

## Search and destroy: a new tool in the war on weeds

Clayson J. Howell and Stu Cockburn

Department of Conservation, PO Box 10-420, Wellington New Zealand  
(chowell@doc.govt.nz)

**Summary** The New Zealand Department of Conservation (DOC) has developed a new tool to record search paths and herbicide usage. The unit combines a flow meter with an accurate GPS and records daily search paths and the volume of herbicide dispensed at each location in a single .gpx file. Once switched on, all data recording is completely hands-free, and is being widely used to record operations. Once operations are complete, the data are easily uploaded into DOC's Weeds application, an on-line GIS-based tool that allows DOC staff to record all weed control in a consistent way. Once entered, data are available to all staff, which enables more effective planning over very large tracts of land administered for conservation.

**Keywords** Search, destroy, herbicide, GPS.

### INTRODUCTION

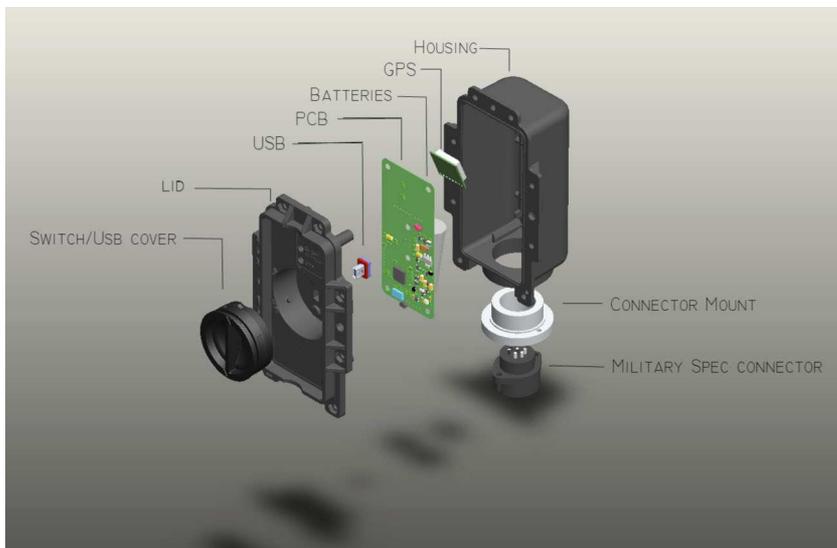
Tracking herbicide use is of increased importance. Typically staff record spray information in diaries and transfer these data when reporting on operations. It is vital that this information is recorded to monitor effectiveness, respond to public queries, and pass

on historic information to new staff. Our staff were increasingly being asked to improve the detail of the information they recorded about spraying operations and this reduced the amount of work they were able to deliver.

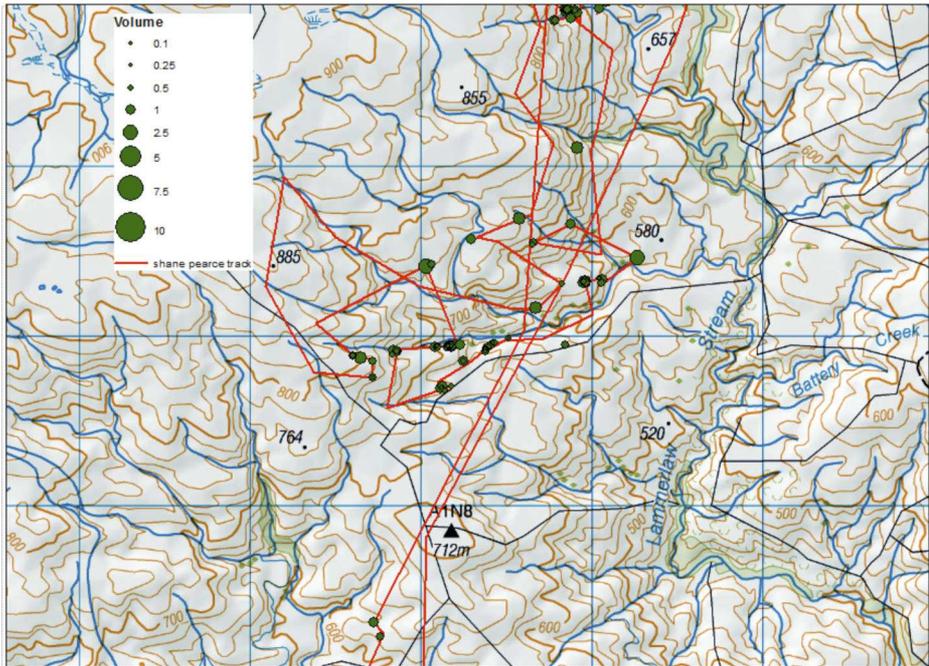
### PRODUCT DEVELOPMENT

With DOC's electronics workshop we developed a small unit to improve field data capture of weed spraying information. The unit comprises a turbine-type flow meter integrated with a GPS. The flow-meter can be connected to any spray unit (Figure 1) and records herbicide volume and location every time herbicide is dispensed. The unit also records a track that clearly illustrates the search path taken (Figure 2).

All information is stored in .gpx file format and upload of data and battery recharging is completed with a standard USB cable. All software was developed internally and can be customized. The data from the unit can easily be uploaded to standard GIS tools where information on the herbicide formulation used and weeds targeted can be appended.



**Figure 1.** The search and destroy unit is small, hands-free and can be attached to a knapsack, gun and hose or helicopter spray wand.



**Figure 2.** Example of search path and volume data overlaid on topographic map.

#### APPLICATIONS

After the final prototype was built feedback on the unit has been positive. Staff no longer have to carry a GPS that is separate from the spray equipment. While not mandatory, it is hoped that uptake of the unit will be widespread.

Because operation is very simple, potential applications can range from very small scale spraying around sensitive plants in a wetland to spot treatments of wilding conifers over thousands of hectares.

The inclusion of the search path allows simple checks that surveillance plans have been followed, and can highlight points of interest for follow-up surveys.

The unit has also proven useful in operational experiments to test efficacy of spot spraying. When mortality is variable, the dose that individual plants received can explain some of the variation in results without an expensive controlled experiment.

Within DOC, the information is easily integrated with our web-based GIS tool for recording weed work. But the standard format can be viewed in many applications.

#### DISCUSSION

Sophisticated systems are available for large agricultural weed spraying, but this simple unit has great potential for recording control actions for environmental weeds. The unit can be connected to a variety of tools and the cost is comparable to hand-held GPS units so most budget managers can afford multiple units.

Herbicide usage is likely to come under increasing scrutiny so recording information as accurately as possible is seen as a priority. This system makes recording easier and allows operators more time to execute safe and effective weed control.

#### ACKNOWLEDGMENTS

Nick Pederson and Steve McKeivitt from the DOC electronics lab developed the hardware and electronics. Prototype units were field-tested by DOC Operations staff Shane Pearce, Dave Walford and Chris Woolmore.