

9.4 CATEGORY B PLANT PROFILES

Aciphylla traversii (F.Muell.) Hook.f.

- Family:** Apiaceae
- Endemic to:** Chatham Islands.
- Common name:** Chatham Island speargrass.
- Ranking:** B, Vulnerable. **In cultivation:** Yes.
- Descriptor:** Medium-sized speargrass with semi-ridged leaves.
- Conservancy:** WL.
- Habitat:** Restiad peat or in *Pteridium esculentum*/*Dracophyllum paludosum*/*Olearia* sp. shrubland on peat, sometimes on sand mounds in peat zones with above species.
- Threats:** Pig rooting and browse (other browsing animals less so); potential competition from tall growing species; habitat destruction (deforestation).

Work undertaken to date

Survey of locations, recently located on Pitt Island; translocations attempted and continuing; monitoring of four wild populations; specific reserves being set up and a case is being developed for a covenant.

Priority sites for survey

Continue survey of potential sites including central Pitt Island.

Monitoring: objectives and priority sites

Continue monitoring at Ocean Mail Scenic Reserve, airport, and Rangaika Scenic Reserve to determine population trends.

Research questions

What is the reproductive ecology of *A. traversii*, especially seed dispersal and longevity? What are the effects of browsing and grazing? What are the effects of succession, especially of woody vegetation establishing in bracken fern (*Pteridium esculentum*), where the species often occurs, or in *Sporodanthus* habitats?

Management needs

Develop an effective pig control programme; advocacy with landowners to mitigate pig damage; continue to establish in cultivation for research, advocacy, population management (translocation/population enhancement), and insurance purposes; habitat restoration; seed collections;

Selected references

- Wilson, C.M.: Given, D.R. 1989. *Threatened Plants of New Zealand*. DSIR Publishing, Wellington.
- Greenwood, R.M. 1992. Some differences between plants of the Chatham Islands and the New Zealand mainland. *New Zealand Journal of Ecology* 16: 51-52.

***Alepis flavida* (Hook.f.) Tiegh.**

- Family:** Loranthaceae (the only species in the *Alepis* genus).
Endemic to: New Zealand.
Common name: Pirita, piriraki, yellow mistletoe, golden mistletoe.
Ranking: B, Vulnerable. **In cultivation:** No.
Descriptor: A shrubby, hemi-parasite, with yellow flowers.
Conservancy: TT, WG, EC/HB, NM, WC, CA, OT, SL, (WL).
Habitat: Principally black/mountain beech (*Nothofagus solandri* complex) forests.
Threats: Lack of seed dispersal; poor recruitment; reduction in native bird species involved with reproduction; possum browse; habitat destruction (deforestation).

Work undertaken to date

Research into biological systems; attempts at propagation; survey of small populations in Upper Maruia Valley (West Coast), Raetihi (Wanganui), opportunistic in Southland, Arthurs Pass (Canterbury), and at Puketitiri, Boundary Stream Scenic Reserve (East Coast/Hawke's Bay); monitoring at Raetihi, Totara Flat, north Mavora Lake (Southland), Rough Creek, Maruia Valley, Puketitiri, Boundary Stream; unsuccessful survey of historical sites in Wellington Conservancy; banding of accessible hosts and caging of accessible plants; database/monitoring system set up in various conservancies; monitoring at Craigieburn Forest Park and Mt Thomas Forest Park; fencing from stock and monitoring being done at the Boyle River site; Waitaanga Plateau (Wanganui Conservancy) record rejected.

Priority sites for survey

Opportunistic survey at historical sites, particularly in East Coast and Wellington Conservancies.

Monitoring: objectives and priority sites

Continue monitoring the effects of management at all sites.

Research questions

What are the pollinators and seed dispersers for the North Island populations? What level of possum population control is required to maintain healthy populations? Can *A. flavida* be cultivated?

Management needs

Cultivation trials to infect trees with seed; seed collection for population enhancement and translocation to historical sites; minimise browse using collars, cages, and/or bait stations as appropriate; legal land protection is required for protection of private sites.

Selected references

- de Lange, P.J.; Norton, D.A. (eds.). 1997. *New Zealand's loranthaceous mistletoes*. Proceedings of a workshop hosted by Threatened Species Unit, Department of Conservation, July 1995. Department of Conservation, Wellington.
- Dopson, S.R. 1999. *Management recommendations for the Loranthaceae mistletoe in the Tongariro/Taupo Conservancy*, Department of Conservation. Science & Research Investigation No. 1991, Department of Conservation, Wellington.

- Norton, D.A.; Ladley, J.J.; Owen, H.J. 1997. Distribution and population structure of the loranthaceous mistletoes *Alepis flavida*, *Peraxilla colensoi* and *Peraxilla tetrapetala* within two New Zealand *Nothofagus* forests. *New Zealand Journal of Botany* 35: 323-336.
- Norton, D.A.; Ladley, J.J.; Sparrow, A.D. 1997. Development of non-destructive age indices for three New Zealand loranthaceous mistletoes. *New Zealand Journal of Botany* 35: 335-343.
- Norton, D.A.; Reid, N. 1997. Lessons in ecosystem management of threatened and pest loranthaceous mistletoes in New Zealand and Australia. *Conservation Biology* 11: 759-769.
- Ogle, C.C.; Wilson, P. 1985. Where have all the mistletoes gone? *Forest and Bird* 16(3): 10-13.
- Williams, B.; Ogle, C.C. 1998. Yellow-flowered mistletoes on Waitaanga Plateau, North Taranaki. *New Zealand Botanical Society Newsletter* 53: 15-17.



***Astelia chathamica* (Skotts.) L.B.Moore**

Family: Asteliaceae

Endemic to: Chatham Islands.

Common name: Moriori flax, Chatham Islands swamp lily, Chatham Islands kakaha.

Ranking: B, Vulnerable. **In cultivation:** Yes.

Descriptor: Forms flax-like clumps with sword-shaped leaves, which are silver underneath.

Conservancy: WL.

Habitat: Wetlands (fertile to acid), take margins, clearings in forests, bluffs, stream banks.

Threats: Sex-ratio imbalance at a few sites; lack of legal land protection at some sites; pigs, sheep, cattle browse at some sites; collectors.

Work undertaken to date

Reserves and covenants set up and some more being negotiated; seed being collected: seedlings being grown up for translocation into protected areas.

Priority sites for survey

Continue survey of suitable habitats.

Monitoring: objectives and priority sites

Commence monitoring to determine population dynamics.

Research questions

Does the sex imbalance at some sites limit seed production?

Management needs

Continue to establish insurance populations: seed collection: translocation/ population enhancement: secure legal land protection of key populations in the south of Chatham Island: develop a plan to control pigs: advocacy to mitigate collection: continue opportunistic survey; establish formal monitoring.

Selected references

Wilson, C.M.; Given, D.R. 1989. *Threatened Plants of New Zealand*. DSIR Publishing, Wellington.

Atriplex cinerea Poir.

- Family:** Chenopodiaceae
- Endemic to:** Indigenous to New Zealand. Also found in Australia, Lord Howe Island, and Norfolk Island.
- Common name:** Grey salt bush, barilla.
- Ranking:** B, Endangered. **In cultivation:** Yes.
- Descriptor:** A sprawling, semi-woody shrub with crowded, thick, silver-grey leaves.
- Conservancy:** NM, (WL).
- Habitat:** Cobble beaches, estuarine islands and sand spits.
- Threats:** Reproductive failure; browsing (caterpillar, hare, rabbit, cattle, etc.).

Work undertaken to date

Translocation to Moutere Estuary; opportunistic monitoring plus photo points; survey at historic locations (Wellington - survey unsuccessful, and areas in Nelson/Marlborough); nature reserve made for main population; field guide sheet prepared by Wellington Conservancy; taxonomy, ecology, and national status reviewed concluding that *A. cinerea* is a vagrant species to New Zealand.

Priority sites for survey

Wellington Coast (Ocean Beach and Palliser Bay), and D'Urville Island.

Monitoring: objectives and priority sites

Continue to monitor at Waimea and Moutere Estuaries to determine population trends, and translocation success.

Research questions

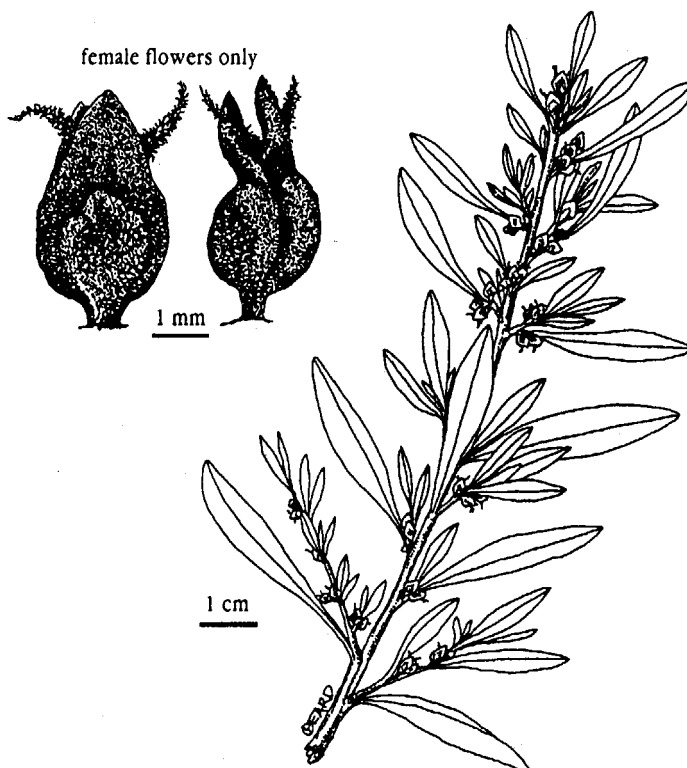
What is the reproductive system of *A. cinerea*? Does this limit the reproductive success for small populations?

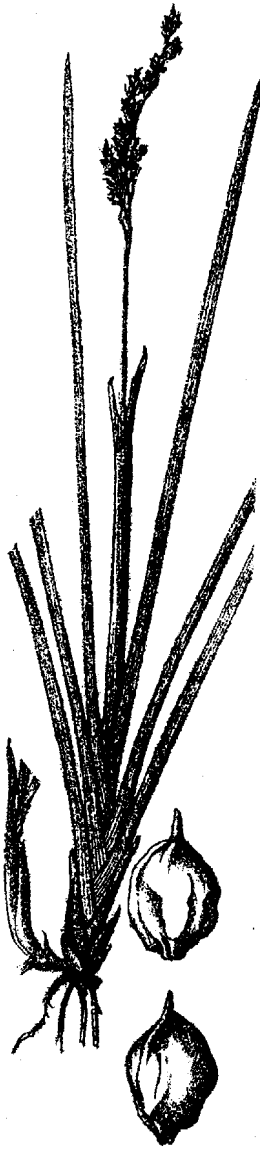
Management needs

Establish known provenance male plants in cultivation for insurance purposes; animal control; re-establish in Wellington; identify browse-free sites for translocation.

Selected references

- de Lange, P.J.; Molloy BJP 1995 Vagrancy within New Zealand threatened orchids: what are our conservation priorities? *New Zealand Botanical Society Newsletter* 40: 13-14.
- de Lange, P.J.; Murray, B.G.; Gardner, R.O. 1998. *Atriplex cinerea* (Chenopodiaceae) in New Zealand. *New Zealand Journal of Botany* 36: 521-529.





***Baumea complanata* (Bergg.) Blake**

- Family:** Cyperaceae
Endemic to: Northern North Island.
Common name: -
Ranking: B, Vulnerable. **In cultivation:** Yes.
Descriptor: Light-green sedge with flattened leaves arranged in fans up to one metre tall.
Conservancy: NL, (WK).
Habitat: Found in lowland peatbogs, lake margins, gumland scrub, and coastal swamps. Now confined to one main location in a geothermal area.
Threats: Habitat destruction (geothermal development); shading out caused by succession of surrounding vegetation; weed encroachment.

Work undertaken to date

Survey in Waikato, Bay of Plenty, and Northland Conservancies; seed germination; informal monitoring.

Priority sites for survey

Opportunistic survey, particularly in likely habitat in the northern North Island.

Monitoring: objectives and priority sites

Ongoing at Ngawha Thermal Springs where a thermal power plant is proposed.

Research questions

What are the optimal seed germination requirements? How is *B. complanata* cultivated and propagated?

Management needs

Advocacy to retain habitat; translocate to historical sites in the Waikato; fire-breaking will open the habitat for *B. complanata*; weed control at sites.

Selected references

Wilson, C.M.; Given, D.R. 1989. *Threatened Plants of New Zealand*. DSIR Publishing, Wellington.

***Brachyglottis huntii* (F.Muell.) B.Nord.**

- Family:** Asteraceae
Endemic to: Chatham Islands.
Common name: Rautini.
Ranking: B, Rare. **In cultivation:** Yes.
Descriptor: Erect, perennial tree up to 8 m tall.
Conservancy: WL.
Habitat: *Dracophyllum arboreum* dominated and *Dracophyllum arboreum/mixed* broadleaved forests. Particularly common along rivers, stream sides, and banks of Chatham and Pitt Islands.
Threats: Stock grazing; habitat destruction (land clearance); pig rooting preventing regeneration and recruitment; lack of legal land protection.

Work undertaken to date

Survey for locations; collection of several seed sources; translocation and habitat enhancement using nursery-raised stock.

Priority sites for survey

Southern Chathams.

Monitoring: objectives and priority sites

Success of species translocation efforts.

Research questions

What microsite requirements influence the occurrence of this species in the peat forest of South Chatham Island?

Management needs

Develop a plan to control pigs and stock; establish insurance populations in the north of Chatham Island, and continue with translocation efforts elsewhere on Chatham Island; secure legal land protection for further populations.

Selected references

- Given, D.R. 1991. *Studies on Threatened Plants. Part 2: Autecological Study of Chatham Island Species*. DSIR Land Resources Contract Report 91/57(2), for Contract Investigation 679 (part). Department of Conservation, Wellington.
- Given, D.R.; Williams, P.A. 1985. *Conservation of Chatham Island Flora and Vegetation*. Botany Division, DSIR, Christchurch.

***Caladenia atradenia* D.L.Jones, Molloy et M.A.Clem.**

Family: Orchidaceae

Endemic to: North Island and northern South Island.

Common name: -

Ranking: B.

In cultivation: No.

Descriptor: An elusive orchid, slender, hairy, dark reddish-green with greenish flowers. The labellum and calli are a dark chocolate brown.

Conservancy: NL, WK, BP, TT, NM.

Habitat: Forest and shrublands, including exotic forest.

Threats: Weed encroachment; successional changes; fluctuating water levels.

Work undertaken to date

Opportunistic survey and monitoring by orchid enthusiasts; taxonomy revised.

Priority sites for survey

Opportunistic survey.

Monitoring: objectives and priority sites

Continue at Northland to monitor population trends.

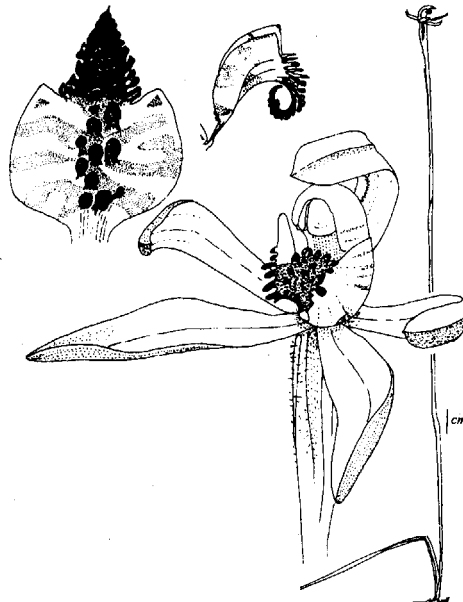
Research questions

Management needs

Weed control at sites; habitat restoration.

Selected references

Jones, D.L.; Molloy, B.J.P.; Clements, M.A. 1997. Three new species and a new combination in *Caladenia* R.br. (Orchidaceae) from New Zealand. The *Orchadian* 12: 221-228.



***Cardamine "tarn"* (of Johnson & Brooke 1989)**

- Family:** Brassicaceae
Endemic to: Eastern South Island.
Common name: Bitter cress, pygmy turf cress.
Ranking: B, Endangered. **In cultivation:** Yes.
Descriptor: Very small, bitter cress with lobed leaves and hairy leaf stalks.
Conservancy: NM, CA, OT.
Habitat: Turf of ephemeral wetlands around kettle holes and tarns.
Threats: Weed encroachment; trampling by stock; habitat degradation (Canada geese foul turf and modify wetland balance); lack of legal land protection (Otago and Canterbury).

Work undertaken to date

Only known population in Marlborough has been fenced, and is being monitored; taxonomic investigation in progress.

Priority sites for survey

Tarns of inter-montane basins in Otago and Canterbury.

Monitoring: objectives and priority sites

Ongoing monitoring in NM; set up monitoring for population trends and threats (especially weed encroachment) in Canterbury and Otago.

Research questions

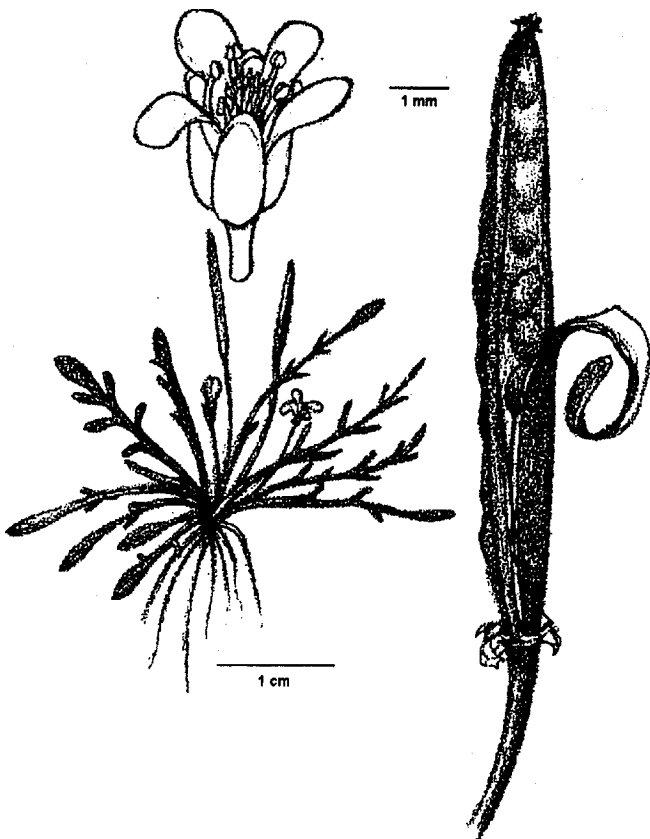
How can weeds be effectively controlled to protect threatened wetland plants?
How does removal of cattle by fencing affect seedling establishment?

Management needs

Management needs are dependent on results of fencing enclosure and weed control research; weed and stock control at sites; habitat restoration; establish insurance populations; secure legal land protection at sites in Canterbury and Otago.

Selected references

- Johnson, P.; Brooke, P. 1989. *Wetland Plants in New Zealand*. DSIR Field Guide, DSIR Publishing, Wellington.
- Champion, P.D. 1998. Selective control of weeds in New Zealand wetlands using herbicides. NIWA Client Report: DOC80220. National Institute of Water & Atmospheric Research Ltd, Hamilton.



Carex uncifolia Cheeseman

- Family:** Cyperaceae
Endemic to: South Island and central North Island.
Common name: -
Ranking: B, Rare. **In cultivation:** Yes.
Descriptor: Short (c. 5 cm), densely tufted, wiry sedge with very narrow, curled, reddish leaves.
Conservancy: WG, NM, OT, SL, (TT).
Habitat: Wet sites on ultramafic substrates (South Island), and bogs of sparse *Chionochloa rubra*, *Empodisma*, and small statured *Carex* spp in Moawhango.
Threats: Trampling by horses; weed encroachment; habitat destruction (deforestation); track/road construction.

Work undertaken to date

Cytology known; survey in Nelson/Marlborough and Southland; limited monitoring at upper Moawhango; removal of wild horses from the Moawhango area; unsuccessful survey at Hauhungatahi (Tongariro National Park).

Priority sites for survey

Further survey at Hauhungatahi; ultramafic sites in the South Island; Upper Moawhango.

Monitoring: objectives and priority sites

Monitoring population dynamics in Moawhango; Red Hills, Marlborough; West Dome, Southland.

Research questions

How are the populations affected by weed encroachment? How are weeds best controlled in wetland habitats?

Management needs

Ongoing management to remove the impacts of the wild horses on the upper Moawhango habitat; weed control at sites; advocacy to prevent habitat destruction and to aid careful selection of road/track placements.



Selected references

- Champion, P.D. 1998. Selective control of weeds in New Zealand wetlands using herbicides. NIWA Client Report: DOC80220. National Institute of Water & Atmospheric Research Ltd, Hamilton.

***Carmichaelia curta* Petrie**

- Family:** Fabaceae
Endemic to: Waitaki Valley.
Common name: -
Ranking: B, Vulnerable. **In cultivation:** Yes.
Descriptor: Suckering, rush-like, broom
Conservancy: CA, OT.
Habitat: Found in dry, tussock-grassland on colluviurri, gravel outwash, and along braided river banks. Also on cliffs.
Threats: Animal browse at all stages of life-cycle; habitat degradation (fire, road realignment, quarrying, spraying of gorse); lack of legal land protection; collectors; weed encroachment; inappropriate weed spraying.

Work undertaken to date

Limited survey in the Waitaki Basin (Deep Stream, Waitaki Dam); taxonomic status resolved; seed collected; research on ecology and habitat requirements in process; a South Island Native Broom Recovery Plan has been funded.

Priority sites for survey

Further survey of Waitaki Valley; historical sites.

Monitoring: objectives and priority sites

Monitor Lake Aviemore roadside population to determine population trends (size, health, threats etc.); monitor impacts of wilding tree spread on Benmore Island.

Research questions

To what extent do browsers damage plants, and what is the role of browsers in controlling weeds? What is the reproductive ecology and what are the optimal habitat requirements for germination?

Management needs

Animal control; secure legal land protection; translocate to reserves in the lower Waitaki Valley; advocacy to mitigate collection, and to prevent plants being eliminated by spraying, road works etc.; implement wilding pine control (Benmore Island) if subsequent monitoring shows them to have an impact.

Selected references

- Heenan, P.B. 1995. A taxonomic revision of *Carmichaelia* (Fabaceae - Galegeae) in New Zealand (Part 1). *New Zealand Journal of Botany* 33: 455-475.
Heenan, P.B. 1998. An emended circumscription of *Carmichaelia*, with new combinations, a key, and notes on hybrids. *New Zealand Journal of Botany* 36: 53-G3.



***Carmichaelia juncea* Hook.f.**

(including *C. prona* Kirk, *C. lacustris* G.Simpson, *C. floribunda* G.Simpson, *C. nigrans* var. *nigrans* G.Simpson, *C. nigrans* var. *tenuis* G.Simpson, *C. fieldii* Cockayne)

- Family:** Fabaceae
Endemic to: South Island, and Hawke's Bay.
Common name:
Ranking: B, Insufficiently Known. **In cultivation:** Yes.
Descriptor: Slender, prostrate, leafless broom.
Conservancy: NM, WC, (CA, EC/HB, OT, SL).
Habitat: Found in coastal turfland and conglomerate rock; and gravel of braided river islands (eyots).
Threats: Browse; lack of legal land protection; collectors; lack of recruitment; weed encroachment; catastrophic events e.g., river flooding (West Coast).

Work undertaken to date

Taxonomic revision; a South Island Native Broom Recovery Plan has been funded.

Priority sites for survey

Hawke's Bay (the type locality of *C. juncea*); Te Taitapu Coast survey; West Coast (Waiho - type locality for *C. n.* var. *tenuis*); Makarora River (Otago) (the type locality for *C. n.* var. *nigrans*); Lakes Te Anau and Manapouri (Southland) (sites and type locality for *C. lacustris*).

Monitoring: objectives and priority sites

Continue monitoring population dynamics in Nelson/Marlborough (Te Taitapu); commence monitoring volatile habitats for population trends in the West Coast.

Research questions

What is the genetic variation within *C. juncea*? What are the germination and seedling establishment requirements?

Management needs

Browse control; secure legal land protection (Nelson); advocacy to mitigate collection; establish insurance populations from stock of known provenance; translocation to re-introduce to Lake Lyndon from Percy's Reserve (*C. prona* form); translocation into eyots in Westland; weed control at sites.

Selected references

- Heenan, P.B. 1995. A taxonomic revision of *Carmichaelia* (Fabaceae - Galegeae) in New Zealand (Part 1). *New Zealand Journal of Botany* 33: 455-475.
- Heenan, P.B. 1998. An emended circumscription of *Carmichaelia*, with new combinations, a key, and notes on hybrids. *New Zealand Journal of Botany* 36: 53-63.
- Norton, D.A.; de Lange, P.J.; Miller, C. 1998. *Carmichaelia juncea* - a little known plant on the brink of extinction. *New Zealand Botanical Society Newsletter* 52: 11-13.



***Carmichaelia kirkii* Hook.f.**

- Family:** Fabaceae
Endemic to: Eastern South Island.
Common name: Climbing broom, Kirk's broom.
Ranking: B, Critical. **In cultivation:** Yes.
Descriptor: Scrambling, leafless, climbing broom with big white flowers.
Conservancy: NM, CA, OT.
Habitat: Grey scrub, and podocarp swamp forest.
Threats: Browse; habitat loss of grey scrub; fire; lack of legal land protection; access; inappropriate weed spraying; mining (Macraes Flat).

Work undertaken to date

Opportunistic surveys in Otago; survey in Marlborough and further limited survey in Canterbury; a South Island Native Broom Recovery Plan has been funded; taxonomic status has been revised.

Priority sites for survey

Cardrona (type locality); survey upper Waitaki, Macraes Ecological District, Cluden Valley, upper Maniototo (Otago); Mackenzie Basin, scrub remnants and stream gullies - Two Thumb, Kirkliston and Hawkdun Ranges, Waimakariri Basin (Poulter Gorge); Upper Awatere Valley, South Marlborough.

Monitoring: objectives and priority sites

Monitor success of population enhancement at Poulter River, Ahuriri Bridge.

Research questions

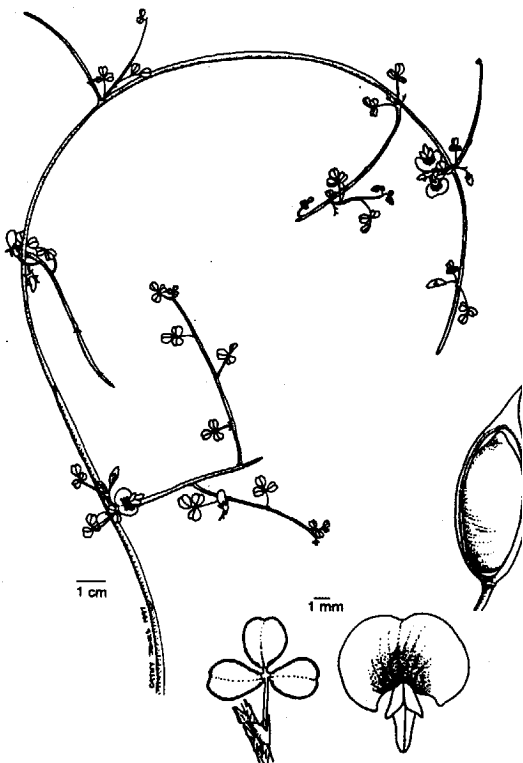
What is the ecology of *C. kirkii*? What are the optimal germination and seedling establishment requirements? Is rabbit grazing a threat?

Management needs

Fencing to remove browse threat; establish insurance populations; secure legal land protection; advocacy - a good flagship species for grey scrub, as *C. kirkii* is very attractive with big, white flowers, and advocacy to prevent inappropriate weed spraying; population enhancement at Poulter River, Ahuriri Bridge; commence translocation to Cave Stream Scenic Reserve habitat restoration site, Canterbury; identify potential translocation sites in protected areas at Macraes Flat; scrub weed control, e.g. introduced broom (*Cytisus scoparius*).

Selected references

- Heenan, P.B. 1996. A taxonomic revision of *Carmichaelia* (Fabaceae, Galegeae) in New Zealand (Part 11). *New Zealand Journal of Botany* 34:157-177.
- Heenan, P.B. 1998. An emended circumscription of *Carmichaelia*, with new combinations, a key, and notes on hybrids. *New Zealand Journal of Botany* 36: 53-63.
- Norton, D.A.; de Lange, P.J.; Millar, C. J. 1998. *Carmichaelia juncea* - a little known plant on the brink of extinction. *New Zealand Botanical Society Newsletter* 52: 11-13.



***Carmichaelia stevensonii* (Cheeseman) Heenan**

- Family:** Fabaceae
Endemic to: South Marlborough.
Common name: Weeping tree broom, cord broom.
Ranking: B, Vulnerable. **In cultivation:** Yes.
Descriptor: Weeping tree broom
Conservancy: NM.
Habitat: River beds, greywacke bluffs and open mountain beech forest.
Threats: Browsing (deer, goats); lack of legal land protection (pastoral lease); catastrophic events, especially flood erosion.

Work undertaken to date

Monitoring programme at Miller Stream for , browsing and recruitment; taxonomic status revised; a South Island Native Broom Recovery Plan has been funded.

Priority sites for survey

Survey all previously recorded sites - Wharekiri, George, Medway Rivers.

Monitoring: objectives and priority sites

Ongoing monitoring of effectiveness of browse control, and recruitment at Miller Stream.

Research questions

Management needs

Wild animal control to mitigate browse; advocacy for tenure review, Middle Hill Station; establish in cultivation for insurance, research, and advocacy purposes.

Selected references

- Connor, L.N.; Connor, A.J. 1988. Seed biology of *Chordospartium stevensonii*. *New Zealand Journal of Botany* 26: 473-475.
- Heenan, P.B. 1998. An emended circumscription of *Carmichaelia*, with new combinations, a key, and notes on hybrids. *New Zealand Journal of Botany* 36 53-63.



***Carmichaelia williamsii* Kirk**

- Family:** Fabaceae
Endemic to: Northeastern North Island.
Common name: Giant flowered broom.
Ranking: B, Vulnerable. **In cultivation:** Yes.
Descriptor: Yellow flowered, broad-stemmed coastal broom.
Conservancy: NL, AU, WK, EC/HB.
Habitat: Coastal forest and off-shore islands.
Threats: Lack of recruitment, loss of pollinators; browse (rats, goats etc.); weed encroachment; lack of legal land protection; coastal erosion.

Work undertaken to date

Floral ecology and causes of decline known; survey at all known sites (Eastern Bay of Plenty, near East Cape); some failed cultivation attempts; some in cultivation of unknown provenance; Poor Knights material in cultivation.

Priority sites for survey

Little Barrier Island, Coromandel Islands, coast of northeastern Coromandel Peninsula; Alderman Islands, Eastern Bay of Plenty; East Cape.

Monitoring: objectives and priority sites

Monitor population dynamics prior to rat eradication on Little Barrier Island; Aldermen Islands to determine recovery after rat eradication in 1994.

Research questions

Management needs

Commence population translocation at feasible sites; commence advocacy for restoration programmes; control rats; habitat restoration and weed control at sites; secure legal land protection; establish in cultivation for insurance, research, and advocacy purposes.

Selected references



***Chionochloa spiralis* Zotov**

- Family:** Poaceae
Endemic to: Fiordland.
Common name: Limestone snowgrass.
Ranking: B, Rare. **In cultivation:** Yes.
Descriptor: A fine-leaved snow tussock.
Conservancy: SL.
Habitat: Subalpine to alpine zones on limestone and marble.
Threats: Browsing by deer; some populations susceptible to catastrophic events.

Work undertaken to date

Survey of three calcareous substrate areas in Fiordland.

Priority sites for survey

Calcareous substrate areas in Fiordland.

Monitoring: objectives and priority sites

Population trends and impacts of deer at Takahe Valley (to be established).

Research questions

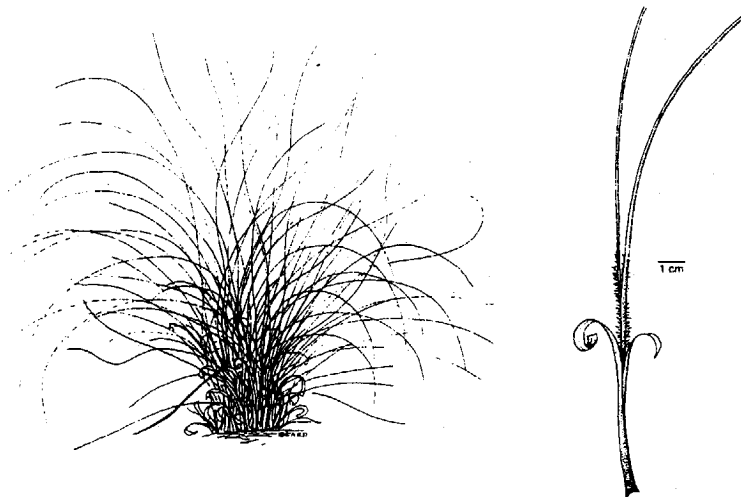
What impact do deer have on *C. spiralis* populations?

Management needs

Animal control; population enhancement at Luxmore Cave - three plants only are left at this site; establish in cultivation for insurance, research, and advocacy purposes.

Selected references

- Lee, W.G. 1989. *Chionochloa spiralis*, a rare Fiordland tussock - ecology and management. Unpublished report. Botany Division, Department of Scientific and Industrial Research, Dunedin.



***Coprosma waima* A.Druce**

- Family:** Rubiaceae
Endemic to: Tutamoe Ecological District.
Common name: -
Ranking: B, Vulnerable. **In cultivation:** Yes.
Descriptor: Shrub or small tree.
Conservancy: NL.
Habitat: Grows in montane cloud forest, usually on basalt cliff face refuges.
Threats: Goat, horse, and pig browse; degradation of habitat by possums and stock.

Work undertaken to date

Species described; animal control (of varying intensity); in limited cultivation, however, most cultivated plants are male.

Priority sites for survey

Re-survey all past sites and potential new ones.

Monitoring: objectives and priority sites

Monitor all individual plants to determine success of animal control and translocation/enhancement.

Research questions

Does *C. waima* hybridise with *C. grandifolia*? If so, is hybridism a threat to the *C. waima* population?

Management needs

Fence Waima Range from wandering stock, starting with Hauturu and Mt Misery; continue goat control at low levels in Waima Range; increase the number of female plants in cultivation, and establish populations for insurance, research, and advocacy purposes.

Selected references

Druce, A.P. 1989. *Coprosma waima* (Rubiaceae) - a new species from northern New Zealand. *New Zealand Journal of Botany* 27:119-128.

Coprosma wallii Petrie

- Family:** Rubiaceae
Endemic to: New Zealand.
Common name: Bloodwood.
Ranking: B, Vulnerable. **In cultivation:** Yes.
Descriptor: Divaricating tree, with glossy dark green thick leaves, twinned dark purple fruit, and wine-red under-bark.
Conservancy: TT, WG, WL, NM, WC, CA, OT, SL.
Habitat: Frost flats and temperature inversion colluvial toeslopes and alluvium. Occasionally on hillslopes with base-rich soils.
Threats: Habitat loss; lack of recruitment due to animal browse; weed encroachment; lack of legal land protection.

Work undertaken to date

General germination requirements known; North Island: resurveyed and re-discovered; seed collection from Wellington sites to be grown up for translocation; landowners notified and management programmes for each population prepared for Wellington Conservancy; possum control at Erua, Tongariro/Taupo Conservancy, and Paengaroa Scenic Reserve near Taihape (a "mainland island"), Wanganui Conservancy; South Island: survey of frost flats; weed control trials have been started for germination; some sites have been fenced off; survey at Banks Peninsula; survey of Matukituki River.

Priority sites for survey

Glenroy Catchment (Nelson/Marlborough); Western Southland; Maruia Valley and Windbag (West Coast); Catlins (Otago); opportunistic survey (Wellington).

Monitoring: objectives and priority sites

Continue monitoring population dynamics in Wellington; monitor seedling establishment and growth at Paengaroa Scenic Reserve, near Taihape; continue weed control trials for population recruitment at Howard Valley.

Research questions

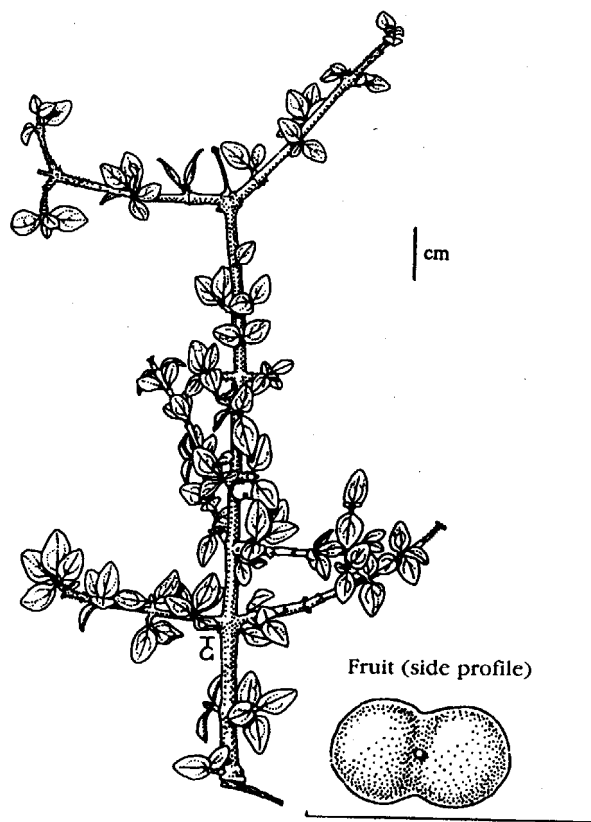
Part of research programme of suite of divaricating shrub communities on alluvium. Involves restoration of shrub communities and control of browsers and weeds.

Management needs

Annual seed collection from Wellington Conservancy populations; habitat restoration at Admiral Road, Wairarapa as part of a Science and Research project; ongoing weed control trial (Nelson/Marlborough); animal and weed control at sites; secure legal land and physical protection of sites, including DOC grazing licences.

Selected references

- Smale, M.C.; Whaley, P.T. 1999. Management of frost flat communities under threat from mouse-car hawkweed invasion. *Conservation Advisory Science Notes* 224. Department of Conservation, Wellington.
- Rogers, G.; Barkla, J.; Rance, B.; Simpson, N. 1998. Recent discoveries of rare small-leaved shrubs and trees from Otago and Southland. *New Zealand Botanical Society Newsletter* 54: 8-13.



Crassula hunua A.Druce

- Family:** Crassulaceae
Endemic to: North, South, and Chatham Islands.
Common name: -
Ranking: B, Endangered. **In cultivation:** Yes.
Descriptor: Minuscule, succulent, moss-like herb.
Conservancy: AU, WL, (NL, SL).
Habitat: Occurs on riparian and lake margin turfland, river banks, plunge pools, cobbles and lake edges.
Threats: Weed encroachment; habitat loss and degradation caused by cattle (eutrophication, trampling) (Chatham Islands).

Work undertaken to date

Unsuccessful survey of historical sites in Wellington.

Priority sites for survey

Northland, Auckland, Kawakawa River, Bay of Islands, Chatham Islands, Lake Huro, Ohau Valley (Wellington); lakes in the Southland region.

Monitoring: objectives and priority sites

Regular inspection of Chatham Island sites to determine spatial extent and abundance.

Research questions

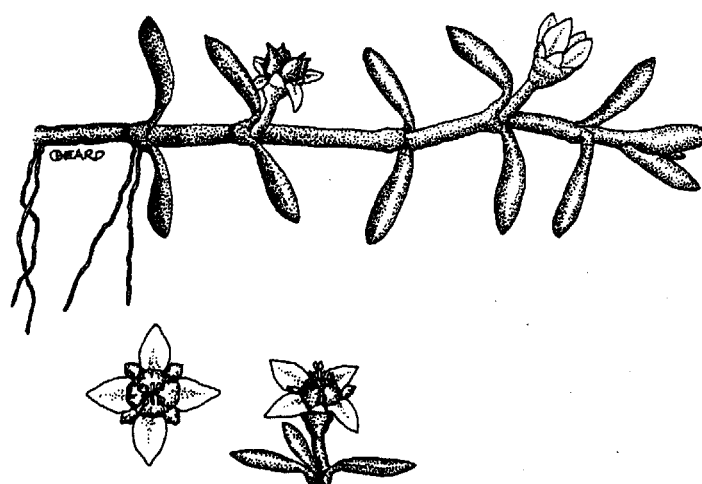
How can weeds be effectively controlled to protect threatened wetland plants?

Management needs

Weed control at sites; advocacy with bowling clubs as *C. hunua* occurs on bowling greens and is treated as a weed, and advocacy with Auckland Regional Council as *C. hunua* occurs on land administered by ARC; translocation if suitable sites found in Hunua, Lake Huro, Chatham Islands; fence lake margin of Huro, Chatham Islands and remove cattle.

Selected references

- Champion, P.D. 1998. Selective control of weeds in New Zealand wetlands using herbicides. NIWA Client Report: DOC80220. National Institute of Water & Atmospheric Research Ltd, Hamilton.



***Crassula peduncularis* (Smith) Meigen**

- Family:** Crassulaceae
Endemic to: Indigenous to New Zealand, Australia, and South America.
Common name:
Ranking: B, Vulnerable. **In cultivation:** No.
Descriptor: Diminutive, annual succulent.
Conservancy: EC/HB, WG, WL, NM, CA, OT.
Habitat: Coastal turf vegetation, cliff tops, and seasonal (ephemeral) wetlands.
Threats: Weed encroachment; trampling by stock; modifications to drainage affecting water levels in wetlands, and thus the habitat of *C. peduncularis*.

Work undertaken to date

Monitoring in Wanganui; re-discovered in Wellington; historically in cultivation but no longer; surveys and mapping of spatial extent of population, and management programmes prepared in Wellington Conservancy.

Priority sites for survey

Opportunistic survey in Marlborough; Mackenzie Basin -recorded as common around kettle holes (1994).

Monitoring: objectives and priority sites

Monitor population dynamics in Wellington and Wanganui plus suitable South Island sites.

Research questions

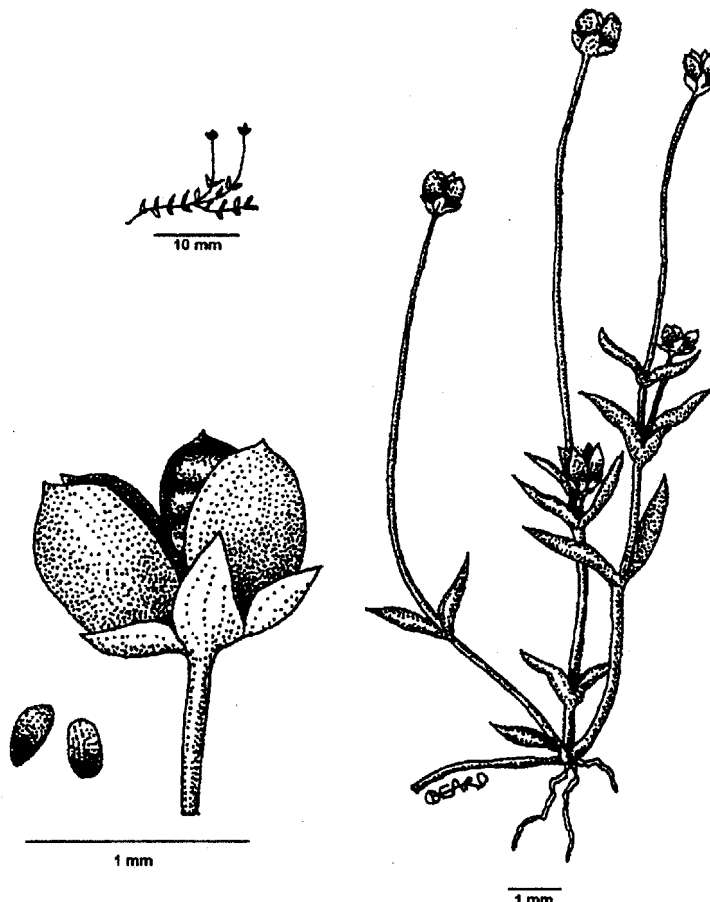
How can weeds be effectively controlled to protect threatened wetland plants?
How do differing hydrological regimes affect this plant?

Management needs

Manual weed control on South Taranaki Coast; advocacy with stock owners to prevent habitat loss and mitigate the effects of trampling; establish insurance populations for advocacy and research purposes; habitat restoration.

Selected references

Champion, P.D. 1998. Selective control of weeds in New Zealand wetlands using herbicides. NIWA Client Report: DOC80220. National Institute of Water & Atmospheric Research Ltd, Hamilton.



Eleocharis neozelandica Kirk

- Family:** Cyperaceae
Endemic to: New Zealand.
Common name: Sand spike sedge.
Ranking: B, Vulnerable. **In cultivation:** Yes.
Descriptor: Small, creeping, rushlike sedge with arching spiked leaves which form an open turf.
Conservancy: NL, AU, WG, NM, (WL, CA).
Habitat: Coastal sand flats, at or near the fresh water table.
Threats: Weed encroachment (pampas grass and other weeds); changes to natural dynamics of habitat; recreational use of habitat (vehicles); rabbit browse of flower/seed heads causing a decrease in reproduction; stock trampling and eutrophication; lack of legal land protection.

Work undertaken to date

MSc thesis on response to water table fluctuations, sand burial, and grazing at Tangimoana (Wanganui); survey completed in Wellington and ongoing in Nelson/Marlborough - new population found in latter; large population found at Pouto, Northland.

Priority sites for survey

Farewell Spit.

Monitoring: objectives and priority sites

Population dynamics at Farewell Spit, Waitotara, Te Paki, Tangimoana, Auckland (two sites).

Research questions

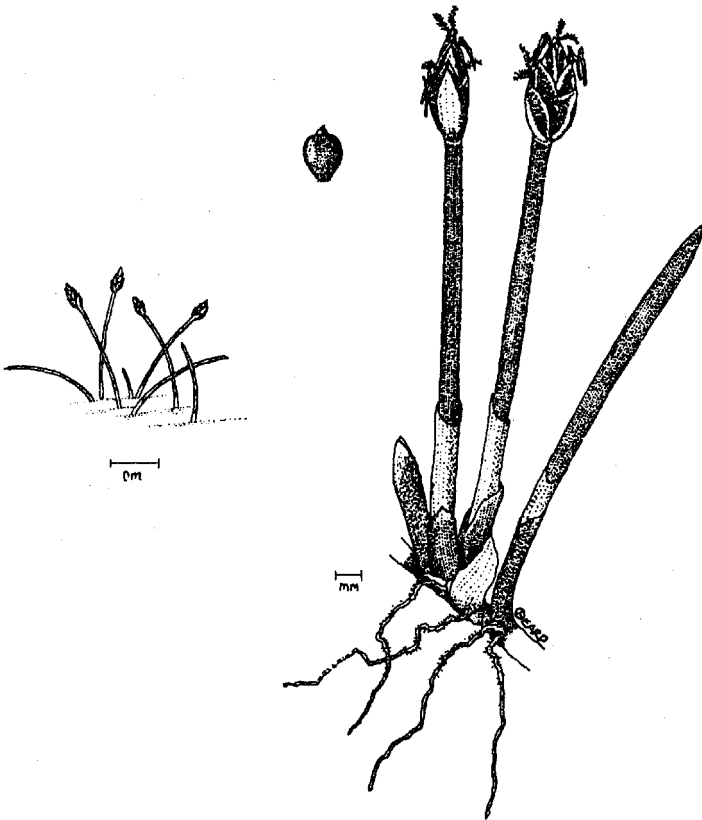
How are dune slack dynamics altered by adventive weeds in the medium- to long-term? What is/are best way to control weeds in ephemeral wetlands?

Management needs

Most sites need rabbit, stock, and weed control; habitat restoration; transplant to more suitable habitat; restore to Wellington Conservancy using plants from the nearest provenance; advocacy with recreational users at population sites, e.g., vehicles on sand dunes; secure legal protection of unprotected sites.

Selected references

- Champion, P.D. 1998. Selective control of weeds in New Zealand wetlands using herbicides. NIWA Client Report: DOC80220. National Institute of Water & Atmospheric Research Ltd, Hamilton.
- Singers, N.J.D. 1998. The dynamics of temporary wetlands in dune slacks at Tangimoana, Manawatu, New Zealand, with special reference to sand spike sedge, *Eleocharis neozelandica* Kirk (Cyperaceae). Unpublished Masters thesis, Massey University, Palmerston North.
- Wilson, C.M.; Given, D.R. 1989. *Threatened Plants of New Zealand*. DSIR Publishing, Wellington.



***Embergeria grandifolia* (Kirk) Boulos**

- Family:** Asteraceae (there are only two species in the *Embergeria* genus).
- Endemic to:** Chatham Islands. *E. grandifolia* is the only known host to an endemic rust.
- Common name:** Chatham Islands giant sow thistle.
- Ranking:** B, Vulnerable. **In cultivation:** Yes.
- Descriptor:** Thistle.
- Conservancy:** WL.
- Habitat:** Occurs in coastal megaherb fields on clay promontories, dunes, and at the base of cliffs.
- Threats:** Browsing animals; lack of legal land protection; trampling by stock.

Work undertaken to date

Some population enhancement and translocation; coastal surveys on Chatham Islands; some habitats formally protected, others privately; sites are informally monitored.

Priority sites for survey

Monitoring: objectives and priority sites

Ongoing at Chatham Islands to ensure there is no reverse in the upward population trends, especially due to stock gaining increased access to dunes or due to the impact of regular, extreme northerly storms.

Research questions

How distinct is *Embergeria* genus from *Sonchus*?

Management needs

Effective stock exclusion from protected areas; secure legal land protection of main island populations; continue with translocation and population enhancement at Tangepu, Ocean Mail, Awatotara.

Selected references

- Wilson, C.M.; Given, D.R. 1989. *Threatened Plants of New Zealand*. DSIR Publishing, Wellington.
- Greenwood, R.M. 1992. Some differences between plants of the Chatham Islands and the New Zealand mainland. *New Zealand Journal of Ecology* 16: 51-52.
- Sang, T.; Crawford, D.J.; Sueng-Chu, K.; Stuessy, T.F. 1994. Radiation of the endemic genus *Dendroseris* (Asteraceae) on the Juan Fernandez Islands: evidence from sequences of the ITS regions of nuclear ribosomal DNA. *American Journal of Botany* 81: 1494-1501.

***Gnaphalium luteo-album* var. *compactum* Kirk**

Family: Asteraceae

Endemic to: Eastern South Island.

Common name: -

Ranking: B, Endangered.

In cultivation: No.

Descriptor: Diminutive, prostrate, annual, woolly daisy.

Conservancy: NM, CA, OT, SL.

Habitat: Wetlands, lake margins, inter-montane basins, wind hollows (seasonally damp).

Threats: Weed encroachment; land development; stock disturbance (trampling); lack of legal land protection; wetland drainage altering habitat.

Work undertaken to date

Some taxonomic work; survey in areas of the Von Valley (Otago); monitoring of fenced population at Sedgemere, Nelson/Marlborough.

Priority sites for survey

Otago (Von Valley, Dunstans); Mid Canterbury (Rakaia, Waimakariri).

Monitoring: objectives and priority sites

Continue at Marlborough site; Lake Lyndon, Canterbury, Von Valley for population trends.

Research questions

What is the taxonomic status of *G. l. var. compactum*? What are the conditions required for optimal recruitment of seedlings? What are the population dynamics of *G. l. var. compactum*? What is the ecology of *G. l. var. compactum* especially in relation to colonisation patterns of this and other annuals in ephemeral wetlands?

Management needs

Weed control at sites; more fencing of known sites; further survey; secure legal land protection (Von Valley, habitat on Dunrobin Station (Southland), Lake Tekapo (Mackenzie Basin).

Selected references

***Gunnera hamiltonii* Kirk**

- Family:** Gunneraceae
Endemic to: Southern New Zealand.
Common name: -
Ranking: B, Endangered. **In cultivation:** Yes.
Descriptor: Creeping, rhizomatous, succulent, rosette-forming herb.
Conservancy: SL.
Habitat: Stable areas within dune systems.
Threats: Coastal erosion; reproductive failure due to separation of sexes; weed encroachment; lack of legal land protection

Work undertaken to date

Weed control; work on reproduction, germination and propagation from all wild populations; successful translocation of one population; new plant recently discovered (only the fourth in the last ten years).

Priority sites for survey

Opportunistic survey.

Monitoring: objectives and priority sites

Monitor population dynamics at existing sites, and new sites once translocation is carried out to gauge success of translocations.

Research questions

What is the sex of the West Ruggedy population (Stewart Island)? What are the optimal habitat requirements?

Management needs

Translocate sexes into same area, known sites, and new sites to establish mixed sex populations to allow reproduction; monitor new sites after translocations; weed control at sites; secure legal land protection.



Selected references

- Rance, C.; Rance, B.D. 1996. *Gunnera hamiltonii*: new information on phenology and distribution. *New Zealand Botanical Society Newsletter* 44: 8-9.
- Rance, B.D.; West, C.J.; Rance, C.; Maria, L. 1999. Update on *Gunnera hamiltonii*. *New Zealand Botanical Society Newsletter* 55: 14-16.
- Webb, C.J. 1996. Seed production in *Gunnera hamiltonii*. *Conservation Advisory Science Notes*: 133. Department of Conservation, Wellington.
- Webb, C.J.; Webb, T.H. 1976. *Gunnera hamiltonii* in Stewart Island, New Zealand. *New Zealand Journal of Botany* 14: 361-363.
- Wilson, H.D. 1985. Notes on *Gunnera hamiltonii* and marram grass (*Ammophila arenaria*) at Mason Bay, Stewart Island. Unpublished report. File PTS 012, Southland Conservancy.

Hebe armstrongii (J.B.Armstr.) Cockayne et Allan

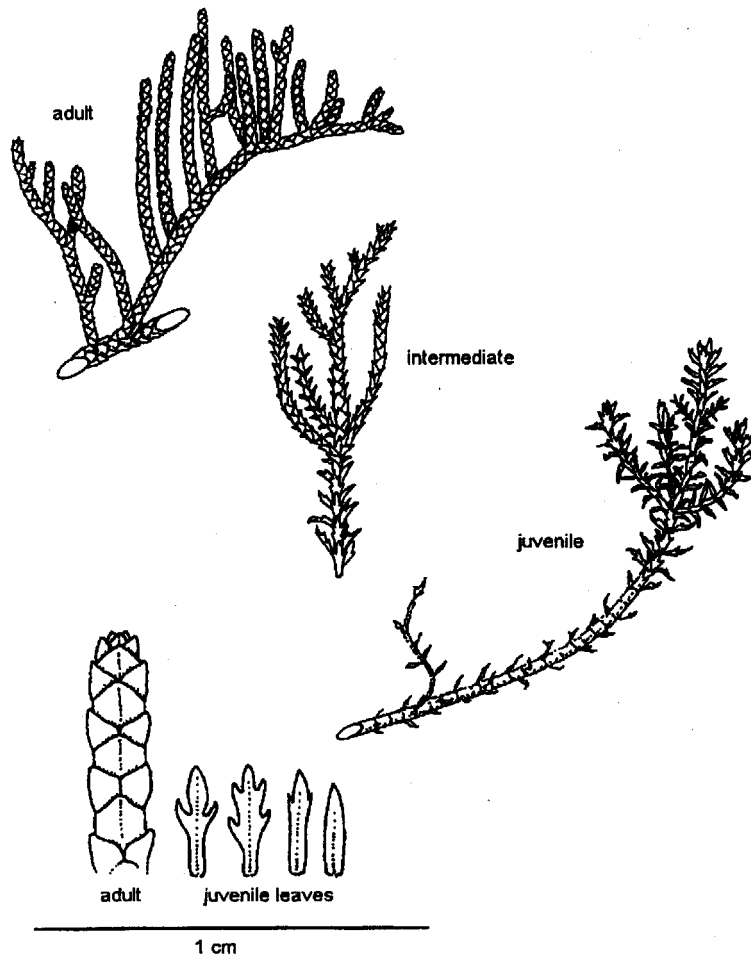
- Family:** Scrophulariaceae
Endemic to: Eastern South Island.
Common name: Whipcord hebe.
Ranking: B, Endangered. **In cultivation:** Yes.
Descriptor: Yellow-green to orange-green or golden, dull, erect to spreading whipcord hebe up to one metre tall.
Conservancy: CA, (NM).
Habitat: Probably associated with bogpine/shrublands in wet areas and deflation surfaces within inter-montane basins.
Threats: Fire, and hydrology (change in the water table causing habitat loss as Enys Scientific Reserve is drying out-Broken River); lack of legal land protection; rabbit and hare browse; pig roofing.

Work undertaken to date

Population enhancement at Enys Scientific Reserve continuing; survey at type locality (no longer present); monitoring of Flora terraces population (exclosure plots) with intensive management of browsing animals and habitat restoration of bogpine community.

Priority sites for survey

Flora terraces.



Monitoring: objectives and priority sites

Monitor response to management at Enys Reserve; monitor at Flora terraces to determine recruitment and population status.

Research questions

What is the gene pool of individuals in cultivation? What is the autecology of *H. armstrongii* in its natural habitat, including impacts of exotic grasses on germination?

Management needs

Translocate to known and historical sites where habitat still exists; secure legal land protection; continue to control pigs, hares and rabbits; fence Flora terraces to exclude stock; continue with population enhancement.

Selected references

Wilson, C.M.; Given, D.R. 1989. *Threatened Plants of New Zealand*. DSIR Publishing, Wellington.

***Hebe barkeri* (Cockayne) Cockayne**

- Family:** Scrophulariaceae
Endemic to: Chatham Island.
Common name: Chatham Island koromiko, Barker's veronica, Chatham Island tree hebe.
Ranking: B, Vulnerable. **In cultivation:** Yes.
Descriptor: A tree hebe.
Conservancy: WL.
Habitat: A forest species, often in damp sites, near streams and around ponds
Threats: Habitat loss; browse by possums and other animals, especially cattle (even in protected areas); lack of legal land protection.

Work undertaken to date

Population enhancement; translocation; reservation and covenanting; advocacy; monitoring in Tuku area.

Priority sites for survey

Continue survey at southern Chatham sites.

Monitoring: objectives and priority sites

Monitoring success of transplants and long-term seedling establishment patterns in mixed tarahinau/broadleaved forest.

Research questions

What is the successional role of *H. barkeri* - is it a seral species or a long-term species in the forest structure? What are the light requirements of *H. barkeri*, and what effect do feral stock and storm events on the forest canopy have on this?



Management needs

Advocacy with private landowners and the public; stock management in protected areas; continue population enhancement, translocations, expand translocation sites to give better geographic coverage; securing legal land protection, and monitoring programmes already in place.

Selected references

Wilson, C.M.; Given, D.R. 1989. *Threatened Plants of New Zealand*. DSIR Publishing, Wellington.

***Hebe cupressoides* (Hook.f.) Cockayne et Allan**

Family:	Scrophulariaceae	
Endemic to:	Eastern South Island.	
Common name:	Whipcord hebe, cypress hebe.	
Ranking:	B, Endangered.	In cultivation: Yes.
Descriptor:	Grey-green, cypress like, whipcord hebe.	
Conservancy:	CA, OT, (NM).	
Habitat:	Grey scrub.	
Threats:	Fire; lack of legal land protection; weed encroachment (especially grasses); rabbit and hare browse.	

Work undertaken to date

Ecology/germination etc. established; survey for distribution; seed collection: monitoring of Mackenzie population; GIS mapping; population enhancement at Pukaki Scientific Reserve, Iron Bridge, Waimakariri sites, and Hanmer sites: largest population (Branches Station, Otago) has been QEII covenanted; *H. cupressoides* Recovery Group has been set up.

Priority sites for survey

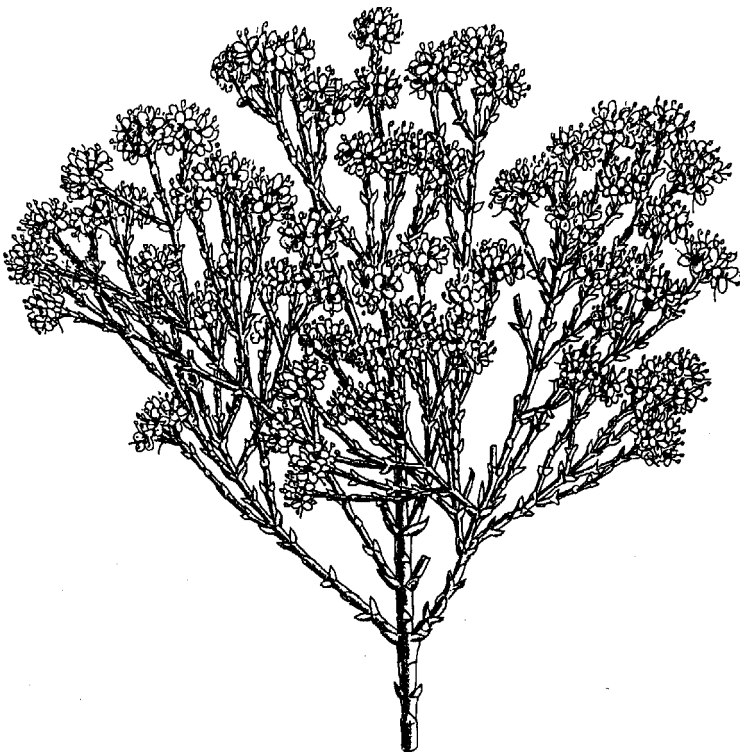
Opportunistic survey, especially in conjunction with the tenure review, Mackenzie Basin (including Tekapo Army lands); Clarence and Waiou River headwaters.

Monitoring: objectives and priority sites

Monitor response to management after translocation and population enhancement.

Research questions

How are weeds best controlled so recruitment can occur in the wild populations of *H. cupressoides*? What are the impacts of rabbits and hares on seedlings?



Management needs

Population enhancement for northern sites in South Marlborough; advocacy with private land holder for main population (covenant) including Acheron River site; legal land protection/fencing of sites on Brookedale Station (Waimakariri Field Centre); weed, rabbit and hare control.

Selected references

- Molloy, BPJ 1984 Potential reserve of *Hebe cupressoides*, 'Birdwood', Ahuriri River. Unpublished Botany Division report, Department of Scientific and Industrial Research, Christchurch.
- Widyatmoko, D.; Norton, D.A. 1997. Conservation of the threatened shrub *Hebe cupressoides* (Scrophulariaceae), Eastern South Island, New Zealand. *Biological Conservation* 82:193-201.

***Hebe elliptica* var. *crassifolia* Cockayne et Allan**

- Family:** Scrophulariaceae
Endemic to: Kapiti Coast.
Common name: Kokomuka, shore hebe, shore koromiko.
Ranking: B. **In cultivation:** Yes.
Descriptor: Thick-leaved hebe.
Conservancy: WL.
Habitat: Coastal bluffs and turfs by the sea.
Threats: Collectors; weed encroachment.

Work undertaken to date

Survey and population management programme prepared by Wellington Conservancy, distribution of the plant is accurately mapped here.

Priority sites for survey

Opportunistic survey.

Monitoring: objectives and priority sites

Monitor response to management once translocations to Mana Island are completed; regular inspection (once every two years) of Kapiti population.

Research questions

What is the taxonomic status of *H. e.* var. *crassifolia*?

Management needs

Advocacy to prevent collection and to help reduce disturbance at mainland sites; weed control at sites; propagation and translocation to Maria Island.

Selected references

Wilson, C.M.; Given, D.R. 1989. *Threatened Plants of New Zealand*. DSIR Publishing, Wellington.

***Iphigenia novae-zelandiae* (Hook.f.) Baker**

- Family:** Asphodelaceae
Endemic to: Eastern South Island, and inland Hawke's Bay.
Common name: -
Ranking: B, Vulnerable. **In cultivation:** No.
Descriptor: A small, summer-green monocot herb.
Conservancy: CA, OT, SL, (EC/HB).
Habitat: Ephemeral wetlands and depressions within tussock.
Threats: Habitat loss; weed encroachment (causing smothering); collectors; lack of legal land protection.

Work undertaken to date

Watching brief and legal land protection moves in Southland and Otago; unsuccessful surveys over the past ten years in inland Hawke's Bay.

Priority sites for survey

Historical sites (including inland Hawke's Bay).

Monitoring: objectives and priority sites

Establish monitoring of population dynamics once survey is complete on Dunrobin QEII site, Southland.

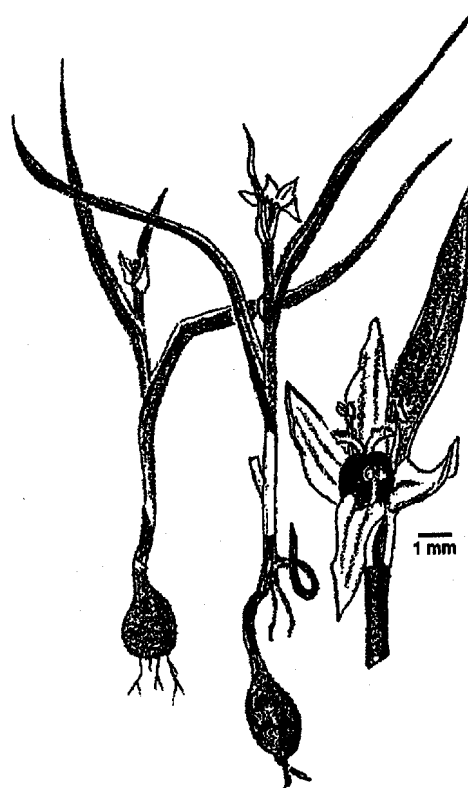
Research questions

What is the distribution of *I. novae-zelandiae*? What is the ecology of *I. novae-zelandiae*?

Management needs

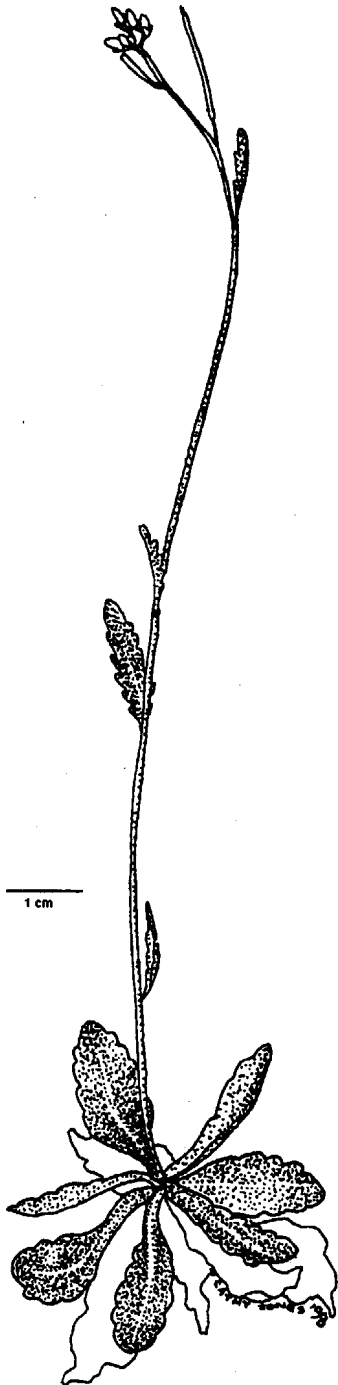
Secure legal land protection at priority sites in Otago and Canterbury; undertake weed control (*Hieracium* spp.) at sites; advocacy to mitigate collection.

Selected references



***Ischnocarpus novae-zelandiae* agg.**

- Family:** Brassicaceae
Endemic to: Eastern South Island.
Common name: -
Ranking: B, Endangered. **In cultivation:** Yes.
Descriptor: Semi-woody, rosette-forming, perennial cress.
Conservancy: NM, CA, OT, SL.
Habitat: Dry, sheltered cliffs, scrubs, open tussocklands, and bluffs.
Threats: Unclear; habitat destruction via forest clearance; browse (including insects); fungal disease (*Albugo* sp.); lack of legal land protection; Mt Somers site threatened by recreational use.



Work undertaken to date

Limited survey (in southern half of range); taxonomic and ecological work in progress.

Priority sites for survey

Historical sites; South Marlborough; Canterbury.

Monitoring: objectives and priority sites

Monitor for recruitment under protective cages; population dynamics e.g. Bobs Cove, Queenstown; monitor success of threat mitigation once threats have been clearly identified and management is put in place to manage them.

Research questions

What is the taxonomic status of the *I. novae-zelandiae* aggregate? What is the ecology of *I. novae-zelandiae* agg.? What are the threats to *I. novae-zelandiae* agg.?

Management needs

Advocacy to increase awareness of the plant with landusers (e.g., sites under pastoral lease, particularly in Otago and Canterbury, and with recreational users); secure legal land protection at Molesworth; once threats are clearly identified, manage the threats and monitor for success of management; once taxonomy resolved, initiate recovery planning; ensure an adequate number of sites are protected; disease control; animal control.

Selected references

Garnock Jones, P.J. 1991. Seed morphology and anatomy of the New Zealand genera *Cheesemanina*, *Ischnocarpus*, *Iti*, *Notothlaspi*, and *Pachycladon* (Brassicaceae). *New Zealand Journal of Botany* 29: 71-82.

***Isolepis basilaris* Hook.f.**

- Family:** Cyperaceae
Endemic to: Southern North Island, and South Island.
Common name: -
Ranking: B, Vulnerable. **In cultivation:** Yes.
Descriptor: Minute, tufted sedge.
Conservancy: WG, WL, NM, CA, OT, SL, (EC/HB).
Habitat: Dune slacks, ephemeral lake shores and tarn edges.
Threats: Weed encroachment; recreational use of dune slacks; cattle trampling; lack of legal land protection; eutrophication at Lake Forsyth.

Work undertaken to date

Opportunistic survey; several populations surveyed and population management programmes prepared in Wellington Conservancy; opportunistic monitoring at Tangimoana; legal land protection in Whitiua Scientific Reserve at Whangaehu River mouth.

Priority sites for survey

Historical sites; inter-montane tarns in Canterbury, Von Valley and Fiordland lakes in Southland; Sedgemere Tarns in Marlborough.

Monitoring: objectives and priority sites

Once sites identified, monitoring needed for habitat quality (weeds, etc.) and population dynamics; regular monitoring of all populations required.

Research questions

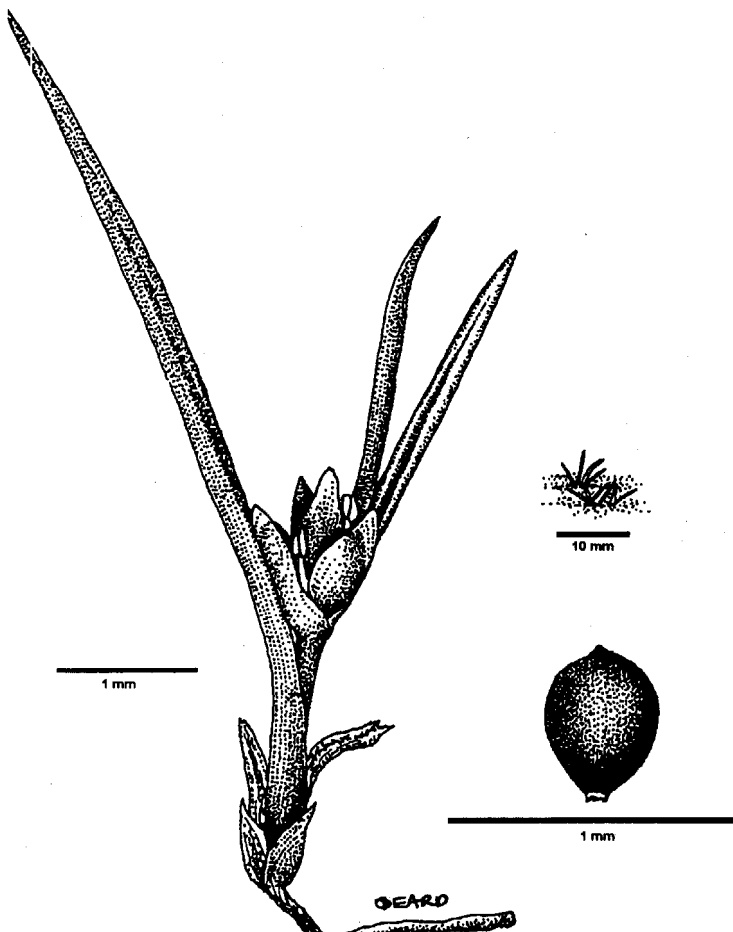
How can weeds be effectively controlled to protect threatened wetland plants?

Management needs

Weed control; advocacy with recreational users of dunes; animal control; secure legal land protection for more populations.

Selected references

Champion, P.D. 1998. Selective control of weeds in New Zealand wetlands using herbicides. NIWA Client Report: DOC80220. National Institute of Water & Atmospheric Research Ltd, Hamilton.



***Iti lacustris* Garn.-Jones et P.N.Johnson**

- Family:** Brassicaceae (the only species in the *Iti* genus).
Endemic to: Fiordland.
Common name: *Iti*.
Ranking: B, Rare. **In cultivation:** Yes.
Descriptor: Small, tufted, annual cress.
Conservancy: SL.
Habitat: Wave-wash margins of Fiordland lakes.
Threats: Lake shore erosion; possibly weed encroachment.

Work undertaken to date

Opportunistic survey.

Priority sites for survey

Shore of Lakes Te Anau and Manapouri.

Monitoring: objectives and priority sites

Research questions

What are the precise habitat requirements for *I. lacustris* and its modes of colonisation, spread, and persistence in relation to lake level fluctuations, redistribution of sediments on lake shores, and periodic availability of precise habitats in a changing environment?

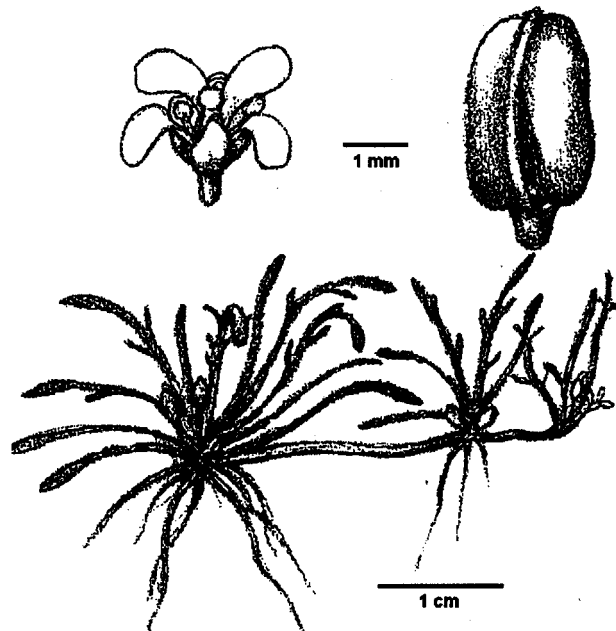
Management needs

Habitat restoration; weed control if required, particularly of aquatic weeds; further survey.

Selected references

Garnock Jones, P.J.; Johnson, P.N. 1987. *Iti lacustris* (Brassicaceae), a new genus and species from southern New Zealand. *New Zealand Journal of Botany* 25: 603-610.

Garnock Jones, P.J. 1991. Seed morphology and anatomy of the New Zealand genera *Cheesemania*, *Ischnocarpus*, *Iti*, *Nototblaspi*, and *Pachycladon* (Brassicaceae). *New Zealand Journal of Botany* 29: 71-82.



***Kunzea sinclairii* (Kirk) W.Harris**

- Family:** Myrtaceae
Endemic to: Great Barrier Island.
Common name: Great Barrier Island kanuka.
Ranking: B, Endangered. **In cultivation:** Yes.
Descriptor: Rambling, grey-green kanuka.
Conservancy: AU.
Habitat: The summits of rhyolitic and hydrothermally altered dacitic bluffs and associated starved soils.
Threats: Possible problem of hybridism with *K. ericoides*; fire; recreation.

Work undertaken to date

Some taxonomic work done; distribution mapped; some flowering ecology work done.

Priority sites for survey

Great Barrier Island.

Monitoring: objectives and priority sites

To be determined.

Research questions

What is the taxonomic status of *K. sinclairii*? Does *K. sinclairii* hybridise with *K. ericoides*? If so, does the level of hybridism pose a threat to *K. sinclairii*?

Management needs

Dependent on results of hybridism study (by University of Auckland, due to start in 1998); fire control; advocacy to prevent trampling by recreational users of the track through the population.

Selected references

- Harris, W. 1996. Genecological aspects of flowering patterns of populations of *Kunzea ericoides* and *K. sinclairii* (Myrtaceae). *New Zealand Journal of Botany* 34: 333-354.
- Harris, W.; Porter, N.G.; Dawson, A.I. 1992. Observations on biosystematic relationships of *Kunzea sinclairii* and on an intergeneric hybrid *Kunzea sinclairii* x *Leptospermum scoparium*. *New Zealand Journal of Botany* 30: 213-230.



Lepidium flexicaule Kirk

- Family:** Brassicaceae
Endemic to: Indigenous to New Zealand and Tasmania.
Common name: Coastal cress.
Ranking: B, Endangered. **In cultivation:** Yes.
Descriptor: Low-forming, semi-succulent, shore cress.
Conservancy: NM, WC, (AU, WK, WL).
Habitat: Coastal turf, cobble beaches, bluffs, and the mouths of streams.
Threats: Collectors (in the North Island and parts of the South Island, e.g., Heaphy Track); some habitats are artificial; loss of associated fauna (seabirds) causing a degradation of habitats; browsing (sheep, cattle, caterpillars, slugs, snails); weed encroachment; recreational use of habitat.

Work undertaken to date

Coastal Cress/Nau Recovery Plan has been published; Coastal Cress Recovery Group set up; survey and monitoring along Te Taitapu coast; survey of all known West Coast sites, and all known sites in the North Island; taxonomy has been resolved; monitoring of the Heaphy Coast population.

Priority sites for survey

Continue survey of suitable habitat, i.e. Rangitoto Island, North Westland, Northwest Nelson coast, and Wellington area.

Monitoring: objectives and priority sites

Continue monitoring to determine population dynamics at Punakaiki, Scotts Beach, Tauranga Bay, and Kaihoka Coast.

Research questions

What are the habitat requirements of *L. flexicaule*? How dependent is *L. flexicaule* on seabird and seal colonies, and other disturbances such as tracks?

Management needs

Advocacy to mitigate collection, and to increase awareness with recreational users of the habitat; good flagship species for the health of coastal communities; translocation to historical sites with appropriate habitat, e.g. Cape Foulwind, Mokihinui, Karamea, Seatoun, once habitat requirements are known; weed and browser control.

Selected references



Garnock Jones, P.J.; Norton, D.A. 1995. *Lepidium naufragorum* (Brassicaceae), a new species from West-land, and notes on other New Zealand coastal *Lepidium*. *New Zealand Journal of Botany* 33:43-51.

Norton, D.A.; de Lange, P.J.; Garnock Jones, P.J.; Given, D.R. 1997. The role of seabirds and seals in the survival of coastal plants: lessons from New Zealand *Lepidium* (Brassicaceae). *Biodiversity and Conservation* 6: 765-785.

Norton, D.A.; de Lange, P.J. 1999. *National Coastal Cress/Nau Recovery Plan*. Department of Conservation, Wellington.

***Lepidium kirkii* Petrie**

- Family:** Brassicaceae
Endemic to: Central Otago.
Common name: Salt-pan cress.
Ranking: B, Endangered. **In cultivation:** Yes.
Descriptor: A mat-forming, slender, trailing short-lived cress with minuscule, filiform leaves.
Conservancy: OT.
Habitat: Restricted to saline soils.
Threats: Habitat destruction by land development, mining, and sheep grazing; collectors; lack of legal land protection.

Work undertaken to date

Photo monitoring of some sites; an Inland Cress Recovery Plan has been funded.

Priority sites for survey

Revisit all sites recorded in the survey completed in 1988.

Monitoring: objectives and priority sites

Monitor any translocations and population enhancements. Monitor responses to seasonal and weed changes.

Research questions

What are the exact habitat, and reproductive requirements of *L. kirkii*? Which weeds are an invasive threat to saline soils? Can *L. kirkii* be re-established in developed salt-pan soils?

Management needs

Regular liaison and advocacy with landowners to mitigate habitat destruction; translocation to suitable sites where *L. kirkii* is currently absent; control weeds at sites; animal control; advocacy to mitigate collection; protect habitat i.e., secure legal land protection.

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- Partridge, T.R. 1981. Rare and endangered habitats of New Zealand: inland saline habitats. Unpublished report, Botany Division, DSIR, Lincoln.