

Do weed managers need to know about weed impacts?

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Summary Despite long-standing international interest in the impact of weeds on ecosystems and biodiversity, there continues to be a dearth of studies published on the subject. This may be largely due to the fact that it is inordinately difficult to identify and measure 'impact', and then attribute cause to that effect. In this study we ask a) what we know about weed impacts in New Zealand, and b) how this information might be used by weed managers in the Department of Conservation. We conducted a literature search for weed impact studies done in New Zealand where the impact was quantified, rather than merely assumed or inferred. We found 32 studies published between 1969 and 2007; 27 from terrestrial systems, and five from aquatic systems. Of the terrestrial studies, 11 of the 27 measured some effect on native plant species (e.g. regeneration, growth, species assemblage, succession) and ten studies measured below ground effects and/or nutrient cycling. The other studies considered effects on invertebrates (3), stream fauna (2), or geomorphology (1). The number of terrestrial species investigated in these studies was extremely limited; only 10 species from nine genera. Eighteen of the 27 studies (67%) were done on a subset of only four species: *Tradescantia*, gorse, or *Hieracium* (two species). This group of 10 species comprises less than 4% of the c. 328 vascular weed species currently managed by Department of Conservation. Thus, we have very little empirical information on the impact of environmental weeds in New Zealand.

But would having better information make any difference to weed management decisions? In New Zealand, the Department of Conservation manages weeds from either a 'weed-led' or a 'site-led' approach (Owen 1998). Weed-led programs are for newly emerging weeds that have not yet become widespread within a defined catchment area. They are controlled because they are at an early stage of invasion, and thus can potentially be eradicated at limited cost. Often we do not know what impact a newly emerging weed is going to have in the long term, but we say why take the risk when there is an early opportunity for control?

The site-led approach is used where weeds are invading sites of high conservation value. At these

sites, one or more species of weed is controlled, usually because of some perceived impact on the values of that site. Thus, it is in these situations that weed impact information could be used by managers to determine which weeds to control and which to leave. So how do managers make those decisions, given that weed impact information is usually lacking? When people call a species 'weedy', they usually mean it is very abundant or spreads quickly. Within the Department of Conservation, potential impact is also judged during the process of assigning 'weediness' scores, whereby each species is scored on its 'effect on system' — whether it changes habitat structure or composition, whether it suppresses native regeneration, and how persistent the species is over time (Owen 1997). Thus, managers are required to make subjective judgements in order to score most of these factors. In most cases, however, it is likely that abundance drives the management decision; at valuable conservation sites, if an exotic plant is growing in any particular spot, then a native plant is not. In many cases, that is all the impact we need to know about.

In summary, for both weed-led and site-led programs it is the presence, or distribution, of the weed that drives the management decision. Stage of invasion (weed-led) or site of invasion (site-led) determines priority for control rather than any known or assumed potential impact. Sometimes abundance may be perceived to equate to impact, but the latter need not be demonstrated before control is effected. Accordingly, while understanding weed impacts is of great interest and value theoretically, in practical terms the Department of Conservation manages weeds for more pragmatic reasons. While this approach is born, largely, out of necessity, nevertheless we suggest that this is a sensible approach.

REFERENCES

- Owen, S.J. (1997). Ecological weeds on conservation land: a database. Department of Conservation, Wellington, New Zealand.
- Owen, S.J. (1998). Department of Conservation strategic plan for managing invasive weeds. Department of Conservation, Wellington, New Zealand.