

**PROJECT TITLE: MAC CAMPUS ORCHARD**

Please answer the following questions and return the completed form to the [SPF Staff](#) via e-mail.

Final Report prepared by Mike Bleho and David Wees

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Actual Project Start Date 2018-05-01

Actual Project End Date 2019-05-01

**Questions**

1. Please summarize the project and its key accomplishments to date in 1-2 sentences.  
(400 characters maximum)

We prepared the site (15,000 m<sup>2</sup> or 1.5 Ha of land), grafted 2,800 trees and planted ~2350 apple trees and established the support system (posts, stakes, mulch, irrigation lines...)

2. Your team listed the following goal in your project application:

Environmentally-friendly production of apples at the Horticultural Center with reduced pesticide use and the planting of a Upick orchard that will be open to the McGill community

Did your team achieve your project's goal? In your answer, please describe the impact your project had on McGill's structures, processes, and/or systems. Also, please specify how this positively transformed people's behaviors/perspectives/habits on McGill campus(es).

(Unlimited characters, suggested minimum ½ page or approximately 250 words)

We did indeed succeed in establishing the new, environmentally-friendly orchard. And we were also successful in reducing the environmental impact of pesticides, in part by better timing and in part by using low-impact fungicides. Furthermore, 20% of the new apple trees planted in 2018 are naturally resistant to apple scab, the most common disease of apples in the World.

We are offering apple u-pick activities in the fall to McGill student and staff groups even though the new trees won't be ready for the level of apple production needed for u-pick for another 5 years. It's such a great community building activity that we will offer it anyway using our existing apple trees until the newly planted ones kick in.

3. Please describe the key successes and challenges of your project. (Minimum of two examples for each)  
(Unlimited characters, suggested minimum ½ page or approximately 250 words)

We succeeded in carrying out most of the planned activities: preparation (plowing, measuring and marking) of the site, grafting and preparation of apple trees, planting of apple trees, installation of the posts and wires for tree support, installation of the mulches (for weed control) and drip irrigation system, baseline measurements of the trees. Students were involved in every step and learned much as a result. However weather conditions, both in 2018 and 2019, greatly complicated our work: the summer of 2018 was very hot which required frequent watering of the young trees before they were planted; the poor weather in the late Fall of 2018 and Spring of 2019 delayed much field work. Furthermore, deer damaged some of the trees during the winter.

The soils at the Hort. Center sit on top of a layer of sedimentary rock that is around 3 ft below the surface and since our posts had to be 4 ft deep this required the rental of a specialised auger to instal our support posts.

Juggling weather and student availability is also a challenge that was difficult in the fall 2018 and slowed down the completion of the project.

4. What key points of advice or *lessons learned* would you give to other SPF teams either regarding your experience managing your project or the project itself?  
(Unlimited characters, suggested minimum ½ page or approximately 250 words)

When you are dealing with outdoor projects, the weather can always affect even the best-laid plans. So always have a back-up date for outdoors activities.

Creating a detailed time-line is extremely useful as it is easy to underestimate the time it will take to accomplish various tasks

5. What recommendations do you have for the future of this project to be continued and are there any opportunities for complementary projects? Who will take responsibility for the project's future and how can interested persons be in touch? The SPF team will also be in touch with this contact for updates on the project's progress in coming years, if ongoing.

*(Unlimited characters, suggested minimum 1 paragraph)*

Since this is the beginning of a long-term commitment, the new orchard will need to be monitored for several years to come. This should include replacement of any trees that die, routine maintenance (pruning, etc.), scouting for pests and diseases and using low environmental impact integrated pest management (IPM) methods when needed. As mentioned elsewhere, students measured the height and trunk diameter of the apple trees after planting. This will need to be continued at least once a year. Furthermore, in another 2-3 years, the trees will start to bear fruit. Starting at that point, yield and quality of the fruit (from 5 different apple varieties) will also need to be evaluated. Mike Bleho and David Wees will continue to be involved and organise the work that needs to be done in the project. Prof. Valérie Gravel (Dept. of Plant Science) is also interested in using the new orchard for her courses and research, particularly as related to environmentally-friendly methods of disease control in fruit crops. The management of the Mac Farm will undertake the general orchard management for the duration of the life of the trees.

6. Would you or your project team member(s) be willing to serve as a mentor to SPF project teams? Please choose one. If yes, SPF Staff will contact you with more information.

*(800 characters maximum)*

Yes  No

David Wees could mentor SPF projects related to agriculture or horticulture.

7. In your application, you listed the following sources of funding:

Macdonald Campus Farm, \$41,875.00; FMT program (teaching supplies), \$1,350.00.

Please confirm if you received this funding in the space below. In your response, please list the actual amount (in dollars) that you received. Note: If you received funding from a McGill Department or Unit, please attach a letter from its Financial/Budget Officer confirming the actual amount of support.

*(1,800 characters maximum)*

These funds were all received and used towards the work done on the project. In kind payments for tractor and field use and salaries for administrative and field work were all paid up. Materials such as rootstocks are all paid and confirmation of such is available if needed (contact Nancy Lavigne at Mac Farm).

8. Did you purchase equipment or make an installation on campus?  Yes  No  
If yes, please briefly describe how these items will be maintained and used in the future.

*(1,800 characters maximum)*

New pneumatic orchard sprayer: this will have to be stored and serviced by qualified technical staff. The sprayer will be used to spray low impact fungicides and insecticides when needed for the duration of the life of the apple trees.  
Support system for apple trees: the posts and wires should last for at least 20-25 years which is the expected life-span

of the orchard. The tension in the wires will have to be readjusted perhaps once a year during the next few years. Both students and staff will participate. All small tools will be used in general orchard operations.

9. The following Key Success Indicators were indicated in your project application and selected for tracking. Please indicate the actual results that you have achieved in the “Actual” column.

Selected Key Success Indicators	Target	Actual
Orchard established by November 2018	1	<b>~90% of projected trees were planted</b>
Course projects related to the orchard	2	<b>1</b>
Reduction in pesticide/fungicide use	20%	<b>60 %</b>

If there is a significant difference in the target numbers and the actual numbers achieved, please explain. If you have any additional information to share about these success indicators, please also include it below.

*(1,800 characters maximum)*

Approximately 125 trees had to be replaced in May 2019 because of winter mortality or deer damage. Originally, students from 2 courses (FMT4-033 and PLNT 312) were to be involved. In fact, only the students in FMT4-033 participated. Those in PLNT 312 could not because of scheduling issues. We achieved a much greater reduction in conventional pesticide use in part by being able to spray more effectively with the new orchard sprayer, by following apple scab disease progression with sophisticated software, scouting and more intensive utilisation of biological control methods.

10. Please report on your progress with the standard SPF Key Success Indicators in the “Actual” column.

Standard SPF Key Success Indicators	Actual
# of volunteers directly or indirectly engaged in the project	0
# of people (student, staff, or other) trained in the context of the project	Students: 10 in FMT4-033; Summer students: 6
\$ raised for project activities subsequent to SPF funding	0
# of tons of GHG emissions reduced by your project	~17 tonnes of CO2 sequestered over the next 5 years
# of partnerships or collaborations developed between the project team and other McGill administrative units, student groups, community groups, other universities, and/or other groups/organizations.	u-pick by 8 McGill student groups (2018), visits by University chefs (UK)

Regarding the last Key Success Indicator, please list the groups and/or organizations that you counted.  
(Unlimited characters; point form acceptable.)

Macdonald Campus Farm (<https://www.mcgill.ca/macdonaldfarm/>)  
Farm Management & Technology Program (<https://www.mcgill.ca/fmt/>)  
Maut, Aesus, Ceus, Res life, Mcgill students for Santropol, Nus, Puls, Qm (2019 booked), late spring 2019 visit by University chefs across the UK to look at our food systems including the new orchard set-up.

If you have any additional information to share about the Standard SPF Key Success Indicators, please include it below.  
(1,800 characters maximum)

We used iTree Design (<https://design.itreetools.org/>) to estimate environmental benefits of the trees. In addition to our projection of 17 tonnes of CO<sub>2</sub> sequestered (see above) over the next 5 years (2019-2023), we also estimate the trees will intercept ~475,000 litres of storm water from 2019-2023. As the trees become larger, CO<sub>2</sub> sequestration and storm water interception will increase from 850 kg CO<sub>2</sub>/year to 8200 kg CO<sub>2</sub>/year and from 48,000 litres/year to 500,000 litres/year, respectively. And of course the trees will continue to sequester CO<sub>2</sub> and intercept storm water for the next 20-25 years.  
Two students measured the size (trunk diameters and tree height) of every tree in November. These data will serve as a base-line for future evaluations and educational activities.

11. Please indicate the McGill stakeholder groups that were involved with your project as a team member or collaborator/partner. Choose all that apply.

Undergraduate  Postgraduate  Administrative Staff  Academic Staff  Alumni

12. Please rate your project team's overall satisfaction with the support provided by the SPF Staff. Choose only one response.

Very Dissatisfied  Dissatisfied  Neither Satisfied Nor Dissatisfied  Satisfied  Very Satisfied

13. Please provide any feedback or recommendations regarding your team's experience with the SPF  
(Unlimited characters, suggested minimum 1 paragraph)

The template of the "time-line" form supplied by the SPF staff was very useful. In fact, for any large project such as this one, a detailed time-line is essential.  
Some training in filming and editing video could be useful. Although we took a lot of video clips of various activities, not all will be of good enough quality to use for promoting this project.  
The SPF team was always available to support us with any budgetary / expense / administrative queries

14. If there is additional information you would like to share about your project, please use the field below.  
(Unlimited characters)

Mike Bleho and David Wees were interviewed on the project. See video clip:  
[https://m.youtube.com/watch?time\\_continue=2&v=WC3NVM9ctXg](https://m.youtube.com/watch?time_continue=2&v=WC3NVM9ctXg)  
Mike Bleho was interviewed by: Marie-Claude Ouellette. 1 mai 2019. L'approche écologique du Centre Horticole. La Terre de Chez-Nous, p. A19. <https://www.pressreader.com/canada/la-terre-de-chez-nous/20190501>  
Part of sustainability involves education. Indeed, the 10 students in Vegetable & Fruit Crops (FMT4-033) who participated in the actual planting of the apple trees gained valuable experience in the initial steps of setting up a modern, intensively-managed and environmentally friendly orchard. Although this is a first step, their efforts will

have important repercussions on future students' learning for years to come.

15. Has involvement in this SPF project positively impacted your team in the area of professional growth? Please choose one. If you would like to elaborate, please use the field below.

*(800 characters maximum)*

Yes  No  Prefer Not to Share

All those involved developed team-work skills. But in particular, it was an excellent team-building exercise for four undergraduate students who worked closely on the project. These four didn't know each other well at the outset nor did all them have a lot of experience with orchards. But they learned to plan, to think, to problem-solve and to work together. Their combined efforts brought this project to fruition (if you pardon the pun!).

16. Has involvement in this SPF project positively impacted your team in the area of personal growth? Please choose one. If you would like to elaborate, please use the field below.

*(800 characters maximum)*

Yes  No  Prefer Not to Share

It was a particularly good confidence-builder for the the four undergraduate students (see above). Note that there is some overlap between effects on professional growth and personal growth.

17. Which of the following skills or attributes has your team improved through involvement in your SPF project? Choose all that apply.

- |   |  |  |
|---|--|--|
| <input checked="" type="checkbox"/> Budgeting | <input type="checkbox"/> Networking                    | <input checked="" type="checkbox"/> Systems Thinking |
| <input type="checkbox"/> Communications       | <input checked="" type="checkbox"/> Planning           | <input checked="" type="checkbox"/> Teamwork         |
| <input type="checkbox"/> Conflict Resolution  | <input checked="" type="checkbox"/> Problem Solving    | <input checked="" type="checkbox"/> Technology       |
| <input type="checkbox"/> Leadership           | <input checked="" type="checkbox"/> Project Management | <input checked="" type="checkbox"/> Time Management  |
| <input type="checkbox"/> Listening            | <input type="checkbox"/> Public Speaking               | <input type="checkbox"/> Writing                     |
| <input type="checkbox"/> Mentoring            | <input type="checkbox"/> Stakeholder Engagement        | <input type="checkbox"/> Other (Please specify in    |
| <input type="checkbox"/> Negotiating          | <input type="checkbox"/> Stakeholder Identification    | the field below)                                     |

Other:

18. Since starting your SPF project, has your team improved its knowledge of sustainability? Please choose one. If you would like to elaborate, please use the field below.

*(800 characters maximum)*

Yes  No  Prefer Not to Share

Learning how to use RIMPRO (<http://meteo.irda.qc.ca/meteoIRDA/Rimpro/PrevMaladie.htm>), an on-line application for prediction of pest and disease problems, successfully led to a decrease in fungicide application as well as a switch to low-impact fungicides. This was a risk as several things were changing at once (timing of fungicides, type of fungicides, technology for fungicide application). Yet these changes were necessary in order to decrease environmental impact. Furthermore, the project much more intensive scouting (monitoring) of insect pests than in

the past. All of the above has led us to better understand the overall "working" of the orchard ecosystem which has led to more sustainable management practices.

19. (Optional) If applicable, please list the total number of team members voluntarily self-identifying as members of marginalized communities:

Please identify the represented communities below. (e.g. women, Indigenous people, people of colour, LGTBTTQI, student parents, members of ethnic minorities, immigrants, people with disabilities)  
(1,800 characters maximum)

Women: Sarah-Ann Persechino (student), Valérie Gravel (professor)  
Indigenous women: Kahshennoktha Deer (student, from Kahnawà:ke)  
Ethnic minorities: Mohammad Gofran (staff)

### THANK YOU FOR COMPLETING YOUR FINAL REPORT!

Please e-mail your report to the [SPF Staff](#) attaching any additional information that you would like to share about your project (e.g. other reports, research, documents, photos, etc.). Please note that this Final Report will be shared publicly on your SPF project's webpage.