

Outcomes of ungulate management in Whanganui National Park, 2009-2019.

Introduction

Wild animals include goats, deer and other browsing mammal species (ungulates). They were introduced to Aotearoa New Zealand and are now widespread across public conservation land (PCL), where they affect indigenous forests and other ecosystems.

DOC monitors wild animal populations and their effects on native ecosystem composition and structure to evaluate its management. This report shows results of monitoring with the seedling ratio index (SRI) method to measure forest understory vegetation in Whanganui National Park (WNP) and Waitotara Forest Conservation Area (WFCA) since 2009.

What methods were used?

SRI compares plant occurrence in different height tiers to indicate if seedling growth is restricted. Most ungulate damage occurs to plants in the browse tier (from 30 cm to 2 m tall). Shorter plants are less affected, so assumed to represent the potential, natural, forest understory.

To measure SRI, plants were recorded as present in two height tiers on variable length transects. From these data, we calculated SRI for groups of plant species with similar palatability to ungulates. The group that ungulates prefer to eat is more likely to have restricted growth than the group that ungulates avoid eating. Staff also recorded mammal browse on foliage from 15 cm to 2 m.

SRI ranges from -1 (no tall plants) to +1 (only tall plants). In forest without ungulates it is mostly just above 0, and it becomes more negative as animal abundance increases. The closer the value is to -1 the higher the degree of ungulate impact (Sweetapple and Nugent 2004).

DOC monitored c. 50 SRI transects in WNP and WFCA with some transects in areas receiving ungulate control (Matemateonga and Te Mata) and some transects established in areas with no ungulate control (Non-treatment) (Figure 1). Some transects were measured in 2009, 2012, 2015 and 2019 (Figure 3).



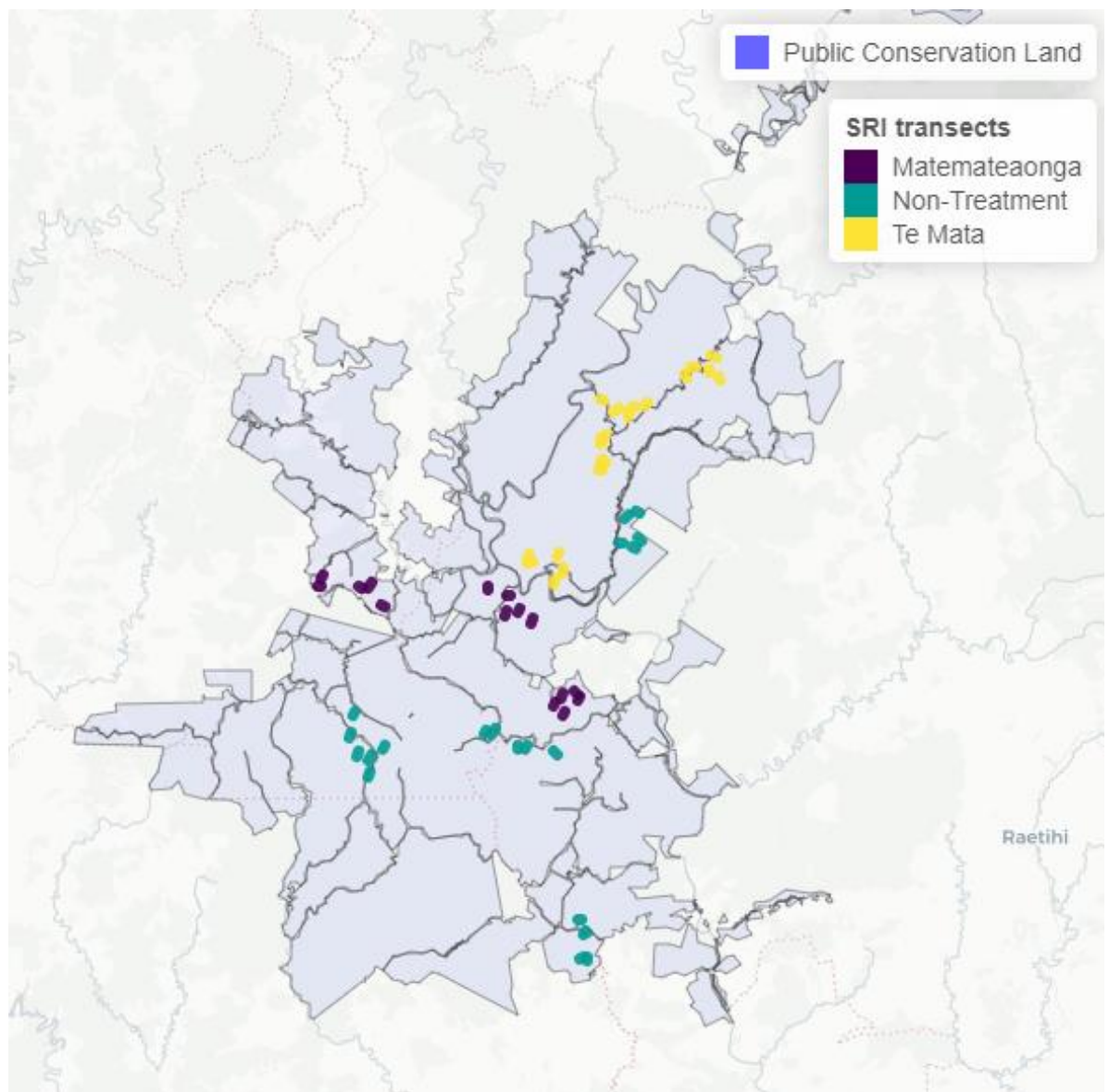


Figure 1: The locations of the SRI transects in Whanganui National Park and Waitotara Conservation Areas.

Results

Results show a clear, ongoing lack of tall plants of preferred and not-selected species through time across all treatment blocks (Figure 2).

- The SRI value for preferred species across all blocks (Matemateonga, Te Mata and Non-Treatment) was at or near -1 and has not changed over time.
- The SRI value for not-selected species across all blocks was skewed to the lower range of SRI values and has not changed over time.
- The SRI value for avoided species also shows a trend towards more short plants then tall plants across all blocks and measurement periods.

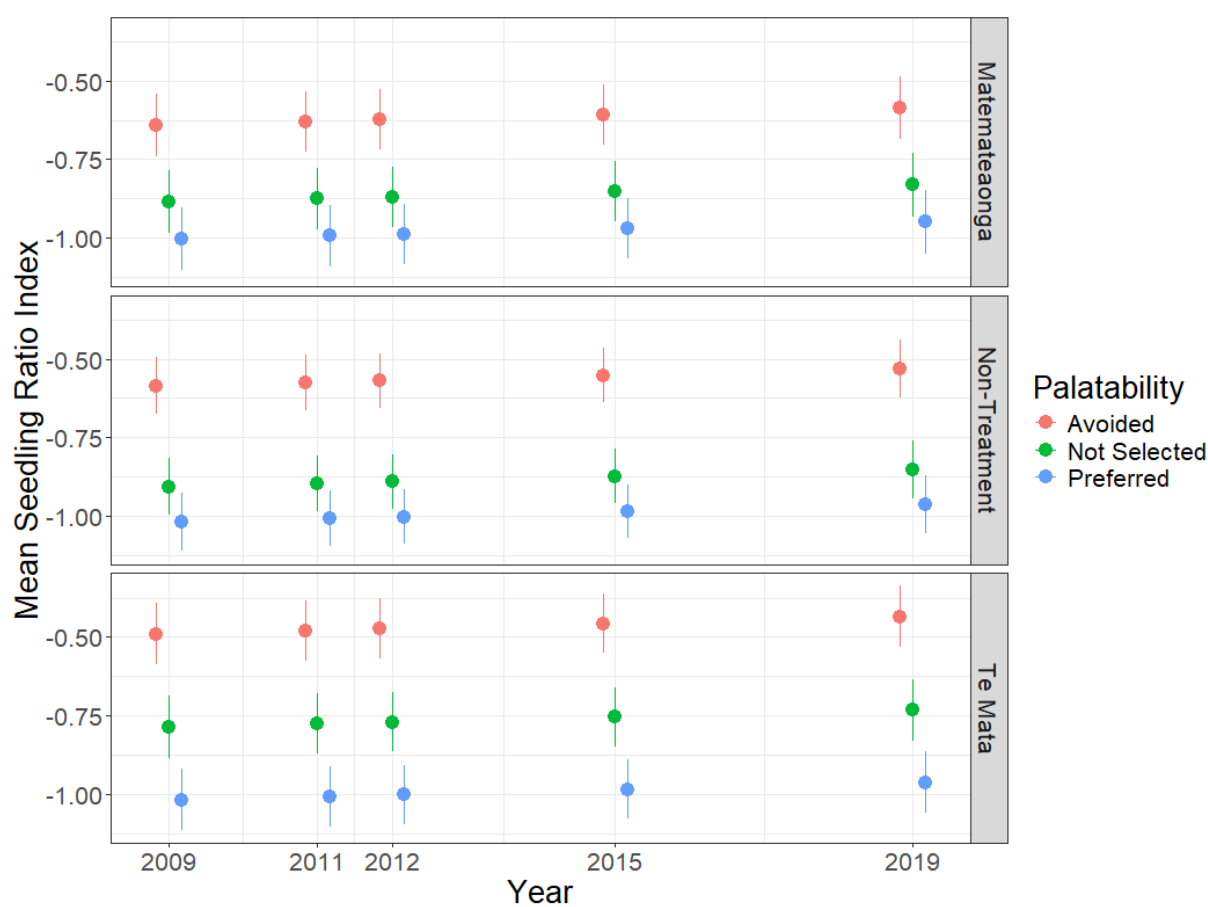


Figure 2: Mean SRI results over time for different palatability classes in the Te Mata, Matemateonga and Non-Treatment group of transects.

Discussion

The results of the SRI monitoring carried out in WNP and WFCA shows an ongoing, sustained impact from ungulates despite more than 2 decades of goat control. The area contains populations of feral goat (*Capra hircus*), red deer (*Cervus elaphus*) and fallow deer (*Dama dama*) in some places, but only feral goats have been targeted during hunting operations.

Without analysing hunter effort and kill data it is not possible to discuss the effectiveness of hunting operations but the SRI results suggest that;

1. Controlling only one of the feral ungulate species present is not achieving biodiversity outcomes and/or
2. Hunting operations to date have not been effective at suppressing ungulate populations to low enough levels, or for long enough times to allow for vegetation recovery.

All hunting operations in a management unit need to have an objective and appropriate operational plan. If the objective is to allow for vegetation recovery in the understorey, then both feral goat and deer populations need to be managed. Targeting only one ungulate species is only appropriate if management objectives relate to containing populations or reducing spread.

In 2025, the Wild Animal Management monitoring programme intends to remeasure some of the existing SRI transects in WNP and WFCA and also establish the faecal pellet index (FPI) at each transect to provide data on the relative abundance of ungulate populations in the area. Results from the next measurement should be used to inform strategic decision making on ungulate control plans in WNP and WFCA.

Glossary

Browse scores are the average of scores recorded for every species with live foliage in the browse tier (from 30cm to 2m) at each plot on an SRI transect (see below). Scores are recorded on a scale from 0 (none) to 4 (severe browse). This report uses the transect average for plants grouped by palatability to ungulates.

Faecal pellet index (FPI) is derived by counting the number of faecal pellets in 30 plots along a 150-m-long transect. The total number of pellets counted per transect is an index of relative abundance. Pellet counts are often used to monitor ungulate abundance and have been shown to be correlated to known population size (D. M. Forsyth et al. 2007) and other count methods (D. Forsyth, MacKenzie, and Wright 2014).

Seedling Ratio Index (SRI) is derived by recording plants as present in two height tiers (short: less than 30cm, or tall: 30cm to 2m) in up to 40 plots on a variable length transect (200m to 400m). It is the ratio of the difference between the number of tall plant records and the number of short plant records to the sum of the number of tall plant records and the number of short plant records.

Ungulate is the collective term for a group of browsing mammals including deer, goats, tahr, chamois and sheep. Faecal pellets from these mammals cannot be easily told apart and so are aggregated into the group 'ungulates'. Pigs are also ungulates, but counted separately because their dung is easily identified.

Appendix

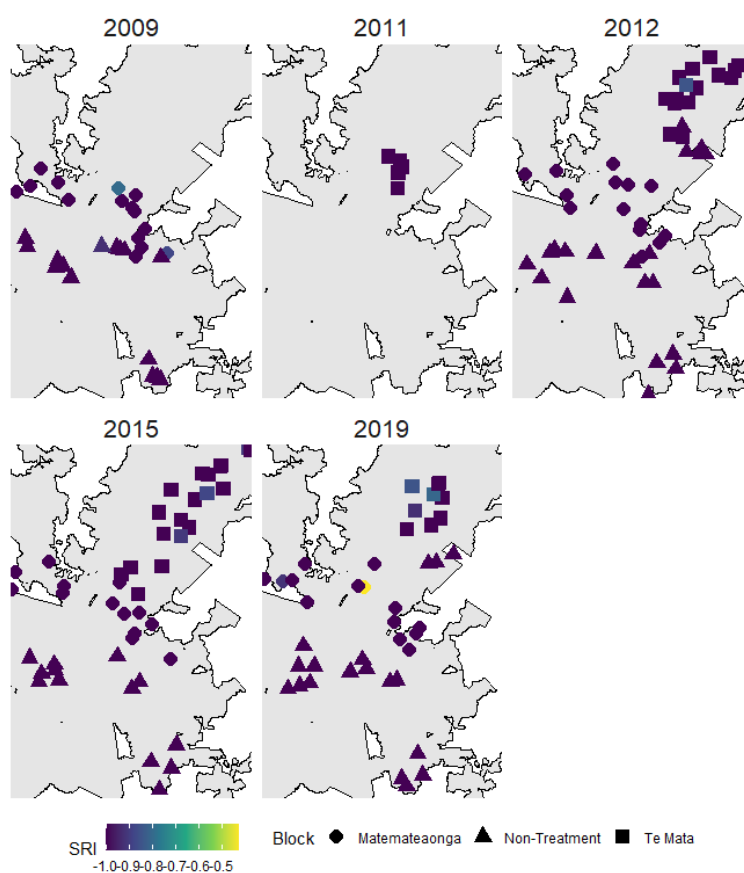


Figure 3: Preferred species SRI scores for individual transects by year.

References

- Forsyth, David M, Richard J Barker, Grant Morriss, and Michael P Scroggie. 2007. "Modeling the Relationship Between Fecal Pellet Indices and Deer Density." *The Journal of Wildlife Management* 71 (3): 964–70.
- Forsyth, DM, DI MacKenzie, and EF Wright. 2014. "Monitoring Ungulates in Steep Non-Forest Habitat: A Comparison of Faecal Pellet and Helicopter Counts." *New Zealand Journal of Zoology* 41 (4): 248–62.
- Sweetapple, Peter J, and Graham Nugent. 2004. "Seedling Ratios: A Simple Method for Assessing Ungulate Impacts on Forest Understories." *Wildlife Society Bulletin* 32 (1): 137–47.