

5. Developing supportive partnerships

5.1 WHY PARTNERSHIPS ARE ESSENTIAL

Supportive partnerships are essential to protect New Zealand's natural heritage from weed threats in the long term. These include partnerships between DOC and other landowners and land managers, Regional Councils, iwi, volunteers, organisations such as environmental groups, research associates, the public, other government agencies, and others with an interest in weed management.

This section identifies how DOC will address the following:

1. Places that are privately owned or managed by another agency may be important sites for surveillance, or for a weed-led programme. Because weeds often invade protected natural areas from outside, other places may also be important components of a site-led programme as buffers or seed sources. Successful weed-led or site-led programmes (see sections 4.3.2 and 4.3.3) may therefore require the support of other land owners or land managers and regional councils.
2. Other places that are privately owned or administered by another agency may also be important to New Zealand's natural heritage, and in turn may require DOC's support to protect their natural values from weed threats.
3. DOC's invasive weed work also occurs within a broader context of central and local government, agency, community and individual efforts to manage invasive weeds (see section 2.1.2).
4. Many research associates and management agencies as well as DOC have expertise and information on weeds, carry out research, and develop improved control techniques. Sharing information and technology will strengthen the efforts of all those who manage weeds (see also section 2.2, 4.3.4).
5. DOC needs to develop a co-operative relationship with iwi, not only because of DOC's Treaty obligations under section 4 of the Conservation Act, but also because iwi are an important associate in achieving conservation gains. Goal 4 in DOC's 1997 Kaupapa Atawhai Strategy is to work with Maori in conserving New Zealand's indigenous biodiversity. Managing plant and animal pests is an important area of iwi interest.
6. In the long term, effective border control and the protection of New Zealand's natural heritage from weed threats will only occur if the public supports and is involved in weed control efforts. In many places, volunteers are directly involved in weed control programmes and are vital for their success. Just a few examples include Conservation Corps volunteers, the Royal Forest and Bird Protection Society, volunteers under DOC's summer holiday programmes, and the general public variously controlling, for example, an area from which contorta is invading into Pikiariki (Waikato); wilding pine seedlings in over 100 hectares in the Sedgemere tussocklands (Nelson), in Tongoriro National Park, and in many places in Otago; and holly-leaved senecio in Whitiāu Scientific Reserve (Wanganui).

5.2 BUILDING PARTNERSHIPS

5.2.1 Gaining support to ensure successful weed-led and site-led programmes

DOC will explore a range of options to support its weed-led and site-led programmes. The options used must be appropriate to the circumstances (for example, a PMS should only be developed or used when it is both necessary and efficient to do so—see section 6 in Appendix 1). Options include:

1. Negotiating directly with the relevant landowners or managers, and entering into an agreement, contract or other arrangement if they agree. This is appropriate when a rapid response is needed, or the necessary level of landowner support is easily achieved and maintained. (See section 3 in Appendix 1)
2. Providing general advice to Regional Councils and other land management agencies on risks to native species and communities from invasive weeds.
3. Providing specific advice to Regional Councils (under the RMA) on appropriate rules for Regional Policy Statements, Regional Plans or Regional Coastal Plans with respect to proposals to introduce plants to lakes, rivers and the coastal marine area. (see sections 4 and 5 in Appendix 1 for details of DOC's legal role in these processes).
4. Exploring options under the Biosecurity Act, including:
 - preparing a national plant pest management strategy (a proposal for a NPMS must meet the criteria under the Biosecurity Act, and the Biosecurity Council policy on NPMSs);
 - preparing an RPMS, when more formal or extensive co-ordination is required than is possible to negotiate directly;
 - working with Regional Councils when RPMSs are being developed or amended, to include appropriate species and activities in the PMS;
 - using powers under Part VI of the Biosecurity Act to carry out control without preparing a PMS (e.g., powers to enter, inspect, declare controlled areas etc.)

DOC will only use options under the Biosecurity Act if it is able to make the necessary appropriate contributions (for example, appropriate control or administration costs to an RPMS).

5.2.2 Helping to protect important places on other lands

Where possible, DOC will support the protection of other places that are important to New Zealand's natural heritage from weed threats by:

- providing advice to landowners on risks posed by invasive weeds; or
- providing technical support and information on appropriate weed management to the landowner or manager; or
- entering into an agreement, contract or other arrangement with the landowner or manager, in which DOC may contribute all or part of the required control (see section 3 in Appendix 1).

However, protecting values of private land is more uncertain compared to protected natural areas. Changes in land ownership, uses, or management practices can change the conservation benefits derived from controlling

invasive weeds. In general, therefore, DOC will only contribute to weed control on private land if:

- the landowner or manager supports the proposal; and
- the place is a high priority (for a species recovery programme, or relative to other Conservancy invasive weed programmes) and resources are available; and
- the relevant natural values are likely to be protected in the long-term given the risks of any other threats and likely changes to the tenure, management practises and uses of the place; and
- other options for controlling the threats posed by invasive weeds are not available.

5.2.3 DOC support for broader initiatives to manage invasive weeds

DOC is committed to supporting community initiatives to manage weeds that could seriously affect the long-term integrity or survival of native species and natural communities. DOC will:

- provide advice, where required, on risks to native species and communities from invasive weeds, particularly to Regional Councils when RPMs are being developed or amended;
- share information and technology with Regional Councils, other local authorities and management agencies, and landowners; and
- make reasonable and justified contributions to RPMs, including appropriate levels of control on areas administered by DOC, and appropriate contributions to surveillance, monitoring, public education, or enforcement costs.

5.2.4 Developing and sharing information and technology

DOC will work co-operatively with key research associates in developing and conducting weed research, in line with DOC's Environmental Weeds Research Plan. These key research associates include research agencies, universities, companies, other government agencies, consultants, Regional Councils, and others.

DOC will also seek to improve its own management of invasive weeds, and facilitate effective invasive weed management generally, by encouraging and supporting the sharing of information and technology. (See section 4.3.4, and targets 10, 13, 15 and 16 in section 4.5.3).

5.2.5 Working with iwi

In prioritising decisions for managing invasive weeds (see section 4.4), DOC will consider whether active steps are needed to protect Maori interests (e.g., waahi tapu), and will undertake all practical steps within available resources to protect sites culturally or spiritually important to iwi.

Consultation will be required to identify iwi concerns. In implementing this weed plan, DOC will therefore seek to ensure that a consultative process is maintained with tangata whenua, both to assist DOC's understanding of iwi issues relevant to managing invasive weeds and to share information. (See target 17 in section 4.5.3)

5.2.6 Improving public recognition of weed threats, support for management

Conservancies will develop public awareness activities to:

1. address conservancy weed control issues, such as
 - the impacts of invasive weeds, particularly those specific to the conservancy;
 - controversial issues—including control methods and situations where weeds in the wild are valued by people;
 - the public's role in accidentally or deliberately spreading invasive weeds;
2. advocate for specific weed-led, site-led or surveillance programmes, particularly those where public support may be important to their success;
3. foster public support for weed management in general; and
4. promote awareness of what individuals, communities and interest groups can do to help manage the spread and impacts of invasive weeds, including encouraging public involvement in appropriate programmes (e.g., through volunteer programmes);

Where Regional Councils, other agencies or communities have local public awareness initiatives, DOC will co-ordinate with and support these where appropriate. (See section 4.3.4 and targets 20 and 21 in section 4.5.3).

6. Acknowledgements

Many people contributed to developing the original site-led and weed-led framework and prioritisation systems. Particular thanks go to Jane Sheldon, Carol West, Susan Timmins, Willie Shaw, John Parkes, Bill Fleury, Mike Hawes and Sue Scobie; and to John Holloway and Keith Lewis for their support of this early work.

I was also greatly helped in developing the early drafts of this document by peer review from: Joseph Arand, Keith Briden, Keith Broome, Paul Cashmore, Jack Craw, Pam Cromarty, Mat Ellison, Philippe Gerbeaux, Mike Hawes, Dave Hunt, Hemi Kingi, Colin Ogle, Dane Panetta, Chris Richmond, Andy Roberts, Jason Roxburgh, John Sawyer, Jonty Somers, Whetu Tipiwai, Dick Veitch, Kathy Walls and Chris Woolmore.

Thanks also to the many DOC staff who provided information and help at various times: John Barkla, Ken Brassy, Chris Buddenhagen, Mike Cameron, Lisette Collins, Andy Cox, Wendy Evans, Terry Farrell, Lisa Forester, Sean Goddard, Keith Johnston, Graeme LaCock, Paul Mahoney, Tony McCluggage, Joanne O'Reilly, Nigel Parrott, Ray Pierce and Nick Singers.

Finally, thanks to the many Conservancy and Area staff who provided information on site-led and weed-led programmes.

7. Glossary

aquatic	Instream freshwater (lakes, rivers, ponds) and marine systems.
biodiversity	Includes genetic variation within and between populations of a species; the diversity of indigenous species; and the diversity of indigenous ecosystem types.
border control	Managing unwanted introductions (illegal, accidental or planned) into New Zealand's territorial boundaries (which includes the territorial sea).
BSR	Shorthand for the "biological success rating" scores in the DOC weed database (Owen, 1997). The BSR describes the biological capacity of the weed species. Those characteristics often associated with successful weed syndromes are given a high score, e.g., fast establishment and growth rate, high number of seeds produced per plant, and very effective asexual spread.
community	A naturally occurring group of organisms inhabiting a common environment and interacting with each other.
containment	Ongoing control to prevent a species spreading beyond a defined distribution.
CPD	The Conservation Policy Division of DOC head office.
dioecious	A plant species in which the male and female flowers occur on separate plants.
DOC	Department of Conservation
endemic	Only found in that area. A species endemic to New Zealand originated and is found naturally only in New Zealand; a species endemic to a locality is only found within that locality.
EoS	Shorthand for the "effect on system" scores in the DOC weeds database (Owen, 1997). The EoS rating is an assessment of the behaviour of a weed species in the community type and geographical location in New Zealand where it has its greatest impact on indigenous species and communities. Those features which are most detrimental to native communities are given the highest scores, e.g., major disturbance to the structure, composition and natural processes of a native community.
eradication	The permanent removal of all individuals of a species from an area. It differs from zero-density as control has a definite end point because there is little or no likelihood of reinvasion.
ERD	The External Relations Division of DOC head office.
ERMA	Environmental Risk Management Authority New Zealand, established under the Hazardous Substances and New Organisms Act 1996.
established	A plant species is "established" in New Zealand if it has a population which is present and reproducing in the environment without direct and deliberate human intervention (e.g., aquaculture rearing or deliberate re-introductions), and which persists over time in the absence of unforeseen catastrophic events or successful eradication efforts. (In contrast, "present" in New Zealand includes both established species and species found only in cultivation) (See also "naturalised").
goal	In the context of this Plan, the goal is the overall outcome that DOC seeks to achieve through its management of invasive weeds.
historic place	Includes any land, archaeological sites or buildings that form part of the historical and cultural heritage of New Zealand (definition from the Historic Places Act 1980).

historic value	The values associated with historic places (q.v.).
HSNO	The Hazardous Substances and New Organisms Act 1996.
IHS	Import health standard.
IMU	DOC Head Office Information Management Unit.
indigenous	Naturally occurring in New Zealand (i.e., not introduced accidentally or deliberately by humans).
introduced	A non-native species brought to New Zealand by humans (accidentally or deliberately).
invasive weed	<p>A weed (q.v.) that can significantly and adversely affect indigenous species and communities including: genetic variation within species (within and between populations); the survival of threatened species; or the quality or sustainability of natural communities. The mere presence of exotic species in a natural area is not enough to constitute an invasive weed problem. Whether a species is an invasive weed depends on the nature and significance of its existing or potential <i>impacts</i>.</p> <p>In New Zealand, invasive weeds are almost always exotic plant species that have been introduced to the country (although the majority of introduced plants are not known to pose any significant threat). In some circumstances, however, a native species can be an invasive weed on a site if the species impinges on an important natural value for which the site is being managed.</p>
MAF	Ministry of Agriculture and Forestry
management unit	The protected natural area that is the focus of a programme to protect indigenous species and communities. It may be an entire reserve, or a defined subset of a larger protected natural area (such as a national park) that is too big to manage as a whole.
MFish	Ministry of Fisheries
naturalised	A species that is established in self-sustaining populations in the wild. (See also “established”)
natural resource.	As defined in the Conservation Act 1987, natural resources means plants and animals of all kinds; the air, water and soil in or on which any plant or animal lives or may live; landscape and landform; geological features; and systems of interacting living organisms and their environment.
natural values	The values associated with natural resources (q.v.).
new genetic stock	Includes additions to the stock of plant species that are already present in New Zealand, such as: new sub-species, varieties, cultivars, hybrids, genetically modified versions, or the complementary gender of a dioecious plant where only one gender is currently present in New Zealand. These may be capable of significantly increasing an established species’ likely range or severity of impacts. See also “taxa”
new organism	A plant is classified as a new organism if it belongs to a species, subspecies, variety or cultivar that is not currently present in New Zealand. This includes genetically modified plants as well as plants sourced from other countries.
NPMS	National Pest Management Strategy under the Biosecurity Act 1993.
objective	What needs to be achieved in order to meet the goal. In this Document there are two types of objectives: <i>outcome</i> objectives which define the desired outcomes of managing weeds; and <i>supporting</i> objectives, which define what needs to be done to support weed management in the long term.

pest	The Biosecurity Act 1993 defines a pest as any organism specified to be a pest in a National or Regional Pest Management Strategy. The organisms must be capable of having serious and unintended impacts (see section 6 in Appendix 1).
principles	These are statements of the underlying values or understandings that inform how and why we consider an issue.
propagule	Any part of a plant capable of growing into a new individual. This includes seeds, spores, cuttings etc., depending on the species.
QCM	Quality conservation management. This is a management approach to improve DOC's systems and services by formally identifying and implementing nationally consistent objectives, accountabilities, procedures and standards.
RAP	A "recommended area for protection" identified through DOC's protected natural areas programme.
region	In the context of this plan, a "region" is generally the region of a regional council unless specified otherwise.
Regional Councils	Regional Councils have a major role in achieving the purposes of the Resource Management Act, approve and notify RPMSs, and are currently the key management agencies for implementing RPMSs.
RMA	The Resource Management Act 1991
RPMS	Regional Pest Management Strategy under the Biosecurity Act 1993.
site-led	Programmes to protect the natural values of priority areas from the existing or potential impacts of invasive weed species growing within the area. The term "site-led" is used because planning these programmes involves: <i>first</i> selecting high priority management units based on their biodiversity values; <i>then</i> carrying out the weed control or other activities necessary to protect the significant natural values of the management unit.
STIS	The Science, Technology and Information Systems Division of DOC head office.
sustained control	Reducing and maintaining a population at or below defined densities.
taxa	In the context of this Plan, plant "taxa" includes species, subspecies, and varieties. See also "new genetic stock".
vascular plant	Vascular plants include ferns, flowering plants and conifers. It does not include mosses, liverworts, lichens, fungi and algae.
weed	A "weed" is a plant growing where it is not wanted. In the context of DOC's activities, a plant is a weed if it adversely affects DOC's management objectives of a site or programme (See also "invasive weed").
weed-led	Programmes to minimise the potential future impacts of invasive weeds by managing priority species before they become a major problem. The term "weed-led" is used because such programmes involve <i>first</i> selecting the species to be controlled and <i>then</i> determining where control is required to meet the programme's objectives.
zero-density	A sustained control operation where the desired density is nil adult plants. It differs from eradication as regrowth from the seedbank or persistent reinvasions requires ongoing sustained control to maintain the zero-density.

8. Common and scientific names used in text

INTRODUCED PLANTS

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
alligator weed	<i>Alternanthera philoxeroides</i>	lotus	<i>Lotus pedunculatus</i>
arrowhead	<i>Sagittaria montevidensis</i>	Madeira vine	<i>Anredera cordifolia</i>
Austrian pine	<i>Pinus nigra</i> subsp. <i>nigra</i>	Manchurian rice grass	<i>Zizania latifolia</i>
banana passionfruit	<i>Passiflora mollissima</i>	maritime pine	<i>Pinus pinaster</i>
barberry	<i>Berberis glaucocarpa</i>	marram	<i>Ammophila arenaria</i>
black passionfruit	<i>Passiflora edulis</i>	marsh wort	<i>Nymphoides geminata</i>
bone seed	<i>Chrysanthemoides monilifera monilifera</i>	Mercer grass	<i>Paspalum distichum</i>
boxthorn	<i>Lycium ferocissimum</i>	mist flower	<i>Ageratina riparia</i>
Brazilian buttercup	<i>Senna septentrionalis</i>	moth plant	<i>Araujia sericifera</i>
broom	<i>Cytisus scoparius</i>	mountain pine	<i>Pinus mugo</i>
browntop	<i>Agrostis capillaris</i>	mouse-ear hawkweed	<i>Hieracium pilosella</i>
Christmas berry	<i>Schinus terebinthifolius</i>	Mysore thorn	<i>Caesalpinia decapetala</i>
climbing asparagus	<i>Asparagus scandens</i>	northern banana passionfruit	<i>Passiflora mixta</i>
climbing spindleberry	<i>Celastrus orbiculatus</i>	old man's beard	<i>Clematis vitalba</i>
contorta pine	<i>Pinus contorta</i>	Pacific pohutakawa	<i>Metrosideros "tabiti" collina</i>
Corsican pine	<i>Pinus nigra</i> subsp. <i>laricio</i>	pampas	<i>Cortaderia selloana</i> ; <i>C. jubata</i>
crack willow	<i>Salix fragilis</i>	parrot's feather	<i>Myriophyllum aquaticum</i>
creeping bent	<i>Agrostis stolonifera</i>	phragmites	<i>Phragmites australis</i>
curly pondweed	<i>Potamogeton crispus</i>	pink ragwort	<i>Senecio glastifolius</i>
Darwin's barberry	<i>Berberis darwinii</i>	radiata pine	<i>Pinus radiata</i>
Douglas fir	<i>Pseudotsuga menziesii</i>	reed sweetgrass	<i>Glyceria maxima</i>
egeria	<i>Egeria densa</i>	Russell lupin	<i>Lupinus polyphyllus</i>
elodea	<i>Elodea canadensis</i>	sagittaria	<i>Sagittaria platyphylla</i> ; <i>S. subulata</i>
evergreen buckthorn	<i>Rhamnus alaternus</i>	salvinia / water fern	<i>Salvinia molesta</i>
fringed water lily	<i>Nymphoides peltata</i>	selaginella	<i>Selaginella kraussiana</i>
gorse	<i>Ulex europaeus</i>	smilax	<i>Asparagus asparagoides</i>
grey willow	<i>Salix cinerea</i>	spartina	<i>Spartina anglica</i>
hawthorn	<i>Crataegus monogyna</i>	spartina, American	<i>Spartina alterniflora</i>
heath rush	<i>Juncus squarrosus</i>	spartina hybrid	<i>Spartina x townsendii</i> ;
heather	<i>Calluna vulgaris</i>	stone crop	<i>Sedum acre</i>
hornwort	<i>Ceratophyllum demersum</i>	sycamore	<i>Acer pseudoplatanus</i>
hydrilla	<i>Hydrilla verticillata</i>	tall fescue	<i>Festuca arundinacea</i>
ivy	<i>Hedera helix</i>	wandering Jew	<i>Tradescantia fluminensis</i>
Japanese honeysuckle	<i>Lonicera japonica</i>	water hyacinth	<i>Eichhornia crassipes</i>
Japanese kelp / Undaria	<i>Undaria pinnatifida</i>	water poppy	<i>Hydrocleys nymphoides</i>
Kermadec pohutakawa	<i>Metrosideros kermadecensis</i>	wild ginger (yellow ginger)	<i>Hedychium flavescens</i>
Kikuyu grass	<i>Pennisetum clandestinum</i>	wild ginger (kahili ginger)	<i>Hedychium gardnerianum</i>
lagarosiphon	<i>Lagarosiphon major</i>	yellow flag	<i>Iris pseudacorus</i>
larch	<i>Larix decidua</i>	yellow water lily	<i>Nuphar lutea</i>
		Yorkshire fog	<i>Holcus lanatus</i>

NATIVE PLANTS AND ANIMALS

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
blunt pondweed	<i>Potamogeton ocbreatus</i>	sand bidibid	<i>Acaena pallida</i>
button daisy	<i>Leptinella nana</i>	sand daphne	<i>Pimelea arenaria</i>
Chatham Island toetoe	<i>Cortaderia turbaria</i>	shore spurge	<i>Euphorbia glauca</i>
Clifford Bay broom	<i>Chordospartium muritai</i>	shrubby pohuehue	<i>Muehlenbeckia astonii</i>
climbing broom	<i>Carmichaelia kirkii</i>	stout water milfoil	<i>Myriophyllum robustum</i>
cypress koromiko	<i>Hebe cupressoides</i>	tussock	<i>Cbionocbloa</i> spp.
giant flowered broom	<i>Carmichaelia williamsii</i>	wood rose	<i>Dactylanthus taylori</i>
heart-leaved kohukohu	<i>Ptilosporum obcordatum</i>	ANIMAL SPECIES	
kauri	<i>Agathis australis</i>	freshwater mussels	<i>Hyridella menziesii</i>
mangrove	<i>Avicennia marina</i>	wrybill plover	<i>Anarhynchus frontalis</i>
pingao	<i>Desmoschoenus spiralis</i>		
Poor Knights spleenwort	<i>Asplenium pauperequitum</i>		

9. Bibliography

- Clout, M.N., Lowe, S.J. 1996. Biodiversity loss due to biological invasion: prevention and cure. pp. 29-40 in: "Conserving Vitality and Diversity". Proceedings of the World Conservation Congress Workshop on Alien Invasive Species. Canadian Wildlife Service, Environment Canada, Ottawa, Canada. 96 p.
- Department of Conservation 1998. Restoring the Dawn Chorus: Department of Conservation Strategic Business Plan 1998-2002. Department of Conservation, Head Office, Wellington, New Zealand.
- Elliot, G.P., Ogle, C.C. 1985. Wildlife and wildlife habitat values of Waitutu Forest, Western Southland. Fauna Survey Unit Report No. 39. 108p.
- Esler, A.E. 1988. Naturalisation of plants in urban Auckland, New Zealand 5: Success of the alien species. *New Zealand Journal of Botany* 26: 565-584
- Ministry for the Environment. 1997. The State of the New Zealand Environment Report 1997. Ministry for the Environment and GP Publications.
- Owen, S.J. 1997. Ecological plant pests on conservation land in New Zealand: a database. January 1997 working draft. Department of Conservation.
- Owen, S.J., Sheldon, J.K. 1996. Strategies for invasive weed control on conservation lands in New Zealand. Proceedings of the 11th Australian Weed Conference, Melbourne, 2-5 October 1996.
- Owen, S.J., Timmins, S.M., West, C.J. 1996. Scoring the Weediness of New Zealand's invasive weeds. Proceedings of the 11th Australian Weed Conference, Melbourne, 2-5 October 1996.
- Panetta, F.D. 1993. Identifying and managing the next century's problem weeds. *In*: Popay, A.I., Hartley, M.J. (Eds.), Potential problem weeds. Proceedings of a New Zealand Protection Society meeting, pp. 9-31.
- Panetta, F.D. 1994. Screening plants for weediness: a procedure for assessing species proposed for importation into Australia. A report commissioned by the Australian Weeds Committee. Queensland Department of Lands.
- Scobie, S.E. 1994. A strategic approach to managing environmentally damaging weeds. Unpublished paper presented to the 1994 Noxious Plants Officers National Education and Training Seminar, Palmerston North, 15-16 August 1994.
- Shaw, W.B. 1988. Botanical conservation assessment of Crown lands in the Urewera/Raukumara planning study area. Project Record No 1957. Forest Research Institute, Rotorua. 140 p.
- Shaw, W.B. 1994. Botanical rankings for nature conservation. *Science and Research Series No. 72*. Department of Conservation, Wellington. 17 p.
- Timmins, S.M. 1997. Environmental Weeds Research Plan 1997-2006. Department of Conservation Research Science and Technology Programme, Science and Research Division.
- Timmins, S.M., Williams, P.A. 1991. Weed numbers in New Zealand's forest and scrub reserves. *New Zealand Journal of Ecology*. 15: 153-162.
- Williams, P.A., Timmins, S.M. 1990. Weeds in New Zealand protected natural areas: a review for Department of Conservation. *Science and Research Series No. 14*.
- Williams, P.A. 1997. Ecology and Management of Invasive weeds. *Conservation Sciences Publication No. 7*. Department of Conservation.

10. References for Section 3

- ¹ Swarbrick, J.T., Timmins, S.M. 1997. Annotated bibliography of environmental weeds in Australia and New Zealand. Biodiversity Group, Environment Australia, Canberra.
- ² Report by a multi-agency committee on invasive weeds, 1998 Invasive Plants: Changing the Landscape of America. In press.
- ³ Wilcove, D.S., Rothstein, D., Dubow, J., Phillips, A., Losos, E. 1988. Quantifying threats to imperiled species in the United States: assessing the relative importance of habitat destruction, alien species, pollution, overexploitation, and disease. *BioScience* 48(8): 607-615.
- ⁴ Humphries, S.E., Groves, R.H., Mitchell, D.S. 1993. Plant invasions: homogenising Australian systems. In: Conservation Biology in Australia and Oceania. C. Moritz, J. Kikkawa (Eds). Surrey Beatty and Sons.
- ⁵ U.S. Congress, Office of Technology Assessment. Harmful non-native species in the United States. OTA-F-565. Washington, DC: U.S. Government, September 1993.
- ⁶ Vitousek P. 1996. Ecology of biological invasions. Unpublished lecture to the New Zealand Ecological Society Conference, July 1996, Christchurch New Zealand.
- ⁷ New Zealand flora statistics as at March 1998. Actual figures: 16 950 non-naturalised introduced vascular plants; 2 068 naturalised introduced species, and 2 057 native species (Named native species only—an estimated 350 species are recognised but not yet formally described). Unpublished data prepared by E.R. Nicol from ALLNZspp databases, CHR Herbarium, Landcare Research, Lincoln.
- ⁸ Owen, S.-J. 1997. Ecological weeds on conservation land in New Zealand: a database. January 1997 working draft. Department of Conservation, Wellington.
- ⁹ Unpublished data. Science and Research, Department of Conservation.
- ¹⁰ Esler, A.E. 1987. The naturalisation of plants in urban Auckland, New Zealand. 3. Catalogue of naturalised species. *New Zealand Journal of Botany* 25: 539-558.
- ¹¹ Champion, P.D. 1998. Freshwater aquatic weeds in New Zealand. Unpublished report, NIWA, Hamilton
- ¹² Nelson, W. 1998. National Overview of Ecological Weeds: Trends and Impacts—Marine Macroalgae. Unpublished report, Museum of New Zealand-Te Papa Tongarewa.
- ¹³ Nelson, W.A. 1995. Nature and magnitude of the problem. Ballast water—a marine cocktail on the move. Proceedings of the National Conference on Ballast Water June 2995. *Royal Society of New Zealand Miscellaneous Series* 30: 13-19.
- ¹⁴ Coffey, B.T., Clayton, J.S. 1988. New Zealand waterplants: a guide to plants found in New Zealand freshwaters. MAF New Zealand.
- ¹⁵ Nelson, W.A. 1994. Marine invaders of New Zealand coasts. *Auckland Botanical Society Journal* 49: 4-14.
- ¹⁶ Adams, N.M. 1983. Checklist of marine algae possibly naturalised in New Zealand. *New Zealand Journal of Botany* 21: 1-2.
- ¹⁷ Atkinson, I.A.E., Cameron, E.K. 1993. Human Influence on the Terrestrial Biota and Biotic Communities of New Zealand. *TREE* 8: 447-451
- ¹⁸ Esler, A.E., Astridge, S.J. 1987. Naturalisation of plants in urban Auckland, New Zealand, New Zealand 2. Records of introduction and naturalisation. *New Zealand Journal of Botany* 25: 523-537.
- ¹⁹ Esler, A.E. 1988. Naturalisation of plants in urban Auckland, New Zealand 5: Success of the alien species. *New Zealand Journal of Botany* 26: 565-584.
- ²⁰ Ewen Cameron, Auckland Museum. Pers. comm. 1996.

- ²¹ Reid, V.A. 1998. The weeds of New Zealand threatened plants. *Science & Research Internal Report No. 164*. Department of Conservation, Wellington.
- ²² Molloy J., Davis A. 1992. Setting priorities for the conservation of New Zealand's threatened plants and animals. Department of Conservation. Second edition, October 1994.
- ²³ Reid, V.A. 1998. *ibid*.
- ²⁴ Department of Conservation. 1998. The Conservation Requirements of New Zealand's Nationally Threatened Vascular Plants. Department of Conservation. Draft in prep.
- ²⁵ Hofstra, D. Waikato University. Unpublished research on samples collected from the Rotorua lakes.
- ²⁶ Williams, P.A. 1997. Ecology and management of invasive weeds. Department of Conservation, Wellington, New Zealand.
- ²⁷ Schiffman, P.M. 1996. Animal-Mediated Dispersal and Disturbance: Driving Forces Behind Alien Plant Naturalisation. *In*: Luken, J.O., Thieret, J.W. (Eds). Assessment and management of plant invasions. Springer-Verlag, New York, USA, pp. 87-94
- ²⁸ Williams, P.A. 1997. Ecology and management of invasive weeds. Department of Conservation, Wellington, New Zealand.
- ²⁹ Balneaves, J.M., Hughey, K.F.D. 1990. The need for control of exotic weeds in braided river beds for conservation of wildlife. Proceedings of 9th Australian Weeds Conference. Adelaide. Pp. 103-108.
- ³⁰ White, E.G. 1991. The changing abundance of moths in a tussock grassland, 1962-1989, and 50- to 70-year trends. *New Zealand Journal of Ecology* 15: 5-22.
- ³¹ James, M.R. 1985. Distribution, biomass and production of the freshwater mussel *Hyridella menziesi* (Gray) in Lake Taupo. *Freshwater Biology* 15: 307-314.
- ³² Williams, P.A., Timmins, S.M. 1990. Weeds in New Zealand Protected Natural Areas: a review for the Department of Conservation. *Science and Research Series No. 14*. Department of Conservation, Wellington.
- ³³ Reid, V.A. 1998. *Ibid*.
- ³⁴ Timmins, S.M., Williams, P.A. 1991. Weed numbers in New Zealand forest and scrub reserves. *New Zealand Journal of Ecology* 15(2): 153-162.
- ³⁵ West, C.J. 1992. Ecological studies of *Clematis vitalba* (old man's beard) in New Zealand. Vegetation report no. 736. Land Resources DSIR, Wellington.
- ³⁶ Kelly, D., Skipworth, J.P. 1984. *Tradescantia fluminensis* in a Manawatu (New Zealand) forest: I. Growth and effects on regeneration. *New Zealand Journal of Botany* 22: 393-397.
- ³⁷ Fromont, M.L. 1995. Ecological research for management of *Rhamnus alaternus* L. MSc Thesis, University of Auckland.
- ³⁸ Atkinson, I.A.E., Cameron, E.K. 1993. Human Influence on the Terrestrial Biota and Biotic Communities of New Zealand. *TREE* 8: 447-451
- ³⁹ Chapman, H.M., Bannister, P. 1990. The spread of heather, *Calluna vulgaris* (L.) Hull, into native plant communities of Tongariro National Park. *New Zealand Journal of Ecology* 14: 7-16.
- ⁴⁰ Scott, D., Robertson, J.S., Archie, W.J. 1990. Plant dynamics of New Zealand tussock grassland infested with *Hieracium pilosella*. I. Effects of seasonal grazing, fertiliser and overdrilling; II. Transition matrices of vegetation changes. *Journal of Applied Ecology* 27: 224-241.
- ⁴¹ Taylor R., Smith I. 1997. The State of New Zealand's Environment. The Ministry for the Environment, Wellington.
- ⁴² West, C.J. 1994. Wild willows in New Zealand: proceedings of a willow control workshop hosted by Waikato Conservancy, Hamilton 24-26 November 1993. Department of Conservation, Wellington.

- ⁴³ de Lange, P.J., Gardiner, R.O., Champion, P.D., Tanner, C.C. in press. *Schoenoplectus californicus* (Cyperaceae) in New Zealand. *New Zealand Journal of Botany*.
- ⁴⁴ Reid, V.A. 1998. Ibid.
- ⁴⁵ Partridge T.R. 1987. *Spartina* in New Zealand. *New Zealand Journal of Botany* 25: 567-575
- ⁴⁶ Howard-Williams, C., Clayton, J.S., Coffey, B.T., Johnstone I.M. 1987. Macrophyte invasions. Pp: 307-331 *In*: Viner, A.B. (Ed.). *Inland Waters of New Zealand*. Bulletin of the Department of Scientific and Industrial Research. Wellington.
- ⁴⁷ Howard-Williams, C., Davies, J., Reid, V. 1989. The distribution and abundance of the submerged water-weed *Lagarosiphon major* in Lake Taupo. Project 79.25T Report. Division of Water Sciences, Department of Scientific and Industrial Research, Taupo
- ⁴⁸ Tanner, C.C., Clayton, J.S., Coffey, B.T. 1990. Submerged vegetation changes in Lake Rotorua (Hamilton, New Zealand) related to herbicide treatment and invasion by *Egeria densa*. *New Zealand Journal of Marine and Freshwater Research* 24: 45-57
- ⁴⁹ Hay, C.H. 1990. The dispersal of sporophytes of *Undaria pinnatifida* by coastal shipping in New Zealand, and implications for further dispersal of *Undaria* in France. *British Phycological Journal* 25: 310-313.
- ⁵⁰ Hay, C.H., Villouta, E. 1993 Seasonality of the adventive Asian kelp *Undaria pinnatifida*. *Botanica Marina* 36: 461-476.
- ⁵¹ Hay, C.H., Luckens, P.A. 1987. The Asian kelp *Undaria pinnatifida* (Phaeophyta: Laminariales) found in a New Zealand harbour. *New Zealand Journal of Botany* 25: 329-332.
- ⁵² Miller, K. 1997. Impacts of *Undaria* in Wellington Harbour. Unpublished report, NIWA, Wellington.
- ⁵³ Nelson, W.A. 1998. *ibid.*
- ⁵⁴ Atkinson, I.A.E. 1997. Problem weeds on New Zealand islands. *Science for Conservation No. 45*. Department of Conservation, Wellington.
- ⁵⁵ Atkinson, I.A.E. 1997. *Ibid.*
- ⁵⁶ West, C.J. 1996. Assessment of the weed control programmes on Raoul Island, Kermadec Group. *Science & Research Series No. 98*. Department of Conservation, Wellington.
- ⁵⁷ Wotherspoon, S., Wotherspoon, J. 1996. Rangitoto Island weeds draft operational control plan. Unpublished report, Auckland Conservancy, Department of Conservation.
- ⁵⁸ Veitch, C.R. 1996. Plan for the control of exotic plants on Little Barrier Island (Hauturu). Unpublished report, Department of Conservation, Auckland.

-
- ¹ Swarbrick, J.T., Timmins, S.M. 1997. Annotated bibliography of environmental weeds in Australia and New Zealand. Biodiversity Group, Environment Australia, Canberra.
 - ² Report by a multi-agency committee on invasive weeds, 1998 Invasive Plants: Changing the Landscape of America. In press.
 - ³ Wilcove, D.S., Rothstein, D., Dubow, J., Phillips, A., Losos, E. 1988. Quantifying threats to imperiled species in the United States: assessing the relative importance of habitat destruction, alien species, pollution, overexploitation, and disease. *BioScience* 48(8): 607-615.
 - ⁴ Humphries S.E., Groves R.H., Mitchell D.S. 1993. Plant invasions: homogenising Australian systems. In: Conservation Biology in Australia and Oceania. C. Moritz and J. Kikkawa (Eds). Surrey Beatty and Sons.
 - ⁵ U.S. Congress, Office of Technology Assessment. Harmful non-native species in the United States. OTA-F-565. Washington, DC: U.S. Government, September 1993.
 - ⁶ Vitousek P. 1996. Ecology of biological invasions. Unpublished lecture to the New Zealand Ecological Society Conference, July 1996, Christchurch New Zealand.
 - ⁷ New Zealand flora statistics as at March 1998, Actual figures: 16 950 non-naturalised introduced vascular plants; 2 068 naturalised introduced species, and 2 057 native species. (Named species only—an estimated 350 species are recognised but not yet formally described.) Unpublished data prepared by ER Nicol from ALLNZspp databases, CHR Herbarium, Landcare Research, Lincoln.
 - ⁸ Owen, S.-J. 1997. Ecological weeds on conservation land in New Zealand: a database. January 1997 working draft. Department of Conservation, Wellington.
 - ⁹ Unpublished data. Science and Research, Department of Conservation.
 - ¹⁰ Esler, A.E. 1987. The naturalisation of plants in urban Auckland, New Zealand. 3. Catalogue of naturalised species. *New Zealand Journal of Botany* 25: 539-558.
 - ¹¹ Champion, P.D. 1998. Freshwater aquatic weeds in New Zealand. Unpublished report, NIWA, Hamilton
 - ¹² Nelson, W. 1998. National Overview of Ecological Weeds: Trends and Impacts- Marine Macroalgae. Unpublished report, Museum of New Zealand Te Papa Tongarewa.
 - ¹³ Nelson, W.A. 1995. Nature and magnitude of the problem. Ballast water - a marine cocktail on the move. Proceedings of the National Conference on Ballast Water June 2995. *Royal Society of New Zealand Miscellaneous Series* 30: 13-19.
 - ¹⁴ Coffey B.T., Clayton J.S. 1988. New Zealand waterplants: a guide to plants found in New Zealand freshwaters. MAF New Zealand.
 - ¹⁵ Nelson W.A. 1994. Marine invaders of New Zealand coasts. *Auckland Botanical Society Journal* 49: 4-14.
 - ¹⁶ Adams N.M. 1983. Checklist of marine algae possibly naturalised in New Zealand. *New Zealand Journal of Botany* 21: 1-2.
 - ¹⁷ Atkinson, I.A.E., Cameron, E.K. 1993. Human Influence on the Terrestrial Biota and Biotic Communities of New Zealand. *TREE* 8, 447-451
 - ¹⁸ Esler, A.E., Astridge, S.J. 1987. Naturalisation of plants in urban Auckland, New Zealand, New Zealand 2. Records of introduction and naturalisation. *New Zealand Journal of Botany* 25: 523-537.
 - ¹⁹ Esler, A.E. 1988. Naturalisation of plants in urban Auckland, New Zealand 5: Success of the alien species. *New Zealand Journal of Botany* 26: 565-584.
 - ²⁰ Ewen Cameron, Auckland Museum. Pers. comm. 1996.

-
- ²¹ Reid, V.A. 1988. The weeds of New Zealand threatened plants. Science & Research Internal Report No. 164. Department of Conservation, Wellington.
- ²² Molloy J., Davis A. 1992. Setting priorities for the conservation of New Zealand's threatened plants and animals. Department of Conservation. Second edition, October 1994.
- ²³ Reid, V.A. in press. *ibid.*
- ²⁴ Department of Conservation 1998. The Conservation Requirements of New Zealand's Nationally Threatened Vascular Plants. Department of Conservation. Draft in prep.
- ²⁵ Hofstra D. Waikato University. Unpublished research on samples collected from the Rotorua lakes.
- ²⁶ Williams, P.A. 1997. Ecology and management of invasive weeds. Department of Conservation, Wellington, New Zealand.
- ²⁷ Schiffman, P.M. 1996. Animal-Mediated Dispersal and Disturbance: Driving Forces Behind Alien Plant Naturalisation. *In*: Luken, J.O., Thieret, J.W. (Eds). Assessment and management of plant invasions. Springer-Verlag, New York; USA pp. 87-94
- ²⁸ Williams, P.A. 1997. Ecology and management of invasive weeds.. Department of Conservation, Wellington, New Zealand.
- ²⁹ Balneaves, J.M., Hughey, K.F.D. 1990. The need for control of exotic weeds in braided river beds for conservation of wildlife. Proceedings of 9th Australian Weeds Conference. Adelaide. Pp. 103-108.
- ³⁰ White, E.G. 1991. The changing abundance of moths in a tussock grassland, 1962-1989, and 50- to 70-year trends. *New Zealand Journal of Ecology* 15: 5-22.
- ³¹ James M.R. 1985. Distribution, biomass and production of the freshwater mussel *Hyridella menziesi* (Gray) in Lake Taupo. *Freshwater Biology* 15: 307-314.
- ³² Williams, P.A., Timmins, S.M. 1990. Weeds in New Zealand Protected Natural Areas: a review for the Department of Conservation. *Science and Research Series No. 14*. Department of Conservation, Wellington.
- ³³ Reid, V.A. in press. *Ibid.*
- ³⁴ Timmins, S.M., Williams, P.A. 1991. Weed numbers in New Zealand forest and scrub reserves. *New Zealand Journal of Ecology* 15(2): 153-162.
- ³⁵ West, C.J. 1992. Ecological studies of *Clematis vitalba* (old man's beard) in New Zealand. Vegetation report no 736. Land Resources DSIR, Wellington.
- ³⁶ Kelly, D., Skipworth, J.P. 1984. *Tradescantia fluminensis* in a Manawatu (New Zealand) forest: I. Growth and effects on regeneration. *New Zealand Journal of Botany* 22:393-397.
- ³⁷ Fromont, M.L. 1995. Ecological research for management of *Rbannus alaternus* L. MSc Thesis, University of Auckland.
- ³⁸ Atkinson, I.A.E., Cameron, E.K. 1993. Human Influence on the Terrestrial Biota and Biotic Communities of New Zealand. *Tree* 8, 447-451
- ³⁹ Chapman, H.M., Bannister, P. 1990. The spread of heather, *Calluna vulgaris* (L.) Hull, into native plant communities of Tongariro National Park. *New Zealand Journal of Ecology* 14:7-16.
- ⁴⁰ Scott, D., Robertson, J.S., Archie, W.J. 1990. Plant dynamics of New Zealand tussock grassland infested with *Hieracium pilosella*. I. Effects of seasonal grazing, fertiliser and overdrilling: II. Transition matrices of vegetation changes. *Journal of Applied Ecology* 27:224-241.
- ⁴¹ Taylor R., Smith I. 1997. The State of New Zealand's Environment. The Ministry for the Environment, Wellington.

-
- ⁴² West, C.J. 1994. Wild willows in New Zealand: proceedings of a willow control workshop hosted by Waikato Conservancy, Hamilton 24-26 November 1993. Department of Conservation, Wellington.
- ⁴³ de Lange, P.J., Gardiner, R.O., Champion, P.D., Tanner, C.C. in press. *Schoenoplectus californicus* (Cyperaceae) in New Zealand. *New Zealand Journal of Botany*.
- ⁴⁴ Reid, V.A. in press. Ibid.
- ⁴⁵ Partridge T.R. 1987. Spartina in New Zealand. *New Zealand Journal of Botany* 25:567-575
- ⁴⁶ Howard-Williams C., Clayton J.S., Coffey B.T. and Johnstone I.M. 1987. Macrophyte invasions. Pp: 307-331 In: Viner, A.B. (Ed.). Inland Waters of New Zealand. Bulletin of the Department of Scientific and Industrial Research. Wellington.
- ⁴⁷ Howard-Williams C., Davies J. and Reid V. 1989. The distribution and abundance of the submerged water-weed Lagarosiphon major in Lake Taupo. Project 79.25T Report. Division of Water Sciences, Department of Scientific and Industrial Research, Taupo
- ⁴⁸ Tanner C.C., Clayton J.S., Coffey B.T. 1990. Submerged vegetation changes in Lake Rotorua (Hamilton, New Zealand) related to herbicide treatment and invasion by *Egeria densa*. *New Zealand Journal of Marine and Freshwater Research* 24:45-57
- ⁴⁹ Hay, C.H. 1990. The dispersal of sporophytes of *Undaria pinnatifida* by coastal shipping in New Zealand, and implications for further dispersal of *Undaria* in France. *British Phycological Journal* 25: 310-313.
- ⁵⁰ Hay, C.H., Villouta, E. (1993) Seasonality of the adventive Asian kelp *Undaria pinnatifida*. *Botanica Marina* 36: 461-476.
- ⁵¹ Hay, C.H., Luckens, P.A. 1987. The Asian kelp *Undaria pinnatifida* (Phaeophyta: Laminariales) found in a New Zealand harbour. *New Zealand Journal of Botany* 25: 329-332.
- ⁵² Miller K. 1997 Impacts of *Undaria* in Wellington Harbour. Unpublished report, NIWA, Wellington.
- ⁵³ Nelson, W.A. 1998. *ibid.*
- ⁵⁴ Atkinson, I.A.E 1997. Problem weeds on New Zealand islands. *Science for Conservation No. 45*. Department of Conservation, Wellington.
- ⁵⁵ Atkinson, I.A.E 1997. *Ibid.*
- ⁵⁶ West, C.J. 1996. Assessment of the weed control programmes on Raoul Island, Kermadec Group. *Science & Research Series No. 98*. Department of Conservation, Wellington.
- ⁵⁷ Wotherspoon S. and Wotherspoon J. 1996. Rangitoto Island weeds draft operational control plan. Unpublished report, Auckland Conservancy, Department of Conservation.
- ⁵⁸ Veitch C.R. 1996. Plan for the control of exotic plants on Little Barrier Island (Hauturu). Unpublished report, Department of Conservation, Auckland.

Appendix 1

DOC's legal roles and responsibilities

1. MANAGING INVASIVE WEEDS AT THE BORDER

The Biosecurity¹ Act 1993 and Hazardous Substances and New Organisms Act 1996 (HSNO Act) together provide the legislative framework for managing the risk of undesirable organisms, including potential new invasive weed pests, entering New Zealand. In general terms, the HSNO Act deals with organisms that people wish to intentionally bring into the country; and the Biosecurity Act is concerned with ensuring that unwanted organisms are not unintentionally introduced with imported goods. The Biosecurity Act also includes powers of surveillance, inspection and enforcement to prevent unwanted organisms entering New Zealand unintentionally or illegally.

The Environmental Risk Management Authority (ERMA New Zealand) has been established under the HSNO Act to evaluate applications to import new organisms. It is an independent decision-making body but is required to make decisions in accordance with a prescribed methodology which gives guidance on how ERMA New Zealand should evaluate risks and monetary and non-monetary benefits when making its decisions.

Government has also established a Biosecurity Council to better co-ordinate government responses to biosecurity issues.

1.1 Implications of international agreements

The main international obligations in relation to border control restrictions derive from the World Trade Organisation's "Agreement on the application of sanitary and phytosanitary measures" (the SPS agreement).

The SPS agreement affirms the sovereign right of countries to protect their animal, plant and human health. It does, however, require that any border restrictions must be based on scientific principles and risk assessment and that they do not restrict trade unnecessarily. This means that decisions to not allow certain risk goods or new organisms into New Zealand, or to impose restrictions and conditions on their entry, must be backed by scientific risk assessments.

1.2 Responsibilities of MAF, MFish, and ERMA New Zealand

The Ministry of Agriculture and Forestry (MAF) is responsible for leading and co-ordinating the management of exotic organisms, including weeds, that pose a significant threat to the agricultural and forestry industries. MAF delivers border control services to:

¹ Biosecurity Act s 39.

- reduce the incidence of pests arriving at the New Zealand border;
- prevent those pests that do arrive at the New Zealand border from entering the country;
- facilitate early detection of new pests; and
- enable appropriate responses to be made to new pests once they have been detected in New Zealand.

MAF prepares import health standards (IHSs) for traded goods to reduce the risk of new organisms being accidentally introduced through contaminated imports (risk goods). All risk goods must have an IHS before they can be imported. The requirements and specifications in these IHSs are intended to reduce the risk of unwanted introductions to acceptable levels. MAF also approves the standard for holding new organisms that are imported into containment.

The Ministry of Fisheries (MFish) has policy and regulatory responsibility for ballast water and hull defouling—the two main sources of new marine organisms, including seaweeds that could become marine invasive weeds. The Ministry is currently developing an import health standard for ballast water which will complement and strengthen an existing set of voluntary guidelines.

ERMA New Zealand receives and evaluates applications to import new plant taxa into New Zealand for containment or for release, and decides whether new organisms should be introduced.² ERMA also prescribes standards for the containment of genetically modified organisms on a case by case basis.³ For new organisms that are approved in containment, ERMA may also impose conditions.⁴

1.3 DOC's border control roles responsibilities

DOC has an interest in reducing the threat posed by new invasive weeds and other pests (whether or not they would first appear in New Zealand in an area DOC administers) based on its responsibilities for protecting natural and historic resources under the Conservation Act and other Acts it administers (see section 2 below).

Under the HSNO Act, all applications received by ERMA New Zealand relating to new organisms have to be notified to DOC.⁵ For applications for import, development, field testing or release of new organisms, ERMA New Zealand must have particular regard to any submissions made by DOC.⁶

Although MAF is the primary border control agency under the Biosecurity Act, the Act gives departments with responsibilities for protecting natural and physical resources (such as DOC) the ability to use provisions of the Act to manage biosecurity risks in their areas of responsibility. DOC is therefore able to recommend import health standards for risk goods, and to propose a national pest management strategy for an exotic organism which poses a significant risk to indigenous plants and animals.

Departments are required to consult with one another on import health standards.⁷ MAF must give notice and consult with DOC on new IHSs, or

² HSNO Act s 38, 45.

³ HSNO Act s 42, 45.

⁴ HSNO Act s 45 (2).

⁵ HSNO Act s 53.

⁶ HSNO Act s 58.

⁷ Biosecurity Act s 22 (6-8).

significant changes to existing IHSs, affecting species of interest to DOC.⁸ DOC, MAF and Mfish also consult each other on programmes for the early detection of new pests, and responses to new introductions, in line with protocols established between the Department and MAF and Mfish.

Mindful of their respective areas of interest and responsibilities, departments may consider that a response is warranted to eradicate or control a newly arrived pest. In these circumstances, departments will recommend to the Minister for Biosecurity that one organisation or the other should take a lead in responding to the pest.

2. INVASIVE WEEDS ON LANDS ADMINISTERED BY DOC

DOC's primary legal roles and responsibilities for managing invasive weeds on lands (including wetlands) it administers are based on the requirements in the Conservation Act 1987, Reserves Act 1977, National Parks Act 1980, Wildlife Act 1953, and Marine Reserves Act 1971, depending on the legal status of an area.

2.1 Conservation Act

The Conservation Act established the DOC and requires it to “...*manage for conservation purposes, all land, and all other natural and historic resources, for the time being held under this Act...*”⁹ “Conservation” is defined in this Act as “*the preservation and protection of natural and historic resources for the purpose of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations.*”

DOC is also required to “...*preserve so far as is practicable all indigenous fisheries...and freshwater fish habitats*” and “...*advocate the conservation of natural and historic resources generally...*” (see section 4 below).

DOC is therefore responsible for managing threats (including invasive weeds) to the natural and historic values of areas that it administers. The Conservation Act authorises the Director-General of Conservation to control any introduced species, including plants, causing damage to any indigenous species or habitat (including land, freshwater and estuarine).¹⁰

For areas protected under the Conservation Act (for example, conservation areas), the Conservation Act does not specifically refer to control of introduced plants. However, Part IV s19–23B requires different areas to variously be managed to protect or preserve their natural and historic resources, values, characteristics, and indigenous plants and animals. As these can be seriously degraded by invasive weeds and other threats, the need to control these threats can be implied.

⁸ Biosecurity Act s 22 (6), (8).

⁹ Conservation Act 1987 s 6(a).

¹⁰ Conservation Act 1987 s 53(3)(g).

2.2 National Parks Act and Reserves Act

The National Parks Act and Reserves Act set the broad management objectives for managing plants and animals within areas protected under these Acts.

The purpose of the National Parks Act is to preserve “...*in perpetuity as national parks, for their intrinsic worth and for the benefit, use, and enjoyment of the public, areas of New Zealand that contain scenery of such distinctive quality, ecological systems, or natural features so beautiful, unique, or scientifically important that their preservation is in the national interest.*”¹¹ These areas are to be “*preserved as far as possible in their natural state*”,¹² and “*the introduced plants and animals shall as far as possible be exterminated.*”¹³

The former National Parks and Reserves Authority established the 1983 “General Policy for National Parks” as a guide for interpreting and exercising discretions in the National Parks Act. The General Policy states that: “*Priority will be given to the control of spreading introduced plants, including weeds, where control is feasible.*”¹⁴

The Reserves Act requires DOC to ensure “...*as far as possible, the survival of all indigenous species of flora and fauna, both rare and commonplace, in their natural communities and habitats, and the preservation of representative samples of all classes of natural ecosystems and landscape which in the aggregate originally gave New Zealand its own recognisable character.*”¹⁵

In scenic, scientific and nature reserves, the Reserves Act requires the extermination (as far as possible) of exotic plants, and strict controls on introducing both indigenous and exotic plants¹⁶ (including biological control agents).¹⁷ The National Parks Act has similar requirements for national parks, except where the Conservation Authority determines otherwise. Specifically, both the National Parks and Reserves Act require that “...*the indigenous flora and fauna shall as far as possible be preserved and the exotic flora and fauna shall as far as possible be exterminated.*”¹⁸ and state that it is an offence if a person “...*plants any (plant), or sows or scatters the seed of any (plant).*”¹⁹

2.3 Wildlife Act

Under the Wildlife Act, the Governor-General may declare, by proclamation, an area to be a wildlife sanctuary, wildlife refuge or wildlife management reserve, subject to specified conditions. Proclamations for wildlife sanctuaries may

¹¹ National Parks Act 1980 s 4(1).

¹² National Parks Act 1980 s 4(2)(a).

¹³ National Parks Act 1980 s 4(2)(b).

¹⁴ Policy 9.3.

¹⁵ Reserves Act, Part I, s 3(1)(b).

¹⁶ Reserves Act s 51 and 51(a).

¹⁷ National Parks Act s 4(2) and 5A.

¹⁸ National Parks Act s 4 ss (2)(b). Reserves Act 1977 part III s 19 ss 2(a) for scenic reserves; s 20 ss 2(b) Nature Reserves; s 21 ss 2(a) Scientific Reserves.

¹⁹ Reserves Act s 94 ss 1(d); National Parks Act.

(among other matters) prohibit “*the introduction or planting...of any vegetation*”²⁰...or other matters that may be necessary for the control of the sanctuary or for the protection and well-being of any wildlife or vegetation therein.”²¹

2.4 Marine Reserves Act

Under the Marine Reserves Act 1971, marine reserves must be administered and maintained so that “...*they shall be preserved as far as possible in their natural state; the marine life of the reserves shall as far as possible be protected and preserved; (and) the value of the marine reserves as the natural habitat of marine life shall as far as possible be maintained...*”²² Offences under the Marine Reserves Act include introducing any polluting or potentially harmful thing.

3. INVASIVE WEEDS IN PLACES PRIVATELY OWNED OR MANAGED BY OTHER AGENCIES

Places that are privately owned or administered by another agency may be important to a weed-led programme, to a site-led programme (e.g., as buffers or sources of propagules), or may themselves be important to New Zealand’s natural heritage (for example they may contain threatened species). Examples of the latter include protected private land (e.g., places protected under conservation covenants,²³ QEII covenants,²⁴ protected private land declarations),²⁵ reserves administered by another agency, and recommended areas for protection (RAPs).

DOC may control invasive weeds on land, freshwater or marine areas it does not administer, but only if:

1. It has the permission of those who own or control the land.

The Conservation Act authorises the Director-General of Conservation to control any introduced species, including plants, causing damage to any indigenous species or habitat, including land, freshwater and estuarine.²⁶

DOC can therefore enter into an agreement, contract or other arrangement for land it doesn’t administer, if the landowner or the person controlling the land agrees);²⁷ and

2. It meets any legal requirements such as resource consents.

The conditions under which a conservation covenant is set up sometimes require DOC to control weeds within the covenant.

²⁰ Wildlife Act 1953 s 9 (2)(b).

²¹ Wildlife Act 1953 s 9 (2)(o) s 60 ss 1(c).

²² Marine Reserves Act 1971 s 3 (2)(a-c).

²³ A conservation covenant can be established under the Conservation Act s 27, or the Reserves Act s 77. It can be established between the landowner and the Minister of Conservation, a local authority, or a body authorised by the Minister of Conservation.

²⁴ QEII covenants are established between the landowner and the QEII National Trust under the Queen Elizabeth II National Trust Act 1977, s 22.

²⁵ Protected private land declarations can be established under the Reserves Act s 76.

²⁶ Conservation Act 1987 s 53 (3)(g).

²⁷ Under the Conservation Act s 29, and the Reserves Act s 38. Specifically, under the Conservation Act s 29, the Department may enter into any agreement, contract or arrangement of any kind, to carry out the conservation of any natural or historic resource on or in any land owned or under the control of another private person or another agency.

4 . INVASIVE WEEDS IN FRESHWATER SYSTEMS

DOC manages any freshwater system included in the gazettal of a reserve or national park administered by DOC under the Reserves Act and National Parks Act. However, many river and lake beds are unalienated Crown lands and are administered under the Land Act 1948 by the Commissioner of Crown Lands (located within Land Information New Zealand), who determines and funds priorities for managing pests, including invasive weeds, on these lands, (but may contract DOC or another agency to carry out the control).

The Conservation Act also requires DOC to “...*preserve so far as is practicable all indigenous fisheries... and freshwater fish habitats*” and “...*advocate the conservation of natural and historic resources generally...*”²⁸

4.1 Introducing plants to the bed of lakes or rivers

The Resource Management Act prohibits the introduction or planting of any plant on the bed of any lake or river unless this is expressly allowed in a Regional Plan or resource consent.²⁹ DOC has the opportunity to comment on a proposed Regional Plan or resource consent.

4.2 Approving the transfer and release of live aquatic plants

The prior approval of the Minister of Conservation is required for transferring and releasing live freshwater aquatic species (which includes aquatic plants, both indigenous and exotic), into locations where they do not already exist.³⁰

Thus, any proposal to introduce a plant into a river or lake where it does not already exist, would need to be both possible under the RMA and approved by the Minister of Conservation.

5 . INVASIVE WEEDS IN THE COASTAL MARINE AREA

In the marine environment, DOC has responsibilities as a landowner under the Foreshore and Seabed Endowment Revesting Act 1991, is responsible for managing marine reserves, and is responsible for the protection of marine mammals and protected wildlife.

The “coastal marine area” includes the foreshore or seabed between mean high water spring and the outer limit of the territorial sea (12 nautical miles, or 22 km, from mean high water springs).³¹ Through a 1994 amendment to the Foreshore and Seabed Endowment Revesting Act 1991, DOC now administers all “*foreshore and seabed within the coastal marine area...(that) is for the time being vested in the Crown but for the time being is not set aside for any public purpose...*” and is to manage it “...*so as to protect, as far as is practicable, the natural and historic resources of the land...*”³²

²⁸ Conservation Act 1987 s 6(a,b) and (b).

²⁹ Resource Management Act 1991 s 13(1)(c).

³⁰ Conservation Act 1987 s 26 ZM (3)(a).

³¹ Resource Management Act s 2.

³² Fore shore and Seabed Endowment Revesting Act 1991, s 9A(1) and 9A ss(3)(b).

Activity involving introduction of live plants to aquatic systems **where they do not already occur**

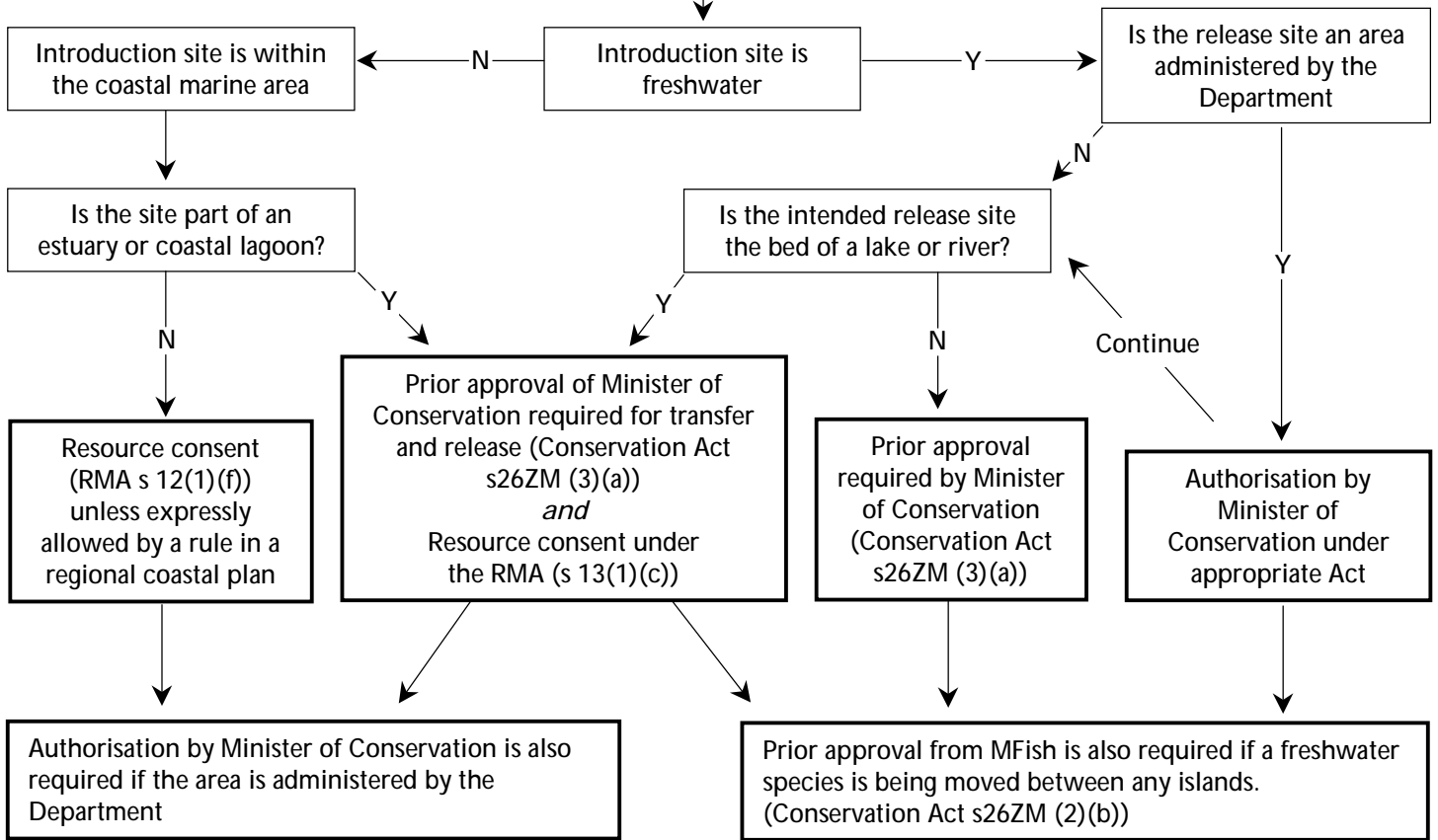


FIGURE A1.1. CONSENTS AND APPROVALS REQUIRED TO TRANSFER AND RELEASE AQUATIC PLANTS IN AREAS WHERE THEY DO NOT OCCUR.

5.1 Introducing plants into the coastal marine area

Figure A1.1 summarises the authorisations required to introduce a plant into the coastal marine area.

The Marine Reserves Act states that it is an offence to “...*introduce any living organism...*”³³ into a marine reserve.

The Resource Management Act 1991 (RMA) requires specific controls to be placed on the introduction of exotic plants to the foreshore, seabed, and coastal water. The RMA requires (among other things) “...*the preservation of the natural character of the coastal environment (including the coastal marine area)...*” to be recognised and provided for as a matter of national importance.³⁴ The Act prohibits the introduction or planting “...*of any exotic or introduced plant in, on, or under the foreshore or seabed...*” unless this is expressly allowed by a rule in a Regional Coastal Plan or a resource consent.³⁵ The New Zealand Coastal Policy Statement 1994 expands upon this, by stating that “*Any activity involving the introduction of any exotic plant species to the coastal marine area is a restricted coastal activity, except where the plant is (both) already present in an area and an operative or proposed Regional Coastal Plan specifies that the planting of it is a discretionary activity.*”³⁶

³³ Marine Reserves Act 1971 s 19(1)(a).

³⁴ Resource Management Act 1991 s 6(a).

³⁵ Resource Management Act 1991, s 12(1)(f).

³⁶ New Zealand Coastal Policy Statement, Schedule 1, s1.8.

Regional Coastal Plans cannot be inconsistent with the New Zealand Coastal Policy Statement. The Minister of Conservation administers the Coastal Policy Statement and approves Regional Coastal Plans.

If an activity that introduces a plant to an area is a restricted coastal activity, it requires the Minister of Conservation's approval. The Minister is advised on the application by a committee of the regional council that contains one person appointed by the Minister.³⁷

Pest Management Strategies under the Biosecurity Act 1993 (see below) can also apply to marine invasive weeds (as the scope of the Biosecurity Act includes the territorial sea). If an aquatic species is declared an "unwanted organism" under the Biosecurity Act, a fisheries permit is not required for its management or eradication, but the Fisheries Act 1996 allows for the issue of special permits to harvest these species if circumstances require.³⁸

6. MANAGING WEEDS IN NEW ZEALAND UNDER THE BIOSECURITY ACT

The Biosecurity Act 1993 provides a legal framework for eradicating and effectively managing pests and unwanted organisms on a regional or national basis. It is an "enabling Act"—that is, it allows people affected, or potentially affected, by a pest to make their own decisions on the pests to be managed, how they are to be managed, and who will incur the management costs. It also provides the management tools. The Act covers both land and freshwater environments and extends out to the limits of the territorial sea (12 nautical miles, or 22 km, offshore). The provisions of the Conservation Act, Reserves Act, National Parks Act, Resource Management Act, and the Fisheries Act 1983 (among others) are not affected or derogated from in any way by the Biosecurity Act.

The Biosecurity Act provides powers and mechanisms that can be used for the management of pests and unwanted organisms and allows for a number of management responses, including declaring a biosecurity emergency, small scale management programmes, and powers for administration, cost recovery and controls on places and areas. Longer term management of established pests requires the development of a national or regional pest management strategy (NPMS or RPMS).

DOC has biosecurity responsibilities relevant to protecting New Zealand's biodiversity and can use provisions of the Act, including developing an NPMS or RPMS, for pests affecting its areas of responsibility.

Any organism (animal, plant or disease) can be identified as a "pest" under this Act. The Act has no hard and fast rules to decide whether an NPMS or RPMS should be developed. However, the Act does require that the pest organism must have the potential to have a serious adverse and unintended effect on:

- economic well being; or
- human health or enjoyment of the recreational value of the natural environment; or

³⁷ Resource Management Act s 117-119.

³⁸ Fisheries Act 1996, s 89(2)(d) and 97(a)(iii).

- the viability of rare or endangered species of organisms, the survival and distribution of indigenous plants or animals, or the sustainability of natural and developed ecosystems, ecological processes and biological diversity;
- soil resources or water quality.
- the relationship of Maori and their culture and traditions with their ancestral lands, waters, sites, waahi tapu and taonga.

In addition, the Act requires that collective intervention to manage pests using the tools of the Act should only occur when it is both necessary and efficient. A PMS must therefore show that:

1. the benefits outweigh its costs (after taking account of the likely consequences of inaction or alternative courses of control); and
2. the net benefits of national intervention are greater than the benefits that would occur with purely regional intervention (for an NPMS); or
3. the net benefits of regional intervention are greater than the benefits that would occur with purely individual intervention (for an RPMS).

The Act requires those who contribute to a pest problem, or who benefit from its control, to pay. A pest strategy cannot, however, impose costs or obligations on the Crown, unless these have been agreed to by an Order-in-Council.

Any person may prepare a proposal for a regional PMS, or suggest to a regional council that a PMS proposal be prepared. Regional councils approve and notify regional PMSs, and are currently the key management agency for implementing regional PMSs. Any person may also prepare a proposal for a NPMS, or suggest that the appropriate Minister do so. The Governor-General approves national PMSs by order-in-Council, on the recommendation of a Minister.

7. GOVERNMENT STRATEGIES AND INTERNATIONAL AGREEMENTS

Managing plant and animal pests and diseases is a key component of some government strategies and international agreements. The Government Strategic Result Area number 9 “Protecting and Enhancing the Environment”, includes a particular emphasis on “*ensuring effective management of risks posed by pests, weeds and diseases, consistent with objectives for biological security of the economy, biological diversity, and people’s health.*”

One of the goals of the Government’s Environment 2010 Strategy is to manage pests (including animal pests, weeds and diseases) by “*...reducing the risks they pose to levels consistent with established objectives for: biological diversity of ecosystems, people’s health, or biosecurity of the economy*”, the priorities for this being:

- “*developing national and regional Pest Management Strategies... which will specify the desired outcomes and the measures necessary to achieve these;*
- *monitoring... to ensure that management strategies are effective...;*
- *maintaining a rigorous system of border control and an effective emergency response;*
- *focusing research on the development of innovative...management, including management techniques that reduce impacts on the environment.*”

The international Convention on Biological Diversity, to which the government is a signatory, requires governments to “...*as far as possible and appropriate...prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species...*”³⁹

³⁹ Convention on Biological Diversity, Article 8(h).

Appendix 2:

Criteria for evaluating the feasibility of eradication and containment

1. ERADICATION: DEFINITION AND FEASIBILITY CRITERIA

Eradication is the *permanent* removal of all individuals of a species from a location with little or no risk of reinvasion.

Eradication should ideally only be attempted if all the following criteria are met:

1. There is no, or a very low, probability of reinvasion—this will involve evaluating:
 - the distance to seed sources
 - the length of time seeds are likely to survive; and
 - the vectors for dispersal and their effectiveness.
2. Individuals can be detected at very low densities (if this is not possible, survivors may re-establish the infestation).
3. Effective control methods are available that can:
 - target all above-ground individuals in the population;
 - remove individuals faster than the rate of increase of the species; and
 - still remove individuals at very low densities.
4. There is certainty that the eradication programme can be completed—this requires:
 - a reliable estimate of the likely time the programme will take;
 - proper identification and commitment of the necessary resources for the length of the programme;
 - local support for both the eradication objective and the methods being used.

These criteria should be regularly reviewed during the course of an eradication programme, as circumstances and available control techniques can change.

2. EVALUATING RISKS WHEN SOME OF THE CRITERIA ARE UNKNOWN

If some of the feasibility of eradication criteria are unknown, the programme must be justified by evaluating all the risks, including both the risks associated with control, and the risks associated with no control (see Table A2.1).

Because of potential reinvasion, eradication is usually feasible only when a species has a small isolated distribution, is in the earliest stages of an invasion, or is on an offshore or outlying island of manageable size.

TABLE A2.1: CRITERIA FOR EVALUATING RISKS

RISK TYPE	RISKS OF CONTROL (risk assessment = probability × implications)	RISKS OF NO CONTROL
Impacts	<ul style="list-style-type: none"> of the operation causing unacceptable adverse non-target effects on indigenous species or communities, historic values, cultural values important to iwi, recreational values, or staff or public health or safety. 	<ul style="list-style-type: none"> of potential adverse effects on indigenous species or communities on areas administered by the Department.
Political	<ul style="list-style-type: none"> of not getting all the necessary co-operation with other agencies, private landowners etc. for the Department's working relationships and trust between Local Authorities, industry and interest groups, Iwi, and landowners. 	<ul style="list-style-type: none"> of not contributing to control for the Department's or Crown's working relationships and trust between Local Authorities, industry and interest groups, Iwi, and landowners.
Operational	<ul style="list-style-type: none"> of not meeting the long-term operational target 	
Legal	<ul style="list-style-type: none"> of not getting necessary resource consents etc. 	<ul style="list-style-type: none"> of not controlling, or contributing to control of, an invasive weed.
Public	<ul style="list-style-type: none"> of significant adverse public or Iwi reaction. 	<ul style="list-style-type: none"> of significant adverse public or Iwi reaction.
Financial	<ul style="list-style-type: none"> of not completing the objective within budget. 	<ul style="list-style-type: none"> of the cost of control escalating as the species spreads.

Weeds in site-led control programmes are likely to be mainly widespread, established species, which therefore have a high potential for reinvasion. So eradicating species in a site-led programme is usually not possible, and sustained control to zero-density will be the best that can be achieved. If all the necessary criteria are met, however, or it is warranted by an evaluation of all the associated risks, eradicating an invasive weed species within a management unit is the priority because it removes the need for ongoing control.

Because eradication programmes can be intensive, control methods must be as specific as possible with no long-term adverse effect on populations of non-target species. Some non-target impacts from an eradication programme may be tolerated, however, if they are fully evaluated and judged to be outweighed by the long-term conservation benefits from the eradication.

3. REQUIREMENTS FOR CONTAINMENT

Containment may be possible if eradication is not feasible.

Containment is ongoing control to prevent a population spreading beyond a limited, defined distribution—there should be no infestations outside a containment zone.

Regional containment includes:

- preventing the species invading a region; or
- containing the species within a discreet, limited distribution within the region.

National containment is containing a species to a limited discreet distribution within New Zealand (e.g., preventing hydrilla spreading beyond its current distribution in the Hawkes Bay).

Effective containment requires:

1. the boundaries of a containment zone to be defensible and rigorously enforced;
2. any infestations outside the containment zone which do exist to be controlled to zero density (controlling a species within a containment zone may reduce the risk of the species spreading);
3. regular monitoring outside the containment zone, so that new outbreaks can be eradicated as early as possible.

Appendix 3:

Criteria to determine the feasibility of a weed-led programme

Weed-led programmes have the potential to quickly become both unachievable and expensive unless they are carefully chosen and planned. The number of weed-led programmes will be limited by the criteria in the decision-making process outlined in Figure A3.1. These criteria are the key factors in determining both the feasibility of a weed-led eradication or containment, and the potential boundaries of the programme. The feasibility and practical boundaries will vary against these criteria according to:

- the type of environment (land, freshwater, or marine);
- the presence of any physical barriers to dispersal; and
- the characteristics of the invasive weed species (including how it is dispersed) and its distribution.

1. SIGNIFICANT IMPACTS ON INDIGENOUS SPECIES AND COMMUNITIES

Weed-led programmes may not be needed if the local conditions will naturally control the growth or spread of the weed species, or the species is not generally invasive in natural communities. If the potential impacts of the species are not well known, the Department will use the precautionary principle and recommend managing a species if there is a reasonable likelihood that the species' impacts will be significant.

The need for a precautionary approach

There is often only a comparatively short period after a new plant species becomes established during which eradication or containment is feasible. Some potential invasive weeds reproduce and spread very rapidly once they become established. Other potential invasive weeds, however, may not begin having significant impacts until some time after they become established in the wild—during this “lag phase”, outlier populations establish and provide a secondary seed source for further population growth. Following the lag phase, the population may grow and spread very rapidly. The longer a newly established species is left unchecked, the greater the chance of its becoming invasive (see Figure 4 in section 4.3.2).

Thus, the best time for eradicating or containing any potential invasive weed is when it only has a small, localised population. This means in turn that a precautionary approach is needed. That is, if it is likely that a species will have significant ecological impacts, but the exact nature and degree of impacts is uncertain, such uncertainty should not be used as a reason for postponing management.

2. EFFECTIVENESS AND NON-TARGET IMPACTS OF AVAILABLE CONTROL METHODS

If eradication is intended, the control methods must be able to target all above-ground individuals in the population, remove individuals faster than the rate of increase, and detect and remove individuals at very low densities (see Appendix 2).

The eradication or containment objective must also be technically possible—see Appendix 2 for the criteria and requirements.

The relative costs and benefits of control methods used in weed-led control programmes must be evaluated. Some non-target impacts from an eradication programme may be tolerated if they are fully evaluated and judged to be outweighed by the long-term conservation benefits from the eradication.

3. THE DISTRIBUTION OF THE SPECIES

The species' distribution affects whether there is a limited invasion front and/or few vehicles for invasion, and hence whether reinvasion is manageable and the size of the infestation is controllable. If eradication is intended, the probability of reinvasion from outside sources should be nil or very low.

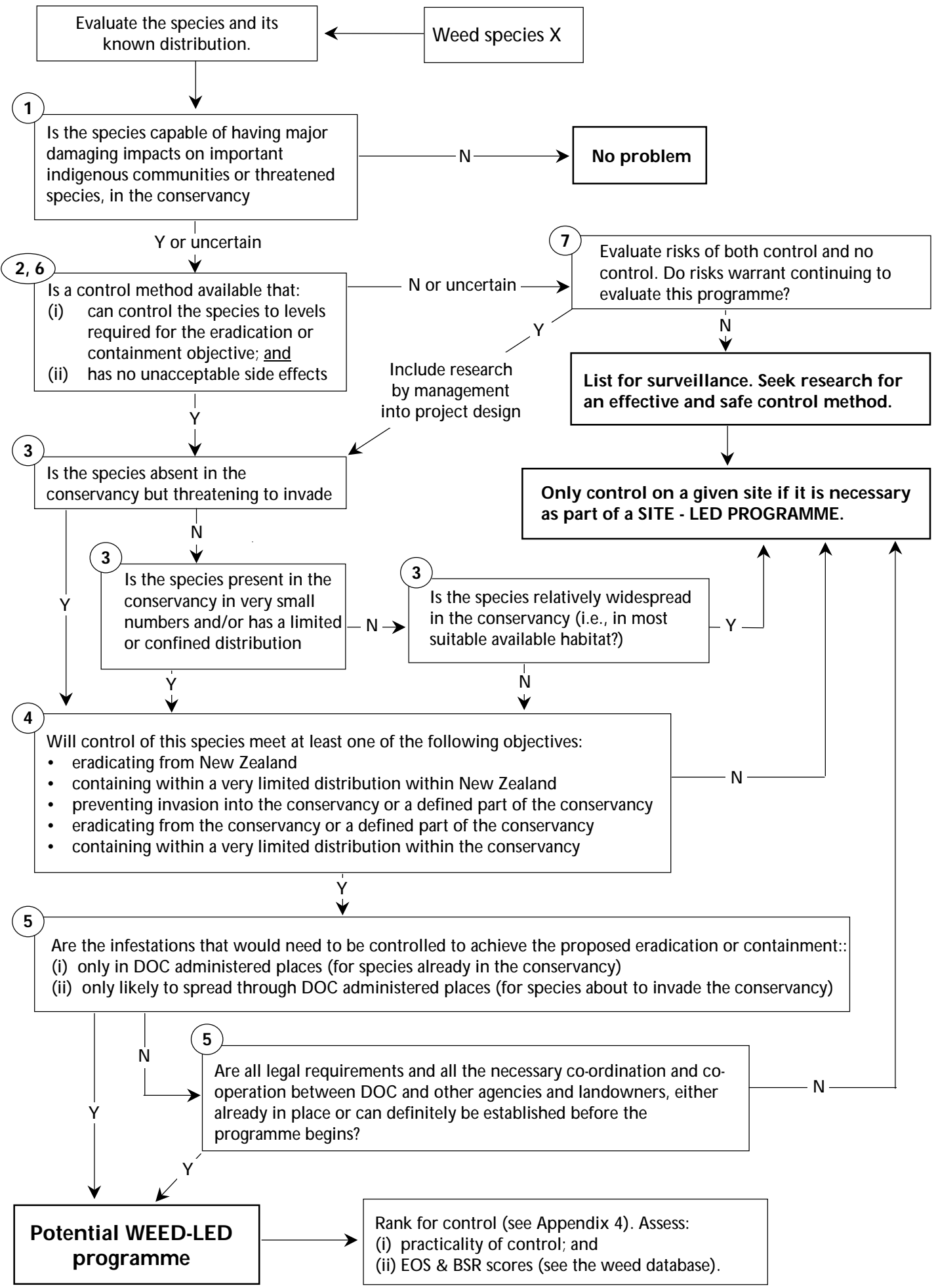
Generally, a terrestrial invasive weed species that is widespread in a conservancy would only be controlled as part of a site-led programme, not a weed-led one. This is because the more widespread a species is, the more difficult control becomes, as:

- there are more potential sources of propagules;
- co-ordinated actions would be required from a greater number of landowners or agencies;
- there is a greater need for weed hygiene controls;
- more intensive and extensive effort—and hence resources—would be required.

However, weed-led programmes may be possible at a smaller scale than a whole conservancy, even though a species may be comparatively widespread in the conservancy. These “sub-conservancy” weed-led programmes will generally only be possible when there are physical barriers to dispersal, such as in freshwater systems. For example, freshwater aquatic invasive weeds will tend to be confined to the catchments of the freshwater system they are in unless there are significant dispersal vectors (e.g., waterfowl for some seed-setting aquatic species; and accidental spread by boat trailers and float planes). An appropriate boundary for a weed-led programme for a freshwater aquatic species could therefore be a catchment of the freshwater system.

4. WHAT OBJECTIVE THE CONTROL PROGRAMME WILL ACHIEVE

The effort required for weed-led control should be justifiable in terms of the level of benefit the programme produces.



⑤ -- See Appendix 3 for details of these and other criteria for determining a

5. WHETHER ALL LEGAL REQUIREMENTS AND NECESSARY CO-ORDINATION CAN BE GAINED

To be successful, a potential weed-led programme must have all necessary legal requirements (e.g., resource consents), and co-ordination between the Department, Regional Councils, and all other relevant landowners and management agencies (e.g., MFish, MAF) before it begins.

This is because DOC's ability to carry out successful weed-led programmes (either control or surveillance) by itself is limited (see sections 2, 5.2.1) if:

- Sites potential is important to the programme are not administered by DOC (new populations of invasive weeds are likely to arise on any land type, or in any waters, irrespective of its quality or who owns or manages it).
- Other activities are required which (in the absence of a NPMS or RPMS conferring such powers) DOC cannot institute under its own Acts, such as inspection, prohibiting the sale and distribution of invasive weeds, or weed hygiene measures .

Sometimes DOC can negotiate directly with other landowners or managers, and this may be sufficient for DOC to successfully eradicate or contain a species. However, other potential weed-led programmes will require more formally co-ordinated actions (see sections 4.3.2, 5.2.1).

The Conservation Act authorises the Director-General of Conservation to control any introduced species, including plants, causing damage to indigenous species or habitat.⁴⁰ Therefore, DOC can manage invasive weeds not only on areas that it administers, but also on land, freshwater or marine areas it does not administer—provided it has the owner's or manager's permission and meets any legal requirements such as resource consents.

6. INDIVIDUALS MUST BE DETECTABLE AND IDENTIFIABLE

The weed species must be readily identifiable. Sometimes weeds look very much like native species (e.g., the introduced ladder fern, which may be easily confused with the threatened native thermal area ladder fern in places where both exist).

If eradication, containment, or zero-density sustained control is intended, individuals must be detectable at very low densities, otherwise survivors may re-establish or spread the infestation.

7. EVALUATING RISKS WHEN INFORMATION IS LIMITED

In some situations, particularly for freshwater or marine invasive weeds, some of the criteria 1-6 above will be unknown. In these cases the feasibility of the programme is assessed by evaluating the potential risks (including both the risks of control, and the risks of no control). See Table A2.1 in Appendix 2 for these risk criteria.

⁴⁰ Conservation Act 1987 s 53(3)(g).

Appendix 4

Ranking weed-led programmes

1. STEPS FOR RANKING WEED-LED PROGRAMMES:

1. Justify identifying the species as a potential candidate for weed-led control programme using the criteria in Appendix 3.

Species that do not meet the criteria should only be controlled on sites that are part of a site-led control programme.

2. Score the species for its EoS and BSR values using the scores in the DOC weed database (Owen 1997).

If the species' degree of impact, and growth/spread characteristics in the conservancy differ from the national scores, the EoS and BSR scores in the database can be rescored for the conservancy using the EoS and BSR criteria in the database.

Any new "conservancy specific" EoS and BSR scores should be the scores for the species in the location/community type in the conservancy where it will grow best.

3. Calculate the species "**weediness score**" = (2 x EoS score) + BSR

4. Assign the species to one of the following **priority groups**:

Priority group A =>(2 x EoS score) + BSR = 29-36

Priority group B =>(2 x EoS score) + BSR = 26-28

Priority group C =>(2 x EoS score) + BSR = 21-25

Priority group D =>(2 x EoS score) + BSR = 20 and below

5. Assess the practicality of control for this species using Figure A3. All the following considerations should be assessed relative to the scale of the proposed programme:

- likely ease with which all the necessary cooperation can be gained and maintained with regional councils, other agencies, landowners and the public (e.g., weed hygiene controls, and control on sites on lands not administered by the Department); and
- criteria for evaluating the feasibility of eradication (see Appendix 2), if eradication intended; or
- requirements for containment (see Appendix 2), if containment intended.

The ranking score for a weed-led programme is the species' "**priority group**" *combined with the* "**practicality of control score**".

For example: B8, C6. The highest possible rank is A10.

Species

+

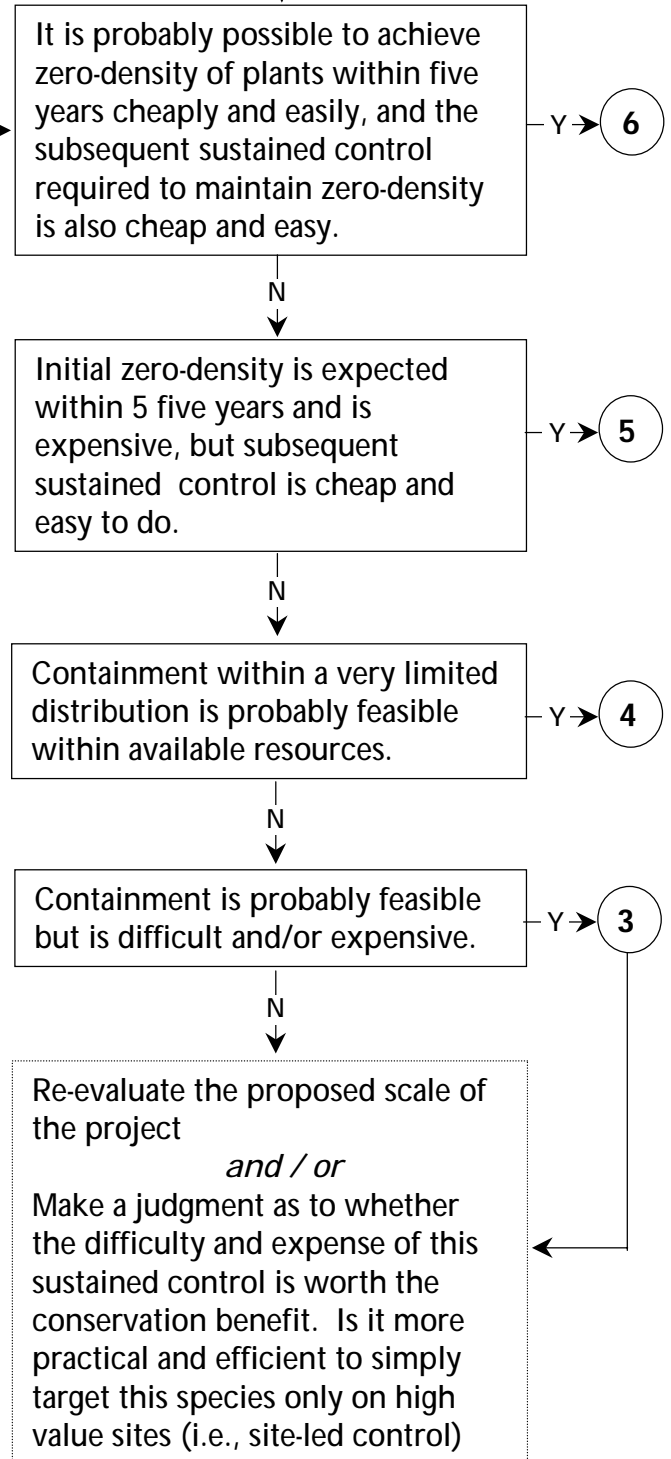
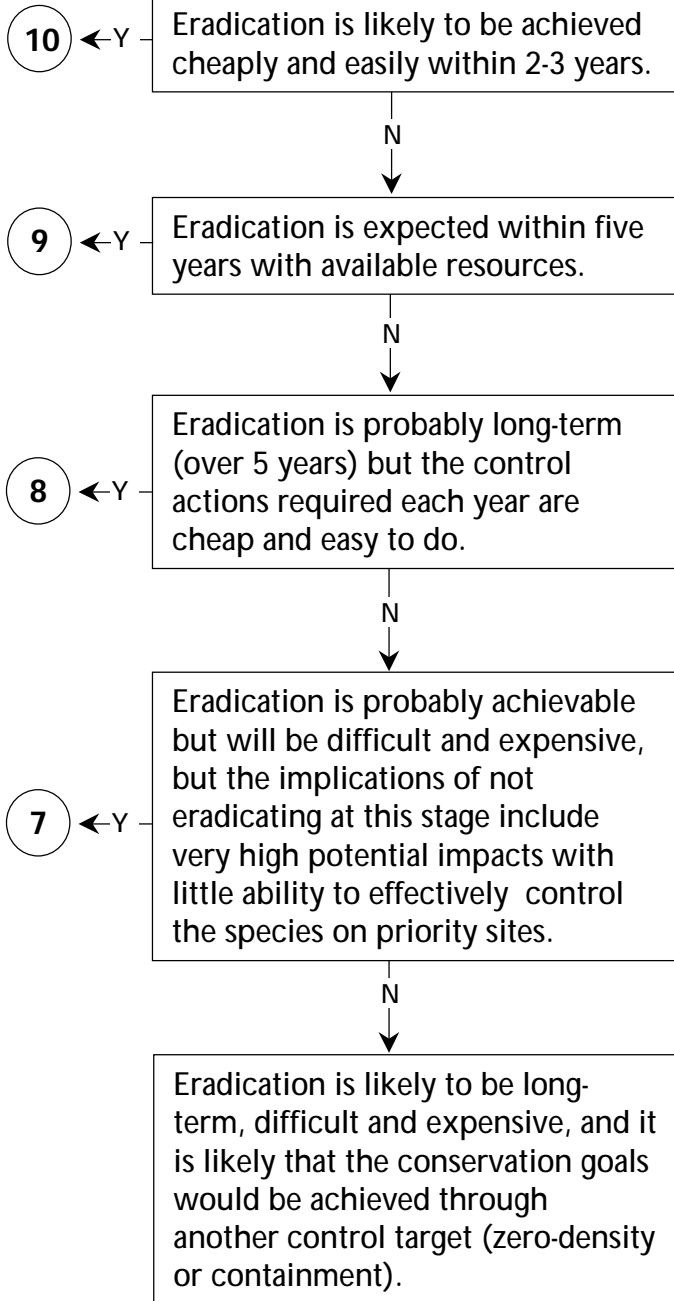
Proposed scale of project

(sub-conservancy, conservancy, multi-conservancy, or national)

Is it possible to *permanently* remove all individuals of the species with no, or a very low probability of, further invasion ?

Y
Eradication

N
Containment



6 = practicality score

Appendix 5

Ranking site-led programmes

The ranking score for a site-led programme is the ranking score of the management unit that is the focus of the programme. Sites outside the management unit that are seed sources, buffers etc. are not scored—they are instead “carried” by the ranking score of the management unit.

1. STEPS IN RANKING SITE-LED PROGRAMMES

1. Identify the core management unit for the programme. Figure A5.1 shows the relationship between this management unit, the components of a site-led programme, and ranking scores.
2. Score the core priority management unit for its botanical values and wildlife values using the six-point scoring system in this appendix.
3. Identify the “biodiversity value score”: this is the higher of the “botanical value” or “wildlife value” scores.
4. Identify the suite of significant invasive weeds that threaten the important natural values of that management unit.
5. Determine the overall urgency of controlling the weeds (in the management unit or in buffers or nearby seed sources) that are, or have the potential to affect the values of the management unit. Use the “Criteria for assessing the urgency of control” in section 2.3 of this appendix. Where specific information is not available as to the exact impacts and rate of change, the “weediness” scores of the individual species will help to indicate the overall urgency.

The “Total ranking score” (for the core priority management unit) =

(Biodiversity value score) × (Urgency of control score)

The maximum total ranking score = 21

1.1 Selecting species and prioritising the order of control within a site-led programme

Species within a site-led programme will be selected and prioritised for control using the following criteria:

1. the species’ potential to establish, spread and affect the values of the management unit (its “weediness”). This will be determined by EoS and BSR scores from the DOC weed database (Owen 1997), modified by evaluating local conditions if necessary;
2. the practicality of controlling the species; and

3. the potential for a weed species to create or exacerbate other weed problems (for example, by consolidating mobile sand, marran grass improves conditions for woody weeds such as gorse and lupins to invade).

Systems for evaluating these factors will be addressed in the Department's weed training programmes (see section 4.3.4) and weed QCM system (see section 4.3.5).

2. THE SIX-POINT SCORING SYSTEM FOR RANKING MANAGEMENT UNITS

2.1 Botanical value scoring criteria

The following criteria based on Shaw (1994) are arranged in a six level scale ranging from the highest score for "nationally important" (6) to the lowest score for "potential" (1).

Score 6: Nationally Important

- (a) Contains a nationally threatened vegetation type, or plant species, which is endemic to the ecological district.
- (b) The best representative site in the country of a nationally uncommon vegetation type.

Score 5: Exceptional

- (a) Contains good examples of nationally uncommon vegetation types, successional sequences or mosaics.
- (b) Contains vegetation types of great conservation value. For example, vegetation largely unmodified by introduced plants, browsing animals or other human influences.
- (c) Sites where a vegetation type, or more than one plant species, reaches a geographic limit.
- (d) Contains threatened plants (in the endangered or vulnerable category) which are not endemic to the ecological district.
- (e) Contains a vegetation type which is endemic to the ecological district.
- (f) Contains communities which are (to a significant degree) representative of the natural character of the ecological district.

Score 4: Very High

- (a) The last, or one of a few remaining examples, of a vegetation type once more widespread in the ecological district. The example must retain most of its natural character.
- (b) Contains regionally uncommon vegetation types in good condition and forming part of a larger tract of native vegetation, for example, subalpine and alpine areas surrounded by a large tract of forest.
- (c) An example of the vegetation of an ecological district that forms a continuous ecological or altitudinal sequence across a district, and that is not better represented elsewhere in the ecological district.
- (d) The last, or one of the few remaining examples, of secondary succession that has developed following disturbance to the vegetation in pre-European or early European times.

- = Decision steps
- = Scoring step
- ▭ (dashed) = Site-led programme and its components

Identify the management unit that is the focus of this project. This must be a place that is both ecologically connected, and of a manageable size relative to the type of weed problem.

Is weed control being done within this place specifically to protect the place's natural values

Assess the biodiversity values of the Management Unit/Reserve (use 6-point scoring system)

Are these values (1) sufficiently high to warrant protection from the impact of ecological weeds; and (2) vulnerable to the impacts of existing or potentially invading ecological weeds

Either the control is not for invasive weeds; or the place is not a management unit but rather a seed source or buffer for another site-led programme. If the latter, determine the relationship of this area to management units in other site-led programmes.

Site-led surveillance programme:
Possible longer-term site-led surveillance programme; or quarantine systems (e.g. for islands).

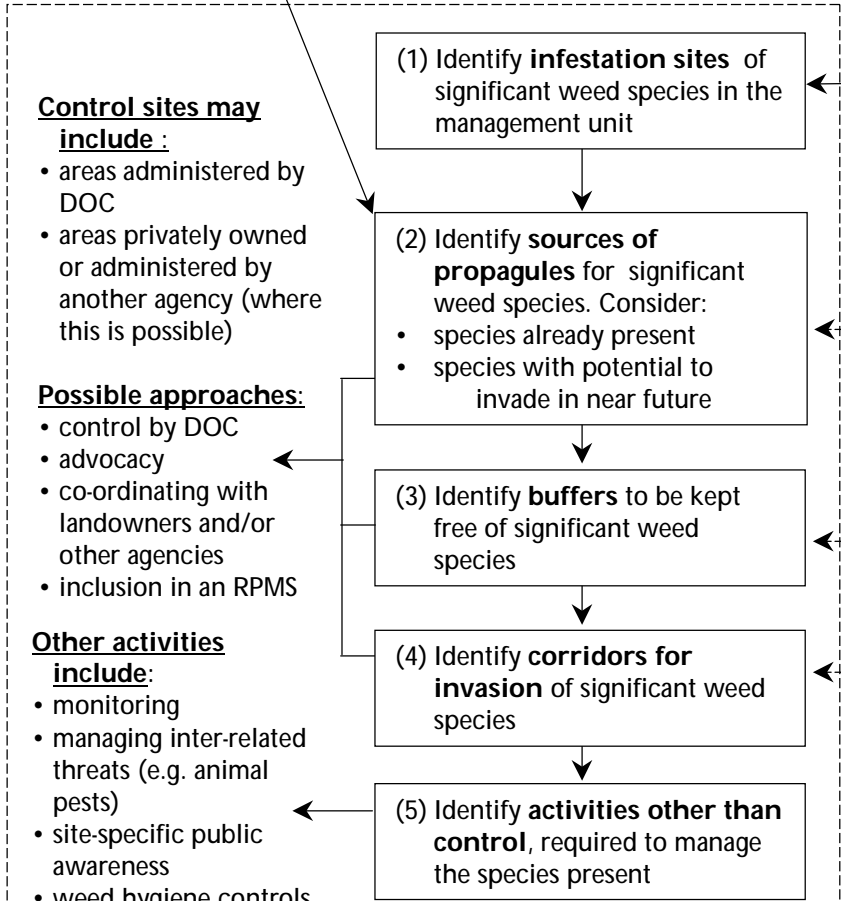
Are there ecological weed species that are likely to invade this MU in the very near future and affect the high values of this area

Is the management unit currently weed free

Are weed species present that are already having, or could potentially have, a significant impact on the values of the management unit

Determine the suite of significant weed species

Determine the Urgency for control score (see Appendix 5)



(1) Identify **infestation sites** of significant weed species in the management unit

(2) Identify **sources of propagules** for significant weed species. Consider:

- species already present
- species with potential to invade in near future

(3) Identify **buffers** to be kept free of significant weed species

(4) Identify **corridors for invasion** of significant weed species

(5) Identify **activities other than control**, required to manage the species present

Include (as appropriate) in the site-led programme for the relevant management unit

Is site a source of propagules for significant weed species?

Is site part of a potential buffer?

Is site a corridor for invasion of significant weed species

NO CONTROL

- (e) Good quality examples, or the only example, of a secondary succession that has developed following a large disturbance such as mass ground movement, storm damage or fire.
- (f) Nationally uncommon ecosystems or vegetation types which have been degraded by, for example, fragmentation, weeds, burning, browsing animals.
- (g) Large (over 300 ha) example of secondary vegetation where there is relatively little (e.g., less than 5%) of an ecological district remaining in native vegetation.

Score 3: High

- (a) Good quality, moderately large (300-1000 ha) example of native vegetation typical of an ecological district where there are other better quality or larger (over 1000 ha) examples present in the ecological district.
- (b) The last, or one of the few remaining examples of a vegetation type within an ecological district which, although in a modified condition, still retains the main elements of composition and structure.
- (c) An example of the native vegetation of an ecological district that now forms part of a culturally interrupted ecological and/or altitudinal sequence.
- (d) Areas where individual species or vegetation types reach the limits of their geographical distribution.
- (e) Regionally uncommon vegetation types, either intact or relatively unmodified, but completely or largely surrounded by a highly modified landscape, for example, small urban reserves.
- (f) Contains a rare species or two or more threatened species in "local" category.
- (g) Nationally uncommon ecosystems or vegetation types, with a conspicuous element of exotic plant species that will eventually be replaced by native plant species.
- (h) Early successional vegetation not presently representative of the natural cover of the ecological district but with the potential to develop so, and where there are very few or very small remaining other examples of natural vegetation in the ecological district.

Score 2: Moderate

- (a) Substantially modified native vegetation types that retain their main elements of composition and structure (for example selectively logged, lightly burnt, grazed, weeds present), but are better represented at other sites in the ecological district.
- (b) Small example of native vegetation type where there are larger or better examples elsewhere in the ecological district.

Score 1: Potential

- (a) Mosaic(s) of native and exotic vegetation where the former are small and of no particular interest.
- (b) Small areas of exotic vegetation surrounded by large areas of native vegetation.
- (c) Early successional vegetation where there are better examples in the ecological district.
- (d) Early successional vegetation dominated by exotic plants.
- (e) Contains native vegetation but essentially recently human-made.

2.2 Wildlife value scoring criteria

The following criteria based on Elliot and Ogle (1985) are arranged in a six level scale ranging from the highest score for “nationally important” (6) to the lowest score for “potential” (1) value as habitat for native animals.

Score 6: Nationally Important

Contains animal species endemic to, or best represented in, this ecological district.

Score 5: Exceptional

- (a) An endangered, rare, or restricted endemic species breeds in the unit.
- (b) The management unit is essential to endangered, rare or restricted species for purposes other than breeding.
- (c) The management unit is vital to internationally uncommon species (breeding and/or migratory).
- (d) The management unit is vital to internally migratory species with very limited distribution or abundance.
- (e) Largely unmodified ecosystems or examples of original habitat not represented elsewhere; of large size and containing viable populations of all or most animal species typical of such ecosystems.

Score 4: Very High

- (a) Site containing a native animal species which has declined significantly as a result of human influence.
- (b) One of a few, or the only breeding area, for a non-endemic native species of limited abundance.
- (c) Habitat of an uncommon, discontinuously distributed species not adequately represented in a particular ecological district.
- (d) Example of a largely unmodified site which is not represented to the same extent elsewhere in the ecological district and is used by most native animal species which are typical of that habitat in that ecological district.
- (e) Supports a species of an endemic family which is of limited abundance nationally although adequately represented in one ecological district but whose habitat is at risk.

Score 3: High

- (a) Supports a species which is still widely distributed but whose habitat has been reduced.
- (b) Contains large numbers of breeding or moulting birds or where breeding or moulting areas are of inter-regional significance.
- (c) Large and fairly unmodified site which is represented elsewhere in the ecological district and contains all or most native animal species typical of that habitat for that ecological district.
- (d) Contains a widespread native animal species which is noteworthy at this site for its abundance or behaviour.

Score 2: Moderate

Not heavily modified and supports good numbers of native animal species typical of the habitat in the ecological district.

Score 1: Potential Value

Small, heavily modified site that could be more valuable to native animals if left to regenerate, or managed and developed for their benefit.

2.3 Criteria for assessing the urgency of control

Where specific information is not available as to the exact impacts and rate of change being caused by the weed species present on the site, the “weediness” scores of the individual species (i.e., $(2 \times \text{EoS}) + \text{BSR}$) will help to give an indication of the overall urgency (the higher the average weediness scores, the greater the overall impact will probably be on the site).

Score 3.5

The plant community or some plant or animal species within it is known, or is very likely to be, at risk of national extinction because of the impacts of invasive weeds.

Score 3.0

The plant community or some plant or animal species within it is known, or is very likely to be, at risk of local extinction because of the impacts of invasive weeds.

Score 2.5

The important conservation values that give the management unit its biodiversity score are at risk of major damage in the near future, but the management unit is so far unaffected or little affected by invasive weeds (e.g., an undegraded high value tussockland at risk of invasion by *Pinus contorta*).

Score 2.0

Significant changes to the important conservation values that give the management unit its biodiversity score are known or are very likely to have already occurred due to the invasive weed species present, with further damage to these values expected.

Score 1.5

The current suite of invasive weed species in the management unit are unlikely to affect the important conservation values that give the management unit its biodiversity score, but are likely to affect, or be affecting, other important values within the unit.

Score 1.0

The important conservation values that give the management unit its biodiversity score are likely to remain intact with the current suite of invasive weed species in the unit.

1

2 HSNO Act s 38, 45

3 HSNO Act s 42, 45

4 HSNO Act s 45 (2)

5 HSNO Act s 53

6 HSNO Act s 58

7 Biosecurity Act s.22 (6–8).

8 Biosecurity Act s 22(6), (8)

9 Conservation Act 1987 s6(a).

10 Conservation Act 1987 s 53(3)(g)

11 National Parks Act 1980 s4(1)

12 National Parks Act 1980 s4 2)(a)

13 National Parks Act 1980 s 4 (2)(b)

14 Policy 9.3

15 Reserves Act, Part I, s 3(1)(b)

16 Reserves Act s51 and 51A

17 National Parks Act s 4(2) and 5A

18 National Parks Act s4 ss(2)(b). Reserves Act 1977 part III s19 ss 2(a) for Scenic Reserves; s20 ss 2(b)

Nature Reserves; s21 ss 2(a) Scientific Reserves.

19 Reserves Act s94 ss(1)(d); National Parks Act s60 ss(1)(c)

20 Wildlife Act 1953 s 9 (2)(b)

21 Wildlife Act 1953 s 9 (2)(o)

22 Marine Reserves Act 1971 section 3 (2)(a)-(c).

23 A conservation covenant can be established under the Conservation Act s 27, or the Reserves Act s 77. It can be established between the landowner and the Minister of Conservation, a Local Authority, or a body authorised by the Minister of Conservation.

24 QEII covenants are established between the landowner and the QEII National Trust under the Queen Elizabeth II National Trust Act 1977, s 22.

25 Protected private land declarations can be established under the Reserves Act s 76.

26 Conservation Act 1987 s 53(3)(g)

27 Under the Conservation Act s 29, and the Reserves Act s 38. Specifically, under the Conservation Act s 29, the Department may enter into any agreement, contract or arrangement of any kind, to carry out the conservation of any natural or historic resource on or in any land owned or under the control of the another private person or another agency.

28 Conservation Act 1987 s 6 (a,b) and (b).

29 Resource Management Act 1991 s 13 (1)(c)

30 Conservation Act 1987 s 26 ZM (3)(a)

31 Resource Management Act s2

32 Foreshore and Seabed Endowment Revesting Act 1991, sections s 9A (1), and 9A ss(3)(b).

33 Marine Reserves Act 1971 section 19 (1)(a)

34 Resource Management Act 1991 s6(a)

35 Resource Management Act 1991, s12(1)(f).

36 New Zealand Coastal Policy Statement, Schedule 1, S1.8

37 Resource Management Act s 117-119

38 Fisheries Act 1996, sections 89(2)(d) and 97(a)(iii).

39 Convention on Biological Diversity, Article 8(h).

40 Conservation Act 1987 s 53(3)(g)