



AGGP-Agroforestry

No. SASK-30

HISTORICAL AND FUTURE GROWTH OF SCOTS PINE SHELTERBELTS IN SASKATCHEWAN

by COLIN P. LAROQUE

We wanted to better understand how shelterbelt trees will grow in the future based on how they have already grown on the landscapes in the past. To do so, we sampled 125 shelterbelt locations across Saskatchewan covering the six dominant shelterbelt tree species, and covering a spatial network across all of southern Saskatchewan.

ALL TREE SPECIES

THE SCOTS PINE SPECIES

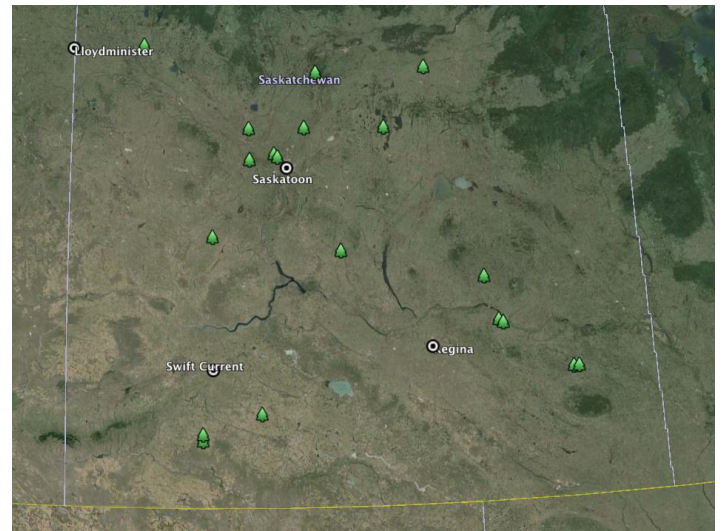
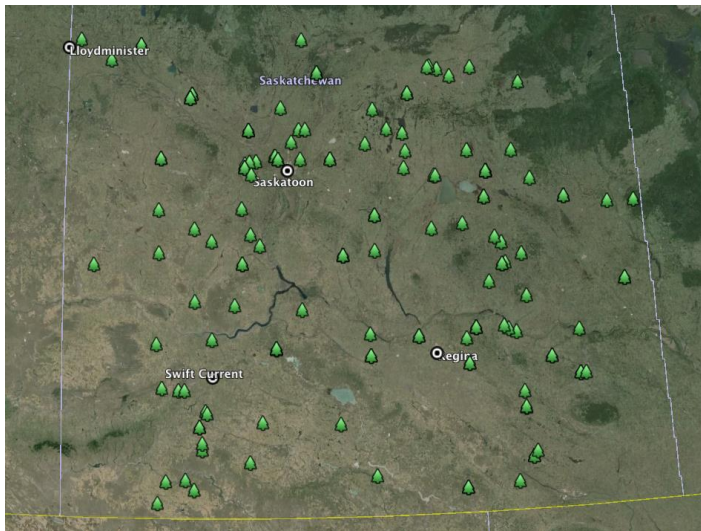


Figure 1: Locations where all six different tree species were sampled in southern Saskatchewan.

Figure 2: Locations where all of the Scots pine species were sampled in southern Saskatchewan.

CLIMATOLOGICAL LIMITING FACTORS

The most common climatological limiting factors that drive the radial growth of white spruce trees in order of importance across the southern part of the province are:

- Current year June Precipitation;
- Current May Precipitation and;
- Current and Past year September precipitation.

From these data we get a better understand that Scots Pine is dominated by moisture signals. When it gets good moisture at key times in its growth cycle, it can do well. Most important is for it to get good moisture inputs when its rings are actively being formed in June. Related to this, if it gets good moisture inputs in May, it will have a good overall growth year. Lastly, it needs moisture to prepare for dormancy in the fall. If it gets moisture then, it can overwinter well and produce good growth the following year. if it does not get good moisture inputs during one or all three of these key times, it will produce a small or very small growth ring in that given year.



Agriculture and Agri-Food Canada

Agriculture et Agroalimentaire Canada



Centre for Northern Agroforestry and Afforestation





AGGP-Agroforestry

AN EXAMPLE OF SCOTS PINE MODELLED FUTURE GROWTH

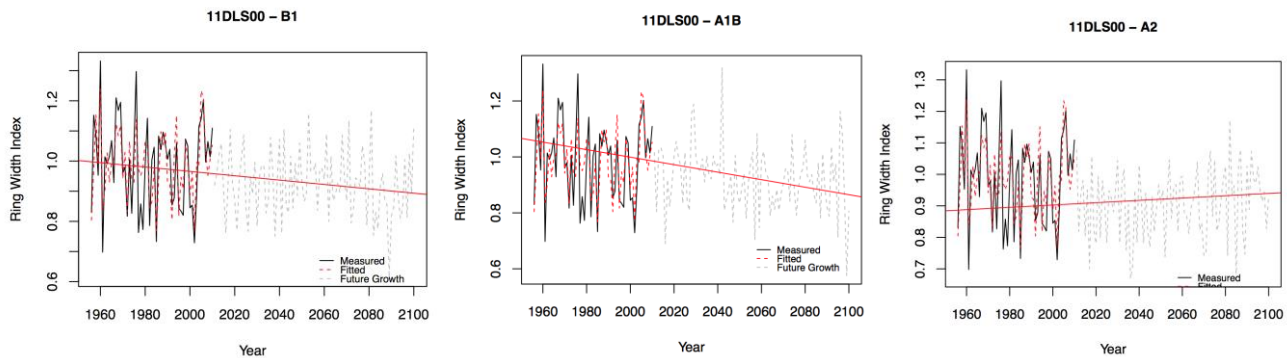


Figure 3a-c: An example of past (black lines) and modelled future growth (dashed lines) from a Scots pine site near Shellbrook Saskatchewan. The three future scenarios illustrate low (B1), medium (A1B) and high (A2) simulated CO₂ emission scenarios. The red line indicates the overall long-term trajectory of radial growth for Scots pine.

TRAJECTORIES ACROSS PROVINCE

Of the 12 Scots pine locations modelled, most of the scenarios illustrated a neutral or downward trajectory into the future in all areas of southern Saskatchewan. The projected hotter and similar moisture conditions in the future for all of southern Saskatchewan are not ideal conditions to Scots pine. The higher moisture stress in most locations of the province illustrates a general decrease for Scots pine in almost all cases.

INDIVIDUAL MODELLING LOCATIONS

For more specific information on future forecasted growth for each species in specific locations in Saskatchewan, please visit our radial growth model at:

http://madlabsk.ca/model2/externaldata_3.html

OTHER FACTSHEETS IN THE SERIES

Specific analysis on most of the locations in the study can be found on our web site at

<http://www.madlabsk.ca/> and <http://www.madlabsk.ca/reports.html>

CONTACT FOR MORE INFORMATION: SASKAGROFORESTRY.CA/

ACKNOWLEDGEMENTS & COPYRIGHT

This research was conducted by a team of collaborators from the University of Saskatchewan, University of Regina, and Agriculture and Agri-Food Canada (AAFC), under the leadership of Dr. Ken Van Rees of the University of Saskatchewan. Funding was provided by Agriculture and Agri-Food Canada (AAFC)'s Agricultural Greenhouse Gases Program (AGGP). We thank the AAFC Agroforestry Development Centre at Indian Head, SK for providing the shelterbelt tree data. This fact sheet was completed in May 2016.



Agriculture and
Agri-Food Canada

Agriculture et
Agroalimentaire Canada

UNIVERSITY OF
SASKATCHEWAN

Centre for Northern Agroforestry and Afforestation

