

Facts speak louder than words: an environmentalist message against the invasion of pine trees through citizen participation in manual removal campaigns

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INTRODUCTION

The spread of invasive pines from productive plantations is one of the main environmental problems in Argentine northwestern Patagonia. This not only threatens biodiversity but also increases the risk of forest fires in natural urban interface areas. However, the gradual nature of the invasion often leads to being perceived as a natural process, and therefore, community education is necessary to understand the problem.

METHOD

In 2021, a group of biology researchers, forest managers and environmentalists from Bariloche City founded the Red PINOS partnership to self-organize the local community for participatory governance of this problem. The defined strategy centrally includes carrying out pine removal campaigns with publicly summoned volunteers. In a multi-species low forest invaded by the exotic *Pinus sylvestris*, *P. contorta*, *P. ponderosa*, and *Pseudotsuga menziesii*, we selected a 7-hectare pilot site with easy access and high visibility to the community of Bariloche. According to Civil Protection and the Municipality, the fire risk in this area is considered medium to high. This site is property of the Argentine Army, which formally granted us permission to intervene. It is located along the access road to Cathedral Mountain, which houses the largest ski resort in South America and is a key destination for both national and international tourism in Argentina. Through public calls via social media and local radio stations, we recruited volunteers to participate in the manual removal of young pine saplings using hand tools (without chainsaws). The pilot area was demarcated by natural features and divided into two sections using a string. Each section was intervened upon during a different campaign: Nov. 2022 and Febr. 2023.



Meeting before the removal to explain the task and the environmental issue



Pulling out a pine tree using the strength of your hands

Flyer for the Second Pine Removal Campaign

RESULTS & DISCUSSION



Flyer with key figures from the first pine removal campaign

Each campaign lasted approximately 2 hours; the first campaign had 31 participants, and the second had 37. A total of 12,965 pine trees were removed. These events were used to raise awareness about the issue of invasions through social media (e.g. WhatsApp, Instagram, Facebook) and local mass media (newspapers and radio), extending the environmental message to the entire community.



Monitoring through transects carried out in March 2024 showed the persistence of pine trees below 30 cm, highlighting the importance of seed tree removal and ongoing monitoring to prevent new seedlings and escapees. Thus, seed tree removal will represent the second stage of the intervention, requiring the involvement of public and private institutions for the use of machinery and waste management, which can be a by-product of economic value.