

Where are we at with ecosourcing for biodiversity? Waitakere City, a case study

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Introduction

Conservation practice is a growth industry in New Zealand, especially the practice of ecological restoration. At the national level, restoring ecological niches for threatened bird species (e.g., on Tiritiri Matangi Island in the Hauraki Gulf) has a high profile, and at the regional level one strong focus is on water quality with riparian plantings and restored or constructed wetlands (e.g., Travis Wetland in Christchurch). At the community and local levels there is a strong focus on gully and stream or dune revegetation. To support these community and local council initiatives the nursery industry is growing greater numbers of wetland and early successional species. In order to achieve some of the principles of biodiversity, most government and local bodies are requiring the use of ecosourced plants for conservation and amelioration restoration. As well, some councils are encouraging the use of ecosourced plants for amenity plantings of local native species in home and public gardens. However, there appears to be some variation in the way the term 'ecosourcing' is being interpreted and the way the practice is implemented within the nursery industry. The results of a Waitakere City Council sponsored ecosourcing audit provide some information about where we, as a country, may be at with ecosourcing.

Biodiversity

Biodiversity has now become a term that is not exclusive to specialists, despite its relatively recent emergence into our language during the 1980s (National Forum on Biodiversity in Washington in 1986; see Wilson, 1988). The meaning of this term was

standardised (more or less) in the Convention on Biological Diversity at the United Nations Conference on Environment and Development (UNCED, also called The Earth Summit) in Rio de Janeiro in 1992 to include ecosystem diversity, species diversity and genetic diversity (UN, 1992).

This UN definition appears fairly straightforward. However, an attempt to define each of these components shows how complex natural systems are. There are ambiguities of meaning when we try to look at the boundaries (spatial and temporal) of ecosystems, the concept of species, and the limits of a population. This complexity is apparent at the practical level of restoration and particularly when implementing the concept of ecosourcing.

Species concepts for example, are numerous. Morphological characteristics have traditionally been important delineating factors, while more recent DNA analyses are providing new information. Taxonomic work frequently splits what has been considered a single species into a number of segregate taxa. A recent example in the New Zealand flora is provided by *Sophora microphylla* or kowhai (Heenan et al., 2001). This species has for a long time been recognised as being variable and having a number of distinct forms, with a distribution throughout the North, South and Chatham Islands. Its taxonomy was revised by Peter Heenan and colleagues who, on the basis of leaf characters and habitat preferences, recognised new species and reinstated others. For example, *Sophora chathamica* occurs in the North Island and Chatham Islands in

coastal sites; *S. fulvida* is found in the northern North Island on andesitic and basaltic volcanic soils; 'true' *S. microphylla* grows in the North and South Islands in a number of habitats; *S. molloyi* is restricted to the Cook Strait area. So for revegetation purposes, seed may have been collected in the past from a number of plants within a region or ecological district that were all included under the name *S. microphylla*. However, collections can now be distinguished between different species. For the Auckland region, *S. chathamica* is found naturally in coastal areas, *S. microphylla* on terraces / hill slopes and *S. fulvida* on volcanic soils. If these species of *Sophora* are usually geographically separate and have the capacity to readily cross-pollinate, any past plantings may have resulted in different species being introduced to an area which may result in genetic pollution of the existing local populations.

Unless detailed studies are undertaken, the genetic variation within a species is often unknown. Population, breeding system and genetic studies are rare for New Zealand plants. However, some work has been done. Research on the newly discovered species of shrubby daisy, *Olearia adenocarpa*, is a good example of a pollination study that contributes to conservation (Heenan et al., 2005). In another recent study, *Cordylina australis* (cabbage tree) has been found to have genetic diversity that distinguishes different populations throughout New Zealand (Harris et al., 1998). Changes occur along the length of New Zealand and the distinguishing features are in plant form, growth rates, time to first flower, leaf pigmentation and cold tolerance. The implications

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for restoration plantings is that the collection of local seed for local plantings retains the integrity of the area's genotype (e.g., plant form) and maximises survival (e.g., level of cold tolerance) through best fit to the environment. Also, the genetic variation within each local population (a group of interbreeding individuals of a species in one place at one time) is the basis for evolutionary change. Many populations naturally have occasional new genetic material introduced from distant pollen or seed dispersal. This adds to the within-population diversity. The occurrence of this may be considered enhanced by non-ecosourced natives in urban gardens adjacent to native ecosystems (Metcalf, 2002). But, if we bring a large number of non-ecosourced plants into contact with the local population, then the introduction of this material is no longer 'occasional' and could be expected to greatly change the genetic character of the native population over time. It is probable that this is already happening and therefore is arguably contributing to the loss of some local populations. In effect, the diversity between populations will be reduced leading to overall increased homogeneity. This may result in reduced biodiversity at a national and global scale (PCE, 2001).

In this context ecosourcing is the main tool available to us to manage the genetic diversity component of plant biodiversity. Also, when undertaken according to a well thought through code of practice, it represents the precautionary principle. Whatever the gaps in our knowledge or the human constructs we put on the genetic differences we define as varieties or species, or even the modifications we have already made to the plant environment (especially urban), if we ecosource, we will contribute to the retention of greater biodiversity than if we do not.

Ecosourcing

The examples above highlight the degree of variability within a species, between populations, and between biogeographic regions. It appears that in practice, the term

ecosourcing was initially commonly used to describe 'collecting local seed for local planting'. As understanding has progressed it is now clear that ecosourcing requires an attempt to represent the range of genetic diversity within the local population. This is the critical difference between collecting for 'genetic purity' and collecting for biodiversity. This results in plantings serving the purpose of not just 'vegetation' (establishing plants) but of 'restoration' by contributing to the functional ecology and to the evolutionary potential of the population of which they will be a part.

One challenge is that identifying population boundaries of a species is problematic. Each species differs in the distances over which genetic material is naturally spread and in the rate at which it is spread (Baum and Schmid, 1996). Sometimes genetic variation of a species may be a continuum across gradients over large distances, known as a cline. At each end of the cline there may be some distinctly different characteristics for the species, but at no point along the cline is there a marked difference that can be recognised in the field (Simpson, 1991).

When it is not possible to define the boundary of the local population many are left with using a proxy to indicate potential for a population boundary. Physical landscape features such as the water catchment boundary, a change in habitat conditions, or the Department of Conservation Ecological Districts, are all used to define the parameters of the seed collection boundary for any new planting site. This use of a proxy thus leads to a generalisation of the concept of 'localness', and can undermine recognition of the local variation within the Ecological District.

A source of information that can be used to assist in identification of areas of similarity within an Ecological District is LENZ (Land Environments of New Zealand) classes (MfE, 2003). These classes distinguish areas of similar climate, geology and vegetation at a range of scales and information

at the finest scale indicates similar habitats at the local level. This classification may have the potential to provide information for defining ecosourcing zones within the Ecological District. A limitation is that LENZ classes at any scale are unlikely to be direct indicators for the population boundary of any particular species because different species have differing degrees of specialisation. Another limitation is that at the finest scale, LENZ classes are only available electronically and at a cost that is probably not realistic for most practitioners working in collecting, producing, supplying and planting native plants.

Where the local population is no longer present and the species is going to be reintroduced, the ultimate challenge for ecosourcing is highlighted. Seed collection could be from colonies that remain within the 'seed distribution catchment' of the planting site. This concept of a 'seed distribution catchment' enables us to acknowledge the fragmentation of a population into a number of colonies within the landscape, and to ask what the likely dispersal mechanisms are and what factors might be limiting distribution. If none of this is readily discernable then 'the nearest colony' may be the fallback position. In this circumstance we are left asking, how far away can still be considered 'near'? This is particularly difficult for the reintroduction of some rare and threatened species with historically disjunct populations that have become locally extinct (Bec Stanley, pers. comm.).

Individual local knowledge is probably the most common source of information about where native species grow naturally. In some cases this is in-depth knowledge especially where passionate individuals are involved with the local vegetation. However, for many practitioners, time is not available to research the natural areas, and detailed local information is not generally available.

Waitakere City

Waitakere City Council (WCC) is widely recognised as an 'eco city' using the guiding principles

of the UN Agenda 21 that were established at the Rio de Janeiro Conference in 1992 and has a commitment to the local implementation of the New Zealand Biodiversity Strategy. An objective for Waitakere City Council is to enhance and manage the sustainability of biodiversity in the city.



Fig. 1 Te Henga Beach, a restored duneland, now trapping sand that once threatened to engulf coastal buildings.

The eco city's aim is to work towards a healthy habitat for indigenous species and people. The city recognises the ecological concept that everything is connected, and aims to integrate the implementation of its biodiversity strategy across all components of the city. It recognises that managing biodiversity affects the functioning of ecosystem services that provide for healthy living environments (Daily, 1997).



Fig. 2 Riparian urban habitat at Waikumete Stream tributary, Glen Eden – a 'restored' landscape.

One manifestation of the implementation of the enhancement of biodiversity is the WCC 'Green Network' concept that includes a physical network, an ecological network and a people network across the city, connecting the Waitakere Ranges to the Waitemata Harbour through the urban landscape (Ferkins, 2005). One of the components of the Green Network is to produce a Biodiversity Strategy for the city. However, restoration programmes

and implementation of biodiversity have been high on the agenda for some time. Revegetation has been occurring at several levels: Council run projects based on ecological or asset management priorities; community/Council coordinated projects usually based on community interest; and community run projects. Examples across the range include riparian margin, bush edge and wetland plantings, tip site rehabilitation, community coordinated plantings on parks and in local neighbourhoods, and community initiative planting (e.g., Trees for Babies, planting backyards on private land). Assistance is available with weeding, and locally sourced plants are provided for all projects including private landowners who have bush, coastal edges, wetlands or riparian areas within their boundary. One example of joint community, private and Council restoration plantings and weed management is Project Twin Streams which has an integrated management approach for the streams within the Henderson Creek and Huruhuru Creek catchments including the Waikumete, Bishop, Oratia, Pixie, Opanuku and Swanson Streams – some 56 km of significant urban/suburban/peri-urban catchments that flow through Henderson, Glen Eden, Swanson and Ranui townships, and into the Waitemata Harbour.

WCC code for ecosourcing

One of the fronts on which WCC confronts biodiversity implementation is through involving local nurseries who are encouraged to participate in the practice of supplying ecosourced plants for the Waitakere area. In order to assist nurseries and other landscape and horticultural industries, the Council has published *Ecosourcing Code of Practice and Ethics* (Ferkins, 2001). The expectation by WCC is that it becomes standard practice to make ecosourced plants available so customers have an informed choice.

WCC objectives for ecosourcing are to maximise the potential for horticulture and related land management practices to contribute positively to the health of the local

and New Zealand landscape, and to minimise some of the damage and risks of damage caused by these same practices.

The Code is relevant to all those interested or involved with New Zealand native plants by way of gathering propagules, plant propagation, sale, distribution, or specification (e.g., contract, landscape design), landscaping and gardening, estate management, conservation (in situ or ex situ), education and training (Ferkins, 2001).

WCC aims to approach the concept of ecosourcing in an holistic way. The Code extends beyond providing guidelines for collection of propagation material to the management of all stages of production and implementation including propagation material, production systems, sales, policies, planning, information and planting. The Code not only defines ecosourcing and provides guidelines for collecting and growing seed, it also provides an ethical framework in which to function. This includes professionalism when participating with others in the industry, the general public and local iwi. It also has an expectation that nurseries growing ecosourced plants will actively promote the concept and provide education material.

The ecosourcing concept definition within the Code is "collecting seed from the same area in which it is intended to plant the plants grown from them" (Ferkins, 2001, p. 6), i.e., connecting the source to the destination. It also means collecting from the representative range of the diversity within the population. This contrasts greatly with amenity plant selection where plants are selected for their visual characters and their performance in gardens. The Council recognises the drivers behind this selection of plants and thus, while encouraging ecosourcing, considers ecosourced plants as a distinct product. The Code thus applies to those plants collected for the purpose of, or otherwise claimed to be ecosourced. The ecosourcing practice of selection from a representative range

intends to optimise the evolutionary potential in a changing environment by maintaining local population biodiversity, maintaining population viability and retaining local character.

WCC's Ecosourcing Code has 11 Standards:

1. Integrity and professional standards
2. Ecology and diversity standards
3. Record keeping, labelling, customer information standards
4. Access and landowner relationship standards
5. Relationship with iwi
6. Collection methods, environmental risk
7. Relationship with colleagues
8. Relationship with community
9. Relationship with paying clients
10. Environmental considerations
11. Educational responsibilities.

WCC consider ecosourcing is *all* of these aspects; a package of 'good practice' for nurseries and for all other participants in the horticulture, revegetation and restoration industries dealing with native plants for the purpose of ecosourcing or with the desire to protect biodiversity.

Ecosourcing nursery audit

The Auckland Branch of the Royal New Zealand Institute of Horticulture were contracted to undertake an independent audit of the nurseries participating in ecosourcing Waitakere native plants. This audit was presented as a report (Haines, 2005).

Audit objective

A 'friendly' audit to provide feedback to both the participating nurseries and Waitakere City Council on the state of ecosourcing practices and

ethics, and to guide the next steps in developing ecosourcing practices and promotion.

Audit criteria

The audit criteria were based upon *Ecosourcing Code of Practice and Ethics* (Ferkins, 2001). The four areas of focus were: seed collection and production practices; record keeping and information systems; consultation and professional relationships; and education for ecosourcing. All aspects of the Code are required to be implemented with integrity for it to be stated that ecosourcing is being practised.

Audit process

The independent auditor was directed to 15 native plant outlets that all had some exposure to ecosourcing native plants within Waitakere City boundaries. They included large wholesale nurseries specialising in propagating and growing native plants, small retail native plant specialists, liner nurseries growing small size native and exotic plants on contract, small wholesale nurseries growing native and exotic plants, garden centre retail outlets and local community nurseries. The approach was to examine the practices and decision making processes involved in managing stock – from supplier to customer. This related only to that stock claimed to be ecosourced. The method involved a detailed questionnaire for each participant and a site visit to verify the information.

Audit results (Haines, 2005)

The success of implementing the WCC Code was based upon the whole Code and not simply upon

the definition of ecosourcing as 'connecting the source and the destination'. That is, integrating practice and ethics, including participation in public awareness of ecosourcing. The result of the audit showed that one nursery fully complied with the Code, three mostly complied, six complied to some extent, four were non-complying, and one declined to participate.

Although there was a good understanding and involvement of ecosourcing concepts and practices by a small number of nurseries, only one nursery fully complied with all (or almost all) aspects of the ecosourcing Code. This distinction appeared to be due to the combination of a total commitment to ecosourcing principles and ethics, and to a systematic approach at all levels of production management, including a written ecosourcing strategy.

Liner nurseries contracted to grow from supplied seed complied with sections of the Code relating to good batch management.

All nurseries specialising in or predominantly producing native plants were actively growing and supplying plants labelled as ecosourced. Where there was a market for ecosourced plants, there was a higher level of interest in the ecosourcing concepts and an implementation of these into best practice and ethics. There was very little ecosourcing of plants produced for retail, although one nursery had a small permanent retail section labelled 'ecosourced Waitakere' plants. Ecosourced plants were almost exclusively produced to fulfil contracts or



Fig. 3 Ecosourced Waitakere logo. Available to nurseries for attaching to individual plants (retail) or batches of plants (wholesale).



Fig. 4 Chris Ferkins and nursery manager Hillary Star, amongst a range of Waitakere ecosourced plants for sale in a commercial nursery.



Fig. 5 A community nursery in operation.

for local community projects. Nurseries growing plants 'on spec' were generally not complying with ecosourcing principles. The apparent limited call for ecosourced plants and the assertion of higher costs of seed collection and compliance were the reasons stated for not providing ecosourced plants in these nurseries. This is contradicted by statements that landscape architects do request ecosourced plants 'off the shop floor', and there are requests at short notice for ecosourced plants to fulfil the requirements of some local council resource consents for new developments. The following are the key areas identified by this audit:

1. Good systems

The best ecosourcing nursery was supported by good documentation and systems throughout the whole organisation which gives confidence in being able to maintain integrity for each batch of ecosourced plants. Having good systems is the key to robust practices. Nurseries that currently don't produce ecosourced plants, but have good systems, have the greatest potential for becoming suppliers of high quality ecosourced plants. Smaller nurseries growing 'on spec' had a more casual approach to batch management which limits the potential for good ecosourcing practice. Modification of practices and an ecosourcing strategy document would be required to better meet the requirements of the Code.



Fig. 6 Community planting in an urban setting along a swale. This planting has a strong community and ecological (ecosystem service) purpose – creating habitat for a neighbourhood.

2. Seed collection and batch management

Batch management is crucial to 'best practice' for ecosourcing, and poor management practices

can undermine the integrity of the stock, i.e., management from seed collection through to sale for planting at a specified site.

Genetic diversity is often compromised by collecting from a narrow range of plants and collecting from the same plants each year. Where there are a limited number of local plants this is a necessary compromise. However, it seemed that it is common practice for at least some of the species to be collected from a small number of plants because it is more convenient and cost effective. The concept of 'local wild genetic diversity' is similarly compromised for convenience. The practice of collecting seed from plants that are acclimatised local plantings, but of unknown origin, occurred in at least three nurseries.

Only one nursery systematically recorded the habitat of the collection site, although this information may have been known (but not written down) by the individual seed collector for some other nurseries. The actual plant source or planting destination was very seldom included on the plant label. The use of coloured labels to differentiate ecosourcing regions while plants are in the nursery was an exception rather than the rule for batch management.

Only five of the nurseries used accession codes on the labels to clearly differentiate batches and provide a reliable link to records for more specific information. Some nurseries relied upon the date for reference, but others had no cross-reference system and relied on the knowledge informally held by individual staff members.



Fig. 7 Pat La Roche collecting seed (*Spinifex*) from a site for dune restoration at Piha.

3. Understanding ecosourcing concepts

Nurseries that had a commitment to ecosourcing understood the concepts and followed the appropriate practices. Nurseries specialising in growing cultivars (native and exotic) generally were not growing ecosourced plants, had less of an understanding of the concepts, and were generally unconvinced of the value of ecosourcing. A few nurseries, either through limited knowledge of ecosourcing or sometimes not complying despite good understanding, were supplying supposedly ecosourced plants when these were asked for, despite not complying fully with the Code (i.e., making seed collections from cultivated natives of unknown provenance, and collecting from a small number of parent plants).

The retail-only garden centres tended to view ecosourced plants as a 'product' that has some differentiation from other native plants, and offered customers a choice; but the staff did not demonstrate a good understanding of the concepts of ecosourcing. There was generally no policy to continue providing ecosourced plants as a permanent component of their stock and staff were not proactive in offering the option of ecosourced plants to their customers.

4. 'Local population' concept

Several nurseries relied upon the Department of Conservation Ecological Districts for defining 'local'. Two nurseries incorrectly considered plants of unknown origin that were 'locally acclimatised' within the Ecological District as appropriate for labelling as ecosourced. Some community nurseries considered the local catchment as the basis for collection, but where scientific research support was available, coastal margin plants extending a considerable length of the coast beyond the catchment were considered locally sourced, e.g., for pīngao (*Desmoschoenus spiralis*). Whether or not this is justified is determined by the likelihood that plants within that extended area are part of the same population.

Another misunderstanding by a minority of nurseries is that if the provenance is known, the plant is considered ecosourced, irrespective of the final destination e.g., collecting seed from a known Auckland site for planting in the Bay of Islands, or collecting Matauri Bay rengarenga (which may actually correspond with a new species, *Arthropodium bifurcatum*, rather than the more commonly known *A. cirratum*) for sale in Auckland. Knowing a plant's origin isn't enough to consider it ecosourced. We also need to match the origin with the destination. So, is it correct to label plants as 'ecosourced from...', or should we find different wording? In this instance the Code expects that the seller will "*Display and communicate the status of ecosourced plant material and information about its source, so that potential customers are aware of the geographical area within which it should be planted in order to fulfil its ecosourced status.*" It follows that if the plants are subsequently planted in a site outside the boundaries of their population they no longer have the status of being ecosourced.

5. Permits

Collections from public land generally are not formally permitted (despite the Auckland Regional Council providing permits if they are approached – the ARC owns most of the public land suitable as source areas for seed in Waitakere) and there is some cause for concern that there are no controls over quantities of seed collected or over areas from which seed is collected. Some participants were concerned about the future impact on seed sources as more collections occur by an increasing number of collectors.

6. Iwi and cultural practices

Only one nursery made contact with local iwi in relation to their practices, such as local planting ceremonies and gaining permission from iwi for seed collection where Māori are directly involved with the site. No other nursery had contact with iwi in relation to their business. No nursery deliberately used Māori cultural practices when collecting seed or other propagules.

7. Filling a contract

All nurseries stated that they have not had to reject an order that did not meet the standards of the Code (this has happened at least once since the audit was completed). It is probable that some compromises are being made by some nurseries but it was not possible to identify this in the audit. There were four possible actions cited for a situation where a nursery cannot fulfil a contract for ecosourced plants:

1. Pass the client on to another supplier. One nursery used this approach.
2. Purchase the balance from another nursery. This is common practice amongst nurseries, and nursery ecosourcing standards can be upheld if the supplying nursery practices are good, but can be undermined where practices are less robust.
3. Substitution by the nursery with non-ecosourced plants, without permission from the client. One nursery mentioned this as known to be happening in the industry, but this was not able to be verified by the auditor.
4. Substitution by the client with non-ecosourced plants. This is said to be happening where clients are required to fulfil resource consents for development, but again this was not able to be verified by the auditor.

8. Promotion of the ecosourcing concept

Community nurseries take the opportunity to communicate ecosourcing concepts to the community during public planting days, as an integral part of their practice.

Specialist native nurseries have staff who are able to articulate the ecosourcing concepts for customers. It appears that very few nurseries regularly promote the option of ecosourced plants. Staff training for most nurseries and retail outlets in ecosourcing concepts was limited.

The promotion of ecosourcing concepts appears to reflect the emphasis on a response to market demand, rather than a committed

proactive approach to ecosourcing or biodiversity. Because of the size of orders and contracts, Councils are in a position to have a positive influence on the demand for ecosourced plants, but only if they maintain standards when accepting plants. None of the participating nurseries stated in their catalogues the source of their current stock. There are more opportunities for the promotion of ecosourcing by all nurseries, through their labelling systems, catalogues, flyers, newsletters and word-of-mouth.

9. Availability of ecosourced plants

Availability of ecosourced plants is limited almost exclusively to contracts although ecosourced plants surplus to a contract may become more broadly available. One nursery had a limited number of labelled 'ecosourced Waitakere' plants available for retail sales. The lack of readily available ecosourced plants is a major limitation when landscape contractors, developers attempting to fulfil resource consent requirements, and residential gardeners cannot make quick or casual purchases. It also limits the nursery's ability to give the client the option to use ecosourced plants.

10. Image of ecosourcing

Generally there was an attitude of support for the concept of ecosourcing from the nurseries participating in the audit. Only one nursery that was approached did not want to participate with the audit as they felt the concept of ecosourcing was 'rubbish' and not appropriate for the urban environment. The practice of ecosourcing plants is mostly seen to be associated with local bodies or government agencies. However, there is a growing interest by landscape developers to use ecosourced plants if they are available within their time-frames. A comment about the general public demand for ecosourced plants was made by one of the nurseries during the audit, that 'ecosourced Waitakere' plants available in garden centres were not turning over very quickly and began to look old and miserable with a narrow range of unattractive species. Given the increasing public and

professional awareness this could be overcome with better marketing of the product.

Audit summary

Most nurseries are achieving the 'connecting the source with the destination' aspect of ecosourcing that is one fundamental aspect to environmental integrity and protecting New Zealand's biodiversity. Most however are not complying with other aspects of the Code such as collecting from a representative range within the population, or communication and education about ecosourcing, associated with a holistic approach to practices and ethics fundamental to the WCC Code. Only one nursery had a fully developed, and two nurseries had partially developed ecosourcing strategies.

Important issues relating to ecosourcing that arose out of the audit are related to the interpretation of the ecosourcing concept, the definition of 'local population', the collection of seed, the production batch integrity, permission to collect, and practices of exchanging plant material – including the exchanging of information.

One of the strengths for ecosourcing in the industry is where nurseries with robust systematic procedures at all levels of the business are able to comply with the ecosourcing Code with confidence. Nurseries that produce plants for a defined catchment only (i.e., local community nurseries) have fewer opportunities for batch contamination. Nurseries with regular contracts to grow ecosourced plants are most committed to the Code.

Weaknesses for ecosourcing in the industry include misinterpretation of ecosourcing concepts in smaller nurseries that can result in clients purchasing non-ecosourced plants that they wrongly understand to be ecosourced. The need to trust other nurseries' practices and ethics for exchange of plant material may undermine the confidence of the receiving nursery in the integrity of the product they supply. Apparent higher costs in producing ecosourced plants mean that nurseries usually do not

grow these on spec. The lack of availability of ecosourced plants can result in the use of non-ecosourced plants. Plants grown on spec are not usually labelled or listed in catalogues with the provenance. This is limiting the knowledge and choice for clients to take the ecosourcing option. Community nurseries accepting plant gifts may be vulnerable to genetic pollution.

Conclusion

Perlman and Adelson (1997) ask "How can we save genetic biodiversity if we can't see it?" Ecosourcing practice is an attempt to participate in saving genetic biodiversity. However, 'local seed' is still very difficult to quantify and to represent appropriately in restoration projects. And in the process of attempting to save genetic biodiversity we need to be cautious, as one audit participant said, "in some areas we already harvest most or all of the local indigenous seed available". The audit conducted by the RNZIH for Waitakere City is one step in collating information relating to these challenges. One of the possible future resources that may help to overcome some of these difficulties associated with ecosourcing at the local level is the production of a 'population atlas' for species commonly grown for revegetation planting. If it was possible to delineate local populations, and if there are sufficient sources of local seed, the indication from some nurseries is that this would increase the ability to produce ecosourced plants.

There is interest from regional and local councils to combine efforts, to align practices and requirements of nurseries, and to promote ecosourcing to the wider public. *Ecosourcing Code of Practice and Ethics* is now being recognised nationally as a guide and as a teaching text. Ecosourcing is promoted by Christchurch City Council in their biodiversity strategy; Greater Wellington Regional Council have adopted a policy for ecosourcing; Hamilton have established a group to supply ecosourced plants for gully restoration; Southland, Palmerston North, Taranaki, Horowhenua,

Waitakere, Wellington, Whangarei/Northland, amongst others, have community nurseries that are interested in combining efforts, and aligning practices. Given this endorsement and spread of interest, there may be a sufficient base on which to launch a national ecosourcing programme, logo, and accreditation system, possibly in a partnership or accord with RNZIH and others.



Fig. 8 Community planting on a relatively natural and wild site. **A**, 'dune' site in front of Piha surf club prior to restoration, a challenging site for plants to establish in. **B**, community nursery plants arriving for the planting day. **C**, getting started on community planting day. **D**, finished job, six months later. On one day in 2005, about 15,000 people visited this beach!

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Chris Ferkins is the Parks Environmental Coordinator at Waitakere City Council. His primary areas of expertise are ecological restoration and community participation. Chris has pioneered streamside revegetation techniques used in Waitakere. He has a significant advocacy and advisory role, working with private landowners, community groups, industry groups and Council staff encouraging understanding and best practice implementation. Chris is a contributor to the recently launched book *Waitakere Ranges*, and author of the *Ecosourcing Code of Practice and Ethics*.

Waitakere City is styled as an eco city aiming for sustainability, including biodiversity protection. The Green Network is the concept that provides a framework for this sustainability objective to be translated into how we manage, use and otherwise interact with the City's open spaces including Parks.