

# Grassland restoration in the Pampas Region

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## The frame of reference

The Argentine Pampas cover a vast plain of ca. 700.000 km<sup>2</sup> in the eastern portion of temperate South America. About 1800 vascular plant species live in the region, which has a low level of endemism. The Sierra de la Ventana range, located in the southwest, is the only mountainous area in the region, with highest elevations of 1100 m. The Parque Provincial E.Tornquist (38° S- 62° W), with an area of 7500 ha, is the only nature reserve protecting the original grassland. In the park live more than 20 taxa endemic to the range. The park is totally surrounded by pastures or cultivated fields and is considered an important tourist attraction. The impact of human activities on the original ecosystem has been profound.



Figure. 1. A portion of the protected grassland

As a consequence of cattle raising and agricultural exploitation since the arrival of the European man in the XVII century the flora and vegetation have been modified to the point that at the present one out of three plant species that live in the Pampas is exotic. Taking this into consideration it appears obvious that biological invasions have been very successful and, consequently, represent a threat to biodiversity.



Figure. 2. An area of the park invaded by alien conifers

The Convention on Biological Diversity expresses that “Each Contracting Party shall, as far as possible and as appropriate, prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species” (CBD, Art. 8-h). Although the text of the CBD is clear, its application in the area reflects the conflict between land use and conservation, and its implementation becomes difficult.

### **The diagnosis: does a problem exist?**

To conservationists the main management problems are 1) the invasion by exotic trees, a biological form alien to the ecosystem, which has transformed the original grassland into a mosaic of interspersed woody patches, 2) the presence of large numbers of feral horses (about one per 10 ha), which have replaced the original population of native large herbivores (camelids and cervids), and c) the generalized perception that trees and horses represent an “improvement” derived from their use as touristic resources.

Considering that the tree life-form was absent in the pristine bioma, it is evident that its introduction changed drastically the ecosystem structure modifying the soil stability, the composition of bird and invertebrate communities and serving as acclimatization areas for other potentially invasive species. Additionally, in the public perception the grassland is much less attractive for recreation activities than the landscape modified by the presence of trees.

Along with the invasion by woody species, another threat to the ecosystem is the presence of a large number of feral horses, that are also appreciated as a tourist attraction.



Figure 3. A population of about 700 feral horses live in the park

### The action

Botanists, ecologists and conservation biologists of the Universidad Nacional del Sur have been conducting research projects aimed to restore the original ecosystem and, simultaneously, to develop the feeling of concern necessary to revert the present process of degradation. The control of the invasion by exotic trees has been determined as one of the main actions in order to restore the original ecosystem.

The priority for implementing measures of control for different areas has been determined by an evaluation of the feasibility to apply effective actions of control in relation to the impact of the invasion upon the ecosystem and to the effort required to achieve it. Once detected the factor of perturbation it was important to determine the best way to do it.

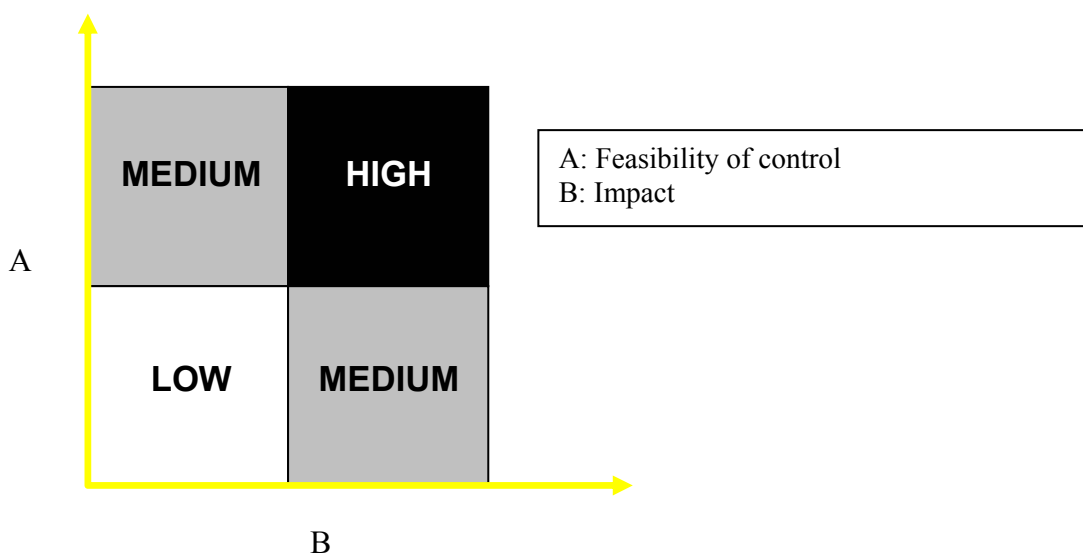


Figure 4. The priority of control is determined combining chance of success and degree of impact.

Several types of data have been collected to define the most effective approach in this direction, such as the population structure of the invasive species, response to fire and grazing, variation in the plant community composition, reproduction strategies, etc.

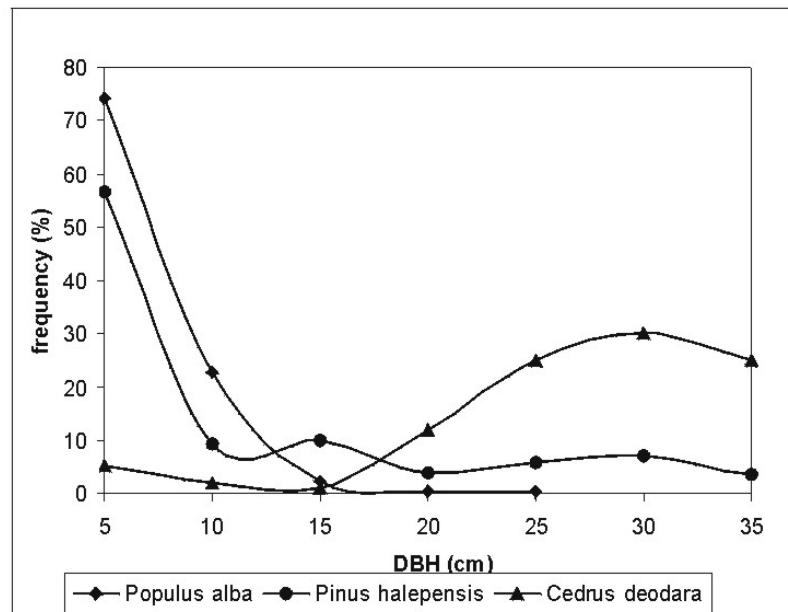


Figure 5. Population structure of three invasive tree species

By mapping the topography, the slope orientation, the distribution of endemics, and other parameters, the priority for control at the best cost/benefit relation in different sectors could be estimated. On the basis of this information experiments at real scale have been developed according to an adaptive management approach which aims to maximize the success of such practices, ensuring an effective control at the lowest cost.



Figure 6. Measuring the impact of the feral horse population

## Changing the perception

In a specific case like this, the control of invasive tree species becomes an acute challenge to communications, as it is difficult to modify the generalized perception that, in all cases, forest is better than grassland. A series of educational activities have been carried on during the last 20 years in an effort to convey the idea that natural areas are at their best when not disturbed.

Recently the Pillahuincó Botanic Garden, specifically oriented to promote the appreciation of the native grassland and its components, was created and managed by agreement between the provincial government and the Universidad Nacional del Sur, with the financial assistance of BGCI, WFN and the Rufford Foundation. Its main objective is to introduce the general public to the direct contact with the native flora through play and art. The program, which has been well accepted by the community, deals mainly with the elementary and high school populations in the neighbourhoods and with the occasional visitors from other places.



Figure 7. Voluntary work to build the Pillahuincó Botanic Garden

All the endemic plant species of the area have been subject of research in relation with their cultivation requirements. For several of them the attempts have been successful enough as to allow that potted plants or seedlings of endemic and other native species could be sold to the public or donated for educational purposes, after the appropriate information about observation was supplied. The success of this approach to reach the general public is being evaluated through questionnaires specifically designed for this purpose. A surprising shift towards the appreciation of the grassland vs. the alien tree forest has been achieved. As an example of this it can be mentioned that more than 190.000 young pine plants were cut in only one week-end by a group of voluntaries recruited among the high school local population.



Figure 8. Endemic species (*Festuca ventanica*) cultivated for educational purposes

Virtually the whole school population in the surroundings of the park have been included in activities oriented to develop the appreciation of the native ecosystem at the earlier stages of education.



Figure 9. The educational strategy is aimed to develop the appreciation of the grassland at early age.

It is expected that through a proactive program including research, recreation and educational components the present process of degradation of the Pampean grasslands can be reduced and the original landscape can be restored, at least in protected areas.

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