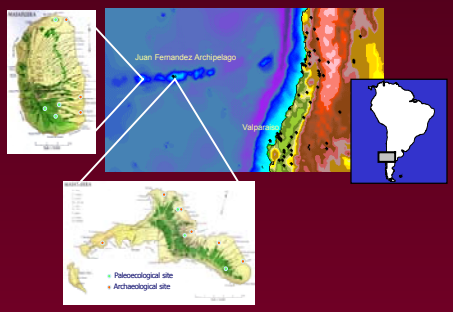
Robinson Crusoe's Legacy

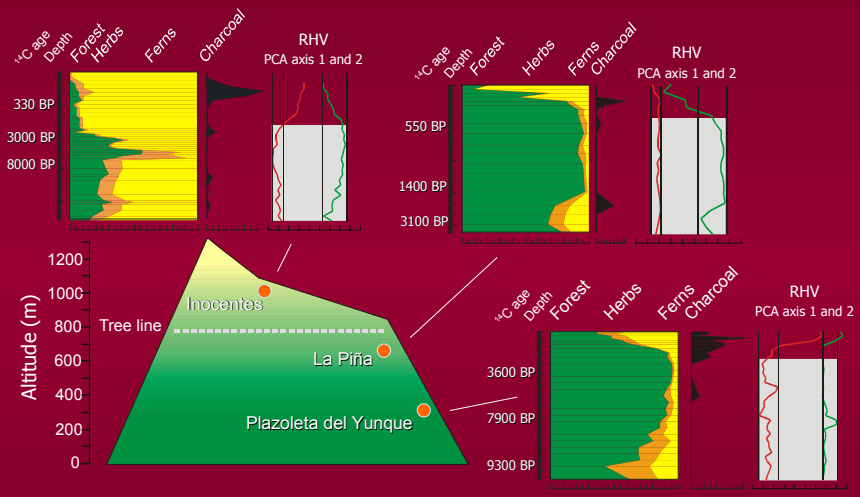
An Environmental History of the Juan Fernández Archipélago

The Juan Fernández Archipélago is located approximately 650-850 km west of Santiago, Chile, and was discovered in 1574 by the Spanish explorer Juan Fernández. The islands harboured many castaways including Alexander Selkirk, later to be immortalized in Danial Defoe's tale of Robinson Crusoe The Islands are considered to be one of the few regions in the Pacific that did not experience the impact of people prior to European occupation in the 16th Century AD.

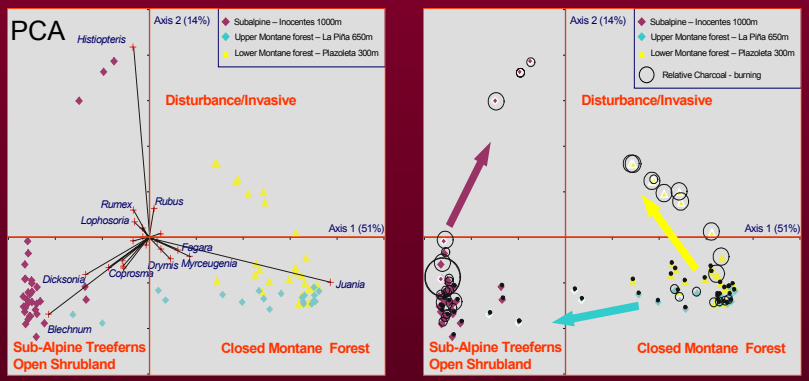


Are pre-European conditions relevant baselines for managed reserves in eastern Pacific Islands? Adopting the ***Range of Historical Variability*** (RHV) concept which works on the premise that native species are adapted to the range of habitat patterns resulting from historical disturbance events over timescales of centuries to millennia, and the probability of survival of these species is reduced if their environment lies outside the range of historical conditions for a prolonged time.

Pollen and charcoal records from three sites shows the dramatic reduction in forest cover and increased burning after European settlement. The first and second axis of the Principle Components Analysis (PCA) is used as a proxy for biotic change showing that unprecedented, though not unidirectional, ecosystem changes have occurred since European settlement of the islands.



What are the most significant factors driving change? Greatest changes occur after the arrival of people with loss of forest cover and invasion of exotic species (samples with white highlight are post-1574). Fire is an important driver of change in the subalpine (Inocentes, purple) and lowland montane forest site (Plazoleta, yellow). Alternative explanations must be sort for the upper montane forests (La Pina, blue), where there is no evidence that fire is the cause of change, such as the impact of human exploitation of Chonta palm and the impact of introduced herbivores (goats).



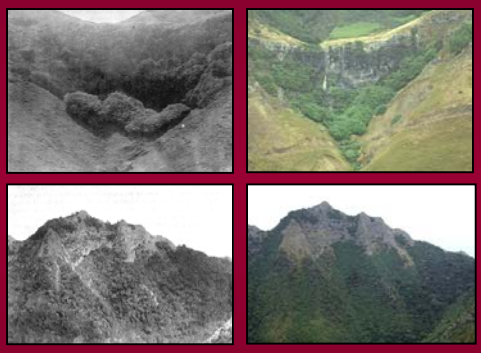
Millennial-Century scale climate change and variability resulted in significant changes to island ecosystems showing that island flora adapted to continuous and rapid environmental change. Post-1574 human settlement resulted in unprecedented environmental change, with frequent fires, loss of endemic diversity, and increased opportunity for invasive plants to become established. Relevant baselines for managing island reserves must include a long term perspective. Limiting fire reduces invasive potential of exotic plants.

Historical Evidence for Environmental Change

Depictions of Robinson Crusoe Island in early-mid 18th Century suggest that the islands were forested except for the high slopes. By the early 20th Century much of the lowland forest was removed or being invaded by introduced species.

Skottsberg 1916-17 | Present Day

Forest boundaries appear relatively stable over the last ~100 years though species composition changes to increased invasive species in forests and grassland areas.



Lowland slopes subject to erosion possibly due to increased rabbit population after their introduction in 1935.

Recent period of fire management and control of feral goats has resulted in partial recovery of native plant species, particularly ferns.

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