

SEARCHING FOR WEEDS – A GIS TOOL

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Sampling for rare events, such as a new weed incursion, can be surprisingly efficient when adaptive, unequal probability survey designs are used. Spatially explicit habitat models and expert knowledge of weedy species can be used to identify areas of varied survey intensity. We introduce a GIS-based tool that can be used for designing such a survey. The user-friendly tool interfaces (behind the scenes) with the US Environmental Protection Agency's spatially balanced sampling design functions in R. The functions ensure that the location of the sample points are spatially balanced while at the same time, allowing the user to specify survey intensity in areas of special interest (preferred habitats, areas of high conservation value, areas of high public use etc).

We discuss the use of the GIS tool in a case study where we designed a 5-year weed monitoring plan for local authority in New Zealand. The plan includes 'over sample' sites to replace any original sample sites that were impractical or costly to visit.

Initial results include estimates of what proportion of the total region has weeds present and an estimate of weed density. More detailed results are produced for specified known weed-hot spots such as areas adjacent to roads and rivers. These estimates are available for all weed species, and for individual species. Because the system is GIS-based, spatial information is stored. Over time, as the weed surveillance and monitoring progresses, regional changes in weed distribution can be tracked, and species and locations that require more targeted weed management can be identified. Further results of such a probability-based design can be used to develop habitat models for predicting future distributions.