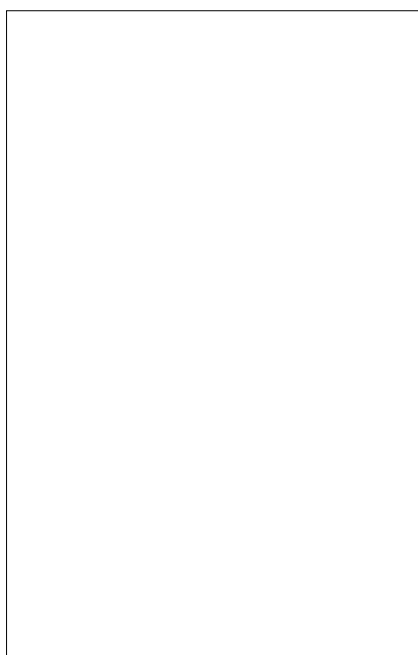


# 1. Introduction

There is increasing concern about the threats to New Zealand's natural heritage from imported plant species which have spread in the wild and are displacing native species. The number of naturalised exotic plant species continues to increase. Over time, a proportion of these naturalised species will become a threat to native species and to natural communities. They will then be recognised as invasive weeds. In 1999 there were 24 539 plant species recorded as introduced to New Zealand. Of these, 2109 (c. 10%) had been recorded in the wild, i.e. become naturalised (Landcare Research 1999). Some introduced species may be present in the country for decades before being recorded in the wild, so even if there are no further plant species brought into the country, the number of species recorded in the wild will continue to climb. In 1997 the Department of Conservation recognised 240 actual and potential weed species (Owen 1997). This list will grow as additional species demonstrate their invasive potential, and the invasive weed species already present continue to spread and to colonise new parts of New Zealand (Buddenhagen et al. 1998).

A surveillance system for weeds has been developed within the Department of Conservation (DOC). The system will prompt the timely and accurate identification of new populations of invasive weeds. The need for this system was identified in the Department's strategic weed plan (Owen 1998). This surveillance system facilitates early detection of invasive weeds. It is hoped that it will improve the efficacy of the Department's weed control programmes. A co-ordinated plan for early detection of weeds should reduce control costs and minimise the impacts of invasive weeds on conservation values. The surveillance system is only concerned with invasive weeds that are new to an area or of limited distribution. By finding a weed incursion early, the probability of achieving effective control is maximised. The alternative to surveillance is to wait until the infestation is found by chance, perhaps once it has spread widely and is clearly a problem. This document, the Weed Surveillance Plan, is an introduction to the surveillance system.



Cathedral bells, *Cobaea scandens*, a garden plant with a pretty flower which invades forest remnants and smothers canopy trees.  
*Photo: Colin Ogle.*

## 1.1 DEFINITION OF SURVEILLANCE

Weed surveillance is the searching for, and documenting of, new incursions of weeds of conservation concern (i.e. invasive weeds).

## 1.2 DEFINITION OF INVASIVE WEEDS

Invasive weeds are plant species that can significantly and adversely affect the long-term survival of native species, the integrity or sustainability of natural communities, or genetic variation within indigenous species. This definition is the one used in the DOC strategic weed plan (Owen 1998).

### 1.3 OTHER TERMS

The term 'Area' (with a capital 'A') is used to mean the area administered by a DOC Area Office, including land of all tenure.

The term 'area' (lower case) refers to any geographic space.

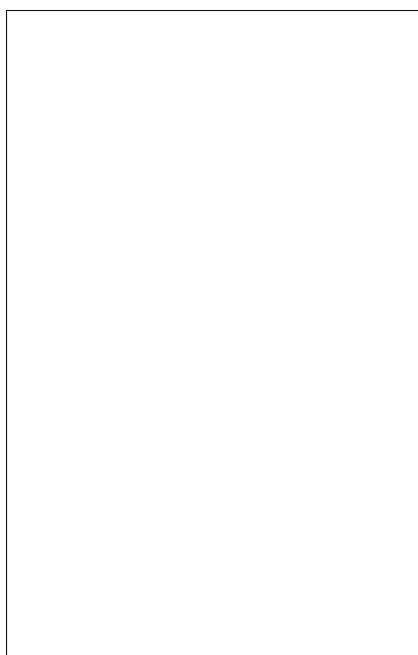
The term 'Weed Tech' is used to mean the Technical Support Officer in a DOC conservancy who deals with weed issues.

The term 'Area weed person' refers to the person in a DOC Area Office who is responsible for weed issues, often designated the 'Weed Programme Manager'.

The terms 'weed-led' and 'site-led' refer to types of weed control programmes and are described in detail in the DOC strategic weed plan (Owen 1998).

- A weed-led programme is a weed control programme designed to minimise the future impacts of an invasive weed species before it becomes a major problem.
- A site-led programme is a programme to protect the natural values of a priority conservation area from the impacts of invasive weed species.

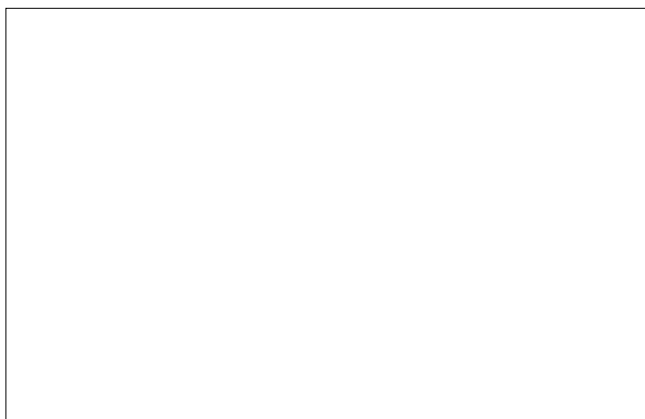
### 1.4 WHAT IS COVERED IN THIS PLAN



The weed surveillance system applies across all terrestrial, freshwater and marine ecosystems. It covers **plant species** of known or potential conservation concern. It also covers **sites** where a weed incursion would be of conservation concern, either because of the value of the site or the characteristics of the weed species. The sites may be terrestrial, freshwater, wetland, coastal or marine. They may be on mainland sites or islands (inshore and remote).

The surveillance system encompasses the process from detection through to taking appropriate action. The advantage of early detection is maximised if action is taken promptly.

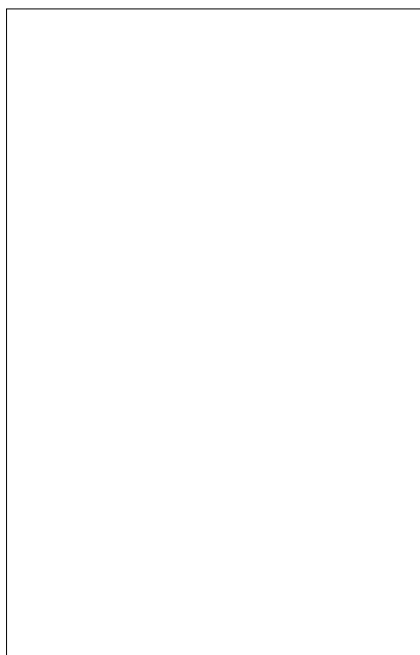
A Standard Operating Procedure (SOP) has been produced and is linked to this weed surveillance plan. The SOP details the processes that are identified in this plan.



White briony, *Bryonia cretica* ssp. *dioica*, was recently discovered in Makino Reserve on the Rangitikei River. Its bird-dispersed fruit make it hard to find all the plants and its massive tubers make it hard to control. By acting quickly we have a chance of eradicating the species from New Zealand.  
*Photo: Colin Ogle.*

Yellow ginger, *Hedychium flavescens*, perhaps originating from a planting on a grave, has swamped this graveyard at Whangaroa, Northland.  
*Photo: Susan Timmins.*

## 1.5 WHAT IS NOT COVERED IN THIS PLAN

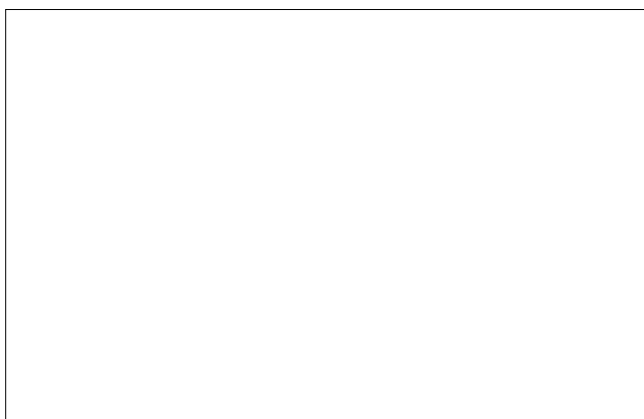


(a) DOC has a role in border control, i.e. minimising the risk of new potentially invasive plant species being introduced into the country. Such border control action is, however, outside the scope of this weed surveillance plan. The one exception is surveillance of offshore islands; occasionally an island may be the first point of arrival for seagoing vessels.

(b) The scope of the surveillance plan does not include weed species that are known to be widespread in the area to be checked. These species are covered, when appropriate, by a control programme. Examples of such control programmes include site-led programmes, and programmes required under a regional pest management strategy (RPMS).

(c) The surveillance plan does not address monitoring the spread of weed infestations which have previously been assessed as not warranting a weed-led or site-led control programme. In some situations it will be necessary to track these infestations.

Mexican daisy, *Erigeron karvinskianus*, in a home garden—unfortunately it does not stay at home.  
*Photo: Susan Timmins.*



Many species, known to be weeds in protected natural areas, were on sale either as plants or seeds at this open-air Saturday market.

*Photo: Susan Timmins.*

## 2. The role of weed surveillance

### 2.1 CURRENT WEED SURVEILLANCE ACTIVITIES

Most DOC weed staff around the country do not have any time allocated specifically for searching out new weed incursions. Some surveillance, however, does occur. One example is the checking of sites that have been free

from invasive aquatic weeds, to ensure that plants have not been transferred in from elsewhere. Whilst there is very little formal surveillance activity, there is some informal surveillance activity. For example, a goat hunter working in a remote area in the Kaitake range, Egmont National Park, found Chilean rhubarb, *Gunnera tinctoria*, and reported it to the local DOC Area Office; the infestation is now being controlled.

Outside DOC there is limited surveillance for new invasive weeds. Some regional councils do carry out surveillance of pest plants (as defined in this plan), but the majority of their activities concentrate on the widespread pest plants already identified in their individual strategies. Most regional councils use the term 'surveillance' in a different way. Weed species on their surveillance lists are banned from sale or propagation but there is no obligation to clear any infestations that are found. Work on invasive weeds that threaten natural communities is increasing. However, most regional councils still have a predominantly agricultural focus.

Chilean rhubarb is favoured by landscape gardeners, but it is invading natural areas such as here in Timaru Stream, Egmont National Park.

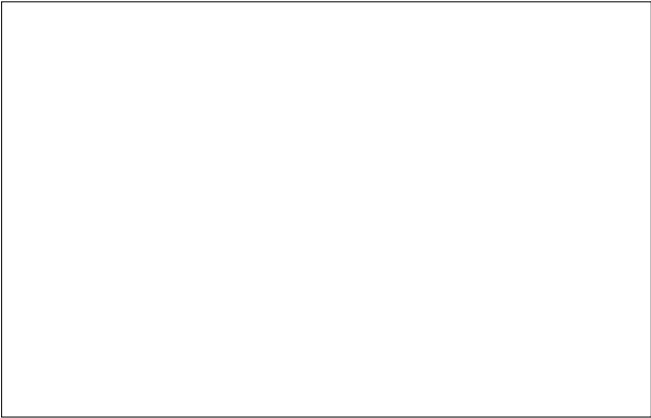
*Photo: Susan Timmins.*

### 2.2 HOW SURVEILLANCE CAN HELP

Surveillance will help detect new invasive weed incursions before they have a chance to establish widely. The benefit of surveillance is best demonstrated by considering the effects of not carrying out surveillance. If there is no surveillance activity, by the time it is obvious that a species is a problem, the infestation may be prohibitively expensive to control. It is also likely that conservation values may already be degraded by the weed. In addition, large-scale control work on a site will probably damage native species.

Examples of weeds that would have been easy to control when they were first noticed include:

- Heather, *Calluna vulgaris*, which was present in only a small area of Tongariro National Park in 1918. The



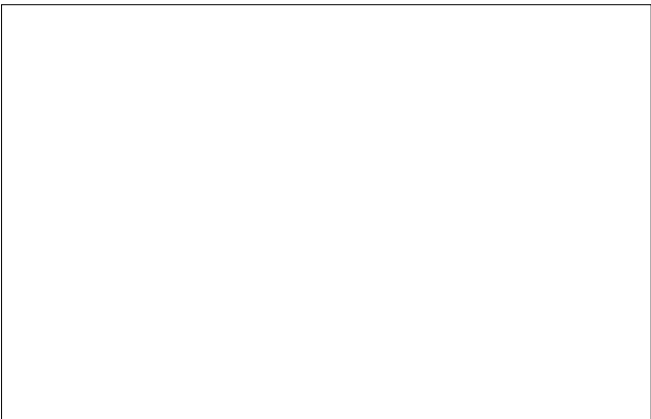
area affected had increased more than tenfold by the 1960s. In 1990, the area occupied by heather had increased to more than six times the 1960s level and the infestations were much more widely dispersed (from data in

Heather (pink flowers) is well established in native tussock shrub land in Tongariro National Park.  
*Photo: Susan Timmins.*

Hunt 1992). Already heather has irreversibly changed the composition of a large area of the park. Unless a recently-introduced bio-control agent is very successful, the only feasible control option will be to slow the spread of heather.

- Evergreen buckthorn, *Rhamnus alaternus*, which would have been easy to control on Rangitoto Island 15 years ago, cannot now be eradicated.

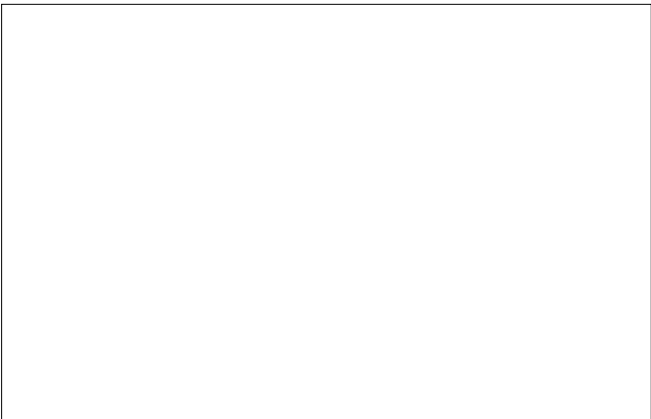
Once a weed species has established as a weed in one part of New Zealand, all is not lost elsewhere in the country. Surveillance can help stop the species establishing in new regions. Examples of this include:



Russell lupin may have colourful flowers, but it is a pest in South Island braided rivers, such as here in the Rakaia River, as it changes the habitat of threatened species such as the wrybill plover and black stilt.  
*Photo: Susan Timmins.*

- Russell lupin, *Lupinus polyphyllus*, which is a serious problem along river systems in Canterbury. A sharp look-out is kept, so any plants establishing on the West Coast side of the main divide are quickly removed.
- Wild thyme, *Thymus vulgaris*, which is wide-spread in Central Otago and in the McKenzie Basin, south Canterbury. The potential of thyme to become a problem is recognised in Canterbury, and any wild thyme found on land administered by DOC will be removed.

Wild thyme and rabbit burrows near lower Manorburn Dam, Alexandra.  
*Photo: Colin Ogle.*



## 3. Types of surveillance

Surveillance action may focus on particular species or particular places. The surveillance effort may be an active search of a site, but it is also possible to follow-up fortuitous sightings or make use of existing information.

### 3.1 SURVEILLANCE FOR SPECIES

What species are targeted by this surveillance? An invasive species may be newly established in a nearby area, a problem in another part of the country, or new to the country. Some new incursions will be species that have been in

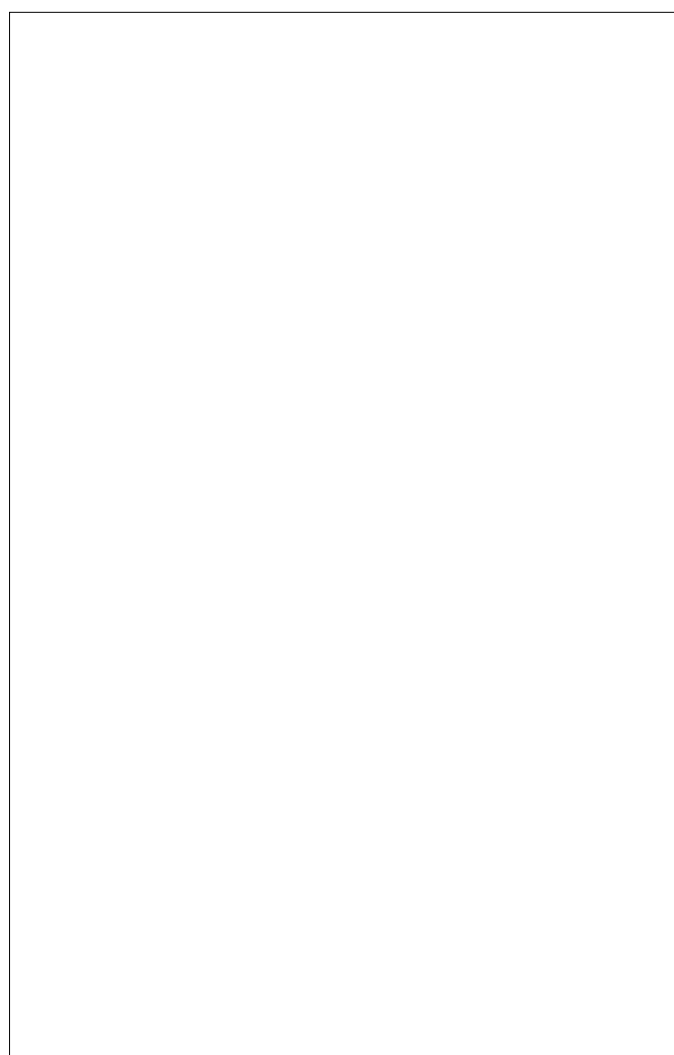
cultivation in New Zealand gardens and have recently escaped into the wild. Other species may have been naturalised in the wild for some time but may have only just begun to be of conservation concern. Occasionally surveillance may detect species that are not recorded as having been introduced to New Zealand.

Surveillance is only concerned with invasive weeds species that have not previously been recorded as naturalised in an area, or are of very limited distribution. Three scales of area are recognised:

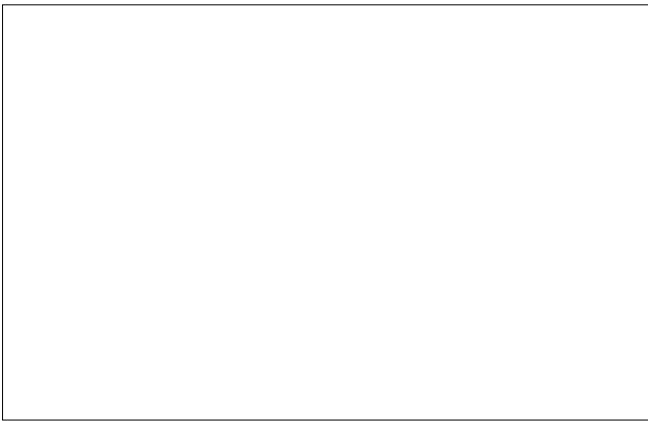
- The whole area administered by a DOC Area Office (regardless of land tenure).
- A smaller portion of an Area where there is a barrier to invasion, e.g. where a valley is separated from neighbouring valleys by steep hills.
- A site of high conservation value (regardless of who manages the site).

If we know which species we are looking for it becomes easier to search for them. It is easy to identify and list some of the likely invasive weeds. Species which are known to be a problem in places where the conditions are similar, are prime candidates for inclusion on a search list, for example:

- Cathedral bells, *Cobaea scandens*, is a common weed in the Kapiti and Poneke Areas, but is only known to be present at one site in the Wairarapa Area (the third Area in the Wellington Conservancy). Further sightings of cathedral bells in the Wairarapa Area would be of serious concern.



A French poster alerting people to the dangers of *Caulerpa taxifolia* and encouraging them to report any sightings.  
*Photo: Wendy Nelson.*



Lagarosiphon—an underwater invader.  
Photo: John Clayton.

• Lagarosiphon, *Lagarosiphon major*, is an invasive aquatic weed which is difficult to control once it starts to spread. Lagarosiphon can be brought into a lake or river system on boats or fishing gear, so in water systems under threat regular surveys are needed. To illustrate, a sizable infestation of lagarosiphon was discovered in Rosie Bay (Lake Waikaremoana); none had been found when the Bay was checked just two years previously.

However, not all new weeds will be on a list of likely invasive weeds. It is important to be watchful for previously unidentified intruders. Any plant which is new to a site, or which looks out of place, should be checked. If the species cannot be readily identified, the plant should not be removed until a positive identification can be made. It would be very distressing if a threatened native plant was inadvertently damaged.

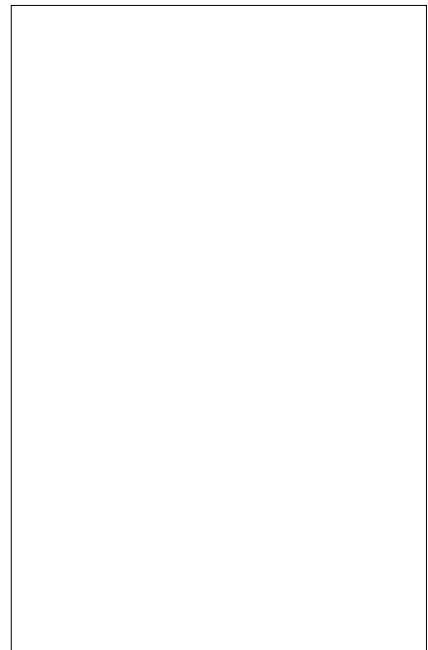
### 3.2 SURVEILLANCE OF PLACES

There are two types of places that need particular attention. Weeds are more likely to occur in places that are vulnerable to weed invasion (vulnerable places). At these sites early control of a new weed species will prevent it spreading. It is also very important that new weed invasions are found as soon as possible in sites with high conservation value (valuable places).

#### 3.2.1 Vulnerable places

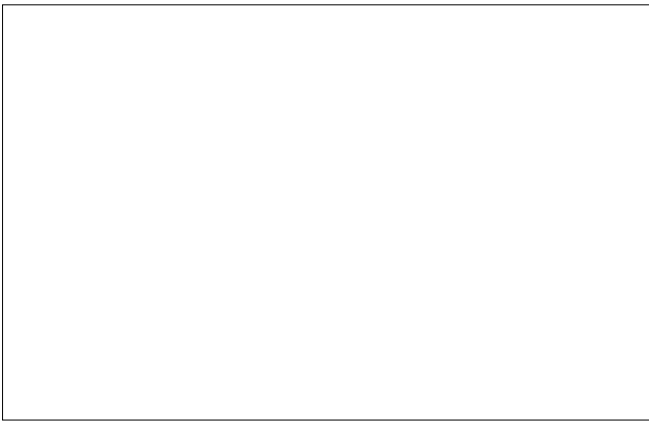
The first place that a new weed species colonises may have little conservation value. However, if a new weed species establishes and builds up, it may be very difficult and expensive to prevent it spreading more widely, so it would be beneficial to remove a completely new weed before it becomes well established and threatens conservation areas. Examples of places which are vulnerable to weed incursions include:

- Alongside roads and railways.
- Rubbish dumps.
- Places with low or disturbed vegetation.
- In or near water—lakes, rivers, coastal areas.
- Places modified by human activity.
- On the edges of reserves, close to settlements.



The white flower heads of pampas, *Cortaderia selloana*, mark the line of disturbed ground created by putting in the Kapuni gas line at Whitecliffs, New Plymouth.

Photo: Susan Timmins.



Garden rubbish is dumped on the sand dunes at Patea, near Wanganui, in a bid to achieve erosion control; but more than 162 plant species have naturalised, some of them known weeds. These include agapanthus, *Agapanthus orientalis*; bamboo, *Pseudosasa japonica*; buddleia, *Buddleja davidii*; climbing dock, *Rumex sagittatus*; crack willow, *Salix fragilis*; kikuyu grass, *Pennisetum clandestinum*; palm grass, *Setaria palmifolia*; tree lupin, *Lupinus arboreus*; tree mallow, *Lavatera arboreus*; and wonga vine, *Pandorea pandorana*.  
 Photo: Susan Timmins.

However, new weeds can pop up in unexpected places, so it is wise to look beyond the most likely places; widespread surveillance is needed.

There is an expectation that new weeds will first occur in the north of the country, because of the warm weather, the high concentration of people, the busy ports and airport, and the area's history of new weed sightings. However, there are several reasons why not all the effort should be concentrated in these areas:

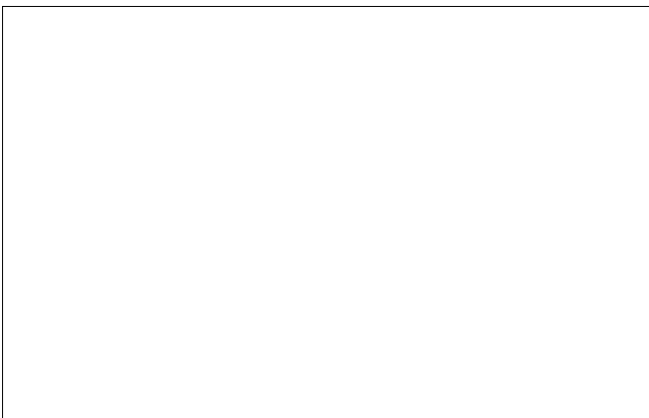
- Of the terrestrial invasive weeds, 74% were deliberately introduced as ornamental plants (Owen 1998), so the weeds of the north may be present, but not yet noticeable in the wild, further south. Eliminating these weed species from the north won't stop their spread, as they are likely to be already present elsewhere, so surveillance throughout the country is needed.
- Of the actual or potential weed species that have naturalised since 1980 (Owen 1997) about three-quarters are seen as a problem in either or both of Auckland and Northland. However, more than half of these species are identified as being of equally serious concern in other conservancies (derived from data in Owen 1997 and Webb et al. 1988).
- It may be that new weed incursions are first identified in the north of the country because there are more weed spotters there, and they have an expectation that new weeds will be found. In the South Island, for example, there are fewer DOC staff and they deal with a wide variety of conservation issues over a huge area. Nevertheless, the inventory process has produced reports of new invasive weed problems in the South Island because people were sent out with specific instructions to look for weeds.

### 3.2.2 Valuable places

It is important to catch new weeds as soon as possible in places of high conservation value, particularly those which are relatively weed-free. To protect the biodiversity values at these sites, new weed invasions must be detected and cleared at an early stage. If weed infestations are not stopped early, then not only will the values of the area be damaged, but also the necessary weed control will be more expensive and may risk doing further damage to the site. Within valuable sites, search effort should focus on the most vulnerable parts; the margins, for example:

- On Rangitoto Island an annual inspection is carried out of the coastal area, looking for new weeds that may establish from seeds brought in from the mainland by the wind or birds.
- At Otanomomo, a 36 ha reserve in Otago, half the new weed species found were in a 0.42 ha area adjacent to the original homestead and two other houses. The gardens back onto the reserve; one household uses it as a dump for garden waste.

Ripe tree privet, *Ligustrum lucidum*, fruit; attractive to birds which will spread the seeds into new and unpredictable localities.  
 Photo: Ewen Cameron.






### 3.3 ACTIVE SURVEILLANCE

Active surveillance is the systematic checking of an area for new incursions of invasive weeds. The places to be checked may be likely invasion corridors for new invasive weeds (vulnerable places) or sites of high conservation value (valuable places). Active surveillance is not limited to conservation land; a new weed can first appear anywhere.

Active surveillance should be carried out where the greatest conservation benefit would accrue from finding a weed early. Effort should be concentrated on places where weeds of conservation concern would otherwise be unlikely to be found. So, the emphasis should be on places that are rarely visited by DOC staff with weeds expertise.

To gain the most benefit within an active surveillance site, effort should be directed to places where there is the greatest likelihood of finding new weeds. This will vary from site to site depending on local conditions. Examples of places where a search may be focussed include areas with low vegetation, disturbed areas and places that are, or have been, subject to human disturbance.

A good example of active surveillance is the surveying of lakes and rivers in Southland for the water weed lagarosiphon. This active surveillance is carried out in conjunction with other complementary initiatives. DOC and the Southland Regional Council are publicising the problems with lagarosiphon and asking boat owners to ensure that they do not introduce waterweeds on boats and trailers.



Lantana, *Lantana camara*, is a garden plant which has become a troublesome weed in many countries. Currently it is a weed of conservation concern in Northland.  
*Photo: Susan Timmins.*

### 3.4 FORTUITOUS WEED SIGHTINGS

The nature of weed invasions means that a wide range of different species could invade across many types of sites. It is not easy to detect a new incursion before it becomes a widespread problem. The terrain and vegetation on a site may make it difficult to spot a new incursion, the new species may not be noticeable at the time of year a site is surveyed, or the species may first establish in a site that is not surveyed. So, it will not be possible to identify all new weed incursions at an early stage by actively searching. Therefore, any help that is available should be used. This help may come from within DOC or it may be from outside.

A variety of people may notice new plants in either their work or leisure time. These range from a DOC weed expert finding a new weed incursion on a site of high conservation value, to a member of the public spotting a plant that looks out of place. Useful informants may include DOC staff (from all work areas), professional botanists, regional council pest plant officers, people with an interest in plants, and members of community groups.

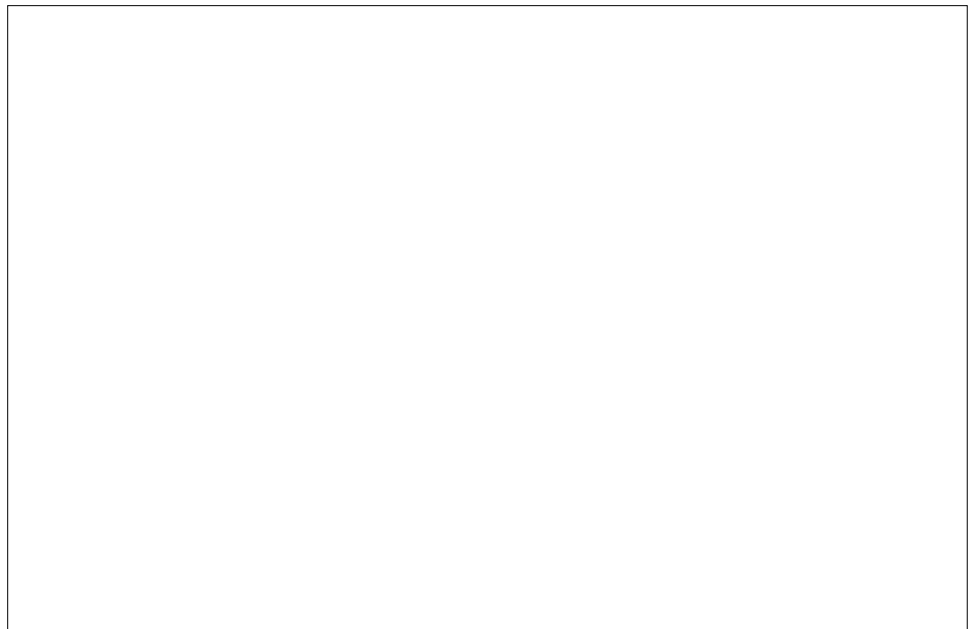
There is a wealth of information available about new weeds, if it can just be gathered and used. In the past, there has been no process for reporting sightings of new weeds. Weeds that are subject to a control regime could be reported to

the local regional council office (or to DOC for infestations on conservation land). However, the plants that are subject to control regimes are usually well-established and widespread, and new weeds have sometimes been left until their effect is apparent, by which time it is often too expensive or difficult to institute control measures.

The number of reports DOC receives can be increased by encouraging such sightings and by publicising weed issues and the need to report new weed incursions.

### 3.5 MAKING USE OF EXISTING INFORMATION

Records of new weed incursions may already exist in, for example, published literature and species lists compiled by botanical society members or by DOC contractors. In Wellington Conservancy several serious weed infestations were identified as a result of setting up a weeds database. This process exposed the need for a weed-led project to eradicate purple loosestrife, *Lythrum salicaria*, from Lake Horowhenua.



Purple loosestrife at Lake Horowhenua.  
*Photo: Noel Proctor.*

## 4. The surveillance system

The detailed procedures for surveillance activities within DOC are listed in the Weed Surveillance Standard Operating Procedure—QD Code: NH/1228. This section and subsequent sections of the surveillance plan describe the process and explain the rationale behind the Standard Operating Procedure.

The responsibility for setting up and operating the surveillance system rests largely with each DOC Area Office. This responsibility may be delegated to Field Centre staff who have suitable expertise. When necessary, assistance should be sought from conservancy staff.

There are many resources available to assist in the different stages of the surveillance system. Examples of these include DOC's National Weeds Database, conservancy specialists, and herbaria held by other organisations.

### 4.1 COLLECTING INFORMATION

In some places there are valuable or vulnerable sites where active surveillance may have obvious conservation benefits. In these cases, DOC staff should organise active surveillance.

In other places it is less clear where new weeds will appear, so it is difficult to know where to search. It may, therefore, be more effective to encourage the reporting of fortuitous sightings. In most Areas, both methods should be used.

The balance of different surveillance activities will vary around the country.

Whatever method is used to obtain a sighting, it is important for DOC staff to have enough information to check and act on the report. A greater degree of detail may be demanded from an expert who is carrying out active surveillance than from a casual observer. However, the enthusiastic amateur often appreciates guidance on what information will be useful.

### 4.2 SPECIAL CASES

Certain places are recognised as having special status. In some ecosystems, specialist training may be needed to carry out searches. Particular skills and knowledge may be needed to identify some species.

Surveillance will be carried out over a wide range of ecosystems and each case should be considered on its merits. If the DOC staff initiating surveillance or processing weed records need specialist help they should seek assistance, first from experts within the conservancy and elsewhere in DOC and then, if necessary, from outside organisations such as Landcare.

Some special cases where specific issues will need to be considered are discussed below.

#### 4.2.1 Freshwater aquatic communities

Some aquatic species like yellow flag, *Iris pseudacorus*, are relatively easy to spot and identify and they occur on the water margins. However, many of the submerged aquatic species such as egeria, *Egeria densa*, hydrilla, *Hydrilla verticillata*, and lagarosiphon, are more difficult to identify and can be found in water over 5 m deep. These species are of particular concern, as they spread rapidly and replace native plants. To carry out effective surveillance of a lake or river system it is important to have trained divers with a good knowledge of aquatic plant species. It is likely that specialists will have to be contracted to perform aquatic surveys. This already occurs; for example:

- A search in 1998 by NIWA of the lakes and rivers of Southland for lagarosiphon (NIWA 1998).
- A survey in March 1999 (by the DOC Conservancy dive team) of Lake Waikaremoana, again for lagarosiphon.

There are far fewer aquatic weed species than terrestrial weeds, but most DOC staff have less experience at identifying aquatic weed species. A separate report identifies which aquatic species are most likely to invade particular water systems around the country (Champion 1999). The report will help the Weed Tech in each conservancy decide which aquatic species have to be watched for.

Egeria at Lake Rotorua.  
Photo: Paul Champion.

#### 4.2.2 Marine communities

Many of the difficulties with surveillance of aquatic species also apply to marine species. Special equipment and training are needed and specialist help with identification will often be needed.

There has been some confusion about the responsibilities of different government departments in the marine environment. An agreement has now been reached that the Ministry of Fisheries will co-ordinate surveillance activities in the marine environment and take the lead in incursion responses. However, DOC staff with suitable qualifications and experience may be involved in both surveying and response work.

If a marine weed is identified as being a likely threat to conservation values, the report should be checked in the same way as other surveillance reports. In addition, the sighting should be referred to the Ministry of Fisheries. Similarly, DOC requests for surveillance for marine weeds should also be referred to the Ministry of Fisheries.

Examples of current marine weed issues include:

- Undaria, *Undaria pinnatifida*, a seaweed first discovered in Wellington harbour in 1987 and now also found in several other harbours around New Zealand. Action is being taken to control undaria and to prevent it spreading beyond Big Glory Bay on Stewart Island.
- *Caulerpa taxifolia*, a green seaweed invading Mediterranean waters but not, so far, found in New Zealand. The Ministry of Fisheries will be

publicising this seaweed as part of a marine surveillance campaign they are initiating.

A herbarium specimen of undaria—part of the identification toolkit.  
Photo: Cameron Hay.

### 4.2.3 Islands

The same basic principles apply for surveillance on islands as for the rest of New Zealand. In particular, areas that have high conservation value and are vulnerable to new weed incursions will have the greatest priority for active surveillance.



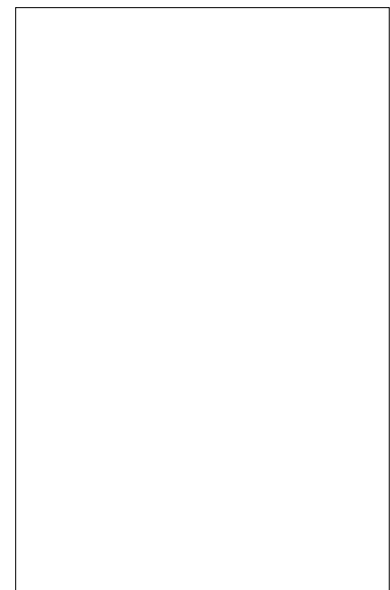
An outer coastal reef being overtaken by undaria.  
*Photo: Gina Williams.*

Islands are more likely to be high value sites, because their separation from the mainland has meant that there has often been less human interference. This separation and lack of disturbance makes many islands potential refuges for preservation of threatened species, thus increasing their conservation value.

Several of the factors that increase the vulnerability of islands to new weed invasions are listed below:

- Visitors: The risk of new weeds being introduced increases with the number of visitors and the frequency of visits. The reason for the visit will also be relevant. One hopes that a DOC botanist visiting the site of a threatened plant will be careful not to introduce new plant material. However, a member of the public having a picnic may be blissfully unaware of such risks. If visits are infrequent, there is less risk of a weed being introduced, but also less chance of a new weed invasion being spotted early. This increases the importance of the precautionary principle, i.e. any potential weeds should be removed when found.
- Human occupation: Islands that have been, or are, occupied are more likely to be subject to new weeds. This is most noticeable where gardens have been established, as some of the garden species escape and spread.
- Being down-wind from a source of wind-borne weed seeds.
- Being visited by birds from areas with weeds that are bird-dispersed.
- The presence of natural disturbance such as erosion or slips.

Islands may be the first port of call for overseas vessels (e.g. yachts). There is a risk of such vessels releasing invasive plant material before they pass through the border control provided by MAF and Customs. However, these risks are probably fairly minimal compared with those arising from local boaties accidentally bringing in plant material, or deliberately planting trees or other plants on islands. For many islands there



Periwinkle, *Vinca major*, escaping from a garden around an abandoned house.  
*Photo: Susan Timmins.*

are quarantine procedures and contingency plans to help protect the island environment, but it is often difficult to enforce access restrictions and quarantine procedures. For example, people on vessels visiting Little Barrier Island are required to obtain a permit before landing, but visitors without permits occasionally land and spend time on the island before being asked to leave.

#### 4.3 CHECKING INVASIVE WEED SIGHTINGS

The first step in processing weed sightings is to verify the details—the species identification, the location, and the size of the infestation. The same process can be used for sightings from a variety of sources. At this stage, some sightings may be excluded from the surveillance process for one of many reasons. For example, the species may already be widespread in the area, or it may not be of conservation concern in that area.

The Area weed person will be responsible for ensuring that species that are reported are correctly identified and that the full extent of the infestation is checked. Once the species identity has been confirmed, its weedy status is determined. The Area weed person will use information on the characteristics of the species and the threat it poses to do this. The species may already be on a list of known weed species, otherwise help may be needed from the experts within the Department of Conservation, or suitable contacts in outside organisations.

#### 4.4 STORING INFORMATION

All confirmed sightings of new invasive weeds should be recorded in the DOC National Weeds Database. This will help build up a picture of the distribution of weed species of concern. If a weed report is the first recorded occurrence of the species in the wild in the conservancy, then a voucher specimen will be prepared to lodge in a herbarium. Additionally, any species not known to be in cultivation and not recorded as having been introduced to New Zealand must be reported to DOC's Chief Technical Officer (the Manager, Science & Research).

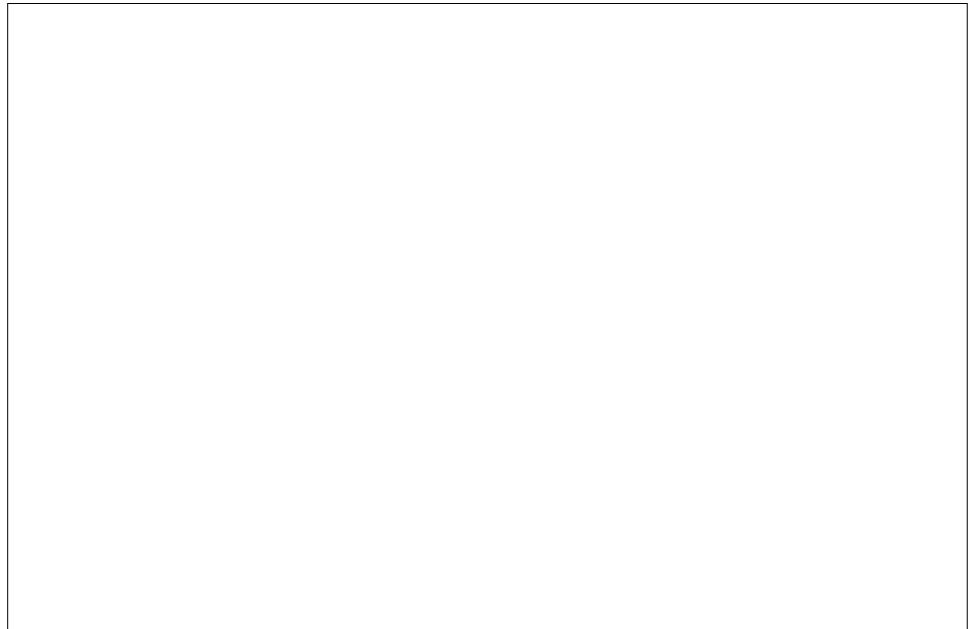
#### 4.5 MANAGEMENT ACTION

Armed with all the information that has been gathered about an invasive weed infestation and the threat posed by the species, the Area weed person must decide what action should be taken.

If the species is not considered a conservation threat, then no action is necessary. If the species can be successfully controlled quickly (for example half a day's work in the first instance) then this should be done as soon as possible. Larger infestations will need to be assessed for a weed-led programme or for a site-led programme (if appropriate). In some cases it will not be possible to carry out control. It may be that the species is found to be more widespread

than was initially apparent, or a weed-led programme or a site-led programme may not meet the criteria detailed in appendices 2 to 5 of the Department of Conservation's Strategic Plan for Managing Invasive Weeds (Owen 1998).

It is vital that control action is taken as soon as practicable, otherwise the benefits of undertaking surveillance and detecting weeds at an early stage will be lost.



Ranger Norm Watson hand-pulling wilding lodgepole pine, *Pinus contorta*, in Tongariro National Park. For many years the control of this conifer, which spreads by wind-dispersed seeds, has involved both aerial spraying of hard-to-get-at plants and hand pulling by volunteers (such as members of tramping clubs, in weekend 'aborta contorta' trips).

*Photo: Shirley Henderson.*

# 5. Activities to support surveillance

There are a variety of ways of making the surveillance effort more effective. People in different parts of the Department of Conservation will carry out a range of activities. Some of these activities are detailed below.

## 5.1 WEED SURVEILLANCE LISTS

As surveillance aims to detect new invasive weeds early, knowing which species are likely to occur will help focus the search effort. A surveillance list for each Area will be compiled by the Weed Tech in each conservancy office.

The list will include species that have the potential to become invasive weeds. These species will either be of very limited distribution in, or not recorded in the wild in the Area. They may be absent from the Area or present only in cultivation. Information on the species and pictures will be provided.

The Area Surveillance List will be a vital information source for the Area weed person.

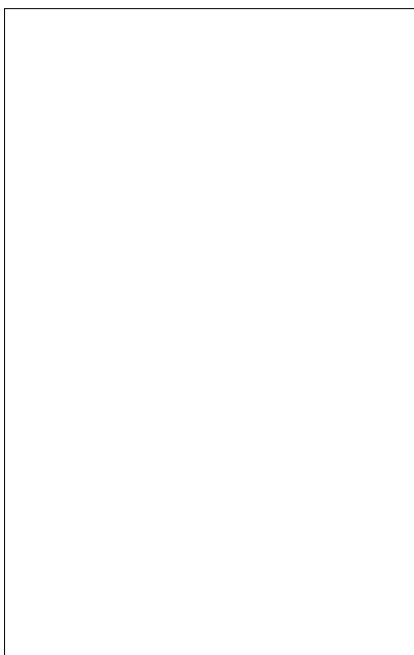
## 5.2 PLANNING FOR WEED SURVEILLANCE

In each Area Office the Area weed person will plan the surveillance activities each year, as a part of the business planning process. If there is a significant surveillance component in their work, Department of Conservation staff may decide they need a specific surveillance plan. Alternatively, the Area weed people may have a separate surveillance work plan, otherwise surveillance should be part of the weeds work plan.

National guidance on surveillance activities will be provided from DOC Regional Offices in the form of annual conservation directions. Each conservancy Weed Tech will provide further guidance on priorities within the conservancy. Based on this guidance and on local conditions, the best mix of the different surveillance activities will be decided at Area level. It will be necessary to decide the best balance between encouraging fortuitous sightings and active surveillance of valuable or vulnerable sites.

All active surveillance to be carried out in the Area should be identified, as part of the planning process. Similarly, weed awareness activities that are planned to encourage fortuitous surveillance should be identified. It is also important to arrange any training that is needed on weed surveillance.

An annual report will be produced on surveillance activities in each Area; this will help ensure that future surveillance effort is correctly focussed.



Notice explaining the problems associated with lagorasiphon and how people can avoid transporting it to other waterways.

*Photo: John Clayton.*



### 5.3 TRAINING

Surveillance effort is concentrated on invasive weed species that are not widespread in an Area. Therefore, DOC staff in the Area may be unaware of the species that are of concern. Training will be needed to rectify this. The Area staff will determine who needs training. The training should not be limited to staff on weed work if other workers, like hut wardens, hunters and staff working on track maintenance, can help with the search for new weed incursions. For example, in Northland, goat hunters requested a training session on invasive weeds and endangered species, so they could help identify problem plants and those that need protecting.

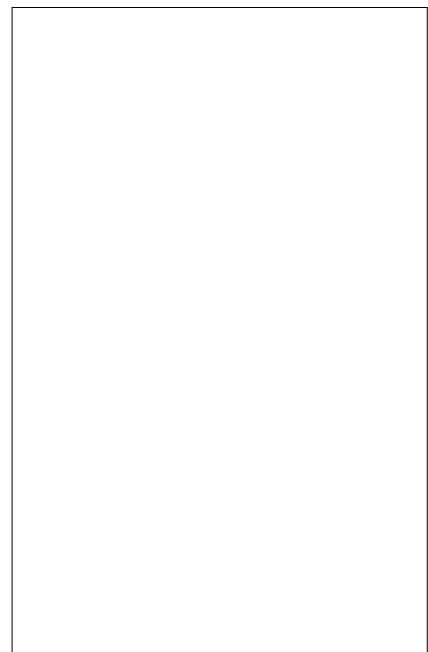
### 5.4 WEED AWARENESS CAMPAIGNS

To encourage the reporting of fortuitous sightings of new invasive weeds, a publicity campaign may be useful. A campaign may be directed at the general public or it can be targeted at a particular group e.g. farmers, gardening groups, diving clubs, local iwi. The campaign may be about one weed species, several weed species or it may concentrate on an issue such as garden escapes.

All reported weed sightings should be acknowledged. People are more likely to continue supplying information if they get feedback. It may not be possible for a weed expert to answer all calls, but it is important that someone who knows about the campaign is available to receive telephone calls during office hours.

Publicity campaigns must not be amateurish. To ensure this, the DOC public awareness team in the conservancy should be consulted. A successful publicity campaign will enhance DOC's image and raise the general awareness of weeds.

For example, in South Taranaki there was concern about hemp agrimony, *Eupatorium cannabinium*, a newly established weed found in a wetland. Following consultation with the conservancy weed experts and public relations staff, a publicity leaflet was sent to local farmers asking for further sightings of the plant. About fifty sightings of the plant were recorded. The feedback to the Area Office about the leaflet was very positive, and other useful conservation information was received on bird sightings and the locations of swamp areas.



Hemp agrimony—a simple leaflet featuring a photo and description of this species was circulated to farmers in South Taranaki. Fifty new sightings of the plant were reported.

*Photo: Colin Ogle.*

## 5.5 CONSULTATION WITH OTHER ORGANISATIONS

Any organisation that can help with the surveillance effort should be encouraged to do so. For example, members of local environmental groups (such as the local Forest and Bird branch) may be happy to look out for weed species of concern while they are visiting natural areas. Scientists, including those employed by Crown Research Institutes, are another group of people who travel widely and often pass on useful information about new weed sightings.

One particularly useful group of contacts is the pest plant officers working for regional councils and other authorities. They travel extensively around the countryside and receive reports about a wide variety of weeds from the public. Many pest plant officers are very observant, and keen to pass on information on new weed sightings. It is hoped that a way will be found of sharing this information electronically. Until then, the Area weed people should regularly consult their colleagues in regional and local authorities.

## 5.6 COST THRESHOLD ANALYSIS

A cost threshold analysis is being carried out on weed surveillance (Harris & Brown 2000). The project seeks to identify the probability of detecting new incursions in various situations before they exceed specified thresholds of control cost. The report from this project contains guidelines for Area Offices on recommended surveillance intensity. The information from the cost threshold analysis will help Area offices to fine-tune the surveillance effort. In turn this will ensure that surveillance produces a return in reduced control costs resulting from early detection.



Cape honey flower,  
*Melianthus major*, a  
dramatic triffid-like garden  
plant that invades waste-  
lands in Northland.  
*Photo: Susan Timmins.*

## 6. Concluding comments

Weed surveillance can help in the battle to protect New Zealand's natural environment by promoting the early detection of invasive weeds. Possible approaches highlighted in the Weed Surveillance Plan include:

- Using lists of potential weeds, but also looking out for any plants that are new to an area.
- Checking high value sites, but also surveying places that are vulnerable to weed invasions.
- Sending experts to check valuable or vulnerable sites, but in other parts of the country putting more emphasis on encouraging the reporting of fortuitous sightings.

The best balance of the different methods will vary according to local circumstances.

To help find new weeds early, the plan identifies the need for the following:

- Lists of likely invasive weeds for each Area (Surveillance List).
- Surveillance activities within each DOC Area Office.
- A system for processing reports of new weed sightings.
- Weed surveillance training.

## 7. Acknowledgements

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