors that influenced planting of shelterbelts in Saskatchewan (Figure 2).

What species: The distributions of six common shelterbelt species were mapped: caragana (*Caragana arborescens* Lam.), green ash (*Fraxinus pennsylvanica* Marsh), Manitoba maple (*Acer negundo* L.), Scots pine (*Pinus sylvestris* L.), white spruce (*Picea glauca* Monch Voss.), and hybrid poplar (*Populus spp.*).

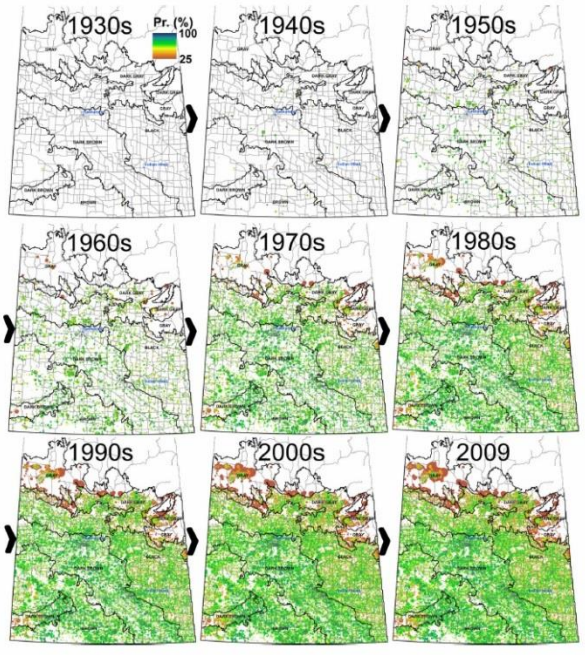

Figure 2. Decadal time-lapse (1925-2009) series of probability (%) maps of expected shelterbelt establishment in Saskatchewan.

Until the 1960's, shelterbelt establishment was uniform, situated immediately next to major roadways, and most likely due to Saskatchewan's expansive road infrastructure. In the 1970s and 1980s, some intersections we treed, and in the 1990s and 2000s shelterbelts were expanded to in-field positions.

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HIGH PRIORITY AREAS FOR FUTURE SHELTERBELT RESEARCH

- The overall work focus is to fill an existing gap in mapping shelterbelt distribution across very large Prairie landscapes.
- A decreasing trend of shelterbelt tree orders from 1990 to 2009 is observed, largely due to advances in direct-seeding technology leading landowners to believe that soil erosion could be prevented without the use of shelterbelts.
- Correlations between number of trees ordered through the PSP and observed shelterbelt length (from high-resolution aerial photos) were used for shelterbelt probability mapping.
- Mapping accuracy of planted shelterbelts was 48 to 86%.
- Total shelterbelt length (of any species) ranged from 322 to 45,231 km for Dark Brown > Brown > Black > Dark Gray > Gray soil zones (in descending order).
- High priority areas for future shelterbelt research in Saskatchewan were also identified and mapped (Figure 3).

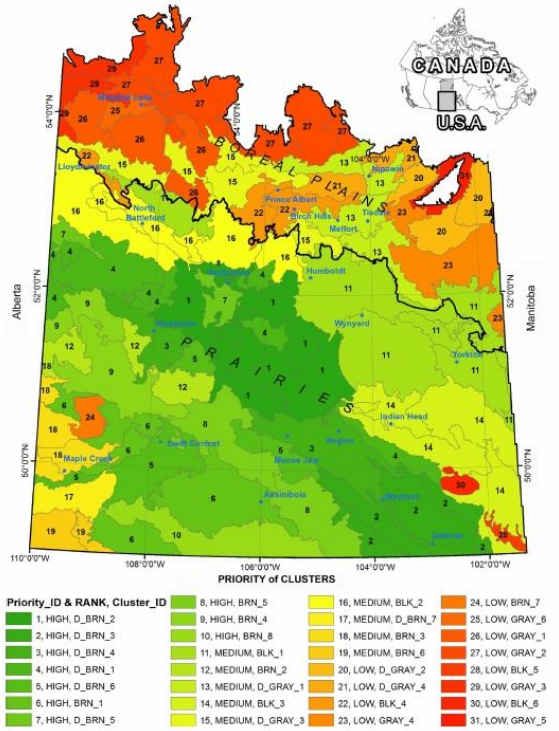

Figure 3. Location of high, medium, and low research priority agricultural areas in Saskatchewan ranked in descending order of expected shelterbelt length.

FURTHER READING

Amichev, B.Y., et al. 2015. **Mapping and quantification of planted tree and shrub shelterbelts in Saskatchewan, Canada.** *Agroforestry Systems* 89(1):49-65

AGGP Fact Sheet(s): **SASK-1, SASK-4 through SASK-10**

CONTACT FOR MORE INFORMATION: SASKAGROFORESTRY.CA/

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