

## Acknowledgements

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# New Zealand geographical limits of native vascular plant species in the Auckland region: past & present

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## Introduction

The Auckland region (see Fig. 1) is not strong in native vascular plant geographical limits because there is adjoining land to the north (Northland), south (Waikato) and higher land to the east (Te Moehau). In fact, Te Moehau at 892m asl is the northern limit for 20 species (excluding *Cordyline indivisa*) (Gardner & Smith-Dodsworth 1984), and in latitude it is level with Waiwera in the Auckland region. The high points in the Auckland region are: Little Barrier Island (722m), Kohukohunui in the Hunua Ranges (688m) and Mt Hobson on Great Barrier Island (627m) – each of these high points is associated with at least one geographical species limit.

Also the Tamaki Ecological District (ED) (see Fig. 1) has been a major urban centre for a long time: it had a very large Maori population in the 17th century and was cultivated long before that. When Europeans first arrived most of the Auckland isthmus was fern and scrubland – the forests had gone (Millener 1965, Cranwell 1981, Esler 2004). Thus primary habitat which might have been repositories was already much depleted even when the first botanical records were being collected.

Historical and extant populations at their geographical limits are important because they indicate whether a species is expanding geographically, receding or remaining static. Some native species appear to be rapidly spreading, e.g. *Epilobium nummulariifolium* south from North Auckland and northern Coromandel Peninsula (Raven & Engelhorn 1971) and *Schoenoplectus pungens* appears to be actively moving north up Auckland's west coast (Cameron & Bellingham 2002). Of course this requires a suitable habitat to spread or retreat into, and often for anthropomorphic reasons this is no longer available. Geographical limits have important implications for conservation and restoration, because these natural limits should not be artificially enhanced or extended by planting (unfortunately some already have been).

They also provide a means to test global warming theories - as northern cold-sensitive species should expand their southerly ranges at the expense of southern cold-tolerant species.

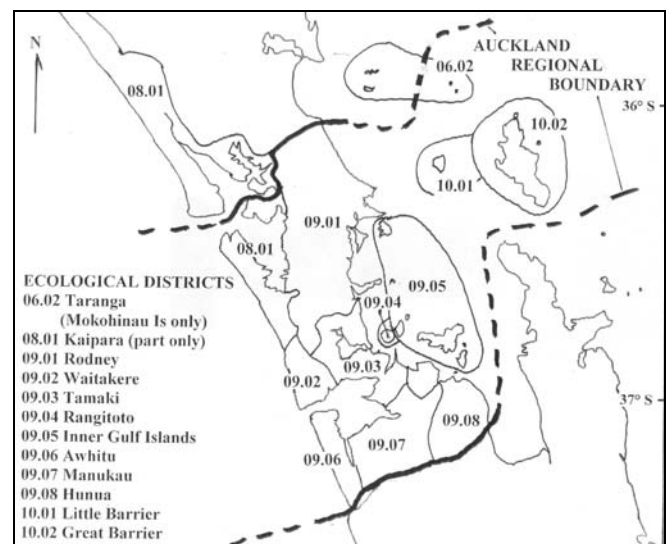


Fig. 1. Auckland region showing the 12 Ecological Districts.

The records presented here are mostly based on the specimens held in the Auckland Museum herbarium (AK), which now also includes the former Auckland University herbarium (AKU). Where there are several collections for the same species, the earliest record is generally cited. Only published taxa are considered – no tag name entities are included. For a few of the species there may not be universal acceptance whether they are native or naturalised, e.g. *Centipeda elatinoidea*, *Gratiola pubescens* and *Polygonum plebeium* – I have treated them here as indigenous.

There are seven vascular plant taxa considered endemic to the Auckland region (with the Ecological Districts where they occur): *Celmisia major* var. *major* (09.02, 10.02), *Hebe pubescens* subsp. *rehuarum* (10.02), *H. pubescens* subsp. *sejuncta* (06.02, 10.01,

10.02), *H. bishopiana* (09.02), *Kunzea sinclairii* (10.02), *Olearia allomii* (10.02) and *Senecio repangae* subsp. *pokohinuensis* (06.02); and two vagrants that have been recorded in New Zealand from only the Auckland region, *Gratiola pubescens* (09.06) and *Senecio australis* (06.02, 10.02).

The records are grouped under three headings (Historical, Extant and Rejected), and within these 12 Ecological Districts (see McEwen 1987), two of which are only partly included in the Auckland region, or Auckland Conservancy (see Fig. 1). Geographical limits

## Geographical limits for the Auckland Region

### Key

N = Northern NZ geographical limit

S = Southern NZ geographical limit

\* = extant but historically not the known New Zealand geographical limit

\*\* = only records for New Zealand (vagrants)

## A. Historical geographical limits (Presumed regionally extinct, records post-1769 and pre-1970)

### 08.01 Kaipara ED

*Clematis forsteri* N (ca. 36° 45' S) (Woodhill; Ball, AK 261677, Oct 1888. The next nearest was: Mt Wellington; *H.B. Matthews*, AK 99899, Oct 1918 (09.03 ED))

### 09.02 Waitakere ED

*Lepidium obtusatum* N (37° 5' S) (Manukau Harbour; *T.F. Cheeseman*, AK 4473, Dec 1870)

*Leptinella rotundata* S (ca. 36° 57' S) (Waitakere West; *T.F. Cheeseman*, AK 10445, Dec 1880)

*Libertia peregrinans* N (36° 57' S) (Piha; *N. Mackie*, AK 103868, Jan 1932. Cited by Blanchon et al. 2002. Could this be based on a cultivated specimen? Next nearest is Kawhia).

### 09.03 Tamaki ED

*Alseuosmia banksii* var. *linariifolia* S (ca. 36° 55' S) (Whau; *T.F. Cheeseman*, AK 9190, Sep 1872)

*Coprosma parviflora* S (ca. 36° 53' S) (Remuera; *T. Kirk*, WELT 63664, 1887)

*Genoplesium nudum* (= *Corunastylis nuda*) N (ca. 36° 53' S) (Browns Bay; *E.D. Hatch & P. Bond*, AK 245791, Jul 1958)

*Hoheria sexstylosa* N (ca. 36° 55' S) (Penrose; *T.F. Cheeseman*, AK 5213, Mar 1875)

*Potentilla anserinoides* N (ca. 36° 55' S) (Mt Roskill; Ball, AK 262684, Jan 1885)

*Ranunculus glabrifolius* N (36° 53' S) (St Johns Lake; *T.F. Cheeseman*, AK 4325-26, Nov 1881)

*Rumex flexuosus* N (ca. 36° 50' S) (Auckland; *T. Kirk*, AK 11271, [1863-74])

*Ruppia megacarpa* N (36° 47' S) (Lake Takapuna [Pupuke]; *T.F. Cheeseman*; AK 201021, May 1884)

### 09.04 Rangitoto ED

*Lepidium flexicaule* N (ca. 36° 45' S) (Rangitoto Id; *T.F. Cheeseman*, AK 4481, Dec 1882)

are generally only broadly given in the *Flora of New Zealand* series (5 volumes). However Tony Druce started being more specific in his checklists (Druce 1980), and some specific ones for the Auckland region have been given in various publications, e.g. Moore (1973), Gardner and Dakin (1989), Cameron (2004a, 2004b). Recently de Lange et al. (1999) included them for the Auckland regional threatened plant list, but this is the first attempt for a structured comprehensive listing for the whole Auckland region.

### 09.06 Awhitu

*Discaria toumatou* N (ca. 37° 15' N) (near Waiuku; *T.F. Cheeseman*, AK 5152, Jul 1869)

### 09.07 Manukau ED

*Trisetum lasiorhachis* N (ca. 37° 14' S) (Waitangi [Falls], Waiuku; *H. Carse*, CHR 333436, Oct 1901. There is also a published record from Mt Wellington (ca. 36° 54' S) see Edgar & Connor 2000. However the only "Mt Wellington" specimen I could trace was: "nr Wellington" (the 2-letter abbreviation "nr" is unclear), *T. Kirk*, WELT 69109; also there are no Kirk "Mt Wellington" specimens on the WELT database (Barry Sneddon pers. comm.).

### 10.02 Great Barrier ED

*Clianthus maximus* ? N (Great Barrier Id; Heenan (2000) cites Goulding (1983) as evidence that it may once have extended to Great Barrier Id; a *T. Kirk* specimen from Great Barrier in WELT is most likely this species (Peter de Lange pers. comm.))

*Elymus solandri* N (ca. 35° 55' S) (Great Barrier Id; *T. Kirk*, AK 11174, [1867-68])

*Leptinella squalida* subsp. *squalida* N (ca. 36° 19' S) (Tryphena; *T. Kirk*, AK 11785, [1867-68])

*Lindsaea viridis* N (ca. 36° 12' S) (Gt Barrier Id; *C.P. Winkelman*, AK 142499, Jan 1886. There are also historical specimens collected from Little Barrier Id in AK and one recent site record)

*Polygonum plebeium* N (ca. 36° 19' S) (Port Tryphena; *T. Kirk*, WELT 44007 & 62222, Dec 1867)

*Vittadinia australis* N (36° 11' S) (Mitre Peak [Kaikoura Id]; *T. Kirk*, WELT 58584, Dec 1867)

## B. Extant geographical limits (all records 1970-present)

### 06.02 Taranga ED (Mokohinau Islands only)

*Hebe pubescens* subsp. *sejuncta* N (35° 55' S) (Burgess Id, *E.K. Cameron* 2739, AK 273288, Jan 1984. Also see Bayly et al. 2003)

- Senecio australis* S\*\* (35° 57' S) (Motukino (Fanal) Id; *I. McFadden*, AK 284669, Mar 1995. Also see de Lange et al. 2005)
- Senecio repangae* subsp. *pokohinuensis* N (35° 54' S) (Motuharakeke; *P.J. de Lange*, AK 224875, Nov 1993. Also see de Lange & Murray 1998)
- Senecio repangae* subsp. *pokohinuensis* S (35° 57' S) (Fanal Id (Motukino); *P.J. de Lange* 5374, AK 256176, Mar 2002)
- Senecio sterquilinus* N (35° 55' S) (Stack "H"; *P.J. de Lange* 2615, AK 227133, Nov 1993 – natural or human introduction? Also see de Lange 1998)
- 08.01 Kaipara ED (Auckland region part only)**
- Baumea complanata* S\*(36° 35'S) (Shelly Beach; *P.J. de Lange* 6055 & *M. Goodwin*, AK 286638, May 2004. Historically it has been collected in the Waikato, e.g. AK 22279-81).
- Clianthus puniceus* ?S (36° 25' S) (08.01) (Moturemu Id; *P. Hynes*, AK 31510, Oct 1953. Now it's the only known "wild population" Heenan 2000; also collected by Banks & Solander in the ?Bay of Islands.
- Coprosma parviflora* S\* (Okahukura Peninsula; *M.E. Young*, AK 218630, Dec 1993. See Jane 2005. The historical S limit was at Remuera (09.03))
- Hebe diosmifolia* S (36° 30' S) (Pukitu; *B.R. Burns*, AK 272447, Feb 1984)
- Hebe speciosa* S (36° 48' S) (Woodhill; *E.K. Cameron* 6644 & *P.J. Bellingham*, AK 205959, Dec 1991. Populations south of here have been shown to be most likely Maori translocations (Armstrong & de Lange 2005))
- Schoenoplectus pungens* N (36° 27' S) (Waionui Inlet; *E.K. Cameron* 7292 & *P.J. Bellingham*, AK 212147, Jul 1993. Cited by Cameron & Bellingham 2002)
- Stenostachys gracilis* N\* (36° 35' S) (Shelly Beach; *P.J. de Lange* 6056 & *M. Goodwin*, AK 286639, May 2004. Historically it has been collected at Pahi (N Kaipara) and Northland, see Gardner 2004)
- 09.01 Rodney ED**
- Alseuosmia banksii* var. *banksii* S (ca. 36° 16' S) (Logues Bush, *C.J. West*, AK 272102, Mar 1983)
- Alseuosmia banksii* var. *linariifolia* S (ca. 36° 53' S) (Mangawhai Heads, *J.E. & P. Morton*, AK 218627, Feb 1994)
- Chionochoa bromoides* S (36° 17' S) (Leigh; *L.B. Moore*, AK 110044-45, Feb 1934)
- 09.02 Waitakere ED**
- Asplenium appendiculatum* subsp. *maritimum* N (36° 56' S) (Whites Bay; *E.K. Cameron* 8343, AK 224585, Dec 1995)
- Celmisia major* var. *major* S (37° 3' S) (Paratutai Id; *E.K. Cameron* 9610, AK 239077, May 1999)
- Clematis forsteri* N\* (36° 57' S) (Maungaroa; *A.D. Mead* & *K. Wood*, AK 109972, Oct 1966. Historical N limit used to be Mt Wellington (09.03))
- Gastrodia minor* N (36 54' S) (Waitakere Ra.; *J.E. Braggins*, AK 151985, Dec 1980)
- Hebe bishopiana* N (36° 54' S) (nr Waitakere Reservoir; *P.J. de Lange* 2586, AK 220459, Aug 1994. Also see de Lange 1996)
- Hebe bishopiana* S (37° 2' S) (Omanawanui Trk; *P.J. de Lange* 2592, AK 220776, Sep 1994)
- Hebe obtusata* N (36 50' S) (Muriwai; *T.F. Cheeseman*, AK 7671, Mar 1884)
- Lindsaea viridis* N\* (ca. 36° 54' S) (Waitakere Ra.; *A.E. Wright*, AK 223368, May 1970. Historical N limit used to be the Barrier Islands (10.01, 10.02). Site record: C.D. Kilgour, Little Barrier (Lambs Bay Crk), Apr 2000 (Bec Stanley pers. comm.))
- Meliclytus lanceolatus* N (ca. 36° 56' S) (Titirangi Ra.; *T.F. Cheeseman*, AK 5281, Dec 1880)
- Myosotis petiolata* var. *pansa* N (36° 53' S) (Bethells; *A.E. Wright* 1764, AK 142951, Jan 1977)
- Ranunculus glabrifolius* N\* (37° 1' S) (Pararaha; *E.K. Cameron* 5329b, AK 279085, Feb 1991. Historical N limit used to be St Johns Lake (09.03))
- Senecio rufiglandulosus* N (36° 53' S) (Kauwahaia Id; *G.A. Taylor*, AK 277972, Sep 1989. Note – there is a historical collection from Cape Maria Id, [J. Buchanan], WELT 31720, [1877]; both cited by Taylor & Cameron 1990. However, correspondence between Kirk and Hector held at WELT suggests "the Cape Maria record is most likely fictitious" Peter de Lange pers. comm.)
- 09.03 Tamaki ED**
- Calochilus herbaceus* S (36° 43' S) (Albany; *E. Asquith & R.J. Stanley*, AK 251366, Nov 2000)
- Calystegia marginata* S\* (36° 54' S) (Waikumete Cemetery; *P.J. de Lange* 4598, AK 251356, Oct 2000. Although Cheeseman (1906) with reference to a Kirk specimen, Allan (1961) and Webb et al. (1988) all cite that it goes as far south as Thames; I couldn't locate a herbarium specimen to support this)
- Centipeda elatinoides* N (36° 49'S) (Taupaki; *T.F. Cheeseman*, AK 10450, Apr 1884. Possibly extinct at Taupaki but extant at Te Atatu, e.g. AK 207039)
- Drosera peltata* s.str. S (36° 47' S) (Whenuapai; *A.E. Esler*, AK 161316, Nov 1982)
- Hymenophyllum bivalve* N (36° 45' S) (Campbells Bay; *E.K. Cameron* 13161 & *S. Jones*, AK 293291, Sep 2005. Note – a collection from the same place by S. Jones, mid 1980s, in AKU could not be located)
- Phylloglossum drummondii* S\* (36° 55' S) (Glen Eden; *M.H. Knight*, AK 259225, Jun 1952. The last recorded sighting at this locality (Waikumete Cemetery) was in 1972 by Elizabeth Miller (Alan Esler pers. comm.). Historical southern limit was near Christchurch and Marlborough Sounds (Braggins 1974); in New Zealand it is now confined to Northland)
- Puccinellia stricta* N (36° 56' S) (Onehunga; *T. Kirk*, AK 11179, [1863-74])
- Ranunculus macropus* N\* (ca. 37° 1' S) (Puhinui Crk; *A.E. Esler & M.L. Scott*, AK 219043, Oct 1977. Historical N limit is in Northland, e.g. Kaiaka, *H. Carse*, AK 12425, Feb 1921)
- 09.05 Inner Gulf Islands ED**
- Cortaderia toetoe* N (36° 50' S) (Waiheke Id, Whakanewha; *R.O. Gardner* 7640, AK 249154, Jul 1995)
- Ipomoea cairica* S (36 35' S) (Tiritiri Id; *A. Hansen*, AK 7382, Jan 1907. Note – there are other Auckland populations south of this one (vouchered in AK) which are difficult to know whether they were planted or not, but T.F. Cheeseman annotated Hansen's Tiritiri specimen as "The most southern station known")

### 09.06 Awhitu ED

- Gratiola pubescens* \*\* (37° 19' S) (Parkinson's Lake; *P.J. de Lange 3896*, AK 247105, Jan 1999 – de Lange et al. (2004) listed it as a vagrant)
- Schizeilema trifoliolatum* N (37° 9' S) (near Pollok; *E.K. Cameron 12456 & M.E. Young*, AK 288199, Sep 2004. See Cameron 2004)

### 09.07 Manukau ED

- Crassula hunua* N\* (ca. 36° 59' S) (Clevedon; *P.J. de Lange 6587*, AK 294547, Nov 2005)

### 09.08 Hunua ED

- Clematis foetida* N\* (ca. 37° 5' S) (upper Mangatawhiri; *B.E.G. Molesworth*, AK 22291, Oct 1946. Historical N limit used to be Fairburn: *H Carse*, AK 246960, Oct 1902)
- Hebe macrocarpa* var. *latisepala* S (37° 2' S) (Kohukohunui; *L.B. Moore*, CHR 103222, cited in Hair 1967)
- Hydrocotyle hydrophila* N (37° 4' S) (Hunua Falls; *R.O. Gardner 5518*, AK 184502, Apr 1988)
- Melicytus macrophyllus* S (37° 13' S) (Mount William SR; *A.J. Dakin*, AK 208440, Feb 1976)
- Senecio scaberulus* S\* (36° 56' S) (Hunua Ranges, Papanui Point; *R.O. Gardner 3797*, AK 165332, Apr 1983. It was collected on the Chatham Is in 1996 (AK 228461) but hasn't been seen there since (Peter de Lange pers. comm.))
- Ucinia clavata* N (37° 2' S) (Mt Kohukohunui; *A.J. Dakin*, AK 211309, Apr 1974. There is a collection from Northland that may also be this species: AK 238922)

### 10.01 Little Barrier ED (also see under Great Barrier records)

- Coprosma neglecta* s.lat. S (36° 12' S) (The Thumb; *P.J. de Lange 3423 & D.A. Norton*, AK 234447, Dec 1997)
- Hebe pubescens* subsp. *sejuncta* S (36° 14' S) (Tirikakawa Str.; *M.L. Fromont*, AK 279347, Jan 1993. Also see Bayly et al. 2003)
- Nothofagus solanderi* var. *solanderi* N (36° 11' S) (north side of island; *E.K. Cameron 656*, AK 154967, Aug 1981. Also see Wilcox 2004)
- Peraxilla tetrapetala* N\* (ca. 36° 12' S) (*E.M. Smith*, AK 118069, [1897-1910]. Still extant on Little Barrier; historical collection by Cunningham in Whangaroa Harbour (K); and a recent one from Wekaweka Valley: *S.T. King*, AK 212173, Jun 1993 – died 2 years later)
- Pseudopanax colensoi* var. *colensoi* N (36° 12' N) (Mt Hauturu; *T.F. Cheeseman*, AK 6098, Dec 1898. Note – there is a collection further north from Large Chicken [Lady Alice I]; *H.E. Powell*, AK 44777, Jan 1948, but this locality seems doubtful)

### 10.02 Great Barrier ED

- Amphibromus fluitans* N (36° 15' S) (near Claris; *P.J. de Lange*, AK 199925, Nov 1989. Peter de Lange records seeing it at Lake Waiporohita in Northland (Gardner 2000) but no specimen was collected (P.J. de Lange pers comm))
- Archeria racemosa* N (36° 11' S) (Mt Hobson; *P. Hynes*, AK 150820, Nov 1950. It also occurs on Little Barrier Id)
- Arthropodium candidum* N (36° 4' S) (Rangiwahakaea Bay; *A.E. Wright 5392*, AK 160903, Jan 1983)

- Celmisia major* var. *major* N (36° 2' S) (Aiguilles Id; *R.J. Stanley*, AK 242892, Oct 1999)
- Colensoa physaloides* S (36° 8' S) (Rakitu (Arid Id); *E.K. Cameron J29*, AK 268525; Jun 1980)
- Coprosma dodonaeifolia* N (36° 11' S) (Mt Hobson; *W.R.B. Oliver*, AK 37296, Jan 1929. It also occurs on Coopers Castle (Peter de Lange pers. comm.) 42" further N, but also rounds to 36° 11' S; and also on Little Barrier Id)
- Cordyline indivisa* N (36° 14' S) (Whangaparapara Rd; *M.E. Young & F. Hudson*, CHR 421267, May 1985)
- Dicksonia fibrosa* N (36° 18' S) (Tryphena; *E.K. Cameron 10990*, AK 255519, Jan 2002)
- Dracophyllum patens* N (36° 11' S) (Mt Hobson; *P. Hynes*, AK 40213, Nov 1954. It also occurs on Coopers Castle (Peter de Lange pers. comm.) 42" further N, but also rounds to 36° 11' S)
- Epacris sinclairii* N (36° 11' S) (Mt Hobson; *J. Bishop*, AK 6871, Jan 1920)
- Grammitis patagonica* N (36° 11' S) (Mt Hobson; *J.K. Bartlett*, CHR 391828, Aug 1977)
- Hebe pubescens* subsp. *rehuarum* N (36° 3' S) ("Unknown Id"; *E.K. Cameron 2105*, AK 272514, Jan 1983. Also see Bayly et al. 2003)
- Hebe pubescens* subsp. *rehuarum* S (36° 20' S) ("Goat Id"; *E.K. Cameron 11304*, AK 280623, Nov 2002)
- Kunzea sinclairii* N (36° 10' S) (Windy Canyon; *P.J. de Lange 4537 & B.G. Murray*, AK 287195, Mar 1999)
- Kunzea sinclairii* S (36° 14' S) (nr Maungapiko Rd; *P.J. de Lange 3983*, AK 245523, Nov 1999)
- Leptinella dioica* subsp. *dioica* N (36° 4' S) (Rangiwahakaea Bay; *A.E. Wright 5500*, AK 161009, Jan 1983)
- Macropiper excelsum* subsp. *peltatum* f. *peltatum* S (36° 15' S) (Pitokuku Id; *P.J. de Lange*, AK 199790, Feb 1990)
- Metrosideros parkinsonii* N (36° 11' S) (Mt Hobson; *W.R.B. Oliver*, AK 5541, Dec 1916. It also occurs on Coopers Castle (Peter de Lange pers. comm.) 42" further N, but also rounds to 36° 11' S. It also occurs on Little Barrier Id at 36° 12' S)
- Microlaena carsei* S (36° 12' S) (central Great Barrier Id; *P.J. de Lange 5477 & D.A. Norton*, AK 257166, Apr 2002)
- Olearia allomii* N (36° 11' S) (Coopers Castle; *P.J. de Lange 6570 & P.B. Heenan*, AK 293607, Oct 2005)
- Olearia allomii* S (36° 15' S) (Te Ahumata; *E.K. Cameron 6437*, AK 278965, Apr 1991)
- Pomaderris hamiltonii* N (36° 7' S) (Whangapoua; *E.K. Cameron 6980*, AK 209333, Oct 1992. See Cameron 1992. Apart from a population near Miranda the species would be endemic to AK region)
- Pseudopanax discolor* N (36° 11' S) (Mt Hobson; *P. Hynes*, AK 28011, Nov 1951. Note – also occurs on Little Barrier Id at ca. 36° 12' S)
- Pterostylis paludosa* N (36° 13' S) (Kaitoke wetland; *P.J. de Lange 4728*, AK 253978, Dec 2000)
- Raukaua simplex* var. *simplex* N (36° 12' S) (Mt Young, *P.J. de Lange 3858 & G. Platt*, AK 240935, Mar 1999. It also occurs on the summit of Little Barrier Id, Peter de Lange pers. comm., Dec 1997)
- Senecio australis* S\*\* (36° 10' S) (Harataonga Bay; *P.J. de Lange 5459 & D.A. Norton*, AK 256401, Apr 2002)

*Thelymitra formosa* N\* (36° 13' S) (Kaitoke wetland; R.C. Cooper, AK 119850, Nov 1964. Note - there are several historical collections from Northland in AK)  
*Uncinia scabra* N (36° 4' S) (Northern block; A.E. Wright 8598, AK 184265, Jan 1989)

## C. Rejected geographical records for the Auckland region

### 06.02 Taranga ED (Mokohinau Islands only)

*Asplenium pauperequitum* S (ca. 35° 54' S) (Mokohinau Id, P.S. [F.S.?] Sandager, AK 135800, [1883-88], see Cameron (1993). Recently discovered on the Forty-fours in the Chatham Is, R.M. Bellingham, AK 290307, Jan 2005)

### 09.01 Rodney ED

*Carex litorosa* N\* (36° 31' S) (Puhoi; P.J. de Lange 2254, AK 224290, Nov 1993 - "site destroyed 1995". Making the next extant N limit: 36° 36' S, Waikawau Bay, NE Coromandel, E.K. Cameron 6816, AK 206865, May 1992. The historical N limit is Maungatapere, H. Carse, CHR 146041, Nov 1897)

*Corybas rotundifolius* (= *Anzybas rotundifolius*) S\* (36° 27' S) (Kawaka; M.E. Young, AK 177425, Aug 1986. But there is a recent Waikato record (Opuatia), P.J. de Lange 6604, AK 294812, Jul 1990. Historical S limit is Manawatu, W. Colenso (K))

*Doodia aspera* S (36° 25' S) (Martins Bay; B.S. Parris, AK 141648-49, Jun 1966. These specimens are not pure *D. aspera*, perhaps a hybrid with *D. australis*? B.S. Parris (pers. comm.))

*Pomaderris phyllicifolia* (= *P. phyllicifolia* var. *polifolia*) S (36° 37' S) (Silverdale; E.M. Dickson, AK 261249, Jul 1972. More S collection: Opuatia (Waikato), P.J. de Lange & D.P. McCrae, CHR 473119, Oct 1990)

*Pomaderris rugosa* N (36° 36' S) (Bankside, Silverdale; F.W. Bartlett, CHR 87612, Jul 1955, see Allan 1961. Many trees and shrubs have been introduced to this property (see Wilcox 2005), also its distance from all other localities suggests that it may have been introduction to this area. There are also 3 collections from margins of logging roads in Northland: behind town [Herekino Forest?], R.H. Michie, CHR 97481, Feb 1957; Herekino Forest, P.J. Bellingham, AK 167584, June 1984; Herekino Forest, L.J. Forester, AK 273868, Oct 1984. My feeling is that all the above records are probably introduced with forestry activities, possibly as seed in soil. Therefore the most northern acceptable locality in AK is on the Coromandel Peninsula at New Chums Beach; P.J. de Lange & G.M. Crowcroft, AK 210966, Sep 1992. Note – Moore (1986) accepted the Silverdale record adding that it died out there "more than 20 years ago", she also accepted the 1984 Northland records)

### 09.02 Waitakere ED

*Gunnera dentata* ?N (37° 52' S) (Waitakere River; T.F. Cheeseman, AK 6029, Nov 1870; and de Lange et al. 1999. Recently collected on Pouto Peninsula, G. Coulston & A.P. McCluggage, AK 248040, Dec 1999)

*Luzula banksiana* var. *banksiana* N (36° 58' S) (Piha; E.K. Cameron 7419 & G.A. Taylor, AK 218569, Dec 1993, see Cameron et al. 1995. More recently it has

been collected at Bream Head Scenic Reserve; P.J. de Lange 5837 & G.M. Crowcroft, AK 284867, May 1997)

*Myosotis pygmaea* var. *pygmaea* N (36° 55' S) (Anawhata; T.F. Cheeseman, AK 7425, Oct 1880; was the basis for ?extant N limit by de Lange et al. 1999. But there is a more N record from a western Coromandel Id (36° 42' S), A.E. Wright 5781, AK 167142, Aug 1983)

*Sophora fulvida* Endemic to the Waitakere west coast. (Recently it has been shown (Heenan et al. 2001) to have a distribution from Maunganui Bluff (Northland) to Mt Karioi (Waikato))

### 09.08 Hunua ED

*Cyathea colensoi* N (37° 2' S) (Kohukohunui Trk; E.K. Cameron 4108, AK 275962, Aug 1986, see Gardner & Dakin 1989. It was based on a misidentification, see Cameron 2001)

*Hoheria populnea* S (37° 5' S) (Hunua Ranges see Gardner & Dakin 1989; but S limit appears to be Ohautiri (SW Hakarimata Ra); KCS [K. Clayton-Greene], WAIK 322, Jul 1974)

*Nertera villosa* (37° 2' S) (Kohukohunui; R.O. Gardner 3122, AK 155445, Aug 1981, see Macmillan 1995. More recently it has been collected as far north as Waipoua Forest; P.J. de Lange & G.M. Crowcroft, AK 228427, Apr 1996)

*Polystichum silvaticum* (37° 2' S) (Kohukohunui; B.E.G. Molesworth, AK 22330, Nov 1944; see Brownsey & Smith-Dodsworth 2000. But it has been collected slightly further north in the Coromandel Range (36° 59' S): Maumaupaki, B.R. Burns, AK 166037, Apr 1983)

*Polystichum vestitum* (ca. 37° 2' S) ("Hunua Ranges southwards" Brownsey & Smith-Dodsworth 2000 (no Hunua vouchers in AK or WELT). But it has been collected in Northland (35° 13' S): Mt Raetea, P.J. Anderson, AK 294683, Jan 1993)

### 10.01 Little Barrier ED

*Dactylanthus taylorii* N (de Lange et al. 1999 for Little Barrier Id; C.E. Ecroyd, AK 206104, Jun 1991. Recently collected in Northland, Puketi Forest, S. Candy & K. Riddell, AK 253337, Mar 2001)

*Pseudopanax gilliesii* S (Little Barrier Id; T.F. Cheeseman, AK 6152-3, 230524, 230526 and WELT 25104, Dec 1898 & Jan 1901. They were based on misidentifications: *P. discolor* × *P. lessonii* (WELT specimen) and large-leaved variants of *P. discolor* (AK specimens), see de Lange et al. 2004)

### 10.02 Great Barrier ED

*Grammitis magellanica* subsp. *nothofageti* N (36° 11' S) (Mt Hobson; A.J. Dakin, AK 213850, Mar 1978. More recently it has been discovered at Warawara (Northland), L.J. Forester, AK 248042, Mar 2000)

*Hebe macrocarpa* var. *latisepala* N (Cameron 2004b for Great Barrier Id. But occurs in Northland, e.g. Bream Head and Mt Manaia (AK specimens out on loan))

*Lepidothamnus intermedius* N (36° 11' S) (Mt Hobson; C.J. Quinn, AK 260024, Nov 1945. It has been collected in Waipoua Forest, S.T. King, AK 233884, May 1997)

### General for the Auckland region

*Epilobium komarovianum* N (de Lange et al. 1999. But there are historical records from Northland, e.g. Ahipara, H. Carse, AK5758; & Raven & Raven 1976)

*Grammitis rawlingsii* S (de Lange et al. 1999. Recently collected from the Kauaeranga Valley, *P.J. de Lange 4320*, AK 253959, Dec 1999)

*Lachnagrostis striata* N ("from Auckland south" Edgar & Connor 2000. The most northern specimen I located was from Hamilton [City], *P.J. de Lange 1959*, CHR 483144, Feb 1993. There are collections from L. Whangape in WAIK (Peter de Lange pers. comm.)

*Poa cita* N (de Lange et al. 1999. But it should be Cape Colville (36° 28' S), *L.M. Cranwell*, AK 110614, Jan 1934)

*Senecio marotiri* S (de Lange et al. 1999. But it is known from further south, e.g. Waimate Id, Coromandel Is (36° 46' S), *A.E. Esler 3495*, CHR 225559, Oct 1971)

## Results and Discussion

A total of 101 northern and southern geographical limits are listed for the Auckland region, 80 of which are extant (Table 1). It is interesting that the ED with the highest number of records is Great Barrier with 34, followed by Tamaki with 16 and Waitakere with 15. Great Barrier can be considered a northern extension of the Coromandel Ranges – they were connected above sea level during the last glacial, until c.10,000 years ago (Moore 2004). Therefore Great Barrier acts as the end of a long peninsula, illustrated by the fact that 79% of the records are N limits. Tamaki has eight historical records (50% of the Tamaki records) which aren't surprising because this is the densest human populated area in New Zealand. The total N limits outnumber the S limits by 67%. These records are based on current knowledge and some of Auckland's EDs are much better botanised (e.g. Waitakeres and Great Barrier) than others (e.g. Awhitu), reflected by

the AK herbarium holdings: >5,800 native plants specimens from Waitakere; and only 679 from Awhitu ED. Collections held in other herbaria will no doubt add extra information.

This list only covers the vascular flora and it would be good to overlay it with the non-vascular flora geographical limits, however, they are generally not as well known. Some that are known to me include these three mosses: *Atrichum androgynum* (AK 229356) appears to be at its northern limit at Awhitu (09.06); *Fissidens berteroi* (AK 284513) is at its extant northern limit in urban Auckland (09.03); and *Lindergia maritima* (AK 288243) appears to be endemic to the Waitakere coast (09.02).

The author welcomes additions, deletions, range extensions, corrections, etc.

**Table 1. Summary of the New Zealand geographical limits (North and South) of native vascular plant species in the Auckland region by Ecological Districts: Historical (1769 to pre-1970) and Extant (1970 to present), including the endemic species.**

Ecological Districts	Historical: North	Historical: South	Extant: North	Extant: South	Totals (historical %)
Taranga (in part)	1	-	3	2	6 (17 %)
Kaipara (in part)	-	-	2	5	7 (0 %)
Rodney	-	-	-	3	3 (0 %)
Waitakere	2	1	10	2	15 (20 %)
Tamaki	6	2	4	4	16 (50 %)
Rangitoto	1	-	-	-	1 (100 %)
Hauraki Gulf Is	-	-	1	1	2 (0 %)
Awhitu	1	-	2	1	4 (25 %)
Manukau	1	-	1	-	2 (50 %)
Hunua	-	-	3	3	6 (0 %)
Little Barrier	-	-	3	2	5 (0 %)
Great Barrier	6	-	21	7	34 (15 %)
<b>Totals</b>	<b>18</b>	<b>3</b>	<b>50</b>	<b>30</b>	<b>101 (21 %)</b>

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## Kakabeak under attack

C J Green & G Atkins

During August - September 2004 an area of the threatened plant *Clianthus maximus* (kakabeak) was being monitored (by GA) near Te Puia Springs on the East Coast. Increasing levels of damage were recorded and there was concern for the plants survival so samples were sent to CG for identification. Initially it was presumed the culprit was the well known kowhai moth (*Uresiphita polygonalis maoralis*) (Lepidoptera: Pyralidae) which is a well known native

defoliator of various Fabaceae, particularly kowhai (*Sophora* species) and broom (*Carmichaelia* species) and is known from kakabeak.

On receipt of the caterpillar sample it was clear that two species were involved and neither of them being kowhai moth. Caterpillars were reared through to adult on the foliage sample to reveal one native and one exotic species. The majority were the native *Pasiphila melochlora* (Lepidoptera: Geometridae), a