New Zealand Forest Remnants and Their Story: A Background to Their Management and Restoration

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In this talk I introduced some ideas intended to give a useful background for understanding, managing and restoring forest remnants. These ideas are briefly summarised below. I also offer a selected bibliography of key references and further reading suggestions for following up the themes of this summary.

What is a forest remnant?

Some definitions:

".....The little that remains, small remaining quantity or piece or number of.....things; surviving trace, fragment, scrap". *(Oxford English Dictionary)*

".....A patch of native forest around which most or all of the original vegetation has been removed."
(Bruce Burns, Landcare Research)

Some general characteristics of forest remnants arising directly from these definitions include:

- Size: Forest remnants are usually thought of as small areas but almost all areas of forest in NZ are remnant, so not all NZ forest remnants are small!
- Discreteness: Remnants are surrounded by some other different vegetation.
- History: A remnant's existence arises from non-natural processes.

Ecological characteristics of forest remnants

Ecological characteristics of forest remnants arise from their general nature as indicated above. Forest remnants share some environmental characteristics with their surrounding habitats (usually called the "matrix"), but the above characteristics also make them different. They are strongly affected by many outside influences, and many of their characteristics are affected by their small size relative to their surrounding matrix.

Biota

Forest remnants usually contain a restricted number of species. These species may not be representative of the whole ecological unit in which they occur (e.g. the Ecological District), and may have limited genetic diversity. Species populations are thus not natural, and are frequently regenerating from external or natural disturbance. Populations may have fragmented age or size characteristics, e.g. they may frequently be even-aged ("cohort" populations).

Plants and animals alike may face external barriers to reproduction and/or dispersal, and plant populations may need external dispersal agents. On the other hand, when forest remnants occur in relatively species-rich lowlands, they may have more diversity than even larger forest areas elsewhere (e.g. at higher altitudes).

Environmental

At the margin between the forest remnant and its surrounding matrix, there is usually an abrupt transition between the two areas: this results in abrupt changes of light levels, humidity, temperature, soil moisture, etc. "Edge effects" dominate ecological processes in a large proportion of remnants, especially small ones. However, there is very often a transition or buffer zone. Remnants are often severely affected by weeds and pests, especially if unfenced. This may be because of edge effects, because they are weakened by exposure, or because they offer a relatively favourable habitat to weeds or pests compared to the surrounding matrix. In New Zealand, forest remnants are most often surrounded by scrub, introduced grassland or exotic tree plantations, less often by native tussock grassland or other vegetation. These different types of vegetation have greatly different characteristics as physical buffer zones and as sources of weeds and pests in the remnants.

Summary and Implications of Ecological Characteristics:

Most forest remnants have limited biodiversity, and limited environmental resilience. This means that they often need intensive management if they are to remain viable. But minimum size thresholds for long-term viability of remnants are not well known. These thresholds are likely to differ according to the composition and environment of the remnant.

Why are forest remnants important?

Forest remnants perform a varied range of valued functions and services:

- Refuges for native biodiversity, especially in the lowlands
- Wildlife corridors
- Contribute ecosystem services
- Preserve representative soil types
- Snapshots of the past
- A context for understanding and appreciating

biodiversity

- Contribute to New Zealand's landscape character
- Cultural importance to Maori and pakeha.

Remnants in urban areas are particularly important, because they may be the only natural areas in the urban setting, and are the natural areas which most people experience and enjoy most of the time. Therefore urban forest remnants not only have the above values but also important amenity values as well. As such, they are becoming the focus of much restoration and management effort, especially by community groups and local authorities.

Conservation of forest remnants symbolises a current shift in thinking about nature conservation in New Zealand. Management of large tracts of publicly-owned, remote near-wilderness natural areas (which do not represent all of New Zealand's total biodiversity) by the Department of Conservation is no longer the sole focus of effort. Much more emphasis is now going into people and communities conserving remnant natural areas, often council reserves or privately owned, near where they live. Such remnants preserve a wide range of biodiversity and are in fact probably the most significant reservoirs of biodiversity in lowlands (including rare and threatened biodiversity) in most regions of the country. This shift is becoming recognised in government policy, especially the New Zealand Biodiversity Strategy.

Management and Restoration of Forest Remnants

In my opinion, restoration is a subset of management, and all management should relate strongly to sustainable land management principles. There are three interrelated aspects of sustainable land management generally - ecological, economic and social. For forest remnant management I would summarise these into "three Ps":

Processes (ecological)

The key is to maintain essential ecological processes in order to maintain the ecological health of the remnant, and the ecological integrity of the remnant within its matrix. Maintaining the ecological processes of the buffer/ edge zone is often a crucial part of this: understanding the ecological character and processes of the buffer zones and at least the immediate matrix are thus as important as understanding the remnant itself.

Priorities (economic)

Most managers don't have the resources to do everything desirable. They need to prioritise actions in order to maintain the ecological processes. Prioritising actions (often relating to different parts of the forest remnant i.e. a zoning approach) is more important than prioritising areas, especially in urban situations where amenity values are often as high or higher than biodiversity conservation values. Monitoring environmental outcomes of management actions is an important element in sorting out management priorities.

People (social)

People may have been the cause of forests becoming remnants but they also allow forest remnants to survive now. People are the greatest resource for forest remnant management: they provide the direct link to the local importance of forest remnants. There is a tremendous surge of interest and commitment to maintenance and restoration of all kinds of remnants. Supporting this local voluntary effort is probably the most important way that government can make a difference.

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