

Determining new Weeds of National Significance

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Summary The National Established Weed Priorities Framework proposes the determination of new Weeds of National Significance (WoNS). Since WoNS were last determined in 2012 there have been important domestic and international developments in pest prioritisation. A review of these has identified improvements so that future determination of new WoNS is contemporary and more participatory for industry and community stakeholders. A proposed nomination, assessment and selection process is described.

Keywords WoNS, weed risk assessment, pest prioritisation, national significance.

INTRODUCTION

The draft National Established Weed Priorities (NEWP) Framework (Wild Matters 2022) aims to guide the prioritisation and management of established weeds and associated weed issues across Australia. Building on the successes of the >20-year Weeds of National Significance (WoNS) initiative, the NEWP Framework has been designed to build better long-term partnerships and collaborations between governments, industry and community organisations in tackling shared weed priorities.

WoNS is a core component of the NEWP Framework. For each of the current 32 WoNS, advances have been made in knowledge, information, tools and strategic actions to better reduce their spread and impacts. One of the greatest legacies of the WoNS initiative is the enduring national network of partnerships that continue to manage WoNS from local and regional control programs to national RD&E collaborations.

There have been two selection rounds for WoNS; the original twenty in 1999 (Thorp and Lynch 2000) and an additional twelve in 2012 (Hennecke 2012). The methodology to select WoNS should evolve with advances in pest risk assessment, biosecurity policy and stakeholder expectations. Taking account of these, this paper summarises considerations for the nomination, assessment and selection of new WoNS.

METHODS

A literature review of national and international pest risk prioritisation was undertaken to inform improvements to the WoNS selection assessment processes. This focused on national standards for

post-border weed risk management (WRM) and risk management more generally (anon. 2006, ISO 2018).

The main biosecurity policy guidance for determining new WoNS is the National Framework for the Management of Established Pests and Diseases of National Significance (EPDNS; NBC 2016). It sets three overarching criteria in determining nationally-significant species threats: national impact; feasibility of management intervention; and benefits from taking a nationally coordinated approach.

A process to determine new WoNS is proposed in the draft NEWP Framework. This process was progressively refined through workshops, meetings and formal feedback from a large cross-section of stakeholders in established weed management across Australia.

RESULTS

General requirements of a contemporary weed prioritisation model include the following considerations (Heikkila 2011, Leung *et al.* 2012, Vanderhoeven *et al.* 2017, Bartz and Kowarik 2019, Osunkoya *et al.* 2019a and Vila *et al.* 2019, plus additional references below):

Explicitly addresses uncertainty To reduce misinterpretation, questions must be clearly written and unambiguous. Lack of information, data variability, conflicting evidence and subjective judgement needs to be explicitly considered when designing scoring approaches, expert elicitation methods and/or statistical measures of confidence.

Systematic and structured The prioritisation model should have a logical, scientific basis and be validated for accuracy. The determination of risk should align with the standard formula of likelihood × consequence (which is equivalent to weed spread × impacts). The National Post-Border WRM Protocol (anon. 2006) gives standard decision criteria for determining overall rankings for weed risk and feasibility of control, which are independent considerations to be compared in determining pest priorities (Canessa *et al.* 2021). A robust species ranking model needs sufficient, defensible questions to confidently distinguish species. Questions that poorly differentiate species or questions that are

correlated with others should be avoided. Definitions for multiple choices within questions should, where possible, be quantitative and scaled geometrically (Evans *et al.* 2019) or exponentially (Blackburn *et al.* 2014, Ireland *et al.* 2020) to help distinguish species.

Stakeholder involvement in weighting criteria Whilst questions in a prioritisation model must have a scientific basis and align with standards, their relative importance (weightings) also needs to explicitly consider human values, including economic, cultural, social and environmental factors. Techniques to select stakeholders and survey their values have been applied to weighting impacts of weeds (e.g. Hurley *et al.* 2010, Kumschick *et al.* 2012).

Transparent and inclusive Trust in the results of risk assessment and prioritisation comes from understanding the model and how its components are scored and combined mathematically. Individual species scoring must be visible and documented, with opportunity for peer review (experts and stakeholders). An expert elicitation approach to scoring, with the structured use of groups of people to assess species through rounds of review and consensus building, provides an inclusive, robust process (Booy *et al.* 2017, Hemming *et al.* 2017, Osunkoya *et al.* 2019b, Evans *et al.* 2019).

Accesses best available information Ideally, species assessments would be completed based solely on published literature. However, even for widespread weeds, there are likely to be gaps in the literature, yet a wealth of personal observations and experience with experts who have studied or managed weeds. Species should not be disadvantaged in a prioritisation process by a lack of documented information. Thus there is the need to compile available relevant literature and personal observations and experience to inform a structured expert elicitation process (see above).

Where national spatial datasets are available these should be used to create maps of risk and feasibility of control, to give a more informed and accurate prioritisation (Kriticos *et al.* 2018). Potential distribution mapping under future climate scenarios, is needed to inform risk and future impact (Roger *et al.* 2015).

Broadly applicable to any weed The prioritisation model should allow assessment of weed risk and impact in any land use, ecosystem, climate and region. Questions need to be generic so that the model can be applied to all vascular plant lifeforms,

including aquatic herbs, grasses, geophytes and woody plants.

DISCUSSION

A proposed approach for determining new WoNS, based on the above technical and stakeholder engagement considerations and EPDNS policy requirements, is outlined in Figure 1.

The selection process for WoNS needs to be transparent, inclusive of all stakeholder sectors, fair, logical, defensible and systematic. These requirements will be met through a multi-stage nomination and assessment process. The process must handle uncertainty and identify and manage any potential conflicts of interest. This includes ensuring independence between those people who design and implement the assessment process and those nominating weed species.

Nominations Any industry, community or government stakeholder would be able to nominate weeds to be assessed for WoNS consideration. Groups of closely related weeds could also be nominated as a WoNS under the banner of a single species, where they are similar in life-form and management requirements, as per some current WoNS (e.g. opuntoid cacti and Asparagus weeds).

Through an initial, confidential expression of interest, organisations with mutual interests in nominating a species would be 'joined-up'. This facilitated partnering to do joint nominations will enable efficiencies and resource sharing in completing a template of required information to support the nomination. The template would include screening questions to filter out candidates that would not meet EPDNS requirements.

Assessing impact This equates with weed risk and it is proposed that the determination of new WoNS should evolve the weed risk ranking model used in 2012 (Hennecke 2012) as the starting point. Impacts questions should seek to align with EPDNS and definitions in international pest impact standards. The model will assess weeds' current and potential impacts on economic, environmental and social assets across Australia, taking account of regional differences and uniqueness and climate change.

Scoring individual weeds in the updated model will consider both high quality published information and the expert opinions of a panel of scientists and weed control practitioners. Uncertainty will be considered using a structured elicitation process that ranks impacts whilst also recording levels of confidence in scoring.

Figure 1. Proposed process for determination of new WoNS (as at May 2022).



Feasibility of management intervention The EPDNS list four factors to be considered in assessing feasibility of management intervention; technical feasibility of implementing a management approach, potential role of regulatory mechanisms, cost-effectiveness of the proposed approach and level of socio-political support (NBC 2016). There is no existing weed ranking system for feasibility of management intervention that integrates all of these factors. For WoNS, such interventions could include on-ground control or containment programs, new control techniques, research, extension, regulation, coordination and/or spread prevention.

Assessment of feasibility of management intervention for WoNS candidates would require a combination of technical and policy analysis. The intent would be to determine whether substantial progress could potentially be made to better manage the national impacts of a WoNS candidate.

Benefits from national coordination During the 2012 WoNS determination, potential management actions of national benefit were identified by government, which in turn informed national strategic plans. These actions were collated for each candidate WoNS under broad action categories of prevention of spread, asset protection and increased management capacity. This approach would be improved by seeking input from community and industry organisations to determine specific, cost-effective actions. These actions would focus on those requiring coordination of cross-jurisdictional/cross-sectoral partnerships to bring about measurable, long-term benefits in addressing a WoNS' spread and impacts.

Selection of WoNS The process for determination of new WoNS would be overseen by a national NEWP Steering Group made up of representatives of government, industry and community stakeholders. The Steering Group would recommend proposed new WoNS to the Environment and Invasives Committee (EIC) for its approval.

ACKNOWLEDGMENTS

This work has been funded by the Australian Government Department of Agriculture, Water and the Environment. Oversight has been provided by the EIC Weeds Working Group. Thanks to Hillary Cherry for comments on the paper.

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