Project Update: March 2020

Achievements:

To analyse the growth patterns of *F. cupressoides* under different environmental conditions along the complete 2019-2020 growing season.

Partially achieved - Initially, we installed six dendrometers and two soil moisture sensors. During winter, rodents have damaged five dendrometers and one soil moisture sensor. It made it impossible to gather enough data to conduct the analyses.

Micro-core sampling every ~15 days to perform histological analysis of the developing xylem.

Not achieved - Visiting the site every week or every 15 days is expensive due to park access fees and boat tickets to reach the site. We have spent the remaining money of the budget to repair the station (fixing and replacing cables and dendrometers).

To write a first technical report for the national park authorities and to print factsheets and fliers to be distributed among tourists.

Partially achieved - We do not have enough data to conduct scientific analyses, but we will deliver a first report explaining the inconveniences that appeared and presenting the few first results we have.

Difficulties:

The main difficulty since my previous report was the damage done by rodents to cables and sensors (see attached file Picture_1). They destroyed cables and sensors, leaving just one dendrometer and one soil moisture sensor recording information. We discovered this situation at the beginning of the growing season (November 2019), but we could not return to the site with the new equipment to replace and repair the damaged ones until March 2020. We had to buy new cables, they are supposed to by "anti-rodent" and two new dendrometers. We also covered the sensors with a metallic mesh to try to protect them (see attached file Picture_2). We finally managed to leave five dendrometers working and one soil moisture sensor. We will send the three heavily damaged sensors to be repaired and we will repair the soil moisture sensor ourselves.

Outcomes:

For the reasons explained above, I do not have data about growth patterns of *Fitzroya cupressoides* yet. Therefore, I do not have results directly related to the species conservation. However, I consider the following outcomes the most important and encouraging:

- Setting up the station, this was the main objective in which all the others are based on.
- Discovering stumps and logging residues of *Fitroya cupressoides* harvesting. The stumps and logs provide material for future dendrochronology analysis about past *Fitzroya* forests use and management and the relationships between Alerce growth patterns and the environment. These results will be the input for new conservation studies of the species.
- Links for new collaboration opportunities. Thanks to the work initiated with this grant, I have contacted laboratories and specialists from Argentina and France with whom I will be able to start a collaborative work to expand the

knowledge about *Fitzroya* conservation and other topics related to my research interests

Future plans:
For this kind of study, it is recommended to have more than one season of data. For this reason, I will extend the project and continue with this work to finally reach the original objective of include at least two growing seasons in the analyses.

I also plan to continue with this work by elaborating new research projects based on the material we have discovered (stumps and logging residues) and the links with could build with other researchers (from Argentina and France) thanks to the opportunity given by The Rufford Foundation grant.

To finally manage to collect data for at least two years and perform the micro-core sampling every week to perform histological analysis of the developing xylem.

Sharing results:
I added a 'Project item' in my ResearchGate site (https://www.researchgate.net/profile/Lucas_Bianchi) and I will also add a description of the work done and of the first results in my personal website (http://lucasbianchi.mystrikingly.com).

Besides that, as stated in the proposal, I plan to share the data gathered and the results obtained with the national park authorities through technical reports every year. Finally, after at least two or three growing seasons of data gathered I plan to publish a scientific article with the results obtained with this project. In each case I will explicitly thank to The Rufford Foundation for the grant.

Timescale:
Since the previous report, the remaining money from The Rufford Foundation grant was used to pay the park access fee and boat tickets and for buying the equipment required to replace and repair the cables and sensors damaged.

Materials:
I have used The Rufford Foundation logo in my ResearchGate page, and I will mention The Rufford Foundation and add the logo to my personal website. I will also mention The Rufford Foundation in the technical reports, congress conferences, and in any other publication related to this project.

Team:
Ricardo Villalba and Ana Srur both collaborated in site selection and setting up the station. They will also collaborate in future data analysis and new projects in the study site regarding *Fitzroya* conservation.

Sebastian D. Rossi is helping me to design and conduct a study about how people relate to *Fitzroya* conservation. We are retrieving data from the Twitter and Flickr big databases to assess the awareness that people have about the conservation of the Alerce and which are the main interests of tourists and local people about this iconic species.

Besides, during the next summer season, when people visited the *Fitzroya* forests, we plan to conduct surveys with visitors and evaluate their opinion and knowledge about conservation of the Alerce.

Nora Audisio together with Sebastian D. Rossi will help me to design the factsheets and with the dissemination of the results to tourists and local communities.

Comments:
So far, I have conducted a very simple analysis of the data we obtained (see file attached Figures.pdf). In Figure 1 it can be observed that only one dendrometer worked fine the whole period (Dendrometer 2). Besides, data from the remaining dendrometers is consistent with data from Dendrometer 2 until certain moment (Figure 2) when we suppose the sensors were damaged by the rodents. This is encouraging since it means that if we finally manage to collect data from more dendrometers we will have very useful information. In Figure 3, it can be observed the relationships between tree-growth and soil moisture content.

After the previous report, from the original budget there was £451 left. Due to the unexpected events (almost all sensors damaged by rodents) I had to use this money, and supplement it with money from other projects, to repair/replace the equipment. I expect to obtain new funding during this year to perform the weekly micro-core sampling next growing season.

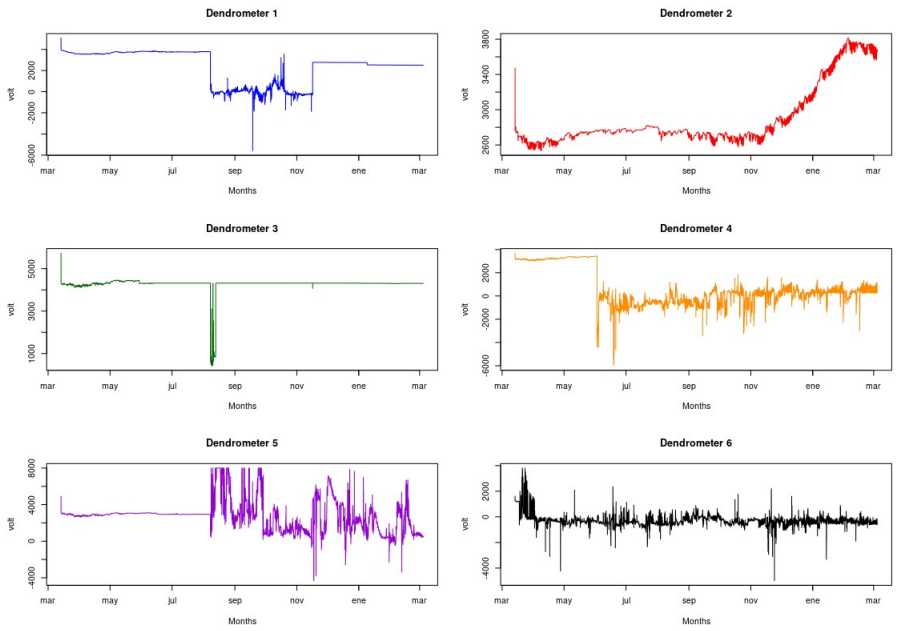
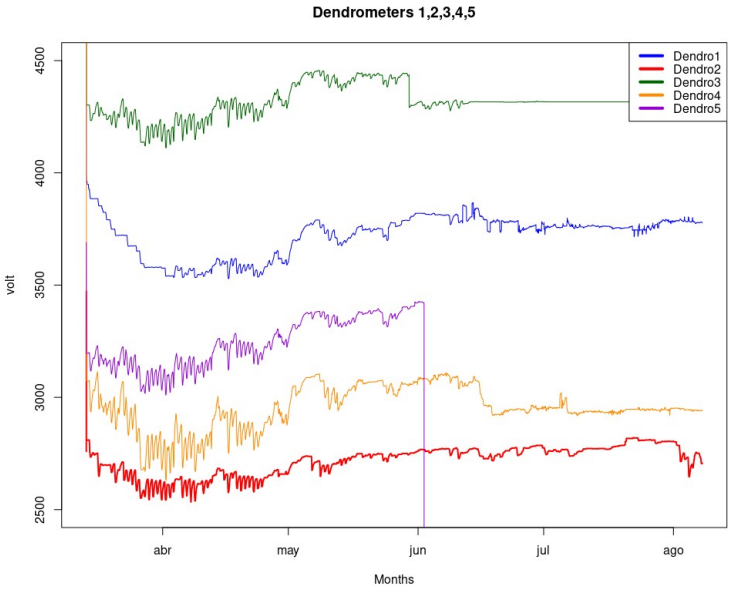


Figure 1

Dendrometers data gathered from 13 March 2019 to 4 March 2020. Only Dendrometer 2 collected data during the whole period. Dendrometers 1 and 4 worked fine until middle August 2019, and dendrometers 3 and 5 until middle June. Dendrometer 6 failed.

Figure 2

Period until 7 August 2019 when dendrometers 1 and 4 stop recording data due to the “rodent attack”. During this period, when most dendrometers were working, they show similar patterns.



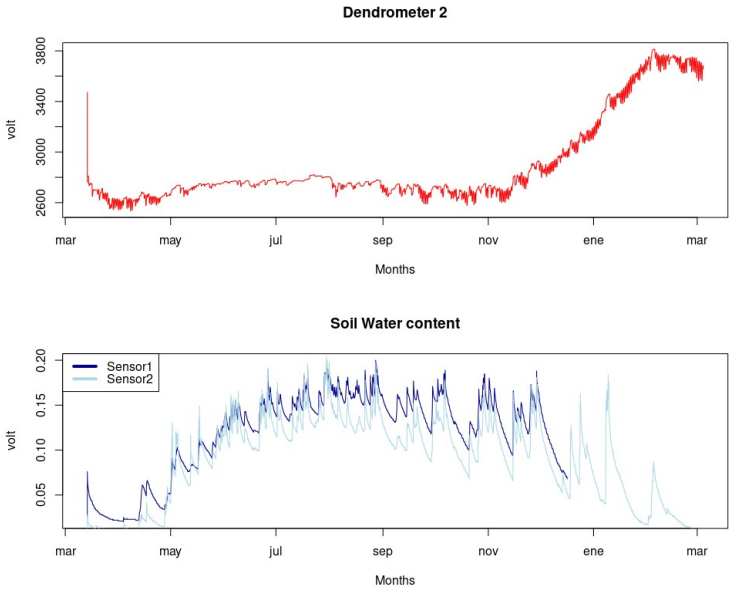


Figure 3

Dendrometer 2 data compared to soil water content. Sensor #1 of soil water content was also damaged by rodents. It recorded data until 16 December 2019. During summer a relation between soil moisture content and tree-growth can be observed.