Project Update: November 2021

Shade tunnel and experimental garden repairs and preparation

Over the late winter months, I was able to successfully repair a shade tunnel housed in the grounds of my research facility (CONICET-CADIC). The shade tunnel had fallen into disrepair over recent years, and it required several weeks of work to return it to functional status. Work to repair the shade tunnel included the removal of rotten wood, dead plants, and weeds and repairing the shade tunnel structure, including replacing the structure's door and air vents. The shade tunnel is now fully functional and will house seedlings I plan to plant in burned and unburned soils, allowing us to control for confounding variables such as wind and aridity to see the impact burnt soils have on seedlings. The improved state of the structure will allow other researchers at my institution to once again use it as well.

I also spent time preparing a plot in our experimental garden to house transplanted seedlings in burned and unburned soil. This work involved weeding, replacing plastic tarps that control herbaceous competition, fixing the fence surrounding the garden, and placing a wind break around the garden. With the experimental garden once again in an acceptable state, I will be able to use it to study the impact of burned soils relative to climate and wind exposure on seedling growth and survival. Rufford funds helped to purchase materials and tools for these essential repairs.

Initial planting workshop with the provincial forestry department and local industry groups

I had the chance to participate in a post-fire restoration planting day in an area of forest that burned in 2012. Tree regeneration is sparse across the 2,500 ha of severely burned forest that provides degraded habitat for native fauna. There were no signs of native birds or ungulates (guanaco) in the affected area as there is virtually no hiding cover or nesting habitat left. Through this event organised by the provincial forestry department, I was able to experience first-hand the current reforestation techniques being employed by local forestry professionals and NGOs. The working group was honest in admitting that more science-based planting techniques and a more systematic determination of the best microsites in which to plant seeds and seedlings could improve their planting success. I hope to provide guidance to these groups as I return results from my doctoral thesis and to organise a planting event next spring as part of my Rufford project.

Soil and plant collection

With a crew of volunteers from my local research institute, we took advantage of mild weather and the spring thaw to collect soil for from burned and unburned areas. Burned soils came from areas impacted by several different fires, the oldest dating back to the early 1950s and the most recent from 2019. We will transplant seedlings into these soils to determine how they respond to burned and unburned conditions. We also carefully excavated approximately 500 ñire (*Nothofagus antarctica*) and lenga (*Nothofagus pumilio*) seedlings approximately 2-3 years in age from unburned areas adjacent to these burned sites for this experiment. Rufford funds were instrumental in orchestrating the field work portion of this part of my project, helping to fund food and

fuel for field work for myself and my team members.

Seedling transplantation

The exciting day arrived when I was able to transplant over 400 seedlings collected from the forest to planting pots at my research station. I will monitor the growth, health, and

survival of these seedlings over time to determine the relative impact burned soils have on them. Rufford funds helped to purchase the tools and materials necessary to successfully transplant these seedlings from the field to the research station for study.

Field verification of study stratification

I spent much of the winter months while field work was not possible stratifying my study sites into different categories: burned and unburned, and further into burned areas with

and without regeneration. Based on these designations, I located potential field sites. However, imagery with the resolution necessary to determine whether regeneration is present after a fire in a given area with a high degree of certainty is not available for Tierra del Fuego. Fire borders can also be difficult to identify through satellite imagery. Therefore, it was necessary to go out to my field sites and confirm that my computer-generated sites were correctly located in their corresponding treatment (unburned, burned with regeneration, burned without regeneration). This work involved visiting my four field sites and walking to the different treatment zones I identified over the winter to visually confirm the condition at a given plot. Meals while in the field and fuel for this component of the project were paid for with Rufford funds.

Review of seedling germination

While verifying my field site stratification, I also had the chance to check whether seeds I had sown last autumn had germinated. I planted approximately 300 lenga seeds and 50 ñire seeds at two of my burned research sites to have a preliminary, exploratory view of germination rates for the two species in burned soils. I was pleased to find that several of the seeds had already germinated. It is early in the field season, and I will continue to monitor germination rates throughout the spring and summer. This information will help guide seedling plantings that will take place in the autumn of 2022 at a much larger scale. This exploratory information has given me an idea of how many seeds I must collect next autumn.

I remain very thankful to The Rufford Foundation; their support has made possible much of my project's field and experimental work. As we move into summer, I will begin taking field measurements at my research plots to describe the conditions that best favour the regeneration of native tree species in burned areas. I look forward to providing an update in March 2022 on my second quarter of work.