Restoration of indigenous biodiversity in Bay of Plenty urban centres

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ABSTRACT

Tauranga and Rotorua are the two largest urban centres in the Bay of Plenty Region and both are situated at the junction of key major ecosystems. Tauranga is part of one of the fastest growing areas in New Zealand and is situated adjacent to Tauranga Harbour. It also adjoins the sea coast and associated coastal dunes, and contains other significant remnants of indigenous vegetation and habitats for indigenous fauna. Rotorua overlaps with a major geothermal field and related surface features and contains many remnants of thermal vegetation and important avifauna habitat. It is also situated on the shores of Lake Rotorua and satellite settlements are situated on the shores of other major lakes — most of which have increasing problems with deterioration of water quality.

Tauranga City has undertaken a major survey of remaining natural areas, established a monitoring network, and identified opportunities for ecological restoration. It is also grappling with major growth issues, ecological and other constraints to growth, and issues related to the environmental effects of major new infrastructure such as large-scale residential development and roading. The City now has active programmes underway for the restoration of Mauao (Mt Maunganui), weed monitoring and control along an extensive section of duneland, and increasing planting of indigenous species. There is also increasing activity by community-based restoration groups.

A similar pattern is evident in Rotorua, where the District Council has also undertaken a survey of remaining natural areas and is working with the community to restore a major urban wetland at Hannahs Bay and restoration of lake margins and wetlands at Lake Okareka. There are also community-based initiatives along the Ngongotaha Stream and in local reserves. There is tremendous potential for the restoration of geothermal habitats in the centre of the city, in Kuirau Park.

Similar initiatives are also underway in other Bay of Plenty urban centres, such as Kawerau. Key elements underpinning current initiatives are:

- There is a dispersed network of degraded natural areas in urban places close to where people reside
- Good baseline information on the extent and composition of remaining natural areas
- A strong desire by motivated local residents to improve the state of their natural environments
- An increasing commitment from Councils to protect and restore indigenous biodiversity in and adjacent to urban settings.

INTRODUCTION

Tauranga and Rotorua are the two largest urban centres in the Bay of Plenty Region and both are situated at the junctions of diverse major ecosystems. The other larger towns are Whakatane, Te Puke, Katikati, Kawerau, and Opotiki. There are many ecological restoration projects underway in the region (e.g., Shaw & Beadel 2003) and many of these are urban-based. In this paper I provide an outline of examples of initiatives to restore indigenous biodiversity to Bay of Plenty urban centres. It is not a comprehensive overview and is only presented as a snapshot of some of the projects underway or proposed. I also provide some commentary on why these projects are being undertaken.

1. ROTORUA

Rotorua is traditionally thought of as a tourism

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town, in the lakes district, renowned for geysers and Māori culture. It is, however, much more than that, and a complex array of ecosystems and habitats are represented in the City and adjacent to it, some of which are under considerable pressure.

KEY ECOLOGICAL FEATURES

Rotorua City is located on a major geothermal field and geothermal surface features are commonly present within the city environs. These are concentrated in certain key locations such as Kuirau Park, Sulphur Bay (adjoining Lake Rotorua), Arikikapakapa Golf Course, and at Whakarewarewa. There are also major geothermal features in other parts of the Rotorua District, at Waimangu, Waiotapu, Tikitere, Maungaongonga, Te Kopia, and Maungakakaramea (Rainbow Mountain), some of which are major tourist attractions for visitors to Rotorua City.

The City, as already noted, is on the shores of Lake Rotorua and there are major streams (e.g., Ngongotaha, Waiteti, and Puarenga) within the City and a network of freshwater wetlands along the margins of Lake Rotorua. These have been reduced considerably in extent (c.f., Stafford 1994) but nevertheless offer tremendous restoration potential. They are, however, without exception, heavily degraded by the effects of adjacent land use activities and invasion by exotic species such as grey willow (*Salix cinerea*). Drier habitats within wetlands are generally infested with blackberry (*Rubus fruticosus*), gorse (*Ulex europaeus*), and other exotic species. There are also lowland forest remnants at the margins of the City, such as on Mt Ngongotaha, and in outlying rural-residential satellite settlements (at Lakes Okareka, Tarawera, and Rotoiti). All of these lakes have increasing problems with nutrient enrichment, water quality, and habitat deterioration. Mokoia Island is Māori-owned and is located close to Rotorua City and is now free of all introduced mammals as a result of recent Department of Conservation projects to eradicate rats and mice and threatened species such as tīeke (North Island saddleback; *Philesturnus carunculatus*) have been established successfully. There are also notable habitats for rare plant and fauna species within the City, including the threatened orchid *Calochilus robertsonii*, and high value bird habitat in Sulphur Bay. Some of these features are of very significant ecological value, particularly the geothermal features, or have major restoration potential, such as the network of freshwater wetlands.

EXISTING INFORMATION

There is a high-level of existing information on natural areas in the Rotorua District and the City. Most natural areas of any size have been described and mapped, including detailed mapping of all geothermal vegetation. Digital data on many sites is held in the Rotorua District Council Geographic Information System (GIS). This information provides an excellent starting point for the development of restoration plans.

ECOLOGICAL RESTORATION PROJECTS UNDERWAY

There is a diverse range of projects underway, as I will illustrate with the following brief examples:

Lake Okareka

A suite of projects is underway in this area. A landcare group has been formed and Forest and Bird, Rotorua Botanical Society, Rotorua District Council, Environment BOP, Department of Conservation, Fish and Game New Zealand, and local landowners are working collaboratively to restore wetlands, protect lake margins, protect mistletoes (*Ileostylus micranthus* and *Tupeia antarctica*), and to control pest animals. This project has also involved the construction of new wetlands on the lake margin (the natural lake level has been lowered and this has exposed former shallow lake margins).

Otauira Wetland at Hannahs Bay

The Otauira wetland is a remnant of a formerly much larger wetland. Part of the wetland is still under threat from the proposed southern extension of the Rotorua airport runway. Rotorua District Council and the local community (through the Mokoia Community Association and the Hannahs Bay Catchment Group) plan to increase the water level in the wetland, control and remove the significant

infestation of grey willow, and to plant selected areas, particularly on the margins and on areas of higher ground.

The District Council initiated this process in the late 1990s when it constructed a boardwalk through part of the wetland, cleared willows, and planted the cleared area with indigenous wetland species. The local community is closely involved and has organised working parties, along with Forest and Bird.

Ngongotaha and Awahou Streams
A Ngongotaha-based community group has undertaken site preparation and planting along an extensive section of the lower Ngongotaha Stream. Many thousands of indigenous plants have been established over c. 15 ha along c. 2 km of stream bank. This project has now been extended to the Awahou Stream.

Lake Tarawera
A major pest control initiative is underway, centred on the local community in Spencer Road, with considerable assistance from Environment BOP. There is a network of c. 400 poison stations for rats, and other pest species are subject to control efforts. Forest and Bird and the Department of Conservation organised a pest control training workshop in 2003. A new initiative is being developed at the Otumutu Lagoon.

Okere Falls
A local community-based ecological care group, working under the auspices of the ratepayers association, is undertaking indigenous planting, pest control (primarily rats, with some possum control), restoration of lake margins, and weed control. This is being done with support from Environment BOP, Department of Conservation, and the Lake Rotoiti Scenic Reserves Board.

Paradise Valley
The local community have recently initiated a pest control project and consideration is being given to a wider and more intensive initiative on Mt Ngongotaha, involving a pest-exclusion fence.

2. TAURANGA CITY
Tauranga City is located at the eastern end of Tauranga Harbour, in the Western Bay of Plenty, which is one of the fastest growing parts of New Zealand. This rapid growth has led to consequential requirements for land for housing, roading, and commercial and industrial use, and has put major pressure on remaining natural areas. Population growth is predicted to continue and future growth has been the subject of a study of constraints and infrastructure requirements. Ecological constraints have been assessed (Wildland Consultants 2003) and protection and enhancement of natural features have been identified by stakeholders as being a fundamentally important platform for sustainable future growth.

KEY ECOLOGICAL FEATURES
Tauranga City is located on the edge of Tauranga Harbour, adjoining the sea coast and coastal dune systems, and contains significant remnants of terrestrial vegetation and wetlands. This landscape has been inhabited for centuries and has been modified highly by human activity. Nevertheless, the harbour is of huge ecological significance as habitat for fish, estuarine macro-invertebrates, waders (some of which are international and internal migrants), and resident marsh birds. A significant component of the future urban expansion of Tauranga will potentially be located on the peninsulas that extend into the harbour. There is a large complex of estuarine wetlands and many adjoining freshwater wetlands, although these have been heavily reduced in extent and are generally infested with willows (formerly extensive areas of freshwater wetland have been reduced to small weed-infested remnants).

The same applies to indigenous forest in the lowlands and coastal strip, most of which are small, weed-infested, and are not sustainable in the long term without active management. Many remnants are secondary and are associated with an extensive network of rivers and streams which provide key linkages (and fish passage) to an extensive area of forest along inland ranges and plateaus. There are also significant indigenous remnants on Mauao, a volcanic mountain at the entrance to Tauranga Harbour, where there are also weed and pest animal issues.

The strip of coastal dunes is heavily infested with exotic weeds but have retained significant examples of indigenous vegetation, particularly *Spinifex sericeus* and pīngao (*Desmoschoenus spiralis*) on the foredune, and pōhuehue (*Muehlenbeckia complexa*) on rear dunes.

EXISTING INFORMATION

Surveys of terrestrial natural areas have been undertaken throughout much of the western Bay of Plenty, although there are information deficiencies in the coastal and semi-coastal bioclimatic zones of Tauranga Ecological District. Estuarine wetlands in the harbours have been described and mapped, and the Department of Conservation has surveyed marsh birds and related habitats in Tauranga Harbour. Natural areas in Tauranga City have been mapped and described, and digital data is held in the Tauranga City GIS. Potential restoration areas have also been identified. A network of photo-points and vegetation plots has been established in natural areas throughout Tauranga City, to monitor vegetation and habitat condition (Fig. 1).

ECOLOGICAL RESTORATION PROJECTS UNDERWAY

Mauao (Mt Maunganui)

Tauranga City Council (TCC) have recently commissioned an ecological restoration plan for Mauao (Fig. 2). Although used by a large number of visitors (c. 25 000/month), there is significant potential for ecological restoration of coastal forest, further weed control, and intensive pest control to protect and enhance a diverse range of indigenous fauna. There are breeding populations of grey-faced petrels (*Pterodroma macroptera gouldi*) and little blue penguin (*Eudyptula minor*) on Mauao, and the Ornithological Society of New Zealand (OSNZ) has been monitoring petrels for about 10 years. Ecological restoration on Mauao is contingent on protection of the extensive network of archaeological features — Mauao is a regionally and nationally significant archaeological landscape.

The high level of visitor use also creates significant impacts and risks. Large fires occurred in 1997 and 2003 (and on many previous occasions) and a planting programme is underway to restore coastal forest to the area burned. This is a difficult undertaking on very steep, unstable slopes with summer-dry soils.

Kopurererua Valley

There is a major project underway to restore wetlands along the Kopurererua Stream. This is a joint initiative between TCC and iwi, which was triggered by the routing of a major new road in the valley.

Coastal dunelands

Coast Care (a partnership between Environment BOP, District Councils, DOC, and local communities) has initiated many dune vegetation restoration projects in Tauranga and along the wider regional coastline. These projects involve planting, weed control, pest control (generally rabbit control to protect plantings), construction of fences to protect dune vegetation, and construction of beach ladders to enable foot access while not promoting erosion.

Waikaraka Estuary

This project is a relatively recent initiative by local residents and iwi to protect and enhance the margins of an arm of Tauranga Harbour at Te Puna. A recently-prepared restoration plan includes provision for weed control, planting, and pest animal control.

Landcare and stream care groups

There has been a proliferation of community-based groups at Tauranga, some of which are working in urban areas, such as at Waimapu. These groups are assisted by the NZ Landcare Trust and Environment BOP. New initiatives are developing, such as a group at Maketu who have assessed options for various restoration initiatives, including restoration of a network of degraded gullies that extend through Maketu and also provide potential links to the adjacent settlement of Little Waihi. Iwi-based initiatives are also underway on Matakana Island.

Matua Saltmarsh

This is a long-standing project by TCC, working with Forest and Bird and the local community,

to maintain and restore the saltmarsh and to recreate wetlands[1].

3. KAWERAU

Kawerau has become, somewhat unexpectedly, something of a centre for ecological restoration initiatives. The Tarawera River flows through Kawerau, which is located on a floodplain, and a riparian strip of largely indigenous vegetation provides a linkage along the river to habitats upstream and along side streams. The river also provides a link to the coast, c. 20 km to the north. Geothermal habitats are present on the edge of the town, in Parimahana Scenic Reserve. There are small remnants of lowland forest close to the town; a network of wetlands and small lakes is located close by, and the town adjoins the volcanic mountain Putauaki (Mt Edgecumbe).

EXISTING INFORMATION

The District Council commissioned an inventory of natural areas in the mid-1990s, which have been mapped and described. DOC is undertaking monitoring of geothermal vegetation in Parimahana Scenic Reserve.

ECOLOGICAL RESTORATION PROJECTS UNDERWAY

Many projects are underway in or adjacent to Kawerau:

Monika Lanham Scenic Reserve

The Kawerau District Council has obtained financial support from the Environmental Enhancement Funding (a contestable fund provided by Environment BOP) to restore indigenous vegetation in this reserve in the centre of the town.

Putauaki

About 200 ha of former pine plantation is being returned to indigenous vegetation on the visually prominent lower flanks of the mountain. Key issues are the management of major weed species.

Wetlands

There is a well-established project underway by Norske Skog Tasman and Carter Holt Harvey Tasman to restore and enhance large areas of wetland and associated terrestrial vegetation. This project has now been running since 1998 and has resulted in the creation of extensive new areas of wetland and the re-establishment, by planting, of adjacent areas of indigenous vegetation where several hundred thousand plants have been planted.

Margins of the Tarawera River

Various projects are underway to restore indigenous vegetation along the margins of the Tarawera River. This is being undertaken by Environment BOP, Kawerau District Council, Norske Skog Tasman, and Carter Holt Harvey Tasman.

WHY IS ACTION HAPPENING?

There are many reasons why there are so many ecological restoration projects underway in Bay of Plenty urban centres. First and foremost, there is increased awareness in the general community of the importance of indigenous biodiversity and understanding of the degraded state of indigenous ecosystems and habitats associated with major Bay of Plenty urban centres. This, combined with the dispersed networks of natural areas (often degraded) close to places where people live, provides many opportunities to initiate active restoration management, and people like to do positive things in their own ‘backyards’, without having to travel significant distances. Active participants are often also ‘gardeners’ or ‘farmers’, and they derive considerable satisfaction from being able to undertake hands-on physical projects. It is a logical transition to move from gardening to ecological restoration.

There is now a wealth of good technical information available on present and former vegetation and habitats. Technical advice is available on the wide range of activities associated with ecological restoration.

Local residents have a strong commitment and interest to improve the state of their natural environments, regardless of the policies, funding

[1] Editor’s note: the Matua salt marsh restoration project is detailed by the previous paper in these proceedings by Mark Dean.

support, and technical services available from agencies. Nevertheless, there is a strong commitment from Councils in the Bay of Plenty to protect and restore indigenous biodiversity in and adjacent to urban settings. An increasing level of funding is available through a wide range of sources (e.g., Environment BOP Care Group budgets, Department of Conservation Biodiversity Advice and Condition Funds).

Local communities have developed restoration solutions that suit their physical and social environments. The many restoration initiatives follow diverse organisational models and are being undertaken on a wide range of scales. There is, nevertheless, a consistent theme in both local communities and organisations (large and small) that restoration projects tend to be organised by key individuals, often aligned with loosely knit groups with a common purpose.

THE FUTURE?

It seems a cliché to say it, but I consider that we are only just seeing the tip of a 'growing' iceberg. Communities (in the broadest sense) are all heading in the same direction, for various reasons, in relation to ecological restoration in urban centres in the Bay of Plenty. I use the term 'communities' to include residents, landowners, councils, iwi, corporates, and government agencies. Community-based initiatives are the present and the future basis for ecological restoration in New Zealand as the potential for these projects is often far beyond what agencies alone can achieve.

The many people involved in these community-based, often urban projects, have become key constituents of indigenous biodiversity management in New Zealand. Their active involvement in projects has led, rapidly, to a much-improved wider understanding of the physical realities and funding requirements to really make a difference in terms of improvements in the state of indigenous ecosystems, habitats, and species. This, in turn, will have a major influence on future political and managerial decisions about the relative priority of ecological restoration initiatives in New Zealand.

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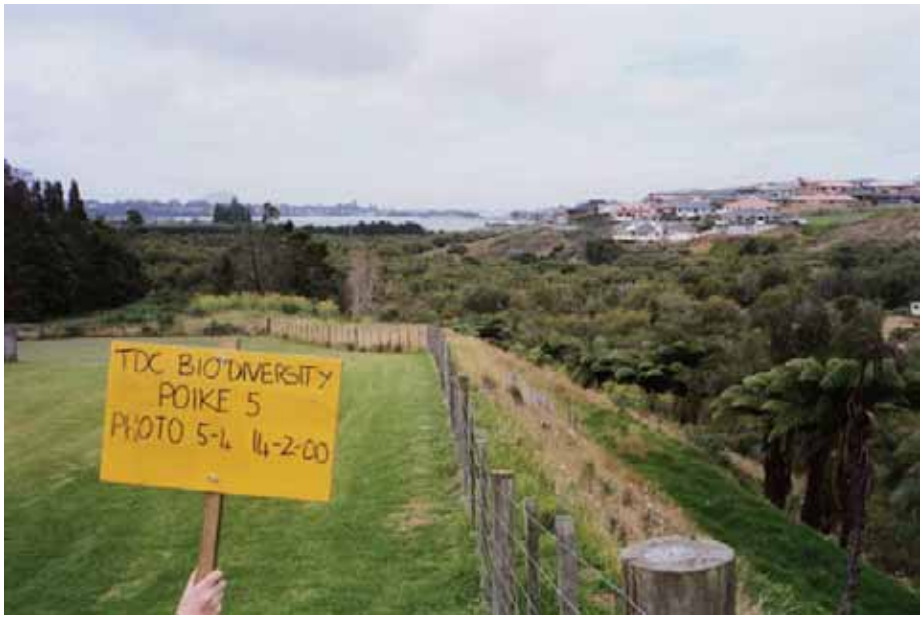

Fig. 1 There are many gullies in Tauranga City with indigenous remnants and there is an increasing interest in the restoration of gully systems. A monitoring network was established in 2000.

Fig. 2 A comprehensive restoration plan has recently been completed for Mauao (Mt Maunganui). This 3-D terrain model shows the location of archaeological sites (shaded) and remaining indigenous vegetation.