

WEED SURVEILLANCE – CATCHING ‘EM EARLY

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Abstract The New Zealand Department of Conservation’s Weed Surveillance Plan promotes the early detection of invasive weeds. This facilitates effective weed control for least cost and minimal impact of new weed incursions on conservation values. Certain places and species are priorities for surveillance. Both sites valuable to conservation and sites vulnerable to weed invasion are checked. Surveillance that focuses on species, uses lists of species that are a problem elsewhere and also checks for unexpected species. The Surveillance Plan accommodates both planned surveys as well as fortuitous observations made while people are engaged in other activities. Weed sightings are processed to verify the observation and to decide on the appropriate action.

INTRODUCTION

The threats to New Zealand’s conservation values from exotic plant species are increasing. Already over 240 species have been recognised as invasive weeds by the New Zealand Department of Conservation (DOC) (Owen 1997). These species are continuing to spread and to colonise new parts of New Zealand (Buddenhagen et al. 1998). In 1999 there were 24,539 plant species recorded as introduced to New Zealand and, of these, 2,109 species had naturalised (Landcare 1999). We can anticipate that over time more of these species will naturalise and/or become invasive weeds and require control. Accepted weed wisdom says that controlling a weed infestation early will minimise the ecological damage wrought by the weeds and significantly reduce control costs (Williams 1997). The first step towards early intervention is finding new weed incursions promptly. This goal has been espoused by other organisations (e.g., Westbrooks 1999).

A weed surveillance system DOC has developed a system for searching for, and documenting new records of weeds of conservation concern (Braithwaite 1999). This “Weed Surveillance Plan” promotes the early detection of invasive weeds by focusing on finding invasive weeds that are new to a geographic area or of very limited distribution. The Plan covers all terrestrial, freshwater and marine ecosystems, both on the mainland and on islands.

Without a system, finding new weed incursions tends to be haphazard and often an incursion is not found until the species has spread widely and the infestation(s) prohibitively expensive to control. With a surveillance system, weed incursions can be found early, before the conservation values we wish to protect have been degraded. This also reduces the need for large-scale control work which itself can cause further damage to native species and communities. Without a surveillance system, even if by chance weed infestations are found early enough, there is a risk that casual observations will not be captured or acted upon.

Responsibility for administering the weed surveillance system rests with each DOC Area office however the Plan is targeted at various levels in the Department. DOC is divided into 13 geographic and administrative units called Conservancies. There are three or four Areas per Conservancy. The Area office is accountable for field operations.

TYPES OF WEED SURVEILLANCE

The Surveillance Plan accommodates planned and fortuitous surveillance and it focuses on both places and species.

Active surveillance The Surveillance Plan covers both deliberate searching as well as fortuitous observations made by people engaged in other activities. In the former, Departmental staff or specialist contract workers are sent out to actively search for particular weed species in an area, or to scour particular places for new weeds in general. Most effort should be put into searching places where there is the highest likelihood of finding new weeds, but which might otherwise not get searched for weeds of conservation concern.

A good example of active surveillance is the surveying of lakes and rivers in Southland, New Zealand, for the oxygen weed lagarosiphon (*Lagarosiphon major*). Regular surveys should mean that as soon as the weed species turns up in a Southland water body it will be detected and controlled, before control becomes impossible. Because lagarosiphon spreads quickly at a new site, six-monthly surveys are recommended.

Some ecosystems and some weed species will demand a specialist to do the searching, either because the searching requires specialist equipment or the species are hard to distinguish from native species. Aquatic and marine communities and their plants, and sedges and grasses are in this category. By contrast, any visitor to an infrequently visited island should be primed to be on the look out for new weeds. Islands often have high conservation value but the paucity of visitors means there is less chance of spotting a new weed invasion early. Such weed watching may be active or fortuitous.

Fortuitous surveillance A huge range of different weed species invade a vast array of types of sites. The task of finding new weed incursions is enormous. Further, new weed incursions can be hard to spot. The terrain and vegetation on a site may make it difficult to see 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 regularly surveyed. So, it will not be possible for local staff to identify all new weed incursions at an early stage, by active surveillance. Therefore, any help that is available should be used, albeit from within or from outside the Department.

A variety of people may notice new plants either in 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. DOC staff may be in weed-related disciplines, e.g., Conservancy weed technical officers or they may be engaged in rather different endeavours, e.g., goat hunters or white bait licence checkers. Other useful informants include: Regional Council pest plant officers, amateur botanists, and members of community groups such as trampers.

There is a wealth of information available if it can just be captured and used. The Plan capitalises on the enthusiasm and observations of a range of people. It guides amateurs in what information is required to make a weed sighting really useful. The Plan also makes sure that all weed sightings are systematically and appropriately followed up by DOC Area offices.

In addition to active and fortuitous surveillance, the Plan recognises that there are often good records of sightings of new weed incursions in the published literature. One DOC Conservancy set up a database to house weed records gleaned from informal literature and botanical society lists. As a result of perusing these

past records, several serious weed infestations have been identified.

Surveillance of species A list of likely weed invaders is prepared for each Area by the relevant Conservancy weed technical officer. Listed species may be cultivated but not yet naturalised in the Area; or invasive in a nearby area; or new to New Zealand but a problem in similar conditions in other parts of the world. These lists provide a search image for the searchers. 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. We use three scales of area:

- The whole area covered by a DOC Area office, regardless of land tenure;
- A subset of an Area, where there is a barrier to re-invasion such as steep hills;
- A site of high conservation value, regardless of the agency managing the site.

In addition to looking for species on the “Area likely” lists, searchers must be alert for unidentified intruders. Any plant which is new to a site, or which looks out of place, should be checked. Some new incursions may be species that have been in cultivation in New Zealand gardens for a while but have only recently escaped into the wild. Very occasionally, surveillance may detect species that are not known to be in cultivation or even not previously recorded at all in New Zealand. These unspecified intruders are the hardest to find because the observers do not have the benefit of a search image. If the species cannot be readily identified, the plant should not be removed until a positive identification can be made in case the unusual plant is actually a threatened species. This may give the observer a dilemma in a very isolated place.

Surveillance of sites Valuable sites (those with high biodiversity values), as well as vulnerable sites (those where weeds are most likely to invade), need to be searched for weeds of conservation concern. Vulnerable sites, such as along roadsides and railways, places with low or disturbed vegetation, in or near water and other sites modified by human activity, may have limited conservation value but they are often the first sites to be colonised by new weeds. It is worth systematically searching these areas, most of which will not be protected, because there is a high likelihood of finding new weeds and weeds of conservation concern would otherwise be unlikely to be found. If the invasive weeds are not controlled at these scruffy sites, they

may spread more widely and become impossible to eradicate in the area.

If we are to protect valuable sites, new weed invasions must be detected and cleared at their early stages. Within valuable sites, search effort again should focus on the parts of the reserve which are most vulnerable to weed invasion, e.g., road ends, near houses or old homesteads, where garden waste is dumped, or where birds or wind deposits new seeds. In addition, vigilance is needed when walking anywhere in a valuable site because new weeds can pop up in unexpected spots.

THE SURVEILLANCE SYSTEM

Responsibility for administering the weed surveillance system rests with each DOC Area office, usually the smallest DOC administrative office in any part of New Zealand. This allows detection, and particularly control, to be responsive and timely. Lengthy bureaucratic procedures would negate the advantage of early detection. However, Area staff need training and back-up from experts to guide their decision making and raise their general level of weed expertise. They can seek help both from within the Department and outside as necessary.

Collecting information Information on new weed infestations can come from active surveillance, digesting existing information or from fortuitous sightings. In some Areas there are valuable or vulnerable sites where obvious conservation benefits would flow from systematic searching. In other Areas, it is unclear where new weeds will appear, and thus where to search. In these Areas, it is probably most effective to encourage the reporting of casual sightings. The best balance of different surveillance activities: (i.e., active or fortuitous, focus on species or sites, focus on valuable or vulnerable sites), varies between Areas. It will be detailed in an annual Area Surveillance Plan.

Processing reports In the past, DOC had no formal system for processing sightings of new weeds. Pest plants that were subject to a control regime could be reported to the local regional council (or to DOC for infestations on DOC-administered land). However, the species that are subject to a control regime are usually well established and widespread. So, new weeds have been left until their damaging effect is obvious, by which time it is often too expensive or difficult to institute control measures.

The Surveillance Plan provides guidance to Area staff on how to process weed sightings. Whether collected fortuitously or by active searching, most weed sightings

must first be verified. This includes ensuring that the species is correctly identified and that the full extent of the infestation is checked. The next step is to determine the weedy status of the species nationally and in the area. In making these determinations, Area staff may need to involve a variety of weed experts within the Department (Conservancy weed specialist or botanist) and perhaps in other organisations' herbaria. If the weed sighting is accompanied by a specimen of the weed and detailed site notes, identification will be easier. At this stage, some sightings may be excluded from the surveillance process for a variety of reasons. The species may already be widespread in the area, or it may not be of conservation concern in the area. Alternatively, there may not be enough information, e.g., the location given may be too vague.

Taking action The next step is to decide on the appropriate action. The advantage of early detection is only maximised if the new weed incursion is managed promptly. Factors relevant to deciding what action to take include: the species' weediness elsewhere, the size of the infestation, its potential to spread and pose a threat, the value of the invaded site, the ease of control and the cost/benefit of action. In some instances, no action will be required because the species is not a conservation threat. In other instances, the weed should be pulled out straight away. If half a day's work is required this can usually be accommodated in the current year's work plan so that control happens quickly. For bigger jobs, the proposed control programme must be assessed in the next year's business planning cycle. Sometimes no management action is taken because the control work required is more than either the site or the species can justify (see Owen 1998).

Storing information Whatever the final outcome, all confirmed sightings of invasive weeds, and any follow-up work, should be recorded in DOC's National Weeds Database administered by DOC Science and Research Unit. This means information on the spread of weeds can be shared and studied. If a weed report is the first recorded occurrence of the species in the wild in the Conservancy, then a voucher specimen should be lodged in a herbarium. Any species not previously known to be in cultivation or not recorded as having been introduced to New Zealand should be reported to DOC's chief technical officer.

Weed awareness Publicising weed issues, and explaining the value of reporting new weed incursions, tends to increase the number of weed sightings DOC receives. Publicity campaigns about one or several weeds have been successfully mounted. Some are tar-

geted at a particular group, e.g., farmers or diving clubs. Others concentrate on an issue such as garden escapes. All tend to encourage people to report new weeds, either the species that is the focus of the campaign or other species. It is imperative that any persons who report a weed sighting are given feedback on what follow-up action occurred. This will encourage them to continue reporting new weeds and guide them as to what information is required. Other public awareness initiatives are planned to keep the flow of sightings of new weed incursions rolling in.

In addition to the general public, one particularly useful group of weed watchers is the pest plant officers working for regional and other authorities. They travel extensively around the countryside and receive reports about a wide variety of weeds from the public. It is essential that the Department work closely with these officers for our mutual benefit.

Costs and benefits A current project seeks to check our underlying assumption that money spent on surveillance is less than the resultant savings in control costs. The project is modelling the costs and benefits of surveillance in a variety of different habitats for different types of weeds, e.g., wind-dispersed seed, animal-dispersed fruit, vegetative spread. The result will be a series of recommendations of the appropriate surveillance intensity under different conditions. This information will help Area Offices to fine-tune their surveillance effort and to maximise the benefits of early detection and control of new weed incursions. A major benefit will be to slow down the current upward trend of new weed threats to conservation.

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