



Does animal pest control help carbon sequestration?

As well as being a large store of carbon, New Zealand's forests and other native vegetation communities are a net absorber of CO₂ from the atmosphere. As these forests are predominantly on conservation land, the way that DOC manages them has an important bearing on their role as carbon sinks. Wild animal control is also a big part of DOC's remit but little has been known about the carbon impact – does reducing the numbers of browsing animals significantly increase sequestration by protecting soil and enabling vegetation to grow?

To answer this question, between 2007 and 2013, the Department commissioned a research programme from Landcare Research investigating whether wild animal control can assist carbon sequestration in indigenous ecosystems. The research has produced five reports and a number of science papers discussing carbon management on conservation land.

The studies' findings are important for future land management decisions, for both conservation and non-conservation land. They found that:

- Conservation land was estimated to currently contain a total of 2,578 mega tonnes of carbon (ie 9,461 Mt of CO₂ equivalents – CO₂e) in vegetation and soil. There is potential for this land to store up to 698 Mt CO₂e more than at present – through reforestation, the advance of existing shrubland successions, and recovery of existing forests from disturbances (including animal browsing). Wild animal control can play a part in all three types of gain.
 - **Natural reforestation** – This would give the largest gains (around 500 t CO₂/ha) and also benefit biodiversity. Reforestation can occur through natural succession, which is most cost-effective; or through intervention, which is potentially expensive depending on the amount of planting, fencing and pest control required. However, there is limited conservation land that would naturally regenerate. The majority of suitable land areas (alluvial floodplains, riparian habitats and coastal ecosystems) are privately owned.
 - **Advance of existing shrubland successions** – Tussock grasslands contain significantly more carbon (around 18 t C/ha) than agricultural grasslands. Moderate gains in carbon storage are likely to ensue where conditions allow for succession to shrubland, though in many areas the need to also manage woody weeds would complicate matters.
 - **Recovery of existing forests from disturbances** (including animal browsing) – The study indicated that recovery from disturbance like animal browsing would give small gains in the short term over large areas. However, the long term impact on carbon sequestration and biodiversity is potentially significant if palatable canopy species cannot regenerate. This means that if browsers are not controlled it is possible that a different type of forest with reduced biomass and reduced biodiversity would eventually result. Small increments in carbon storage over large areas may add up to a significantly enhanced sink nationally, but it would cost a great deal to measure, monitor and report on that change.



- Some of these gains could be easily sustained with minimal management, but the remainder would be intensive and expensive.
- Significant carbon gains are occurring under DOC's 'business as usual' management as New Zealand's natural forests result in net sequestration.

Significant further research opportunities include continuing monitoring of long-term animal exclosure plots and study of planted versus naturally regenerating native forest.

The report is available to download on: www.doc.govt.nz/wild-animal-control-for-emissions-management

Published by:
Department of Conservation
National Office
PO Box 10420, Wellington 6143
New Zealand
March 2016

Editing and design: Publishing Team,
DOC National Office