Non-local indigenous New Zealand vascular plants self-propagating in Wellington

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INTRODUCTION

Many indigenous New Zealand plant species are grown beyond the areas they occupied at initial human arrival. In some areas, such shifted plants are now self-propagating where they did not occur at the time of initial human arrival. Some are so invasive that they are displacing locally indigenous vegetation, or inhibiting its restoration.

We provide a preliminary list of vascular plant species that are (i) indigenous somewhere in the New Zealand Botanical Region (Allan 1961), but (ii) are not indigenous to the Wellington region, and (iii) are now self-propagating in the Wellington region. We term these 'self-propagating non-local native' plants. We also include hybrids between species indigenous to New Zealand, but where at least one of the parents is not indigenous to the Wellington region.

Our list refines that of McAlpine & Sawyer (2003; their Appendix 3), adding commentary from our observations and supporting voucher specimens where available. Their list was for the entire Wellington Conservancy (as it was in 2003) of the Department of Conservation, whereas our list covers a smaller area (see below).

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6. Otari-Wilton's Bush, Wellington City Council, PO Box 2199, Wellington 6140.

7. 57 Thomas Street, Stokes Valley, Lower Hutt 5019.

METHODS

Area of interest

For our purposes we define the Wellington region as that to the west of (and including) the lower Wainuiomata River valley, through Wainuiomata and Whitemans Valley, to Pakuratahi, Akatarawa Road through to Waikanae, with a northern boundary from Field Peak along Peka Peka Road. Kapiti Island and Mana Island are included. Our area of interest, so defined, is shown in Fig. 1.

This definition of the Wellington region includes the urban areas of Wellington and the surrounding settlements (including Lower Hutt, Upper Hutt, Eastbourne, Wainuiomata, Porirua, Paraparaumu, and Waikanae). It also takes in some of the region's forested upland areas (e.g., between Eastbourne and the Wainuiomata River; and that west of Akatarawa Road), but excludes most of the Tararua and Rimutaka ranges.

As indicated in Fig. 1, our Wellington region includes the entire Wellington Ecological District, and the North Island portion of the Cook Strait Ecological District (including Kapiti Island and Mana Island). Parts of the Tararua Ecological District and the southern end of the Foxton Ecological District are also included. Also indicated in Fig. 1 are the three areas employed by Druce (1993). Our Wellington region includes his entire Western Wellington hills area, as well as the western part of his Rimutaka Range area, and the southern part of his Tararua Range area (which extends to the Manawatu Gorge).

Previously defined regions were unsatisfactory for our particular purposes, specifically with regard to including Wellington's urban areas. For instance, the Wellington Ecological District excludes Eastbourne, Wainuiomata, and parts of Stokes Valley, as well as Pukerua Bay, Paraparaumu, and Waikanae. Similarly, much of the Hutt Valley is outside Druce's (1993) Western Wellington hills area.

Definition of indigenous

We regard the indigenous, or native, distribution of a species as that existing at the time of initial human arrival, which for New Zealand is c.750 years ago (Wilmshurst et al. 2008). For each taxon listed, we cite references indicating the extent of the taxon's indigenous distribution.

A few plant species now wild outside their pre-human distributions appear to have been moved by Māori (Heenan et al. 2001; Heenan et al. 2004a; Armstrong & de Lange 2005; Leach & Stowe 2005; Costall et al. 2006), possibly dating back several centuries. However, most self-propagating, non-local, native plants almost certainly post-date European

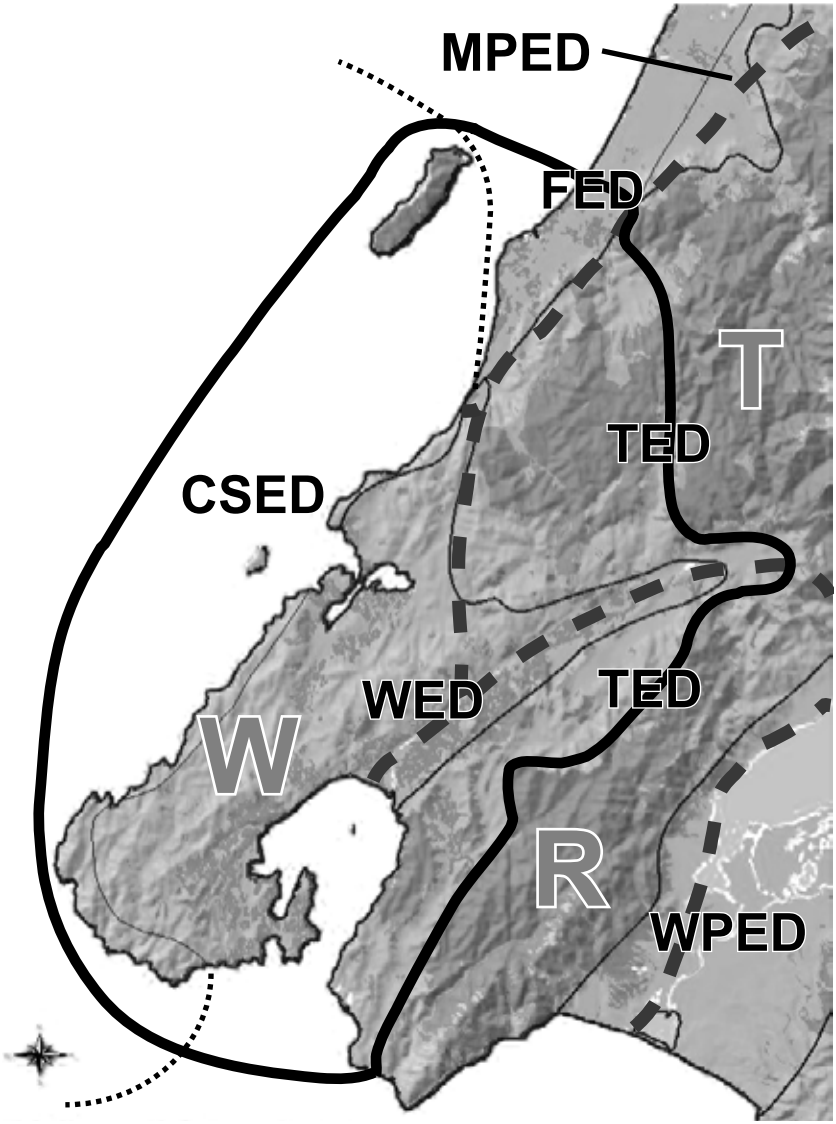

Figure 1. Our circumscription of the Wellington region for the present article is indicated by the thick black line. Dashed lines demarcate the areas employed by Druce (1993): W, western Wellington hills; R, Rimutaka Range; T, Tararua Range. Thin black lines demarcate Ecological Districts: WED, Wellington; CSED, Cook Strait; TED, Tararua; FED, Foxton; MPED, Manawatu Plains; WPED, Wairarapa Plains. Base map with Ecological District boundaries from Department of Conservation's GIS website.

settlement in the nineteenth century. Furthermore, the distributions of plants moved by Māori have been complicated by additional translocations after European settlement.

It is possible that the distributions of some indigenous plants have altered naturally (without direct human involvement) after human arrival. However, we do not know of any major such expansions in range (not just numbers) amongst Wellington plants.

Definitions for self-propagating non-local plants

Our criteria for self-propagating non-local plants follow Heenan et al. (2004b, 2008), who divide such plants into either Naturalised or Casual categories. Naturalised species are those with "populations [that] are self-maintained by seed or vegetative reproduction, or they occur repeatedly in natural or semi-natural habitats or [outside cultivation] in urban environments" (Heenan et al. 2008, p.257). Casual species are those that are "(1) passively regenerating only in the immediate vicinity of the cultivated parent plant, or more widespread but only known as isolated or few individuals; (2) garden escapes persisting only 2–3 years; (3) garden discards persisting vegetatively but not spreading sexually or asexually" (Heenan et al. 2004b, p.797).

Specimen vouchers

We have produced a list for those self-propagating, non-local, native plants for which there are herbarium vouchers, and another list for species lacking vouchers. To be effective, vouchers should show diagnostic features, allowing others to confirm identifications. They also allow names to be updated if a taxon is subsequently split into two or more taxa.

Our vouchering herbarium specimens are accessioned principally with Te Papa's WELT herbarium. Some of them preceded our study, but we have collected most of those we cite. We reference specimens from other herbaria where we are aware of them.

RESULTS AND DISCUSSION

For two reasons, we emphasise that our list is not a final product. First, it represents a compilation of information readily available to us, rather than a comprehensive effort to identify all of the species that meet our criteria. It is, therefore, very likely that many species, especially 'Casuals', have not been 'captured'. Second, additional plant establishments can be expected, so we encourage further observations, reporting, and documentation. It may become increasingly difficult to track Casuals, because of the large number of species that meet the criteria. However, continuing to attempt to record Casuals, especially those spreading by seed, is likely to be valuable in that it

should allow earlier notification of species that are becoming naturalised.

Additional vouchering of specimens would be useful where doing so would extend what is already known (i.e., a non-local species that has not been previously recorded/vouchered as self-propagating, or a new site), and where permission to collect is available. Specimens of seedlings provide a better demonstration than adult material that a species is self-propagating, although they may be harder to identify. Furthermore, clear statements in the collection notes that a specimen is self-sown (or, alternatively, planted) reduces any subsequent ambiguity about its correct status.

We strongly suggest that none of the species on the self-propagating, non-local native plants lists be used in ecological restorations in the Wellington region, because all are locally non-indigenous. Planting of the most invasive, naturalised taxa (e.g., *Pittosporum crassifolium*, *P. ralphii*, *Hoheria populnea*, *Pseudopanax lessonii*, *P. crassifolius* × *P. lessonii*, Fig. 2) should be vigorously discouraged, particularly near areas that retain significant natural values. Care, including monitoring, should be taken with the others, even in ornamental settings, as species showing only limited regeneration today may become the worst weeds of tomorrow (Sullivan et al. 2004; Groves 2006). Some occurrences of the listed species can be considered culturally significant (e.g., karaka groves established by pre-European Māori; pōhutukawa planted on the foreshore during the 20th century). We hope the potential spread and ecological impacts of such species are properly considered before additional plantings are established.

Figure 2. *Pseudopanax crassifolius* × *P. lessonii* (left) and *P. arboreus* in forest above Stokes Valley. *P. crassifolius* × *P. lessonii* has become a significant component of the forest flora in the area (JR pers. obs.).

The following are used as descriptors throughout the list:

- Naturalised: see definition above.
- Casual: see definition above.
- Māori: thought to have been introduced to Wellington by Māori before European arrival.
- MS: listed by McAlpine & Sawyer (2003).

Following the species name and descriptors is the year of the earliest vouchered or published record of self-propagation in Wellington that is known to us. In many cases there are (sometimes much) earlier unvouchered and unpublished observations.

VOUCHERED SELF-PROPAGATING NON-LOCAL NATIVE PLANTS IN WELLINGTON

Ackama rosifolia **Casual (2009)**

Indigenous distribution: North Island north of 36°S (Eagle 2006a).

Self-sown seedling within the forested area of Otari-Wilton's Bush (WELT SP088185).

Agathis australis **Casual, MS (2003)**

Indigenous distribution: North Island north of 38°S (Eagle 2006a).

Self-sown seedling within the garden area of Otari-Wilton's Bush (WELT SP089241). See Lewington & West (2011).

Arthropodium bifurcatum **Casual (2010)**

Indigenous distribution: northern North Island (Heenan et al. 2004a).

Self-propagating by seed in the former Dench garden in Newlands (WELT SP089490).

Arthropodium cirratum **Casual?, Māori? (?)**

Indigenous distribution: possibly North Island, north of c.38°S (Heenan et al. 2004a).

Arthropodium cirratum was cultivated by Māori for food and medicine. Southern North Island and South Island populations are usually associated with archaeological sites and it has been suggested they may result from translocation by Māori (Heenan et al. 2004a). Several wild populations occur in the Wellington region (Paekakariki, WELT SP077043; Kāpiti Island, WELT SP088684; Tītahi Bay, BM pers. obs.; also on the Wainuiomata coast just east of our focal area, WELT SP079124). However, the status of *A. cirratum* in Wellington remains uncertain: indigenous, introduced by Māori, or introduced by Europeans? Buchanan (1875, in Shepherd & Cook 1988, p.371) has *A. cirratum* in his list of "Introduced indigenous plants" for Wellington Botanic Garden, but it is unclear whether it was sourced

from the Wellington region or elsewhere. *Arthropodium cirratum* belongs on this list only if it was not present within the Wellington region at the time of Māori settlement. Furthermore, *A. cirratum* is self-propagating on Matiu/Somes Island (PR pers. obs.), and in gardens in Newtown (WELT SP087492), Stokes Valley (JR pers. obs.), and Kelburn (BM pers. obs.). The source of these plants is unknown.

Carex comans **Casual?** **(2010)**
Indigenous distribution: "Throughout" the North Island and "Very common" in the South Island (Moore & Edgar 1976), but listed as "may be adventive" for the Wellington area by Druce (1993); there are no specimens representing indigenous Wellington populations in WELT.

Self-propagating by seed in a Kelburn garden (WELT SP089438), and in the former Dench garden in Newlands (EB pers. obs.).

Chaerophyllum colensoi **var.** ***delicatulum*** **Casual (2010)**
Indigenous distribution: near Taupo and in the Kaimanawa Range in the North Island; also present in the South Island (Allan 1961). The species, but not the variety, recorded for the broader Wellington region by Druce (1993).

Self-propagating in the former Dench garden at Newlands (WELT SP089455).

Chionochloa flavicans **Casual (2010)**
Indigenous distribution: North Island, Coromandel to Hawke's Bay (Edgar & Connor 2000).

Self-propagating in the former Dench garden at Newlands (WELT SP089477).

Coprosma macrocarpa **subsp.** ***minor*** **Casual (1996)**
Indigenous distribution: northern North Island (Gardner & Heads 2003).

Self-propagating on Matiu/Somes Island, in vicinity of plant nursery (AK 232909; Gardner & Heads 2003, p.80).

Corokia buddleioides × ***C. cotoneaster*** ≡ ***C.*** ×***cheesemanii*** **Casual, MS (2009)**
Indigenous distribution: North Island north of 38°20'S (i.e., the indigenous distribution of *C. buddleioides*) (Eagle 2006a).

Self-propagating in Wellington Botanic Garden (WELT SP087464).

Obvious *Corokia* hybrids are usually ascribed this parentage (Metcalf 2000), but *C. cotoneaster* × *C. macrocarpa* is another possibility (Moore & Irwin 1978).

Corokia cotoneaster × ***C. macrocarpa*** **Casual (2010)**
Indigenous distribution: *C. cotoneaster* has a wide distribution throughout the North Island and South Island, but is not listed for the Wellington area

by Druce (1993). *Corokia macrocarpa* is endemic to the Chatham Islands (Eagle 2006a).

Self-propagating on Matiu/Somes Island (WELT SP088074), in the former Dench garden at Newlands (WELT SP089461) and at Karori Sanctuary (PR pers. obs.).

Corokia macrocarpa **Casual (2009)**

Indigenous distribution: Chatham Islands (Eagle 2006a).

Self-propagating on Matiu/Somes Island (WELT SP087456) and at Karori Sanctuary (PR pers. obs.).

Corynocarpus laevigatus **Naturalised, Māori (2003)**

Indigenous distribution: probably "northern North Island" (Costall et al. 2006; Eagle 2006b).

Corynocarpus laevigatus was almost certainly introduced to the Wellington region by Māori, it being a valuable food source (Leach & Stowe 2005; Costall et al. 2006). Post-European introductions are also likely. As in other areas to which it has been introduced (Costall et al. 2006), in Wellington there are "several places where aggressive regeneration of karaka [*C. laevigatus*] is leading to replacement of existing plant communities by stands of karaka" (Sawyer et al. 2003; p.10). Brooklyn (WELT SP088213), Kelburn (WELT SP089428), Lower Hutt (WELT SP088194), Mount Victoria (WELT SP088029), Oriental Bay (WELT SP086783), Otari-Wilton's Bush (self-sown, WELT SP088187), Wellington Botanic Garden (self-sown, WELT SP088044).

Dodonaea viscosa **subsp. *viscosa* 'Purpurea'** **Casual? (2009)**

Indigenous distribution: North Island, South Island, and Chatham Islands (Eagle 2006a), as well as outside New Zealand. The species is indigenous to Wellington, being listed by Druce (1993) for all three of his sub-regions. Metcalf (2000) indicates the purple-leaved cultivar is derived from Marlborough. However, Tim Park (pers. comm.) has observed that purple-leaved plants occur amongst natural Eastbourne populations. If these purple-leaved plants are indigenous to Wellington, the cultivar does not belong on this list.

The cultivar is self-propagating within the garden area of Otari-Wilton's Bush (RE pers. obs.), in an abandoned section within Mount Cook suburb (WELT SP088033), and a Kelburn garden (WELT SP089435).

Entelea arborescens **Casual?, Māori? (?)**

Indigenous distribution: possibly northern North Island.

Leach & Stowe (2005) suggest Taranaki plants were "at the margins

of its distribution", implying that pre-European plants to the south were the product of Māori introductions. The status of *Entelea arborescens* in Wellington nevertheless remains uncertain: indigenous, introduced by Māori, or introduced by Europeans? Buchanan (1875, in Shepherd & Cook 1988, p.367) had *E. arborescens* in his list of "Introduced indigenous plants" for Wellington Botanic Garden, but it is unclear whether it was sourced from the Wellington region or elsewhere. *Entelea arborescens* belongs on this list only if it was not present within the Wellington region at the time of Māori settlement. There is an apparently wild population near Paekakariki (WELT SP078421). Additionally, it is self-propagating on Matiu/Somes Island (WELT SP087620) and in a Kelburn garden (WELT SP089437). It is unknown whether these latter plants are derived from putative Māori translocations, or from post-European introductions.

Fuchsia procumbens [Casual, MS] **(1992)**

Indigenous distribution: Northland, Great Barrier Island, and Coromandel Peninsula (Eagle 2006a).

Self-propagating, vegetatively, on Kapiti Island (AK 231351; Peter de Lange, pers. comm.) and Matiu/Somes Island (AK 210059).

Geranium potentilloides [Casual] **(2010)**

Indigenous distribution: in the North Island, "Auckland southwards, widespread and common", plus Nelson, Marlborough, and Otago in the South Island (Webb et al. 1988). Recorded by Druce (1993) for his Rimutaka Range area but not for his Wellington area. Our area of interest closely corresponds to the latter, but does overlap with the Eastbourne part of his Rimutaka Range area.

Self-propagating by seed in the former Dench garden at Newlands (WELT SP089466).

Geranium traversii [Casual] **(2010)**

Indigenous distribution: endemic to the Chatham Islands (Webb et al. 1988).

Self-propagating by seed in the former Dench garden at Newlands (WELT SP089460, Fig. 3), in a Kelburn garden (WELT SP089432), and within the garden area of Otari-Wilton's Bush (RE pers. obs.).

Figure 3. Self-propagated *Geranium traversii* in the former Dench garden at Newlands.

Hebe bollonsii **Casual (2010)**

Indigenous distribution: south-eastern Northland (Bayly & Kellow 2006).

Self-propagating by seed in the former Dench garden at Newlands (WELT SP089462).

Hebe diosmifolia **Casual (2009)**

Indigenous distribution: Northland and Auckland (Murray et al. 1989).

Self-propagating in Wellington Botanic Garden (WELT SP087479, WELT SP088037), and Newtown (WELT SP088048).

WELT SP088035, self-sown in Wellington Botanic Garden, appears to be a hybrid with *H. diosmifolia* as one parent; *H. stricta* may be the other.

***Hebe diosmifolia* × *H. speciosa* ≡ *H.* 'Inspiration'** **Casual (1992)**

Indigenous distribution: both parental species are indigenous to the northern North Island (Murray et al. 1989; Armstrong & de Lange 2005), but the hybrid may have arisen in cultivation (Metcalf 2006).

Self-propagating on Matiu/Somes Island (AK 209247), where it is spreading from plantings.

Hebe elliptica* × *H. speciosa* ≡ *H.* ×*francisiana **Casual (1991)**

Indigenous distribution: *H. elliptica* is indigenous to the Wellington area (Bayly & Kellow 2006), but *H. speciosa* is not (see below).

Self-propagating on Miramar Peninsula (AK 207018). A collection (AK 230908) from Makaro/Ward Island was labelled as "obviously planted", but may have actually been self-propagated (Peter de Lange, pers. comm. August 2009). The history and nomenclature of this combination is complex (Metcalf 2006), and the naming of these specimens is not assured.

Hebe ligustrifolia **Casual (2009)**

Indigenous distribution: North Cape to Whangarei Heads (Bayly & Kellow 2006).

Self-propagating in a Kelburn garden (WELT SP088195, SP089433), and in the former Dench garden at Newlands (EB & Arnold Dench pers. obs.).

Hebe speciosa **Casual (1991)**

Indigenous distribution: northern North Island (Armstrong & de Lange 2005).

Hebe speciosa has been recorded as sparingly self-propagating at Evans Bay (AK 203340), "along roadside scrub", having "originated from layered offsets from specimens planted nearby" (de Lange & Cameron 1992), and on Kāpiti Island, "3 plants—semi-naturalised through layering" (AK 231367). Additionally, it is self-propagating by seed in the former Dench garden at Newlands (WELT SP089478), and on the Barnett Street side of Te Papa, where it is spreading beyond the garden in which it was originally planted

(WELT SP086782). Armstrong & de Lange (2005) suggested that pre-European populations in the southern North Island and the South Island are the products of Māori translocations. However, the presence of (extant) *H. speciosa* populations in the Wellington region is thought to post-date European arrival.

Hebe speciosa* × *H. stricta* var. *atkinsonii [Casual] **(1993)**
Indigenous distribution: *H. stricta* var. *atkinsonii* is indigenous to the Wellington area (Bayly & Kellow 2006), but *H. speciosa* is not (see above).

Self-propagating in Karori Cemetery (AK 212094).

Hebe stenophylla* var. *stenophylla [Casual] **(2009)**
Indigenous distribution: central North Island and northern South Island, but absent from the Wellington region (Bayly & Kellow 2006).

Self-propagating in a Kelburn garden (for c. 25 years, WELT SP088196).

Hebe tairawhiti [Casual] **(2009)**
Indigenous distribution: eastern North Island, from East Cape to Hawke's Bay (Bayly & Kellow 2006).

Self-propagating in a Kelburn garden (for c. 25 years, WELT SP088197, SP089431), and in the Druce garden in Upper Hutt (Helen Druce pers. comm. to CO).

Heliohebe hulkeana [Casual] **(2010)**
Indigenous distribution: South Island, Marlborough to North Canterbury (Eagle 2006a).

Self-propagating in a Stokes Valley garden, with seedlings sprouting on rock wall below planted specimen (WELT SP089611), and in a Kelburn garden (WELT SP089430).

Hibiscus richardsonii [Casual] **(2010)**
Indigenous distribution: northern North Island (Eagle 2006a, 2006b; as *H. trionum*).

Self-propagating in a Stokes Valley garden (WELT SP089612, Fig. 4), and in a Kelburn garden (BM pers. obs.).

Figure 4. Self-propagated *Hibiscus richardsonii* in a Stokes Valley garden.

Hoheria populnea **Naturalised (1971)**

Indigenous distribution: North Island, north of Raglan Harbour (Eagle 2006a) although exact southern limits obscured by naturalisation from garden plantings (Eagle 2006b).

Widespread and abundant in many places: Brooklyn (WELT SP088212), Karori (WELT SP088199), Kilbirnie (WELT SP084160), Mount Victoria (WELT SP088032), Otari-Wilton's Bush (self-sown, WELT SP088188), Porirua (WELT SP087481), Pukerua Bay (WELT SP064433), Wellington Botanic Garden (self-sown, WELT SP088042). Present on Kāpiti Island (Russell et al. 2001).

Jovellana sinclairii **Casual (2010)**

Indigenous distribution: east coast of the North Island, from East Cape southwards (Allan 1961), but not including our area of interest (Druce 1993).

Self-propagating by seed in a Kelburn garden (for c. 25 years, WELT SP089436), vegetatively in the former Dench garden at Newlands (WELT SP089458) and by seed and vegetatively in a Stokes Valley garden (JR pers. obs.).

Lepidium flexicaule **Casual (2010)**

Indigenous distribution: extant around Auckland in the North Island and on the north-western coast of the South Island (Webb et al. 1988). Post-European extinctions recorded at several additional sites, including Wellington (Brandon et al. 2004).

Plants not originating from Wellington self-propagating in the former Dench garden at Newlands (WELT SP089467).

Leptinella filiformis **Casual (2010)**

Indigenous distribution: Marlborough and Canterbury (Lloyd 1972).

Vegetative persistence in a Kelburn garden (WELT SP089429), the former Dench garden at Newlands (WELT SP089456), and in a Stokes Valley garden of plants several metres distant from site of original plant, which has subsequently died (JR pers. obs., Fig. 5).

Figure 5. Vegetative spread of *Leptinella filiformis* amongst brick paving in a Stokes Valley garden.

Leptinella minor [Casual] **(2010)**
Indigenous distribution: Canterbury (Lloyd 1972).

Self-propagating vegetatively in the former Dench garden at Newlands (WELT SP089464).

Leptinella rotundata [Casual] **(2010)**
Indigenous distribution: north-western North Island (Lloyd 1972).

Self-propagating vegetatively in the former Dench garden at Newlands (WELT SP089457).

Libertia cranwelliae [Casual] **(2010)**
Indigenous distribution: East Cape, North Island (Blanchon et al. 2002).

Spreading vegetatively in the former Dench garden at Newlands (WELT SP089470), and in a Stokes Valley garden (JR pers. obs., Fig. 6).

Figure 6. Vegetative spread of *Libertia cranwelliae* in a Stokes Valley garden.

Melicytus novae-zelandiae [Casual] **(1996)**
Indigenous distribution: Three Kings Islands, North Island from Bay of Plenty northwards (Eagle 2006a).

Self-propagating by seed on Kapiti Island (AK 226547).

Meryta sinclairii [Casual, MS] **(2003)**
Indigenous distribution: Three Kings Islands, with its presence on other northern island groups probably being the result of translocation by Māori (Cameron & de Lange 2000).

Self-propagating sparingly at the National War Memorial (WELT SP087614), Plimmerton (WELT SP088004), on Matiu/Somes Island (WELT SP088076), and at a few sites in Island Bay (PR pers. obs.). The number of widespread sites suggests this species may be becoming naturalised.

Metrosideros excelsa **Naturalised, MS (1984)**
Indigenous distribution: Three Kings Islands, North Island to c.38°S (Eagle 2006a).

Widely planted in the Wellington region. Large individuals are common, but usually have been planted. Invasive in several places, including above the road between Wadestown and Petone (CO pers. obs.), on Matiu/Somes Island (PR pers. obs.), parts of Porirua Harbour (Tim Park pers. comm.), and Kapiti Island (Russell et al. 2001). Self-sown seedlings also common in urban areas, particularly amongst cracks in 'rock' (including concrete) substrates. Karori (WELT SP088198), Mount Victoria (WELT SP086770), Oriental Bay (WELT SP086784), Pukerua Bay (WELT SP077049), Wellington Botanic Garden (self-sown, WELT SP088040).

Metrosideros kermadecensis **Casual, MS (2009)**
Indigenous distribution: Raoul Island in the Kermadec Islands (Eagle 2006a).

More than ten self-sown seedlings, near adults, in cracks of a concrete retaining wall above Oriental Bay (WELT SP088046).

Myosotis petiolata **var.** ***pottsiana*** **Casual, MS (2003)**
Indigenous distribution: Bay of Plenty (Allan 1961).

Self-propagating on Matiu/Somes Island (AK 228101), in the former Dench garden at Newlands (WELT SP089469, Fig. 7), and in a Kelburn garden (for c. 15 years, BM pers. obs.).

Figure 7. Self-propagating *Myosotis petiolata* var. *pottsiana* in the former Dench garden at Newlands.

Myosotis spathulata [Casual] **(2010)**
Indigenous distribution: North Island, South Island, and Chatham Islands are listed by Allan (1961), but it is not listed for the Wellington area by Druce (1993).

Self-propagating in a Kelburn garden, where it has maintained itself for c. 25 years, and has now appeared c. 60 metres away on road reserve (WELT SP089439).

Olearia pachyphylla [Casual] **(2010)**
Indigenous distribution: Bay of Plenty (Eagle 2006a).

Self-propagating at Otari-Wilton's Bush (WELT SP089422), and in a Kelburn garden (BM pers. obs.).

Pittosporum crassifolium [Naturalised, MS] **(1983)**
Indigenous distribution: North Cape to Poverty Bay and North Taranaki (Eagle 2006a).

Widespread and abundant in many places: Miramar (AK 200999), Mokopuna Island (AK 209277), Mount Victoria (WELT SP088031), Newtown (WELT SP087491), Porirua (WELT SP087483), Pukerua Bay (WELT SP077994), Wellington Botanic Garden (self-sown, WELT SP088038). Self-propagating on Kāpiti Island (Russell et al. 2001) and Mana Island (Timmins et al. 1984).

Pittosporum ralphii [Naturalised, MS] **(2003)**
Indigenous distribution: East Cape to north Wairarapa, plus Patea and Whanganui Rivers (Eagle 2006a).

Widespread and abundant in many places: Brooklyn (WELT SP088211), Mount Victoria (WELT SP088030), Oriental Bay (WELT SP086785), Otari-Wilton's Bush (self-sown, WELT SP088184), Taputeranga Island (CHR 365255), Wellington Botanic Garden (self-sown, WELT SP087480, SP088036).

Pomaderris apetala **subsp.** ***maritima*** [Casual, MS] **(1991)**
Indigenous distribution: North Taranaki (Eagle 2006a).

Self-propagating in Otari-Wilton's Bush (AK 224049, WELT SP088189), Pukerua Bay (AK 203689), on Matiu/Somes Island (WELT SP088077, SP089483), and within Wellington Botanic Garden (PR and BM pers. obs.). The number of widespread sites suggests this species may be becoming naturalised.

Pomaderris kumeraho [Casual] **(2009)**
Indigenous distribution: North Cape to Bay of Plenty and Kawhia (Eagle 2006a).

Self-propagating in Otari-Wilton's Bush (WELT SP088190).

Pseudopanax crassifolius* × *P. lessonii **Naturalised, MS** **(2001)**
Indigenous distribution: similar to the more restricted of its parents, *P. lessonii* (see below).

Widespread and common to abundant in many places and settings (gardens, Town Belt pines, indigenous vegetation): Brooklyn (WELT SP088214), Matiu/Somes Island (WELT SP086743), Mount Victoria (WELT SP089239), Newtown (WELT SP089240), Otari-Wilton's Bush (WELT SP089238, SP088191), Plimmerton (WELT SP088001), Stokes Valley (WELT SP086752), Titahi Bay (WELT SP086751), Wellington Botanic Garden (self-sown, WELT SP088043). Present on Kāpiti Island (Russell et al. 2001).

Pseudopanax ferox **Casual** **(2010)**
Indigenous distribution: indigenous to the North Island and South Island (Eagle 2006a), from Northland to Southland, but it is not indigenous to the Wellington area. The nearest indigenous populations are in the Marlborough Sounds and southern Wairarapa (LP pers. obs.).

Self-propagating within garden area of Otari-Wilton's Bush (WELT SP088016, Fig. 8).

Figure 8. Self-sown seedlings of *Pseudopanax ferox* at Otari-Wilton's Bush.

Pseudopanax laetus **Casual** **(2009)**
Indigenous distribution: from the Coromandel Peninsula to the Whanganui River area (Eagle 2006a).

Self-propagating within the Bush City garden area at Te Papa, with many tens of seedlings in a small area where adult recently removed (WELT SP088034, Fig. 9). Also self-propagating within garden area of Otari-Wilton's Bush (RE pers. obs.).

Figure 9. Self-sown seedlings of *Pseudopanax laetus* in Te Papa's gardens.

Pseudopanax lessonii **Naturalised, MS** **(1992)**
Indigenous distribution: Three Kings Islands and North Island north of Poverty Bay and northern Taranaki (Eagle 2006a).

Widespread and common to abundant in many places and settings (gardens, Town Belt pines, indigenous vegetation): Brooklyn (WELT SP089244), Mokopuna Island (AK 209250), Newtown (WELT SP087495, WELT SP089242), Plimmerton (WELT SP089243, SP088003), Porirua (WELT SP087482). Present on Kāpiti Island (Russell et al. 2001).

Ranunculus royi **Casual** **(2010)**
Indigenous distribution: Kaimanawa Range, Kaweka Range, and Ruahine Range in the North Island, and Canterbury, Otago, South Westland, and Fiordland in the South Island (Webb et al. 1988).

Plants of *R.* aff. *royi* self-propagating by seed in the former Dench garden in Newlands (WELT SP089459).

Ranunculus stylosus **Casual (2010)**

Indigenous distribution: Stewart Island (Webb et al. 1988).

Plants of *R.* aff. *stylosus* self-propagating by seed in the former Dench garden in Newlands (WELT SP089492).

Ranunculus urvilleanus **Casual (1992)**

Indigenous distribution: North Island from near North Cape to lat. 35°30'S, plus Little Barrier Island (Allan 1961).

Self-propagating in Percy Scenic Reserve, Lower Hutt (AK 210076), Takapu Road, Tawa (CHR 478405), and the Druce garden in Upper Hutt (CHR 473068).

Sophora chathamica **Casual?, Māori? (?)**

Indigenous distribution: possibly North Island north of c.39°S (Heenan et al. 2001).

Populations in the Wellington region (around Porirua Harbour and Matiu/Somes Island), as well as on the Chatham Islands, are possibly the result of translocation by Māori, as they correspond with the location of settlements and pā sites (Heenan et al. 2001, and specimens cited therein; also AK 203241). The persistence of these populations since European arrival indicates local self-regeneration. Furthermore, *Sophora* seedlings, presumably *S. chathamica*, are abundant under adult *S. chathamica* in Papakowhai Park, Porirua (LP pers. obs.). We regard this species as a Casual since we do not know it to be spreading far beyond what may be the original planted sites. However, *S. chathamica* belongs on this list only if it was not present within the Wellington region at the time of Māori settlement.

Sophora tetraptera **Casual (2009)**

Indigenous distribution: this does not appear to be indigenous to the Wellington region (Druce 1993), although it is to the north and east (Heenan et al. 2001, Eagle 2006a).

Self-propagating close to planted adult tree in the gardens of the National War Memorial (WELT SP087613). Also self-sown in Wellington Botanic Garden (WELT SP088039).

Vitex lucens **Casual, MS (2003)**

Indigenous distribution: North Island, from near North Cape to near New Plymouth in the west and Gisborne in the east (Eagle 2006a).

Self-propagating on Matiu/Somes Island (WELT SP087448), at Wellington Botanic Garden (WELT SP088045), Waiwhetu, Lower Hutt (WELT SP088193), at Karori Sanctuary, Tapu Te Ranga Marae (Island Bay) (PR pers. obs.), Paraparaumu Reserve, and a Waikanae bush block (Pat Enright pers. comm. 20 July 2007). The number of widespread sites suggests this species may be becoming naturalised.

UNVOUCHERED SELF-PROPAGATING NON-LOCAL NATIVE PLANTS IN WELLINGTON

Beilschmiedia tarairi **Casual, MS (2001)**
Indigenous distribution: North Cape to East Cape (Eagle 2006a).

"Masses of seedlings appeared near trees on Kāpiti Island soon after rat eradication in 1996" (Russell et al. 2001).

Cassytha paniculata **Naturalised (2008)**
Indigenous distribution: North Cape to near Auckland (Eagle 2006a).

Self-propagating in the Druce garden in Upper Hutt (Horne 2008) after an accidental introduction. It is not widespread but we treat it as naturalised because of its persistence even in the face of weeding.

Clianthus **sp.** **Casual**
Indigenous distribution: both of the *Clianthus* species, *C. maximus* and *C. puniceus*, are indigenous to the northern North Island (Heenan 2000).

Self-propagating within garden area of Otari-Wilton's Bush. Adults of both species are (or have been) present, and the specific identity of the self-sown seedlings is unclear (RE pers. obs.).

Colensoa physaloides **Casual**
Indigenous distribution: North Cape to Great Barrier Island (Eagle 2006a).

Self-propagating within garden area of Otari-Wilton's Bush (RE pers. obs.), and in the former Dench garden at Newlands (EB &/or Arnold Dench pers. obs.).

Coprosma macrocarpa **subsp.** ***macrocarpa* × *C. propinqua*** **Casual**
Indigenous distribution: the indigenous distributions of the parents do not overlap; *C. macrocarpa* subsp. *macrocarpa* is endemic to the Three Kings Islands, whereas *C. propinqua* is endemic to the North Island, South Island, Stewart Island, and Chatham Islands.

One planted female of *Coprosma macrocarpa* subsp. *macrocarpa* on Mana Island produced abundant hybrids with *C. propinqua* (CO pers. obs.). McAlpine & Sawyer (2003) listed *C. macrocarpa*, for which we have no supporting specimens or observations of our own.

Geranium **aff.** ***brevicaule*** **"Von"** **Casual**
Indigenous distribution: Southland (Mitchell et al. 2009).

Self-propagating in the former Dench garden at Newlands (EB & Arnold Dench pers. obs.), and at Otari-Wilton's Bush (EB pers. obs.). Regarded as an unnamed species by Mitchell et al. (2009). No wild indigenous populations are known at present, but it was originally collected from the Von River, Southland.

Leptinella potentillina **Casual**

Indigenous distribution: Chatham Islands and Auckland Islands (Lloyd 1972).

Self-propagating within garden area of Otari-Wilton's Bush (EB pers. obs.).

Mazus novaezeelandiae **subsp.** ***impolitus*** **Casual**

Indigenous distribution: Scattered throughout the North Island and South Island, but not known from the Wellington region (where subsp. *novaezeelandiae* is indigenous) (Heenan 1998).

Self-propagating (vegetatively?) in the former Dench garden at Newlands (Arnold Dench pers. comm. to EB).

Myosotidium hortensium **Casual**

Indigenous distribution: Chatham Islands (Allan 1961).

Self-propagating within garden area of Otari-Wilton's Bush (LP pers. obs., Fig. 10), and in a Rongotai garden (Carol West pers. comm.).

Figure 10. Self-sown seedling of *Myosotidium hortensium* at Otari-Wilton's Bush.

Pachystegia insignis **Casual**

Indigenous distribution: all of the *Pachystegia* species are confined to Marlborough and North Canterbury (Eagle 2006a).

Self-propagating within garden area of Otari-Wilton's Bush (RE pers. obs.). *Pachystegia* seedlings of uncertain identity self-sow within a Stokes Valley garden that contains *Pachystegia insignis*, *P. minor*, and *P. rufa* (WELT SP089613).

Pachystegia minor **Casual**

Indigenous distribution: all of the *Pachystegia* species are confined to Marlborough and North Canterbury (Eagle 2006a).

Self-propagating, along with *Pachystegia* hybrids, in the former Dench garden at Newlands (EB &/or Arnold Dench pers. obs.).

Pennantia baylisiana* × *P. corymbosa **Casual**

Indigenous distribution: the indigenous distributions of the parents do not overlap; *P. baylisiana* is endemic to the Three Kings' Great Island, whereas *P. corymbosa* is endemic to the North Island, South Island, and Stewart Island (Eagle 2006a).

Self-propagating within garden area of Otari-Wilton's Bush (RE pers. obs.). Mole (1989) described this hybridisation, but not the seeding.

Picris burbidgeae **Casual**

Indigenous distribution: northern North Island (Holzapfel 1994).

Self-propagating in a Stokes Valley garden (JR pers. obs., Fig. 11).

Figure 11. Self-propagated *Picris burbidgeae* in a Stokes Valley garden.

Sophora prostrata **Casual**

Indigenous distribution: South Island (Eagle 2006a).

Self-propagating via occasional seedlings in a Stokes Valley garden (JR pers. obs.).

UNCONFIRMED TAXA

Carex trifida
Indigenous distribution: Stephens Island, plus scattered South Island localities south of lat. 45°30'S, as well as various sub-Antarctic islands and South America (Moore & Edgar 1976).

Listed by McAlpine & Sawyer (2003), but we have no supporting specimens or observations of our own.

Corokia buddleioides
Indigenous distribution: North Island north of 38°20'S (Eagle 2006a).

Listed by McAlpine & Sawyer (2003), but we have no supporting specimens or observations of our own. Possibly an error for *C. macrocarpa*, or the hybrids involving *C. cotoneaster*.

Elatostema rugosum
Indigenous distribution: North Island, "from near North Cape to Tararua Range" (Allan 1961). Druce (1993) lists it for his Tararua Range area but not for his Western Wellington hills area.

Several populations occur at otherwise relatively natural sites within our Wellington region of interest (e.g., around a waterfall within the remnant forest of Otari-Wilton's Bush; Kaitawa Track, East Harbour Regional Park; Military Track, Northland; the latter population is now extinct; CH pers. obs.). It is uncertain whether these are indigenous populations, or whether they have been planted. Even if the latter is the case, it is unknown whether self-propagation is occurring.

Epilobium nummulariifolium
Indigenous distribution: possibly northern North Island. Raven & Raven (1976, p.281) regarded its "spread elsewhere [as] being correlated with the activities of man". Druce (1993), however, treated it as indigenous to the Wellington region, and its status remains to be clarified.

Known from wild sites such as Outlook Hill, Mt Misery (BM pers. obs.), Owhiro Bay (AK 210983), and self-propagating on Mokopuna Island (AK 210983) and in a Stokes Valley garden (JR pers. obs., Fig. 12).

Olearia angulata* ≡ *O. albida* var. *angulata
Indigenous distribution: As *O. albida* var. *angulata*, North Cape to northern Taranaki (Eagle 2006a).

Listed by McAlpine & Sawyer (2003), but we have no supporting specimens or observations of our own.

Figure 12. Self-propagated *Epilobium nummulariifolium*, foreground, in a Stokes Valley garden.

O. ×haastii* ≡ *O. avicenniifolia* × *O. moschata
Indigenous distribution: presumably the southern South Island, where the distributions of the two parental species overlap (Eagle 2006a).

Listed by McAlpine & Sawyer (2003), but we have no supporting specimens or observations of our own.

Pseudopanax arboreus* × *P. lessonii
Listed by McAlpine & Sawyer (2003). Some consider the existence of this hybrid combination doubtful (Perrie & Shepherd 2009). However, PR has observed a self-sown plant at Karori Sanctuary that appeared to have intermediate characteristics, and it was recorded for Kāpiti Island by Russell et al. (2001). We have no supporting specimens.

Pseudopanax ferox* × *P. lessonii
Listed by McAlpine & Sawyer (2003), but we have no supporting specimens or observations of our own. This hybrid combination appears to be very rare, both in the wild and in cultivation. Nearly all *Pseudopanax* hybrids are *P. crassifolius* × *P. lessonii* (LP pers. obs.).

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