Community-driven ecological restoration in New Zealand

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The health of the planet is a matter of global concern, with the past 50 years bringing more rapid changes in biodiversity than at any other time in human history. These changes include species extinction (the current rate is an estimated 1000 times greater than that indicated by the fossil record) and ecosystem homogenisation through the spread of non-local species around the globe (Millennium Ecosystem Assessment, 2003). One response to the perception of biodiversity under threat has been a growing commitment of human effort to ecological restoration, which has been defined as "the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed" (Society for Ecological Research 2004). Ecological restoration often entails the elimination or control of harmful exotic species and the deliberate reintroduction of native species that have been lost from an area.

The ecosystem restoration movement has captured the enthusiasm of ecologists, resource managers and the public in many parts of the world, and has led to the deep involvement of numerous non-governmental agencies and the donation of countless hours by citizen volunteers (Clewell and Aronson 2006). Restoration is a long-term commitment of land and resources, and a restored ecosystem often requires ongoing human management to counteract the invasion of opportunist species, the impacts of various human activities, climate change and other unforeseeable events. This article describes community-based ecological restoration in New Zealand, focussing on the creation of fenced ecological sanctuaries as a citizen response to the threatened status of New Zealand's indigenous biodiversity. The article identifies some of the issues faced by community sanctuaries and describes current research on the long-term challenges for community-driven restoration in New Zealand.

Ecological restoration in NZ

New Zealand is an island state that offers a poignant case study of the impact of human activity on biodiversity. Isolated from other land masses for 80 million years, New Zealand developed a highly distinctive endemic flora and fauna featuring diverse birds and reptiles but no mammals, apart from three species of bat. There are an estimated 80,000 species of native plants, animals and fungi and a large proportion of these species do not occur naturally anywhere else on earth (Ministry for the Environment 2007). New Zealand was one of the last places on earth to be settled by humans, with indigenous peoples arriving from elsewhere in the Pacific about 900 years ago, and a major colonisation by British settlers in the 19th century. This comparatively recent invasion has had a dramatic impact on indigenous biodiversity; New Zealand has experienced one of the highest species extinction rates in the world and currently almost 2500 of native land-based and freshwater species are listed as threatened (Ministry for the Environment 2007). The two main drivers of biodiversity loss have been habitat change (such as the felling of forests and the draining of wetlands) and introduced mammalian species. The latter (which include rats, mice, hedgehogs, mustelids, rabbits, cats, possums, deer and goats) destroy native flora and fauna through browsing, direct predation and competition for food. Habitat loss has stabilised, with just over 32% of New Zealand's land area protected for conservation purposes, but the effect of introduced pest species is ongoing.

The most effective way to protect indigenous flora and fauna in New Zealand is by the creation of natural environments that are free of these introduced pest mammals, a strategy that has been widely employed on offshore islands. However, the creation of such environments on mainland New Zealand, through intensive pest control and/or the use of pest-exclusion fencing, is a more recent phenomenon.

Pest-exclusion fencing

The technology of pest-exclusion fencing has been developed in New Zealand for New Zealand's particular needs; fences are designed to exclude all introduced mammals. The exclusion fence shown in the photo stands around 1.9 metres high. It has stainless steel mesh so fine that not even baby mice can fit through the gaps. This mesh continues down to form a skirt at ground level that blocks burrowing animals. On top is a steel canopy that prevents cats and possums from climbing over the top. Outside the fence a clearance of at least 4 metres prevents pests from using neighbouring trees to leap across the top of the fence. The fence must be closely inspected on foot several times a week to

check for damage that might allow pests through and thus compromise the safety of the sanctuary. Special culverts and water gates allow native fish to swim in and out of the protected area while preventing access by pest animals, even when the streams are in flood.

Exclusion fencing is an ambitious approach to ecosystem protection and restoration because of the high establishment costs and the need for a long-term commitment to fence maintenance, repair and eventual replacement. Furthermore, a pest-free ecosystem in the current New Zealand situation is an anomaly and calls for vigilant monitoring and the capacity to respond rapidly and effectively to reinvasions. Fenced sanctuaries are ambitious in their long-term goals, which generally entail the restoration of a healthy ecosystem that is naturally authentic to the site. In the New Zealand context this implies the re-growth of mature forest if the area has been previously felled; this regrowth can take many hundreds of years. Restoration also entails the return of species that are known to have become locally extinct, many of which are now nationally threatened or endangered. Their translocation to a sanctuary requires commitment to their appropriate care in the short and long term.

Conclusions

The concept of fenced pest-free sanctuaries on mainland New Zealand arose in the late 1990s, the lead being taken concurrently by a private landowner in the Waikato region (upper North Island) and a community trust in the capital city of Wellington (lower North Island). Since then the idea has taken hold, with the past ten years seeing the initiation of more than twenty fenced sanctuary projects, varying in size from less than 1 hectare to 3,400 hectares. Some are the private initiatives of wealthy landowners and a few have been undertaken by the Department of Conservation for the protection of particular threatened species. More than half, however, have been initiated within the citizen sector and feature high levels of community involvement.

These community-based restoration projects are consistent with New Zealand Biodiversity Strategy, "Our Chance to Turn the Tide", which has as its first goal:

"To enhance community and individual understanding about biodiversity, and inform, motivate and support widespread and coordinated community action to conserve and sustainably use biodiversity; and
To enable communities and individuals to equitably share responsibility for, and benefits from, conserving and sustainably using New Zealand's biodiversity"
(Department of Conservation and Ministry for the Environment 2000)

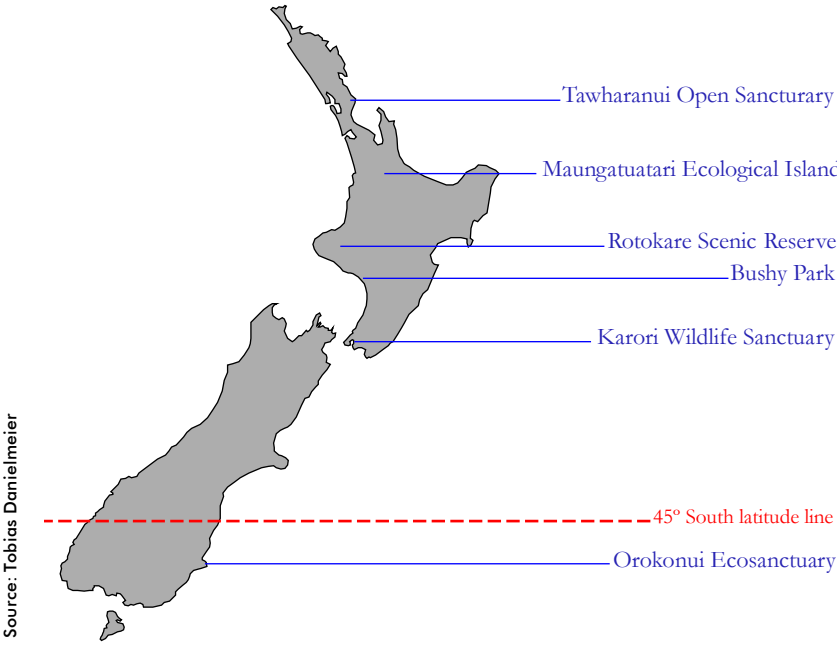
The author is currently engaged in a three year research project on fenced sanctuaries in New Zealand, focussing on projects that have a community focus, evidenced by a formally constituted community-based organisation (such as a charitable trust or incorporated society). The six case study sites that are the subject of this research are all at least 100 hectares in size and have completed construction of a pest-exclusion fence. The purpose of the research is to identify the essential ingredients for successful establishment of a community-based sanctuary and to explore the issue of long-term sustainability from the viewpoints of community support and operational funding.

The costs

The cost of exclusion fencing is in the realm of $200,000 per kilometre and so fundraising becomes a major challenge for groups that choose to establish a fenced pest-free sanctuary. The New Zealand Biodiversity Strategy recognises the role of community engagement with biodiversity and since the Strategy was launched special funds have been established at local, regional and national levels of government to support private landowners who want to protect or restore biodiversity on their land. However, these funds are not of sufficient size to make more than a minor contribution to pest-exclusion fencing projects. Furthermore, where a community group has obtained permission to use publicly-owned land for a fenced sanctuary (as is the case in five of the six sanctuaries being researched), that group is not eligible to access those funds because they are intended to support biodiversity on private land. For the six case studies, fencing costs have been met by a combination of grants from gaming, philanthropic and community trusts, private donations and in some cases government grants. Whereas the exclusion fence is the major establishment cost, there are also substantial costs associated with pest eradication (usually entailing aerial poison drops and trapping) and with the reintroduction of threatened species.

Xcluder ™ fence and pedestrian access gate at Tawharanui Open Sanctuary, NZ

Source: Diane Campbell-Hunt 2008



Source: Tobias Danielmeier

Location of Case Study Sanctuaries in New Zealand

Once the sanctuary has been established, the community group faces the ongoing challenge of meeting operating costs, which include fence maintenance (the integrity of the fence is vital to the pest-free status of the sanctuary), vigilant monitoring for accidental pest re-invasion, care of threatened species, staff salaries, maintenance of plant and equipment, and saving for eventual fence replacement. The life span of exclusion fences is not known, and could be anywhere from 20 to 50 years.

The role of ecotourism

In general community-based conservation has relied on donations, government grants and philanthropic trusts for meeting costs. Such fundraising has been combined with keeping costs down through the use of volunteers and donations of goods and services. Thus community-based conservation has been firmly within the not-for-profit sector, along with community organisations in the realms of education, health and social welfare. Authors from a diversity of countries note that such not-for-profit groups face an increasingly competitive funding environment, due to rising costs, declining support from the government, reduced giving by individuals and corporations, and growing demands on the philanthropic sector (Weerawardena and Sullivan Mort 2006). In this funding environment many not-for-profit organisations are engaging with the marketplace to complement or replace grants and charitable donations through the establishment and operation of a social enterprise (Dees, 2001; Nicholls, 2006). A social enterprise commonly operates in a business that has a link with the mission of the organisation, but its primary purpose is to generate income.

For a community-based ecological project the obvious enterprise choice is ecotourism, which not only provides income but also offers opportunities for advocacy and education for conservation, and the employment of community members (Alter, 2006; Ross and Wall, 1999). In this context it is important to make the distinction between a commercial ecotourism venture, (which focuses on establishing a profitable business), and a community-based biodiversity project that looks to ecotourism to provide some degree of independence from fundraising and government grants. There may be limits to the extent to which an enterprise approach can offer full financial self-reliance. Enterprise strategies for biodiversity conservation are in use throughout Asia and the Pacific and cover a range of "soft" management uses, including not only ecotourism but also the extraction of plant oils and forest fruit. Research has indicated that these enterprises seldom facilitate full financial self-reliance, although they do make a useful contribution to reducing the level of external funding required (Salafsky, Cauley et al 2001).

In New Zealand, community-based fenced sanctuaries are a comparatively recent phenomenon, and none of the six case study sanctuaries has yet achieved full financial self-reliance. Five of the six are planning to use ecotourism to a greater or lesser degree as a source of operating income. (The sixth, Tawharanui Open Sanctuary, is a regional park with free public access; its operating costs are paid by the Auckland Regional Council.) However, the choice to create an ecotourism enterprise brings additional establishment costs, such as a visitor centre, walking tracks and toilets. Long-term operating costs are also increased as these must include marketing and promotion, care of visitors on site, and the maintenance of visitor facilities. Whether full financial self-reliance can be achieved through ecotourism is yet to be seen. Two of the six cases (Karori Wildlife Sanctuary and Orokonui Ecosanctuary) are planning to rely primarily on ecotourism and the Karori Wildlife Sanctuary, which has been open to paying visitors for eight years, already meets a significant proportion (30%) of its operating costs from visitors and retail sales (Karori Wildlife Sanctuary, 2007). These two cases are urban sanctuaries, which are potentially more able to attract visitors than are rural sanctuaries.

Two of the rural sanctuaries (Rotokare Scenic Reserve and Maungatuatari Ecological Island) face the additional challenge of Scenic Reserve status for their land. This reserve category requires free public access; these sanctuaries therefore cannot charge an entry fee although they can charge for value-added experiences such as guided tours. If ecotourism is unable to generate sufficient funds for financial self-reliance, where is the balance of funding to come from? In some cases local government is willing to assist with operating costs, although this depends on the status of the land. For example, the Wellington City Council owns the land used by the Karori Wildlife Sanctuary and has been paying an operating grant to supplement ecotourism income since the sanctuary opened, but in the expectation of eventual sanctuary self-reliance. A second example is the Rotokare Scenic Reserve, which

is vested in the South Taranaki District Council. That council has supported the sanctuary financially during the establishment phase and has indicated a willingness to meet some of the ongoing operating costs in perpetuity. Where land is not controlled by local government, such support is generally not forthcoming.

Source: Diane Campbell-Hunt 2007

Xcluder ™ fence at Maungatautari Ecological Island in the Waikato, NZ

Sustaining community ownership

All six sanctuaries have worked to build a sense of ownership of the project within the wider community by establishing a group of trust members or "Friends" of the sanctuary. These groups provide essential support in the forms of volunteer labour, advocacy for the sanctuary, and donated skills and expertise. Their annual subs or donations provide an important source of income and they can also support the ecotourism enterprise by bringing themselves, their families and friends to visit the sanctuary. Volunteers play a key role in keeping operating costs down in all six sanctuaries. Even at Tawharanui where operating costs (including staff salaries) are paid by the Auckland Regional Council, the associated community group (Tawharanui Open Sanctuary Supporters) contributes many hours of volunteer labour and fundraising which make possible much of the ecological restoration at the site.

Community Involvement

Location influences the scale of community support; sanctuaries that are urban or close to an urban area have larger memberships and therefore higher numbers of volunteers. One of the urban sanctuaries under study has a volunteer workforce of 400, roughly ten times that of one of the rural sanctuaries. The concept of ecological restoration is very appealing to the New Zealand public at this point in time, but sanctuaries must address the issue of how to maintain community enthusiasm in the longer term and this is a matter of considerable uncertainty. All six sanctuaries either have, or are developing, active education programmes that attract schoolchildren and older students; education is seen as an important part of sustaining community support.

The ambitious ecological restoration projects being undertaken by community groups in New Zealand represent an exciting new development in conservation. However, these groups face the challenge of sustaining their sanctuaries into the future. The major issues are the development of secure operating revenue and engaging the ongoing support of the wider community.

The extent to which ecotourism can support full financial self-reliance remains to be seen, and raises the associated question of the appropriate role for government in supporting and sustaining these initiatives.

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