

Evaluating the Benefits of Short-term Grassland Set-asides on Delta Farmland

T. Porter, P. Hanuszak, D. Bondar, Dr. Maja Krzic and Dr. Sean Smukler

The DF&WT has offered the Grassland Set-Aside (GLSA) Stewardship Program since 1994. This program incentivizes farmers to seed a grass-legume mixture on agricultural land and leave it fallow for 1-4 years to improve soil productivity and provide wildlife habitat. Farmers commonly enter fields into the GLSA program to restore degraded land, transition fields into organic production or diversify options for crop rotations.

Grassland Set-aside Stewardship Program

- 500-600 acres (200-250 ha) enrolled annually
- Over 13,000 (5,200 ha) acres have been enrolled in the program since its establishment in 1994.
- \$3.65 million dollars have been distributed through cost-share payments to local farmers in the Cities of Delta and Richmond since the program's establishment.

General Benefits of GLSA to Agriculture

- Improve soil structure¹
- Reduce soil compaction¹
- Increase soil organic matter
- Improve nutrient cycling and crop yields^{2,3}
- Provide habitat for beneficial insects, and birds of prey that mitigate crop pests

General Benefits of GLSA to the Environment

- Provide wildlife habitat
- Increase biodiversity
- Mitigate climate change



Clockwise: Grassland Set-aside; Khalil Walji and Jason Lussier (UBC M.Sc. Graduates), and Christine Terpsma (DF&WT Past Program Coordinator); Some of the UBC students involved in GLSA research project

Demonstrating Long-term Improvements in Soil Productivity on Delta Farmland, 2015-2020 Research Project

The DF&WT in collaboration with researchers from the Faculty of Land and Food Systems at the University of British Columbia assessed the effects of GLSA on various soil quality parameters and yield of crops grown following GLSA incorporation. The findings of this project will help farmers in the Fraser River delta to more effectively use GLSAs as a management tool.

The objectives of the project were to:

1. Evaluate the effects of 1-4 year GLSA on soil quality; and
2. Evaluate the effects of 2-4 year GLSA on soil nutrient availability and crop yields following set-aside

Overview of GLSA Studies

- Soil Quality Studies:
 - ▶ Compared soil quality on adjacent fields with and without GLSA on 5-8 sites over 4 years.
 - ▶ Soils properties evaluated: exchangeable sodium, bulk density, total and active (i.e. easily decomposable) carbon, total nitrogen, aeration porosity, and aggregate stability.

- Soil Nutrient Dynamics and Crop Yield Studies:
 - ▶ Compared 2-, 3-, and 4-year GLSAs with adjacent annually cropped fields on 13 sites
 - ▶ Soils were sampled to a depth of 30 cm
 - ▶ Soils properties evaluated: cation exchange capacity, pH, electrical conductivity (i.e., salinity), plant available nitrogen, texture, and bulk density.
 - ▶ Crops sampled for yield and quality at the end of each season.

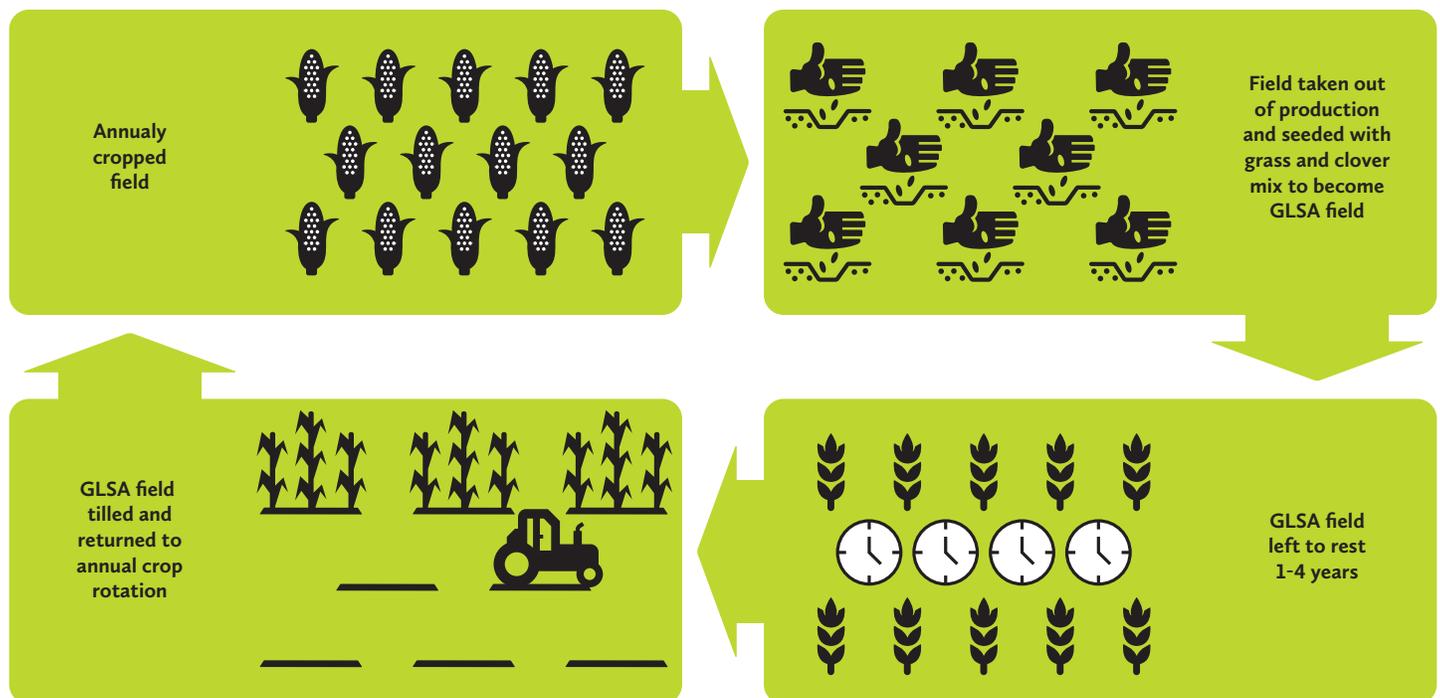
Training Opportunities Provided by This Project

- Six graduate and over 30 undergraduate students participated in the study

Grassland Set-aside Research Deliverables

- One PhD and five MSc projects
- Four undergraduate theses projects
- Scientific papers and conference presentations
- Outreach events
- Workshops

Phases of the grassland set-asides



References:

¹ Lussier, J.M., M. Krzic, S.M. Smukler, A.A. Bomke, and D. Bondar. 2019. Short-term effects of grassland set-asides on soil properties in the Fraser River Delta of British Columbia. *Canadian Journal of Soil Science* 99:136-145 <https://doi.org/10.1139/cjss-2018-0097>

² Fausak, L. K. 2019. The effects of 2- and 3-year grassland set-asides on plant available nitrogen and greenhouse gas emissions in Delta, British Columbia (T). University of British Columbia. <http://dx.doi.org/10.14288/1.0380750>

³ Walji, K. 2017. Nitrogen dynamics following incorporation of 3-year old grassland set-asides in Delta, British Columbia (T). University of British Columbia. <http://dx.doi.org/10.14288/1.0380750>