## Offsite Species Trials: Spatial distribution and Assessment

## Objective

Identify and document where operational and research planting trials of tree species outside their “natural” ranges in British Columbia and present them in R Shiny

## Methods

Preliminary data sources for trials include:

1. Silviculture information from cutblock openings from the Ministry’s RESULTS database;
2. Offsite trial information compiled by Socha (2019); and
3. Ad hoc information collected by District staff, licensees, woodlot owners, universities, etc.

Other data layers:

Database version of the Chief Forester’s Reference Guide for Forest Development Stocking Standards (CFRG) for identifying off-site species.

For this project, a tree’s natural range will be defined by the. In other words, for a given species, BGC units and site series where it is not listed as preferred or acceptable will be considered ‘offsite’.

## Proposed workflow for RESULTS data

1. Download planting data from RESULTS;
   1. Can be done in R using bcdata() package.
   2. If external to government, a BCeID will be required (or Hardy can provide entire dataset HUGE).
2. Perform a spatial join with latest version of BEC map (BGCv11);
3. Identify where tree species are planted outside their BGC range:
   1. Tree species not listed in any site series for the BGC of trial location.
   2. Where site series is recorded in RESULTS, tree species is offsite in the site series recorded.
4. Extract the resultant dataset and join with additional RESULTS data tables, including silviculture cover dataset;
5. Consider setting up as a PostGrs database
6. Import and harmonize other trial datasets (Mocha 2019) with RESULTS dataset to form master trial dataset.
7. Summary of offsite trials by species by BGC
8. Produce spatial output showing trial sites and species using tmap package and export to geopackage for use in GIS software.
9. Produce R Shiny map version of spatial output with data table associated.
10. Dashboard to filter the map locations based on the data table.
11. Ability to add new trial locations via R Shiny map.

TABULAR **–** dataset with the following information:

|  |  |
| --- | --- |
| **Variable** | **Comment** |
| Source | Where trial information has been acquired (E.g. RESULTS) |
| Proponent | Agency/company that established trial |
| Opening ID | Used to link data to RESULTS opening spatial information |
| Treatment Unit ID | Used to link data to RESULTS opening TU information |
| Standards ID |  |
| Georeferencing | Decimal Degrees and Elevation |
| Assessed | Has the trial be reassessed Y/N |
| Trial Success | Categorical Ranks – derived from other process. |
| Tree species | Using species codes |
| Number planted |  |
| Area planted (ha) |  |
| Date planted (year) | To calculate tree age |
| Seedlot | May not be present in older RESULTS data, however, important to determine climatic distance between provenance and site. |
| Recorded BGC |  |
| Recorded Site Series | May not be present; these data have proven unreliable as well. |
| BGC unit | Based on overlay with most recent BEC version |
| Inventory labels | For all regen/free growing surveys. If species has survived and achieved co-dom status, it may be recorded in the inventory label. This can provide information on the species survival and growth. |
| Silviculture labels | For all regen/free growing surveys. In most cases, the species will not be recorded in this label. In cases where it is present, however, it might be worth following up with District staff or licensee to see why this species was considered acceptable. |

Some thoughts on stage two use of the data.

For each site, use ClimateWNA to extract climate normals (same variables/reference period as CCISS and CBST); For each seedlot, extract geographic coordinates and BGC unit. Use geographic coordinates and ClimateWNA to compute *provenance* climate normal. Calculate the species and provenance distance from nearest suitability to characterize how far outside the historic range the trial is.

|  |  |
| --- | --- |
| Site climate normal | Use same reference period and climate variables as CCISS and CBST. |
| Provenance climate normal | Only possible where seedlot information is provided, and provenance information contained in SPAR (or other). Use same reference period and climate variables as CCISS and CBST. |
| Provenance BGC unit | Only possible where seedlot information is provided, and provenance information contained in SPAR (or other). Use same reference period and climate variables as CCISS and CBST. |