

Moutere Inlet

Estuarine Edge Restoration

The Moutere Inlet is one of the largest intertidal areas in Tasman Bay. It has been subject to considerable modification and as a result has lost some of its values. The need for restoration was recognised many years ago, with initial restoration by way of planting in some embayments started in the early 1990's. These initiatives were revived in 2003 as a result of interest shown by landowners in the Eden Road embayment. The purpose of these notes is to provide background information about the ecological values and threats to these values, and stand-alone restoration plans for specific areas will be added as required.



This report was produced by John Preece on 7th March 2004 as part of the Tasman District Biodiversity Advice Programme.

Background

Context

Moutere Inlet is in the Motueka Ecological District (though it shares many characteristics with the Moutere ED). The geology of this part of the ED is characterised by Moutere Gravels, a formation extending from Nelson Lakes National Park through to the coast (best seen from McKee Reserve). This material is glacial outwash from the Southern Alps, and has developed its own distinctive landform as erosive forces have reshaped the materials originally deposited from glaciers. The hills are rounded, of similar height and regular drainage pattern. Soils are typically of low - moderate fertility, and have clayey textured pale-coloured subsoils with impeded drainage. This is one of the lowest rainfall areas in Nelson, and has high sunshine hours. A feature of the Motueka ED is its estuaries and intertidal areas. These include the Moutere Inlet, the Kumeras, the Motueka Sandspit, and the mouths of the Motueka and Riwaka Rivers. Collectively these have a significant intertidal area, which supports large numbers of birds. Many of the birds are migratory waders, but also present are wetland species such as banded rail which frequent the edge of the estuaries.

Moutere Inlet Description

For the purposes of providing some background into wetlands in the Moutere, the following is a brief description of the biota of coastal Moutere wetlands. The vegetation is described in terms of a generalised sequence, but such a sequence does not always occur in nature. Deep water channels with permanent water form the most seaward communities. On the edge of these channels are occasional communities of eelgrass (*Zostera muelleri*) which is one of the few flowering plants to live underwater in marine situations. Large areas of intertidal flats are one of the most distinctive features of the estuaries, and these can be either mud or sand. Large numbers of molluscs frequent these areas, especially the muddy sites. The most visible of these is the mud snail (*Amphibola crenata*), while beneath the surface cockles (*Chione stutchburyi*) are abundant. The first vegetation which is apparent is the short turf communities dominated by such species as



Sarcocornia quinqueflora (shown above), *Samolus repens*, and *Selliera radicans* (shown left).

Moutere Inlet Description (Cont.)

The rushland on the edge of the estuary is dominated by the two rush species sea rush (*Juncus maritimus var. australiensis*) and jointed rush (*Leptocarpus similis*). In the photograph on the right sea rush is on the left with the more orange coloured jointed rush on the right. In some areas the sedge three square (*Schoenoplectus pungens*) is also prevalent – this is the green sedge which is often seen from the road, and dies back over winter.



Three square

Occasional patches of the estuary tussock (*Stipa stipoides*) occur around the islands. Up to the rushland community, this sequence is largely intact in many intertidal areas, but intensive land use on the landward edge of estuaries has removed the remainder of the transition from estuary to the land proper. A key element of the saltmarsh is shore ribbonwood (*Plagianthus divaricatus*), which forms dense shrubland in some areas. It is shown in the photo on the bottom left.



Behind this is manuka (*Leptospermum scoparium*), and often toetoe (*Cortaderia richardii*) and flax (*Phormium tenax*). Beyond this forest can become established, usually beech forest in the Moutere though it is interesting to note that many of the dry slopes in this area were in grassland or shrubland when the first Europeans arrived.



This was a result of burning by Maori. The photograph above shows the sequence from rushland through flax and toe toe to manuka.

Moutere Inlet Description (Cont.)

Prior to development of the edges and surrounds, estuarine areas often graded into the numerous freshwater wetlands, and this mix of habitats produced ideal conditions for birds such as banded rail (*Rallus philippensis*), South Island fernbird (*Bowdleria punctata punctata*) and marsh crake (*Porzana pusilla*). These species are much reduced today, to the point where local extinction is possible. Banded rail (above right) frequent the upper edges of the saltmarsh, feeding in the small channels in the rushland. They require large areas of sea rush (about 4500m²), a freshwater source, and dense cover for roosting and breeding (Elliott, 1989).



Fernbird (left) are inhabitants of freshwater wetlands and the shrublands of estuarine margins. Marsh crake are also more typical of freshwater wetlands, like this one (right) which appeared in Easton's Pond in the 1990's.



In addition to these edge species, the estuary supports large numbers of wading birds which use the inlet primarily for feeding.

Their main high tide roost is on the Motueka Sandspit (above). The main species present are South Island Pied Oystercatchers and Eastern bar-tailed godwits, but knots, turnstones, dotterels, terns and gulls are also present. Regular visitors also include Royal spoonbills, and white herons (right).



Moutere Inlet Description (Cont.)

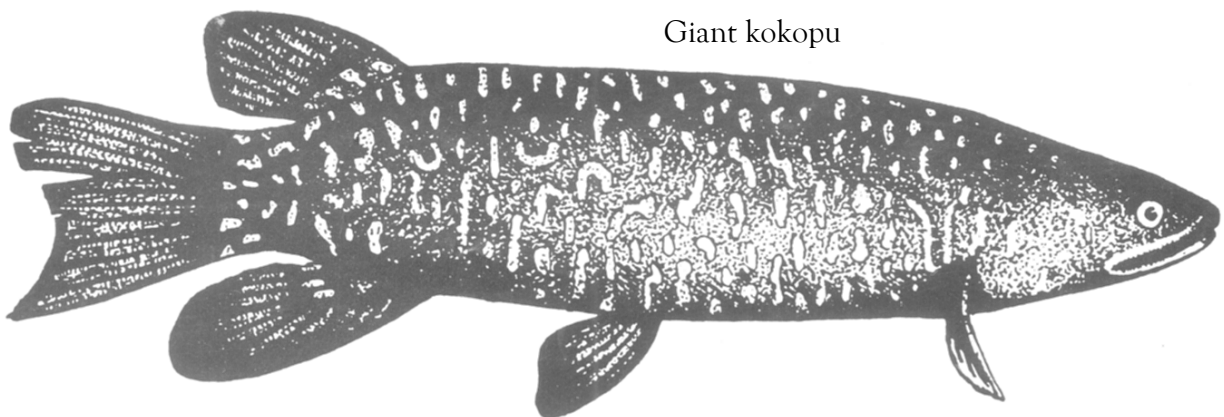
Proximity to the estuary enabled fish species such as banded kokopu (*Galaxias fasciatus*), giant kokopu (*Galaxias argenteus*) and inanga (*Galaxias maculatus*) to populate the coastal streams. These are the species which make up the whitebait catch, now much reduced through loss of both spawning habitat and adult living habitat. By far the most common species is inanga, which makes up the majority of the whitebait catch. Banded kokopu are still found in some tributaries of Moutere Inlet, but Giant kokopu are no longer known to be present.



Inanga



Banded kokopu



Giant kokopu

Conservation Values

The area under consideration is the whole Moutere Inlet, as shown on the first page of this report, but the focus is on those areas on the coastal margin. This section is intended to provide a very brief overview rather than a detailed description. The main ecological values of the Moutere Inlet are the estuarine vegetation which brings about high productivity, and the wildlife associated with the estuary.

Estuarine Vegetation

The normal sequence of estuarine vegetation has been described in the previous section. There are two key communities which are the greatest contributors to productivity; eelgrass and saltmarsh. Eelgrass is highly productive but not present in large areas. It is the saltmarsh which is the key zone for productivity in this estuary. It is the productivity from this zone which generates the food to sustain the invertebrates which in turn sustain large numbers of birds, especially waders. It is important to note that this productivity arises from a different pathway to most terrestrial ecosystems. In farming cattle directly graze the production from grass, but in estuaries much of the production is not actively consumed, but decomposes before it becomes accessible to a range of invertebrate species. This decomposition pathway is characteristic of estuaries. Probably less than 10% of the upper tidal zone has been lost around the Moutere, but this has resulted in approximately a 25% loss in productivity to the estuary as a whole. The upper zone of the saltmarsh vegetation is the area of greatest value to several species of specialist wetland birds, including banded rail, South Island fernbird, and marsh crake. Although these birds may feed out into the rushland, their roosting and breeding areas are in the upper zone of the saltmarsh and it is these areas which have been extensively modified within Moutere Inlet.

Wildlife

Banded rail can be considered a keystone species of estuaries. When they are present in good populations it is often an indication that the estuary is in reasonable health. They live in the upper reaches of most estuaries, and have specific habitat requirements. They prefer to feed adjacent to cover, not out in the open, hence the preference for the growth habit of the sea rush which often has small gaps which facilitate easy movement. The photo to the right shows the main elements required – sea rush, fresh water, slightly open areas, and cover. The freshwater source provides habitat for one of their main food items, a small snail (*Potamopyrgus estuarinus*). Dense cover on the edge is required for roosting, breeding, and as escape habitat from predators. Banded rail occur (red) in most of the suitable habitat in the Moutere Inlet.

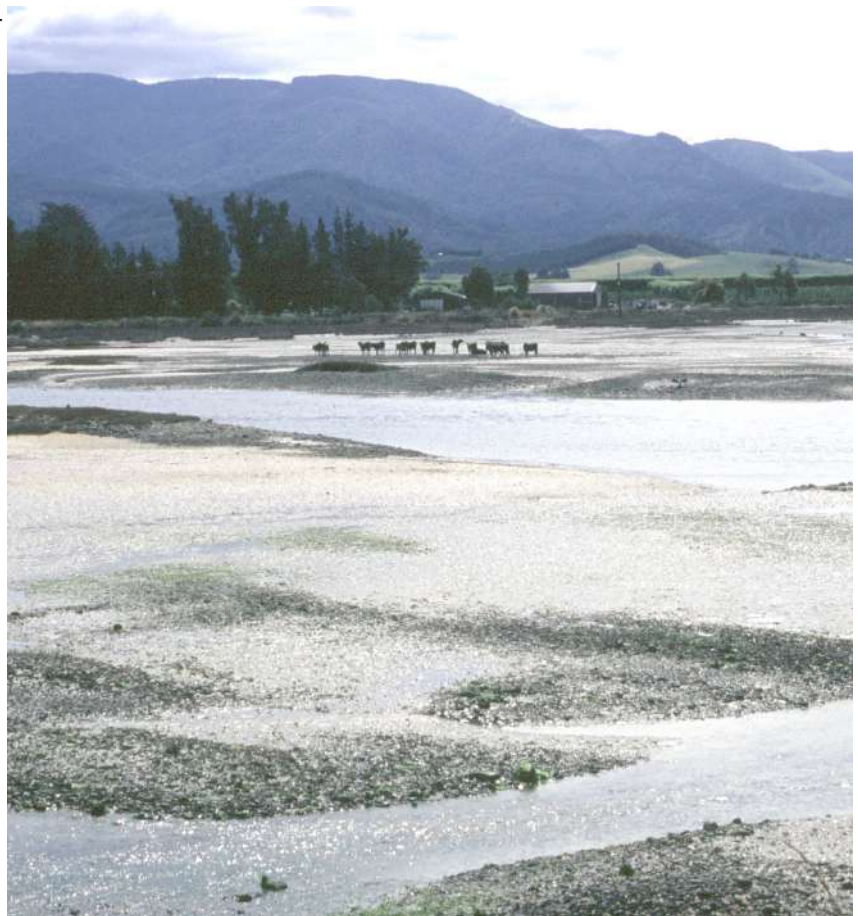


Wildlife (Cont.)

There is a wide range of wildlife values present in and around the Moutere Inlet, due either to the large numbers of birds present or their conservation status. Most abundant are Eastern bar-tailed godwits (migrants from Siberia) and South Island pied oystercatchers. Species which have a high conservation status include Royal spoonbills, white heron, Caspian tern, banded rail, and banded dotterel. Some of these species are not regular visitors to the inlet but may use a small part of the area seasonally.

Threats to Conservation Values

The major threat to conservation values focused on by this report is progressive loss of the estuarine edge. Other threats exist (e.g. sedimentation, shellfish harvesting, pollution) but are outside the scope of these notes. Damage has occurred by roading, grazing, dumping, and reclamation. The formation of the original road around the estuary was located on the first hard ground close to the saltmarsh. This destroyed some parts of the upper saltmarsh, and isolated it from adjacent freshwater wetlands. The new road split much of the western side of the inlet into a series of embayments, drained by culverts which have changed the hydrology of each of the embayments. Grazing has reduced the extent of saltmarsh in some areas, reducing productivity and destroying habitat for wildlife.



Threats to Conservation Values (cont)

Reclamation has already reduced the saltmarsh area with consequent impacts on productivity and wildlife. Estuaries are very important breeding areas for many fish species and such activities will certainly have impacted on local fisheries.



The edge of the inlet has been used as a dumping area for many years. The cumulative impact can be quite significant, even if the direct area impacted seems small.

The result of these modifications to the estuary are that the edge area has been significantly reduced, with consequent negative impacts on productivity and wildlife habitat. Few, if any areas in the Moutere Inlet, have a fully intact sequence from saltmarsh to shrubland or forest. One of the islands has a good sequence, and some of the embayments have small areas where all the elements are present, but an intact sequence is now a rarity.

Banded rail have been the subject of several population studies in the Moutere Inlet (Elliott 1982 and 1990, Lurling 1997). These studies revealed some significant population fluctuations. The 1982 study showed banded rail to be present in eight locations within the estuary, while the 1990 study showed that this distribution had been dramatically reduced to only one site. The 1997 study revealed that six sites had banded rail, while an unpublished survey carried out in 2004 (Steve Wood, pers. comm.) showed that at least one of the sites in which banded rail had been present (Eden Road) in 1982 and 1997 had lost its population. These results are disturbing in that they show a picture of quite significant population swings. The Tasman Bay populations of banded rail are potentially quite isolated from each other by large areas of unsuitable habitat. If a population crash one year then coincides with unfavourable weather conditions, or an explosion in predator numbers, it would be very easy for populations to become locally extinct, further isolating populations and creating risks from the small genetic pool.

Banded rail Distribution in Moutere Inlet; 1982, 1990, 1997



Threats to Conservation Values (cont)

Elliott (1990) identified a number of potential issues which may result in threat to the banded rail population. These included:

- Rubbish dumping attracting rats which are predators and in turn attract other predators
- Residential development bringing with it domestic pets
- High traffic volumes adjacent to saltmarsh resulting in road kill
- Edge modification from road construction
- Potential risks from pesticide use adjacent to the estuary impacting on food of banded rail
- Decreased freshwater input from abstraction reducing water supply for food organisms

Not all of these potential threats are easy to either quantify or rectify. However, this list provides a focus for restoration efforts which are primarily aimed at restoring the edge of the inlet and improving habitat for banded rail.



Restoration

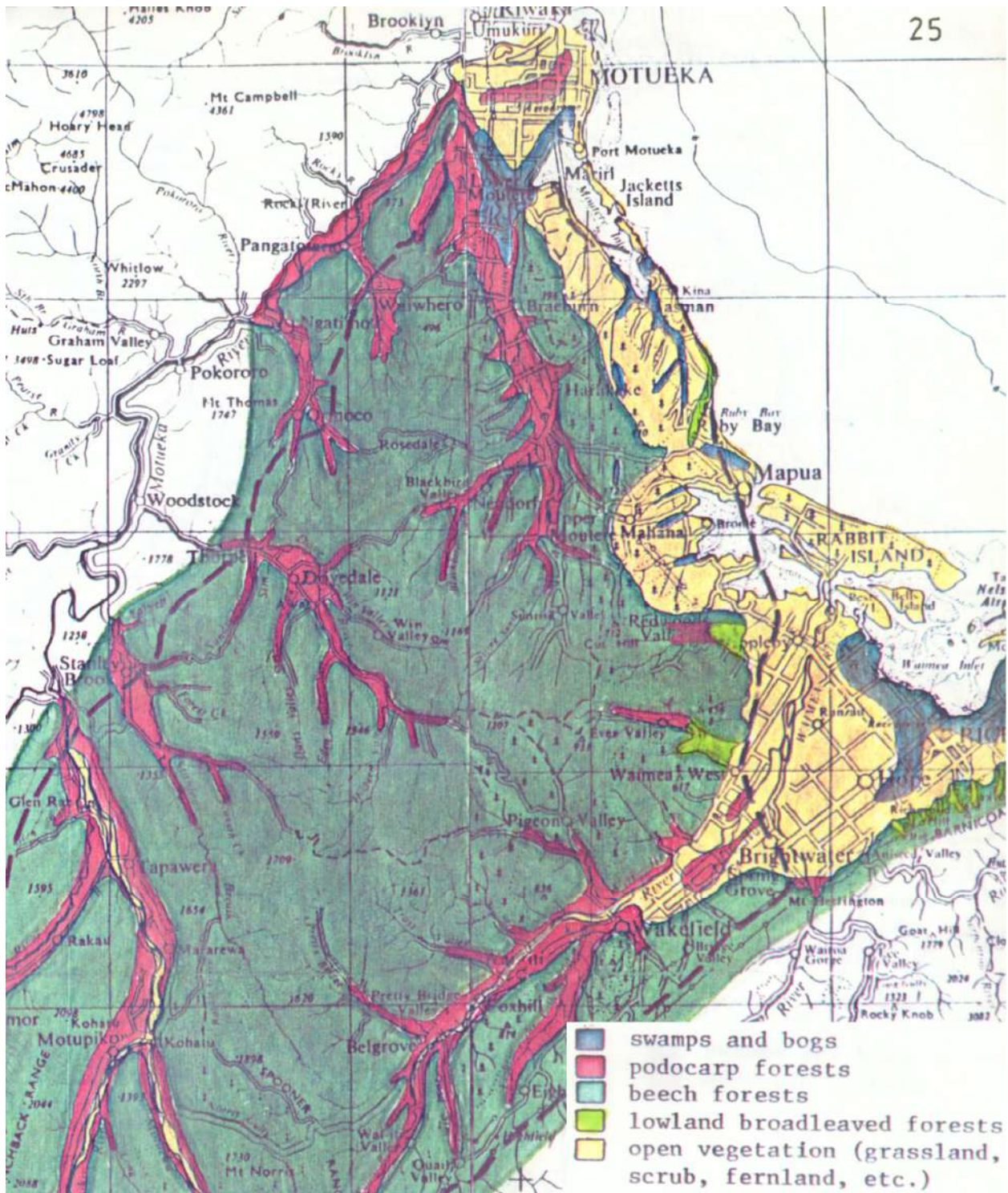
From the preceding information it is clear that some key values of Moutere Inlet are under threat. Some obvious and practical measures which can be taken to improve and better understand the current situation include:

- Restoration of the upper edge of the saltmarsh through rubbish removal and planting of appropriate species to complete the natural vegetation sequence and create dense cover as breeding, roosting, and escape areas for estuarine edge species
- Further investigation of the impacts of predation and active control of selected species in areas where it is thought that this will be beneficial
- Monitoring the supply and quality of freshwater

These notes are intended to serve as the background material for any restoration initiatives within the Moutere Inlet, and specific plans will be developed for each site which is proposed for restoration.



Appendix 1 - Former Vegetation of the Moutere Gravels



From: Walls, G., 1985 Native Bush Remnants of the Moutere Gravels. Botany Division, DSIR

Appendix 2 - Useful references

Subject	Reference
Restoration	Porteous, T. 1993 Native Forest Restoration. A practical guide for landowners. QEII National Trust <i>The most authoritative book on restoration generally.</i>
	Courtney, S. 2003 Nelson's Natural Heritage <i>Recently published, this provides a guide to restoration of natural communities within Nelson City, and next year it will be followed by a guide to restoration within Tasman District.</i>
	http://www.doc.govt.nz/Regional-Info/010~Canterbury/005~Publications/Protecting-and-Restoring-Our-Natural-Heritage/ Protecting and Restoring our Natural Heritage - A Practical Guide. <i>An excellent on-line resource (also in hard copy) which covers all aspects of restoration very thoroughly.</i>
	www.biodiversity.govt.nz/ <i>The official Government site on Biodiversity, has many useful references and resources</i>
Banded rail papers	Elliott, G. 1987. Habitat use by the Banded Rail. NZ Journal of Ecology, Volume 10
	Elliott, G. 1989. The distribution of banded Rails and Marsh Crakes in Coastal Nelson and the Marlborough Sounds. Notornis 36: 117-123
	Elliott, G. 1990 Banded Rail distribution in Tasman Bay and the Marlborough Sounds, Winter 1990.
	Lurling, J.F. 1998. The distribution of Banded Rails in the Moutere and Waimea Inlets, Nelson, 1997-98