White Rose Research Online

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk
Universities of Leeds, Sheffield and York

Deposited via The University of York.

White Rose Research Online URL for this paper:
https://eprints.whiterose.ac.uk/id/eprint/241447/

Version: Published Version

Article:
Westfield, James P., Wandrag, Elizabeth M. and Stringer, Lindsay C. (2026) Linking perceptions of weeds with approaches to weed management. People and Nature. ISSN: 2575-8314

https://doi.org/10.1002/pan3.70337

Reuse
This article is distributed under the terms of the Creative Commons Attribution (CC BY) licence. This licence allows you to distribute, remix, tweak, and build upon the work, even commercially, as long as you credit the authors for the original work. More information and the full terms of the licence here: https://creativecommons.org/licenses/

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

UNIVERSITY OF LEEDS
University of Sheffield
UNIVERSITY of York

Check for updates

Received: 14 May 2025 | Accepted: 11 April 2026

DOI: 10.1002/pan3.70337

People and Nature

RESEARCH ARTICLE

Linking perceptions of weeds with approaches to weed management

James P. Westfield[1] | Elizabeth M. Wandrag[2] | Lindsay C. Stringer[1]

[1]Department of Environment & Geography, University of York, York, North Yorkshire, UK

[2]School of Natural Sciences, University of Tasmania, Hobart, Tasmania, Australia

Correspondence
James P. Westfield
Email: james.westfield@york.ac.uk

Handling Editor: Jennifer Atchison

Abstract

1. A multitude of factors can shape people's perceptions, leading to a variety of views on nature's services and values. The IPBES Values Framework highlights the ways that people and nature interact (both positively and negatively) through consideration of nature's contributions to people. For plants, differences in perceived values by different groups of people can be diverse and polarised, shaped by a range of factors, leading to inefficient or unsustainable management practices.
2. This research helps land stakeholders to think more reflexively as to why and how their perceptions of weeds impact their approaches to weed management, and to think about alternative approaches that could be more environmentally, economically or socially sustainable. This contributes a novel way of involving land stakeholders in wider global debates whilst maintaining a focus on their everyday land management practices.
3. Through a case study of gorse (*Ulex europaeus*), this research: (1) assesses whether gorse is perceived differently across its native and non-native ranges; and (2) considers whether these differing perceptions affect dominant gorse management approaches. Stakeholder analysis, using interest-influence matrices, identified relevant land managers. Interviews ($n = 22$) and questionnaires ($n = 30$) gathered data on gorse perceptions and management approaches in its native ($n = 17$) and non-native ($n = 35$) ranges. Data were analysed in NVivo 20, coded to map onto 12 contributions to people, categorised to positive, negative or neutral perceptions and themed to management approaches.
4. In the non-native range, gorse was unanimously perceived as negative, linked with a colonial past and legal requirements for it to be managed, and predominantly managed through burning and herbicide treatment. In the native range, positive views of gorse were linked to occasional cutting to maintain its presence as part of the overall landscape biodiversity.
5. Future research should focus on how best to engage those with negative views of plants such as gorse that may be perceived as weeds, considering how to reframe them as useful plants that can contribute to sustainable environmental management.

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.
© 2026 The Author(s). *People and Nature* published by John Wiley & Sons Ltd on behalf of British Ecological Society.

KEYWORDS
environmental perceptions, gorse, land management, Nature's contributions to people, stakeholder analysis

1 | INTRODUCTION

1.1 | Why do people's perceptions matter?

Perceptions are shaped by a multitude of factors, including experience, beliefs, motivations, education and positionality (Bell, 2012; Scott et al., 2009), as well as whether people are operating as individuals, smallholders or form part of large governmental or non-governmental organisations (Kizos et al., 2018; van Oosten et al., 2021). These factors can lead people to perceive nature's services and values in different ways and can cause conflict between different groups when considering approaches to land management (Wilhelm et al., 2020). For example, sometimes the environmental data held by large organisations can contradict the sense of place and personal links with the environment held by individuals (Okumah et al., 2020). These social perceptions can also vary between individuals depending on whether they are local to an area or a visitor, affecting perceptions as to whether the land use system should be managed to meet resource demands versus prioritising recreational use (de Juan et al., 2017). These complexities point towards the need for holistic approaches to sustainably manage a landscape for the benefit of all stakeholders and nature (García-Martín et al., 2016; Neyret et al., 2023; O'Farrell & Anderson, 2010) and demand that a wide diversity of stakeholders be included to encourage dialogue and find solutions to mitigate any negative impacts, particularly when some groups may be negatively impacted by the management choices of others.

1.2 | What are weeds?

Plant species that spread easily and displace other plants are variably termed 'invasive', 'weed', 'transient', 'noxious', 'nuisance', 'alien' or 'exotic', despite each of these having distinct meanings (Table 1) (Colautti & MacIsaac, 2004).

A weed can be considered a plant whose spread—natural or anthropogenic—causes problems for the broader landscape, akin to an invasive species (Bourgeois et al., 2019). Weeds can shade out other plants by growing rapidly, reducing light and nutrient availability to other plants (Humphries et al., 2021). The problems caused by weeds can arise in the native or non-native range of the plant (Khattak et al., 2024). In the UK, this is most associated with

TABLE 1 Selection of terms used to define plants that spread easily.

Term	Example species	Explanation	References
Nuisance weed	Water hyacinth (*Eichhornia crassipes*) in the UK	Problematic for the environment but also useful as native fauna has come to rely on the presence of these weeds. Consequently, their management needs to acknowledge this	Marineau et al. (2019)
Exotic invasives	Hawthorn (*Crataegus monogyna*) and rowan (*Sorbus aucuparia*) in Argentina	Produce large, juicer fruit so birds prefer them to native species, which helps them spread, therefore, having a profound negative effect on the environment. May require another 'exotic' species from its native location to be introduced to control spread in the new location	Denslow et al. (2009); Gurevitch and Padilla (2004); Hoddle (2004); Lediuk et al. (2014)
Alien invasive	Golden wreath wattle (*Acacia saligna*) in South Africa Spotted knapweed (*Centaurea maculosa*) in the United States	Non-native species that are spreading rapidly due to increased globalisation, a warming climate or by rapidly adapting to new locations. These species have been linked to a decline in public use of outdoor spaces due to the landscape being smothered and becoming inaccessible	Clements et al. (2004); Daehler (2003); Early et al. (2016); Meyerson and Mooney (2007); Soulé (1990); Walther et al. (2009)
Non-native invasive	Rhododendron (*Rhododendron ponticum*) in the UK Bush clovers (*Lespedeza*) in the United States	Denotes species that were introduced purposefully for ornamental reasons (e.g. as ornamental hedging) but now spread easily if not managed correctly. Reflects the global origins of a species, so alludes to the need to manage it and keep track of its spread. However, may be too neutral a term because the public may not realise these species need to be controlled	Bremner and Park (2007); Chapman et al. (2017); Kean (2009); Mattingly and Orrock (2013); Niemiera and Holle (2009); Selge et al. (2011); Stout (2007); Brandon et al. (2004)
Native invasive	Sea Couch Grass (*Elymus athericus*) in the UK	Species which are difficult to control and so spread easily, doing this within their native, and therefore expected, range	Able and Hagan (2000)

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70337 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

common garden weeds, whereas in Australia and New Zealand, this is more associated with invasive alien species. In the UK, agricultural or arable weeds are generally wild species that have either invaded agricultural land, hybridised with crops or are crops that are no longer domesticised (Mahaut et al., 2020) and can withstand agricultural disturbance, which is particularly problematic on agricultural land (Bourgeois et al., 2019). Some agricultural weeds have become herbicide-resistant, raising concerns of the future threat of increased weed spread (Westwood et al., 2018). Research on agricultural weeds has been criticised for not considering the wider impact of weeds (both positive and negative) beyond the agricultural landscape, and for focussing on short-term, funded solutions rather than expanding the weed discussion to include non-agricultural stakeholders (Moss, 2008).

Many plant species native to the UK have been introduced to and become weedy in places with close colonial ties to the UK. For example, parts of South Eastern Australia and much of New Zealand have similar climates to the UK and, especially within agricultural settings, experience high pressure from weeds due to shared historic management and agricultural practices. In Australia and New Zealand, weeds are not limited to the agricultural landscape and include invasive alien species that require management to prevent unwanted impacts. Impacts vary from unsightliness and undesirable ecosystem or human health impacts to property damage and biodiversity loss (Fracchiolla et al., 2022). Weeds, such as gorse, are subject to specific regulation concerning their management and the steps land stakeholders must take to control their spread.

Both UK and Australian definitions consider weeds to be species that are in the wrong place and have external environmental, economic or social impacts (positive or negative). By combining these definitions under the term 'weed', it allows management solutions to be considered in native and non-native ranges, making findings wider reaching and encouraging a globally sustainable approach.

1.3 | Why is this research needed?

This research seeks to understand what drives differences in perceptions of plants as weeds and whether these drivers directly impact approaches to weed management. By contrasting perceptions of weeds from across the UK and Australia, findings link to wider discussions encouraging land managers in the UK to watch for and manage weeds more actively whilst considering different perspectives (Jones et al., 2024) and encourages stakeholders in Australia to be more actively involved in weed management decision-making (Martín-Forés et al., 2024; Novoa et al., 2018). This research is important at the moment as these debates are happening in response to bigger picture challenges, namely the need to sustain agricultural productivity in the face of worsening food security (Barrett, 2021); the need to improve biodiversity in a changing climate (Urban et al., 2016); and the breaching of planetary boundaries causing resource scarcity and increased costs (Rockström et al., 2009). Thus, this research helps land stakeholders to think more reflexively as to why and how their perceptions of weeds impact their approaches to weed management and to think about alternative approaches that could be more environmentally, economically or socially sustainable. This contributes a novel way of involving land stakeholders in wider global debates whilst maintaining a focus on their everyday land management practices. It addresses a knowledge gap of how to translate big picture discussions into discussions on day-to-day weed management.

This is timely research, with the recent introduction of the IPBES Values Framework (Pascual et al., 2022) and the impending 2030 deadline to achieve the UN Sustainable Development Goals (United Nations, 2015). The focus on values in the IPBES Values report largely arose due to concerns that previous legislation was supported by individuals and organisations invested in maintaining the status quo of focussing on the economic value of nature, rather than considering more significant environmental and social values (Pascual et al., 2023). By encouraging stakeholders to consider how their perceptions drive their management decision-making, it can pave the way for future discussions on alternative sustainable land management methods that consider environmental and social values.

1.4 | What is gorse and why is it managed?

This research employs a case study of gorse (*Ulex europaeus*) (Figure 1). Both the UK and Australia have high gorse abundance data (Stroh et al., 2023; Weeds Australia, 2024). Thus, they provide useful case studies to understand the extent to which weed perceptions vary between native and non-native ranges and how this these perceptions shape weed management strategies between the two locations. Gorse ranks in the International Union for Conservation of Nature's (IUCN) list of the top hundred invasive plant species on Earth (Simberloff & Rejmanek, 2019). In Australia, some states legally define gorse as an invasive species that must actively be managed



FIGURE 1 Photograph of gorse in Cornwall, UK (Westfield 2022).

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70337 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

from land and completely removed where possible (see the law for 'prescribed measures for the control of noxious weeds' in Victoria; Government of Victoria, 2020 and the 'gorse statutory management plan' in Tasmania; Government of Tasmania, 2011). European colonialism played a significant role in the spread of native European species to non-native continents. Gorse was taken to Australia for use as hedging on farms in the mid-1800s, but soon became uncontrolled due to a lack of natural and human-led environmental management (Hill et al., 2000; Miller & Murthy, 2008).

Gorse can be a pest in its native UK, as it smothers the landscape and shades out other species in undergrazed areas (Kirkham & Dudley, 2011). However, it is a nostalgic plant that reminds people of childhood, holidays and coastal visits, forming part of their sense of place within nature (Fergusson, 2023). Gorse has a long history of societal use in the UK, having been used as a fuelwood from the Neolithic period right up to the Industrial Revolution, particularly in poorer communities, and it was regularly grown for animal fodder due to its evergreen nature (Brook et al., 2025; Rymer, 1979). There is a plethora of small scale uses of gorse that were once found regionally in the United Kingdom, including: as cloth dyes and in wine making in the Scottish Highlands (Rotherham, 2007) and as a lime burning fuel in brickmaking and as leporine grazing fodder on rabbit farms in East Yorkshire (Harris, 1991). The main recorded medicinal uses of gorse were in Ireland, such as to treat hiccoughs, coughs, hoarseness and worms, though with little scientific backing to verify and validate its success in treating these (Lucas, 1958). This vast history of use in the UK contrasts starkly with a lack of use in Australia, where gorse use for hedging ended soon after its introduction in the mid-1800s and with little evidence of any other sustained productive use (Dwyer, 2021).

1.5 | Aim and objectives

This research aims to understand perceptions of gorse and its management. It will:

1. Assess whether gorse is perceived differently across its native and non-native ranges.
2. Consider whether and how any differing perceptions affect dominant gorse management approaches.

2 | METHODS AND METHODOLOGY

2.1 | Mixed-methods approach

This research employs a mixed-methods approach. Mixed methods commonly use multiple qualitative and/or quantitative data collection and analysis methods, which are combined to achieve the research aims and can often link the social and natural sciences (Strijker et al., 2020). The focus of mixed methods can be on both qualitative and quantitative outputs or one (Taherdoost, 2022). This research provides qualitative outputs through quotes from land stakeholders and quantitative outputs through quantities of each code. Combining these outputs allows this research to reveal the voices of individual stakeholders and what matters to them, as well as the numerical data to support their views. This strengthens the overall outputs and findings of the research (Doyle et al., 2009).

All participant recruitment, data collection and data analysis were carried out by the lead researcher, Westfield. The two other co-authors on this paper, Wandrag and Stringer, were involved for overall supervision of the research design, writing and review of this paper.

2.2 | Case study approach

A case study approach was used to allow for breadth and depth of data to be collected on one particular plant species (gorse), exploring the wider perceptions of it and their impacts on its management. Addressing these aspects would not be possible from a generalised, non-case study approach (Tsang, 2014). A multi-scale approach was taken to account for perceptions across gorse's native (UK) and non-native (Australia) range, spanning national level and local levels and different scales of stakeholder from individuals to government departments. At the most local scale, Cornwall, UK and Tasmania, Australia, have similar human populations and climates, and both have a high abundance of gorse (Stroh et al., 2023; Weeds Australia, 2024). As such, they provide useful local case studies to compare perceptions of gorse and any effects of its management, within the context of broader, country-wide data.

2.3 | Conceptual framing: IPBES Values framework and NCPs

This research is framed within the concepts and discussions on valuing nature. It applies the IPBES Values Framework. The framework categorises nature's contributions to people (NCPs) to consider how people are 'living in, with, from and as nature' (Pascual et al., 2022). These four categories aim to enhance the inclusivity of people-nature discussions, acknowledging that different people can experience and interact with nature in differing ways (Willemen et al., 2023). By employing the IPBES Values Framework, this research permits stakeholders to perceive gorse as neutral, positive and/or negative and value it in different ways.

NCPs are the differing ways that people and nature interact—they highlight what people gain from nature and also the disbenefits or costs. There are 18 standardised NCPs, which align to the MA ecosystem services (Díaz et al., 2018). However, this research adopts a simplified approach of using 12 NCPs, which removes the six regulatory service contributions (O'Connor & Kenter, 2019). Regulatory contributions, such as 'formation, protection and decontamination of soils', are difficult to assess from a qualitative

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70037 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

TABLE 2 Nature's contributions to people, as adapted from O'Connor and Kenter (2019).

Categories (IPBES values framework)	Codes (Nature's contributions to people)
Living from nature	Aesthetic
Living in nature	Energy
Living with nature	Food and feed
Living as nature	Habitat creation and maintenance
	Learning and inspiration
	Lived experiences
	Maintenance of options
	Physical and psychological experiences
	Practices of care
	Regulation of hazards and extreme events
	Spiritual
	Supporting identities

Note: All codes can appear under each of the four categories.

perspective, as taken in this research. Thus, it was decided to use the 12 NCPs (Table 2).

2.4 | Stakeholder analysis

A stakeholder analysis was undertaken to identify initial land stakeholders of interest. Given the available period for data collection (May to August 2023), quantitatively assessing all stakeholders involved in the land management industry was not feasible, so an interest-influence matrix was employed. This ensured a wide range of stakeholders were involved, covering a range of interests and influences, in line with similar land management research (Kik et al., 2021). Assessment of interest considered the extent to which a stakeholder was likely to be involved with gorse management, whilst consideration of the extent to which each stakeholder affects management policies and actions enabled assessment of influence. Separate matrices were made for the UK and Australia, acknowledging different stakeholder types across the two countries. Additional stakeholders were identified based on gaps in the matrices in terms of interest or influence to ensure breadth of data coverage.

Stakeholder organisations were included through identification of key government and non-government organisations involved with land management. Individuals were identified by the organisations themselves, who provided the necessary direct contact information. Snowball sampling after each interview added further stakeholders to the matrices, using people's expertise to find additional contacts (Meadows et al., 2014), leading to a targeted concentration of stakeholders in Cornwall, UK and Tasmania, Australia. Respondents from other parts of both countries were also included as relevant. Two key parameters were used to ensure continued relevance of stakeholder groups: (1) stakeholders (or individuals representing stakeholders) must be directly involved specifically with gorse management; (2) additional stakeholders must be distinctly different in their scale, management aims or geographical area from previously identified stakeholders. This prevented overlap in data and greater data coverage. Whilst the snowballing approach is often criticised for being too linear (Parker et al., 2019), this was addressed by starting from multiple different points.

2.5 | Key informant interviews

Key informant interviews ($n = 14$) were conducted in the UK. Key informants were identified from the matrix, considering whether they had high levels of influence or interest in land management and were sampled to ensure coverage of those managing different extents of land. The extent of land management is an important consideration as it affects how much of an area a stakeholder's perceptions will affect. If all land is included—regardless of land type—the key informants or their organisations manage 21% of the land in the UK. This percentage was calculated when sampling stopped due to saturation of data (Guest et al., 2006), to ensure not only saturation of perspectives gathered but sufficient spatial coverage.

All key informant interviews were held remotely via video call in May 2023, to ensure inclusion of as many key informants as possible. Remote interviews reduce rapport between researcher and participant, are often more succinct, potentially reducing data richness (Oliffe et al., 2021) and remove the opportunity to spontaneously view documents or speak to others in an organisation. However, they also expand the reach of research, providing participants with more flexibility on when they can partake in the interview. For the researcher, they reduce costs and free up funds for other activities. As such, remote interviews were not deemed detrimental to the data collection process for this study and where responses were considered too succinct, the lead researcher (Westfield) probed for more details.

Interviews lasted up to an hour, depending on stakeholder engagement with the research questions and how involved they were specifically with gorse management. A semi-structured approach was employed. This ensured consistency and comparability between data, whilst permitting flexibility depending on the responses received (O'Keeffe et al., 2016). A standard set of five questions started each interview. A bank of pre-written additional questions was then used, or discussion continued spontaneously where appropriate and relevant. This approach meant some interviews went on far longer than others but revealed different information under the constraints of the same themes. The approach allowed for key informants with neutral views on gorse or who provided little detail in their responses to still be included without straining conversations to continue for longer than necessary.

2.6 | Walking interviews

At the local UK level, in Cornwall, walking interviews ($n = 3$) were employed. Stakeholders for walking interviews were identified on the interest-influence matrix as three of the largest land managers

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70037 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

in Cornwall with distinct and differing interests in outcomes of landscape management. These were separate interviewees to the national level key informants. This allowed greater depth of detail to be collected on exactly how gorse is managed in practice. It also put the stakeholders in a natural environment, empowering them to feel comfortable and be open about their management approaches. The same five questions from the key informant interviews featured at some stage of the walking interviews, but the overall structure was far more flexible. Most conversations were led by the interviewees, with only occasional input from the lead researcher to keep the conversation focussed. Interviews lasted between one and a half and 3 h, depending on the number of managed sites visited and the distance between sites. Whilst there has been some criticism of the term 'walking interview' for being exclusionary, with suggested replacement terms of 'go-along interview' or 'bimbling' (Kinney, 2021), 'walking interview' was kept for this research as it was deemed most self-explanatory, and because the nature of the sites visited meant that walking was the only way to explore them.

2.7 | Questionnaires

To assess the local Australian level, in Tasmania, questionnaires ($n = 30$) (Data S1) were used to remotely gather a good breadth of perceptions (Westin et al., 2023). Due to the land area managed by respondents and quick saturation of data in variation of responses, 30 questionnaires were deemed sufficient for analysis. The questionnaire featured 79 questions, across seven sections. They also included the same five core questions as were asked in all other data collection types, permitting comparability of data. Questionnaires were initially disseminated via the Australian key informants in a similar snowball approach to that used in the UK. However, a low response rate meant that social media was subsequently employed to increase engagement. To mitigate irrelevant responses, an initial set of questions was added to gauge the type of respondent completing the questionnaire, so that they could be discounted if necessary. There is a risk with social media dissemination that the quality of the data can decrease by the inclusion of non-specialists (Keat et al., 2023). Luckily, all responses were of usable quality and all respondents engaged well with the questions, providing a great depth of insightful data. Whilst questionnaires cannot provide the same insightful responses as walking interviews (Day & Cornell, 2023), meaning the Australian data are not necessarily as robust as the UK data, they kept the research within budget and permitted a wide range of respondents to provide their views, giving a good breath of data from across Tasmania, from a variety of land stakeholders. Nevertheless, without direct person-to-person contact, there was little opportunity to clarify questions, expand on answers or refocus responses and this resulted in shorter, less detailed responses than in the interviews and some answers that were not always relevant to the research aims. However, if the questions had not been kept the same, the risk of deviation from research aims would have been higher, whilst we would not have been able to confidently address the research aims from both native and non-native contexts without using the same questions.

2.8 | Written key informant interviews

Following on from the questionnaires, and using the Australian interest-influence matrix, key informants were identified from across Australia. Structured written interviews ($n = 5$) were employed as the difference in time zones between the UK and Australia made it difficult for the lead researcher and land stakeholders to align for video interviews. Written interviews severely limit the ability to have an open discussion and follow new lines of enquiry (Hawkins, 2018) so this remains a limitation. To allow comparability of data, questions were kept the same as for UK key informants. Whilst the use of different data collection techniques will have influenced the data richness from Australia, the data were still valid and useful.

2.9 | Analysis

All video interviews and audio recordings from walking interviews were transcribed using Zoom Video Conferencing (version 6.2.6) and then reviewed by the lead researcher and corrected where necessary. Interviews and questionnaires were then qualitatively coded in NVivo 20 using thematic analysis and an abductive approach.

All key informant interviews were analysed together, separately to the walking interviews being analysed together, and henceforth for the written interviews and questionnaires. This separation of data types meant that whilst the same analysis approach was taken, it was still contextualised within the data collection method used. This therefore accounted for different outputs from different methods.

A codebook thematic analysis was used. The codebook approach was taken instead of the two common alternative thematic analysis approaches, coding reliability thematic analysis and reflexive thematic analysis, as it allowed the data to be aligned directly to the IPBES Values Framework ('predetermined information needs') and permitted the outputs from each data collection method to be merged to create common outputs to keep data reliable (Braun & Clarke, 2022). The limitation to merging the data in this way was that differences in response linked to each data collection type may be lost. This would be important if the focus of this research were on one specific location. However, the benefit of being able to compare responses across locations and produce more wide-reaching results and discussions outweighs this limitation on this occasion. Data were coded inductively based on 12 identified NCPs (see results below). Codes were then categorised depending on whether they presented positive, negative or neutral perceptions. Data were themed deductively, based on the management approach identified by the participant.

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70337 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

2.10 | Ethics

Full ethical approval was received (University of York: DEGERC/Res/13012023/1). All participants gave informed consent to participate in this study. The research, its aims and data handling processes were explained and agreed in advance of each interview or questionnaire response. Participants were given the option to withdraw from this research at any time. Data were anonymised prior to analysis, and personal data were only gathered if the participant wished to be contacted further regarding this study. Full details are available in the footnote.[1]

3 | RESULTS

3.1 | Land stakeholders' perceptions of gorse

To address objective 1 (Assess whether gorse is perceived differently across its native and non-native ranges), codes based on NCPs were tabulated based on the perceptions of the land stakeholder, split across gorse's native (UK) and non-native (Australia) range (Table 3). From these data, certain trends appear. Firstly, different NCPs were mentioned most frequently across the native and non-native range. For example, 'energy' and 'food and feed' were mentioned 32 times by UK participants, but only four times by Australian participants, with the inverse for 'physical and psychological experiences' (18 for the UK; 39 for Australia). This highlights how different landscapes and societies can hold differing values on the same plant species. Secondly, and more notably, perceptions of the same NCP differed across native and non-native ranges. Whilst 'aesthetic' value of gorse was viewed very positively in the UK, it was viewed in equal frequency as negative in Australia. Similarly, 'maintenance of options' and 'supporting identities' were viewed positively in the UK and negatively in Australia in equal measure. These highlight how NCPs can be simultaneously valued as positive and negative for the same species depending on the stakeholder.

TABLE 3 Frequency of NCP codes, split by location and perception of gorse.

		Nature's contributions to people												
Frequency of codes		Aesthetic	Supporting identities	Spiritual	Lived experiences	Practices of care	Habitat creation and maintenance	Regulation of hazards and extreme events	Maintenance of options	Food and feed	Energy	Learning and inspiration	Physical and psychological experiences
Perceptions of gorse	Native positive	27	14	—	16	—	18	—	15	18	25	9	8
	Native neutral	13	3	—	19	4	12	4	7	4	7	—	7
	Native negative	—	—	—	8	—	7	20	4	—	—	—	3
	Non-native positive	5	—	—	2	—	2	—	3	1	4	—	—
	Non-native neutral	—	—	—	20	—	11	3	7	—	—	—	—
	Non-native negative	36	13	—	32	—	45	52	14	6	—	17	39

Note: —denotes no record in responses.

[1]This research was not registered with a Human Research Ethics Committee (HREC) in Australia, for clear reasons. As per the Australian National Statement on Ethical Conduct in Human Research (NSEC) (National Health and Medical Research Council (Australia), 2025), section 2.1, this research is classed as 'lower risk', in the 'minimal' risk category: no risk of harm or discomfort, with only minor potential risk of burden or inconvenience purely due to participants having to give up a small amount of time to partake in this research. Thus, this research falls under section 5.1.12 to 5.1.18 of the NSEC, where it is exempt from registration with an HREC. As per 5.1.12, the research was given full ethical review and approval from a designated committee at the University of York (as explain above). As per 5.1.14, the ethics committee at the University of York are familiar with the Australian NSEC and therefore would have raised concerns had the research been considered greater than low risk, which it was not. As per 5.1.17, all personal identifiers were removed, and no information has been provided in this paper that could make re-identification of participants possible.

The participant recruitment, data collection, and data analysis were all carried out by the lead researcher, Westfield, remotely from the UK. One co-author, Wandrag, was based at the University of York, UK at the start of this research but transferred to the University of Tasmania, Australia partway through this project before data collection had begun. Wandrag was not involved with any social research activities, including any data collection or analysis in this project, to align with ethics guidelines and remove the risk of conflicts of interest. Thus, Wandrag took on a purely supervisory role in this project.

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70337 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

TABLE 4 Number of land stakeholders using each management method, based on their location and perception of gorse.

Number of land stakeholders		Management method					
		Burning	Cutting	Grazing	Herbicide treatment	Biological control	None
Perception of gorse	Native positive	2	3	1	2	0	2
	Native neutral	3	7	3	1	0	4
	Native negative	1	1	1	0	0	0
	Non-native positive	0	0	0	0	0	0
	Non-native neutral	0	0	0	0	0	0
	Non-native negative	11	15	2	20	3	0

3.2 | Perceptions and management methods

To address the second objective (consider whether any differing perceptions affect dominant gorse management approaches), perceptions of gorse and the management method or methods used were tabulated based on whether a land stakeholder was based in gorse's native (UK) or non-native (Australia) range (Table 4). This used the categories from the thematic analysis of 'positive', 'neutral' or 'negative' perceptions. To place stakeholders' codes under these categories, it was considered what their overall view of gorse was, based on the interviews. 'Positive' stakeholders saw gorse as having an overarchingly positive contribution to the landscape—be that for environmental, economic or social reasons. This did not mean gorse was not managed, but that management approaches proactively ensured the continued presence of gorse. 'Neutral' stakeholders fell into two sub-categories: (1) those who gave an equal weighting to gorse's beneficial values to the problems it can cause to the environment, so managed it with these in mind; (2) those who had no specific opinion on gorse and therefore had no specific management plan in place. 'Negative' stakeholders had an overarchingly negative view of gorse. Their sole purpose of management was either to prevent further spread or to try and achieve total eradication. Some land stakeholders are included under more than one management method as they employed multiple approaches to deal with gorse on their land.

4 | DISCUSSION

4.1 | Historical and colonial legacies

Results showed some key differences between perceptions of gorse in its native and non-native ranges and the consequences of this for management with herbicides. In its non-native range, gorse was predominantly perceived as negative, with 17 positive perceptions of gorse's NCPs compared to 254 negative perceptions (Table 3). This can be linked to colonial plant legacies in Australia. Gorse was introduced by British settlers in the mid-1800s for use as an ornamental and hedging plant, reflecting the home landscape back in the UK (Hill et al., 2000). However, these uses were quickly dropped due to the invasive nature of gorse and its rapid spread (Miller & Murthy, 2008). As such, Australian perceptions of gorse may be influenced by links to colonial legacy and the impact it continues to have on the native Australian landscape (Shaik et al., 2022). Aboriginal perceptions of gorse were not captured in this research and, whilst not explicitly excluded, we were unable to access and reach Aboriginal communities—a limitation of conducting research remotely. Thus, negative perceptions of gorse and its management through burning and herbicides are reflective of the politics of colonialism and the characteristics of the sampled respondents. It does not reflect the more holistic approach to invasive plant management often taken by Indigenous groups (Head & Atchison, 2015). Any future research should consider the political implications of weed eradication policies on Aboriginal lives and colonial legacies.

More frequent use of herbicide use seen in the interview data from Australia is driven by the fact that gorse is legislated as a nationally significant weed to be eradicated (Weeds Australia, 2024). Thus, there are legal requirements for landholders to do so in many Australian states, including Tasmania. There is a gorse specific Australian 'National Best Practice Manual' which specifies that the best approach to managing gorse requires follow-up treatment with herbicide (National Gorse Taskforce, 2006). Negative perceptions of gorse can therefore be linked to more frequent use of herbicide because of these legislation and guidelines. Comparable types of guidelines do not exist for gorse in the UK. Both burning and cutting methods require follow-up with herbicide to ensure gorse does not grow back quickly (Roberts & Florentine, 2021). In the non-native range, where gorse is perceived as a weed that must be eradicated, herbicide treatment is crucial to meeting this aim, so more frequent herbicide use in Australia is not surprising. It aligns with land stakeholders' negative views of gorse for its NCPs of 'habitat creation and maintenance' and 'regulation of hazards and extreme events', and therefore, the need to manage it. It is surprising that the proportion of land stakeholders using herbicide is not similar in the UK, considering the perceived ineffectiveness of burning or cutting alone to completely control a species on a large scale (Andreasen et al., 2002; Gerhards et al., 2022). A lack of herbicide use can be put down to economic factors, such as the cost, both of workers needed to treat gorse and the quantity of herbicide needed. Farm labour costs, as of 2018, were £640 per hectare, and herbicide costs

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70337 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

up to £134 per hectare (Agriculture and Horticulture Development Board, 2018). This compares to weed control measures in Australia costing A$113 (£56) per hectare in 2016 (McLeod, 2018). Thus, the economic cost of using herbicides in Australia is already lower before other environmental and social factors are considered. Most of the larger stakeholders interviewed in the UK relied on volunteer labour to reduce costs. In this context, total eradication is not possible, so herbicide use is not deemed necessary. Furthermore, differences in herbicide use in UK and Australia could be put down to social factors. Widespread use of herbicides is more socially and politically acceptable and common in Australia (Thompson & Chauhan, 2022). This demonstrates that whilst the aim of management may be the same in native and non-native ranges, the willingness to engage with herbicides affects the outcome.

Differences in perception between native and non-native ranges can also be attributed to differences in perceived heritage values of gorse. In the UK, it has a well-known history and is seen as part of the landscape. In Australia, few questionnaire respondents knew why it had been introduced to Australia in the first place; they lacked any positive heritage link and viewed gorse within the colonial legacy on weed invasion, as supported in law. Management of weeds needs to draw on positive heritage values, acknowledging the difficulties and opportunities of heritage (e.g. discussions on colonial history), if perceptions are to be shifted. Understanding how what may now be perceived as a weed was used historically and why it came to be in a place is as much about social history as it is about botanical history. Many of the UK stakeholders were open to reviving historic uses if it added value to their gorse management. Australian stakeholders remained very closed to this idea, believing that its weedy nature trumped any such economic or environmental value associated with its productive use. Australian stakeholders did not perceive gorse to be of value for 'food and feed', whilst 'aesthetic' value was dismissed, gorse is seen as a 'scourge on the landscape' (Non-Native Range Stakeholder 30) since it covers large expanses of land. Without seeing gorse for these values, and with gorse a declared weed in all Australian states (Weeds Australia, 2024), it is understandable that herbicide would be seen as an effective solution. Future management strategies need to consider a weed's heritage when suggesting how and why it should be managed (Westfield et al., 2025). This heritage can be used to shift perceptions, not necessarily from negative to positive but to present a more nuanced view that acknowledges differing legacy colonial and Indigenous approaches to, and challenges of, weed management. Gorse's history in the UK must be considered very differently, as its spread is not linked to colonial histories, but instead to class struggles and the enclosure of common land (Blomley, 2007). The three walking interviews in Cornwall all highlighted the heritage value that gorse holds for both local inhabitants and tourists. This aligns with the literature on the social history of gorse and the importance of having gorse in the landscape (Atlan et al., 2015). As such, total eradication is not the goal, and herbicide treatment may not be necessary. Native Range Stakeholder 16 held a negative view of gorse as a weed yet still did not believe in total eradication due to the heritage of gorse on that land. Herbicide was used sparingly only if other management methods were not effective.

4.2 | Ecological and regulatory differences

Finding common solutions to gorse management across the native and non-native ranges is not straightforward. This can be linked to differing biophysical and regulatory contexts in the UK and Australia. In Australia, gorse has low vulnerability to pests and a large ecological niche, making it far more ecologically damaging than in its native range in the UK (Broadfield & McHenry, 2019). Susceptibility of the Australian landscape to gorse invasion directly feeds into its strict regulation across most Australian states. This is seen through the law for 'prescribed measures for the control of noxious weeds' in Victoria (Government of Victoria, 2020) and the gorse statutory management plan in Tasmania (Government of Tasmania, 2011). This regulation could affect public opinions and drive more negative perceptions, presenting a negative discourse around it that does not exist in the UK. Thus, there is an ecological and regulatory need in Australia to manage gorse on a large scale, with the aim of eradication, linked with a social perception that it is negative and needs removing. However, large-scale management has externalities that need to be considered.

As many of the Australian stakeholders highlighted, burning gorse has a wider landscape implication. Without the necessary planning and controls, burning can harm other parts of the ecosystem or lead to uncontrolled fires (Onwudiegwu et al., 2024). This is particularly the case in the UK where plant species are less adapted to functional fire and burning than species in Australia. It therefore needs to be questioned whether the amount of gorse that is reduced through burning is worth the wider impact; whether the perceived negative values associated with living with gorse outweigh any damage to that landscape. Whilst in Australia, Indigenous communities have used controlled fire and burning for thousands of years (Bardsley et al., 2019), and many species are fire adapted (Sample et al., 2022), burning can still have negative externalities for human health and air quality if the appropriate guidelines are not followed (Haikerwal et al., 2015). Evidence suggests that gorse spread is encouraged by burning (Sriramamurthy et al., 2020), requiring follow-up herbicide treatment. Small scale spot herbicide treatment is effective and was used by half of the stakeholders questioned in the non-native range. The other half were dealing with large areas of gorse, so instead took to machine spraying. This has a similar effect to burning, coating, and therefore killing, everything in that landscape. Burning and herbicide treatments to kill gorse produces a barren landscape. This does not align with the positive NCPs of living in nature, such as 'practices of care' and 'maintenance of options', and certainly, does not put nature first when considered alongside the sustainability aims of the IPBES Values Framework and UN Sustainable Development Goals. Whilst putting nature first is a managerial aspiration of these policy goals and approaches, there is a need for more education around how and why burning and herbicide treatment could prove unsustainable in the long term, whilst respecting Indigenous cultural burning regimes and creative use of fire to manage landscapes that has occurred over thousands of years.

Negative externalities for species that thrive on gorse include habitat loss. Only a few of the non-native range land stakeholders

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70337 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

acknowledged the habitat and food source that gorse provides to other species, and this was not mentioned in the legislation. At a broad scale, gorse has been shown as a good source of food for insects, through deadwood, and pollinators, through its flowers (Bowman et al., 2008), a safe nesting environment for birds (Carlos & Gibson, 2020) and protects tree saplings in the early stages of growth, with the trees naturally shading gorse out as they develop (Vidal et al., 2021). However, there is limited research in gorse's non-native range, specifically Australia, assessing whether native species use it as a habitat (Ranyard et al., 2018). Thus, these ecological benefits may not apply or may be less frequently beneficial; more research is required to formally assess this.

Stakeholders in gorse's native range seemed more aware of these co-benefits for other species and that the trade-off was the need to maintain gorse on their land. In the non-native range, there was a general disregard for the wider environmental impact of gorse management and the consequences this could have for other species. More research in this area would identify whether there is a need to conserve some gorse for this purpose as part of living sustainably with nature rather than aiming for total eradication. It could also be further investigated whether in the non-native range staged removal of gorse could have a positive impact on native landscape and ecological function in smaller cleared areas versus trying to eradicate gorse across a large area.

In Australia, two thirds of the respondents reported that gorse control was a constant process, repeated annually to ensure its effectiveness, thus presenting a repeated economic cost. Several interviewees highlighted that this requires an annual allocation of funds. For some stakeholders—regardless of their perceptions—cheaper management methods are their only option due to affordability. Management costs could also be linked with most land stakeholders using traditional methods despite the wider negative environmental consequences—though there is no evidence to suggest this is leading to broad landscape destruction. With biological controls, if there is no guarantee that they will be effective on a large enough scale or long enough time frame, they are not a worthwhile investment—though this risk is sometimes mitigated in Australia where the costs of biological controls are born by the government (Department of Agriculture, Fisheries and Forestry, 2026). Consideration is needed as to how land stakeholders can be supported to transition to management methods with a lower environmental and economic impact, whilst still supporting their management goals. It would also need to be considered how to convince land stakeholders that alternative methods are still a worthwhile investment (e.g. for sustainability targets) if they prove to only be effective on a smaller scale.

In the UK, the ecological and regulatory need to manage gorse is much lower. Two land stakeholders explained that managing gorse on their land is a last resort, which they only carry out if it impacts their day-to-day activities. There is also no regulatory prerogative to manage or eradicate gorse like there is in Australia, so people are not predisposed to hold negative perceptions of gorse. These two stakeholders had neutral to positive views on gorse and its benefits for biodiversity, but its encroachment on too much land posed a risk to people's safety due to increased wildfire risk. As such, even though a stakeholder may perceive gorse as having some positive impacts, social and economic considerations still feature in their management decisions. Gorse management for the overall benefit of the landscape is therefore demonstrated in both the UK and Australia, despite their ecological and regulatory differences. Subsequent research into how to mitigate the externalities of management methods, such as burning and herbicide treatment, can therefore look beyond differences in the native and non-native ranges to find common solutions to externalities that are suitable in all locations.

4.3 | Power and politics in weed discourse

How gorse is perceived has been shown to influence how land is managed and the aims of that management. However, interviews highlighted several other factors that stakeholders must consider when managing gorse on their land, including its impacts on other weeds. These considerations can be split into environmental, economic and social factors.

Most respondents from Tasmania in the non-native range removed gorse from their land, in line with and the Gorse Statutory Management Plan (Government of Tasmania, 2011). The law in Tasmania states, 'a person must not: grow, propagate or scatter gorse' (Goverment of Tasmania, 2011, Section 6, Part 1.c). Existing discourse on the politics of weed management and subsequent legislation have been led cultural and historical anxieties related to settler colonialism and environmental governance; however, this often disregards Indigenous approaches to land management and their relationships with the land (van Holstein & Head, 2018). Having guidance on living with weeds and acknowledging their positive values can go some way to shifting perceptions and incorporating Aboriginal approaches to land management into legislation. In the written interviews, stakeholders were prompted to think beyond current guidance when considering the value of weeds and alternative management methods. Only when prompted in this way did those in the non-native range acknowledge that not all gorse values are negative and that their management methods could be adapted. Being aware of how management methods can change when perceptions shift is key to improving legislation for weed management. Law makers need to recognise that the settler-colonialism environmentalism approach of blanket management and weed eradication legislation is not always effective and that Indigenous approaches of localised environmental management may be more suitable to cope with environmental change (Reardon-Smith, 2025).

In the UK, environmental factors affecting weed management were more focussed around site accessibility and the management methods that were possible on that site. For example, grazing is only feasible when stakeholders have vehicular site access and access to grazing animals to put on the site. As such, even where interviewees believed gorse was

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70337 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

detrimental to the overall biodiversity of the site, what was possible in terms of management was shaped by access and labour availability.

Economic limiting factors highlight how wider socio-political dynamics, such as the funding available from the Environmental Land Management Scheme and other agri-environment schemes decide what management approaches are taken (Cardwell, 2024). This is contextualised by wider environmental governance discussions, such as the role of land management in climate change adaptation and mitigation (Evans & Thomas, 2023). Thus, future research needs to consider how land management stakeholders can be better included in these bigger picture discussions to ensure they continue to have the power to make individual weed management decisions. Importantly, land management stakeholders need to be included in collective or socialised decisions to ensure that their individual actions do not work against the collective good, such as refusing to manage gorse despite its community impacts or vice versa. It thus fosters a sense of community that can allow a group of stakeholders (e.g. farmers) to form a cohesive group argument when discussing land management processes on a larger scale.

5 | CONCLUSION

Gorse is valued differently in its native versus its non-native range, resulting in varying approaches to its management. In the native range, more positive perceptions meant gorse was largely managed sporadically and only when it became problematic. In the non-native range, emphasis was placed on complete removal and eradication of gorse, leading to the use of more intensive and combined management methods. Complex historical, ecological and regulatory contexts also underpin these perceptions.

This research contributes to what we already know about weed management by demonstrating that environmental perceptions are shaped by both economic and social views, with plant heritage playing an unexpectedly significant role in land management decisions. Knowing that plant heritage impacts decision-making means future research can focus on how to expand these discussions, shift land stakeholders away from pre-defined perceptions of weed species and encourage discussions that focus on future sustainability rather than historic problems. Whilst the UK and Australia have linked yet distinct plant heritages, particularly in the case of gorse, by considering people's perceptions of weeds across both locations it has been possible to contribute to bigger picture discussions on heritage, ecological and regulatory differences and the politics of weed management that traverse national boundaries. This means that future weed research can draw on perceptions from multiple locations to consider a greater range of approaches to sustainable weed management.

AUTHOR CONTRIBUTIONS

James P. Westfield conceived the ideas and designed methodology; James P. Westfield collected the data; James P. Westfield analysed the data; James P. Westfield led the writing of the manuscript, with Elizabeth M. Wandrag and Lindsay C. Stringer reviewing and editing. Elizabeth M. Wandrag and Lindsay C. Stringer supervised the research project. All authors contributed critically to the drafts and gave final approval for publication.

CONFLICT OF INTEREST STATEMENT

On behalf of all authors, the corresponding author states that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

Data are not available publicly as they contain individual data that could compromise privacy. Data are archived and available upon reasonable request to review for future related research.

ORCID

James P. Westfield https://orcid.org/0000-0002-8488-4127
Elizabeth M. Wandrag https://orcid.org/0000-0001-8140-539X
Lindsay C. Stringer https://orcid.org/0000-0003-0017-1654

REFERENCES

Able, K. W., & Hagan, S. M. (2000). Effects of common reed (*Phragmites australis*) invasion on marsh surface macrofauna: Response of fishes and decapod crustaceans. *Estuaries*, *23*, 633–646. https://doi.org/10.2307/1352890

Agriculture and Horticulture Development Board. (2018). Review of Weed Control options and future opportunities for UK crops [WWW Document]. https://ahdb.org.uk/review-of-weed-control-options-and-future-opportunities-for-uk-crops

Andreasen, C., Hansen, C. H., Møller, C., & Kjær-Pedersen, N. (2002). Regrowth of weed species after cutting. *Weed Technology*, *16*, 873–879. https://doi.org/10.1614/0890-037X(2002)016%255B0873:ROWSAC%255D2.0.CO;2

Atlan, A., Udo, N., Hornoy, B., & Darrot, C. (2015). Evolution of the uses of gorse in native and invaded regions: What are the impacts on its dynamics and management? *Revue d'Écologie*, *Sup12*, 191–206.

Bardsley, D. K., Prowse, T. A. A., & Siegfriedt, C. (2019). Seeking knowledge of traditional indigenous burning practices to inform regional bushfire management. *Local Environment*, *24*, 727–745. https://doi.org/10.1080/13549839.2019.1640667

Barrett, C. B. (2021). Overcoming global food security challenges through science and solidarity. *American Journal of Agricultural Economics*, *103*, 422–447. https://doi.org/10.1111/ajae.12160

Bell, S. (2012). *Landscape: Pattern, perception and process* (2nd ed.). Routledge. https://doi.org/10.4324/9780203120088

Blomley, N. (2007). Making private property: Enclosure, common right and the work of hedges. *Rural History*, *18*, 1–21. https://doi.org/10.1017/S0956793306001993

Bourgeois, B., Munoz, F., Fried, G., Mahaut, L., Armengot, L., Denelle, P., Storkey, J., Gaba, S., & Violle, C. (2019). What makes a weed a weed? A large-scale evaluation of arable weeds through a functional lens. *American Journal of Botany*, *106*, 90–100. https://doi.org/10.1002/ajb2.1213

Bowman, G., Tarayre, M., & Atlan, A. (2008). How is the invasive gorse *Ulex europaeus* pollinated during winter? A lesson from its native range. *Plant Ecology*, *197*, 197–206. https://doi.org/10.1007/s11258-007-9370-1

Brandon, A. L., Gibson, D. J., & Middleton, B. A. (2004). Mechanisms for dominance in an Early successional old field by the invasive non-native *Lespedeza cuneata* (Dum. Cours.) G. Don. *Biological Invasions*, *6*, 483–493. https://doi.org/10.1023/B:BINV.0000041561.71407.f5

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70337 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Braun, V., & Clarke, V. (2022). Conceptual and design thinking for thematic analysis. *Qualitative Psychology*, *9*, 3–26.

Bremner, A., & Park, K. (2007). Public attitudes to the management of invasive non-native species in Scotland. *Biological Conservation*, *139*, 306–314. https://doi.org/10.1016/J.BIOCON.2007.07.005

Broadfield, N., & McHenry, M. T. (2019). A world of gorse: Persistence of *Ulex europaeus* in managed landscapes. *Plants*, *8*, 523. https://doi.org/10.3390/plants8110523

Brook, T. J., Stratigos, M. J., & Oliver, J. (2025). The archaeology of whin mills in post-medieval north-east Scotland. *Proceedings of the Society of Antiquaries of Scotland*, *154*, 259–285. https://doi.org/10.9750/PSAS.154.1434

Cardwell, M. (2024). The environmental land management scheme: Public goods and levels of ambition. *Environmental Law Review*, *26*, 223–232. https://doi.org/10.1177/14614529241272293

Carlos, E. H., & Gibson, M. (2020). The habitat value of gorse "*Ulex europaeus*" L. and hawthorn "*Crataegus monogyna*" Jacq. For birds in Quarry Hills Bushland Park, Victoria. *Victorian Naturalist*, *127*, 115–124. https://doi.org/10.3316/informit.743232938695441

Chapman, D., Purse, B. V., Roy, H. E., & Bullock, J. M. (2017). Global trade networks determine the distribution of invasive non-native species. *Global Ecology and Biogeography*, *26*, 907–917. https://doi.org/10.1111/GEB.12599

Clements, D. R., Ditommaso, A., Jordan, N., Booth, B. D., Cardina, J., Doohan, D., Mohler, C. L., Murphy, S. D., & Swanton, C. J. (2004). Adaptability of plants invading north American cropland. *Agriculture, Ecosystems & Environment*, *104*, 379–398. https://doi.org/10.1016/J.AGEE.2004.03.003

Colautti, R. I., & MacIsaac, H. I. (2004). A neutral terminology to define 'invasive' species. *Diversity and Distributions*, *10*, 135–141. https://doi.org/10.1111/J.1366-9516.2004.00061.X

Daehler, C. C. (2003). Performance comparisons of co-occurring native and alien invasive plants: Implications for conservation and restoration. *Annual Review of Ecology, Evolution, and Systematics*, *34*, 183–211. https://doi.org/10.1146/annurev.ecolsys.34.011802.132403

Day, S., & Cornell, J. (2023). Walking interviewing method. In P. Liamputtong (Ed.), *Handbook of social sciences and global public health* (pp. 1–17). Springer International Publishing. https://doi.org/10.1007/978-3-030-96778-9_60-1

de Juan, S., Gelcich, S., & Fernandez, M. (2017). Integrating stakeholder perceptions and preferences on ecosystem services in the management of coastal areas. *Ocean and Coastal Management*, *136*, 38–48. https://doi.org/10.1016/j.ocecoaman.2016.11.019

Denslow, J. S., Space, J. C., & Thomas, P. A. (2009). Invasive exotic plants in the tropical Pacific Islands: Patterns of diversity. *Biotropica*, *41*, 162–170. https://doi.org/10.1111/J.1744-7429.2008.00469.X

Department of Agriculture, Fisheries and Forestry. (2026). Supporting Communities Manage Pest Animals and Weeds Program—DAFF [WWW Document]. https://www.agriculture.gov.au/biosecurity-trade/pests-diseases-weeds/pest-animals-and-weeds/supporting-communities

Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R. T., Molnár, Z., Hill, R., Chan, K. M. A., Baste, I. A., Brauman, K. A., Polasky, S., Church, A., Lonsdale, M., Larigauderie, A., Leadley, P. W., van Oudenhoven, A. P. E., van der Plaat, F., Schröter, M., Lavorel, S., … Shirayama, Y. (2018). Assessing nature's contributions to people. *Science*, *359*, 270–272. https://doi.org/10.1126/science.aap8826

Doyle, L., Brady, A.-M., & Byrne, G. (2009). An overview of mixed methods research. *Journal of Research in Nursing*, *14*, 175–185. https://doi.org/10.1177/1744987108093962

Dwyer, J. (2021). *Ulex europaeus* (furze, goss, gorse, whin, friz). *Australian Garden History*, *32*, 20–23. https://doi.org/10.3316/informit.673730993380448

Early, R., Bradley, B. A., Dukes, J. S., Lawler, J. J., Olden, J. D., Blumenthal, D. M., Gonzalez, P., Grosholz, E. D., Ibañez, I., Miller, L. P., Sorte, C. J. B., & Tatem, A. J. (2016). Global threats from invasive alien species in the twenty-first century and national response capacities. *Nature Communications*, *7*, 1–9. https://doi.org/10.1038/ncomms12485

Evans, J., & Thomas, C. (2023). *Environmental governance* (2nd ed.). Routledge. https://doi.org/10.4324/9781003334699

Fergusson, K. (2023). *Cornwall & the isles of Scilly*. Bradt Travel Guides.

Fracchiolla, M., Lasorella, C., Cazzato, E., & Vurro, M. (2022). Weeds in non-agricultural areas: How to evaluate the impact? A preliminary case study in archaeological sites. *Agronomy*, *12*, 1079. https://doi.org/10.3390/agronomy12051079

García-Martín, M., Bieling, C., Hart, A., & Plieninger, T. (2016). Integrated landscape initiatives in Europe: Multi-sector collaboration in multi-functional landscapes. *Land Use Policy*, *58*, 43–53. https://doi.org/10.1016/j.landusepol.2016.07.001

Gerhards, R., Andújar Sanchez, D., Hamouz, P., Peteinatos, G. G., Christensen, S., & Fernandez-Quintanilla, C. (2022). Advances in site-specific weed management in agriculture—A review. *Weed Research*, *62*, 123–133. https://doi.org/10.1111/wre.12526

Government of Tasmania. (2011). Gorse—Statutory Management Plan.

Government of Victoria. (2020). Catchment and Land Protection Act 1994.

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough?: An experiment with data saturation and variability. *Field Methods*, *18*, 59–82. https://doi.org/10.1177/1525822X05279903

Gurevitch, J., & Padilla, D. K. (2004). Are invasive species a major cause of extinctions? *Trends in Ecology & Evolution*, *19*, 470–474. https://doi.org/10.1016/J.TREE.2004.07.005

Haikerwal, A., Reisen, F., Sim, M. R., Abramson, M. J., Meyer, C. P., Johnston, F. H., & Dennekamp, M. (2015). Impact of smoke from prescribed burning: Is it a public health concern? *Journal of the Air & Waste Management Association*, *65*, 592–598. https://doi.org/10.1080/10962247.2015.1032445

Harris, A. (1991). Gorse in the east riding of Yorkshire. *Folk Life*, *30*, 17–29. https://doi.org/10.1179/043087791798238923

Hawkins, J. E. (2018). The practical utility and suitability of email interviews in qualitative research. *The Qualitative Report*, *23*, 493–501.

Head, L., & Atchison, J. (2015). Entangled invasive lives: Indigenous invasive Plant Management in Northern Australia. *Geografiska Annaler: Series B, Human Geography*, *97*, 169–182. https://doi.org/10.1111/geob.12072

Hill, R., Gourlay, A., & Fowler, S. (2000). The biological control program against gorse in New Zealand. Presented at the Proceedings of the X international Symposium on Biological Control of Weeds, Montana State University Bozeman, Montana, USA, pp. 909–917.

Hoddle, M. S. (2004). Restoring balance: Using exotic species to control invasive exotic species. *Conservation Biology*, *18*, 38–49. https://doi.org/10.1111/J.1523-1739.2004.00249.X

Humphries, T., Florentine, S. K., Dowling, K., Turville, C., & Sinclair, S. (2021). Weed management for landscape scale restoration of global temperate grasslands. *Land Degradation & Development*, *32*, 1090–1102. https://doi.org/10.1002/ldr.3802

Jones, T. S., Culham, A., Pickles, B. J., & David, J. (2024). Can gardeners identify 'future invaders'? *NB*, *91*, 125–144. https://doi.org/10.3897/neobiota.91.110560

Kean, J. M. (2009). Potential distribution of hawthorn in New Zealand. *New Zealand Plant Protection*, *62*, 387–392. https://doi.org/10.30843/NZPP.2009.62.4880

Keat, W. O. L., Gauhar, V., Castellani, D., & Teoh, J. Y.-C. (2023). Tips and pitfalls in using social media platforms for survey dissemination. *Société Internationale d'Urologie Journal*, *4*, 118–124. https://doi.org/10.48083/PERG3137

Khattak, W. A., Sun, J., Hameed, R., Zaman, F., Abbas, A., Khan, K. A., Elboughdiri, N., Akbar, R., He, F., Ullah, M. W., Al-Andal, A., & Du, D. (2024). Unveiling the resistance of native weed communities: Insights for managing invasive weed species in disturbed environments. *Biological Reviews*, *99*, 753–777. https://doi.org/10.1111/brv.13043

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70337 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Kik, M. C., Claassen, G. D. H., Meuwissen, M. P. M., Smit, A. B., & Saatkamp, H. W. (2021). Actor analysis for sustainable soil management—A case study from The Netherlands. *Land Use Policy*, *107*, 105491. https://doi.org/10.1016/j.landusepol.2021.105491

Kinney, P. (2021). Walking interviews: A novel way of ensuring the voices of vulnerable populations are included in research. In M. Borcsa & C. Willig (Eds.), *Qualitative research methods in mental health: Innovative and collaborative approaches* (pp. 65–82). Springer International Publishing. https://doi.org/10.1007/978-3-030-65331-6_4

Kirkham, G., & Dudley, P. (2011). Managing the Historic Environment on West Cornwall's Rough Ground. Historic Environment, Cornwall Council.

Kizos, T., Plieninger, T., Iosifides, T., García-Martín, M., Girod, G., Karro, K., Palang, H., Printsmann, A., Shaw, B., Nagy, J., & Budniok, M.-A. (2018). Responding to landscape change: Stakeholder participation and social Capital in Five European Landscapes. *Land*, *7*, 14. https://doi.org/10.3390/land7010014

Lediuk, K. D., Damascos, M. A., Puntieri, J. G., & Svriz, M. (2014). Differences in phenology and fruit characteristic between invasive and native woody species favor exotic species invasiveness. *Plant Ecology*, *215*, 1455–1467. https://doi.org/10.1007/S11258-014-0402-3/FIGURES/3

Lucas, A. T. (1958). Furze [Ulex]: a survey and history of its uses in Ireland.

Mahaut, L., Cheptou, P.-O., Fried, G., Munoz, F., Storkey, J., Vasseur, F., Violle, C., & Bretagnolle, F. (2020). Weeds: Against the rules? *Trends in Plant Science*, *25*, 1107–1116. https://doi.org/10.1016/j.tplants.2020.05.013

Marineau, E. D., Perryman, M. J., Lawler, S. P., Hartman, R. K., & Pratt, P. D. (2019). Management of Invasive Water Hyacinth as both a nuisance weed and invertebrate habitat. *San Francisco Estuary and Watershed Science*, *17*, Article 4. https://doi.org/10.15447/SFEWS.2019V17ISS2ART5

Martín-Forés, I., Guerin, G. R., Lewis, D., Gallagher, R. V., Vilà, M., Catford, J. A., Pauchard, A., & Sparrow, B. (2024). Towards integrating and harmonising information on plant invasions across Australia. *NB*, *92*, 61–83. https://doi.org/10.3897/neobiota.92.113013

Mattingly, W. B., & Orrock, J. L. (2013). Historic land use influences contemporary establishment of invasive plant species. *Oecologia*, *172*(4), 1147–1157. https://doi.org/10.1007/S00442-012-2568-5

McLeod, R. (2018). *Annual costs of weeds in Australia*. Centre for Invasive Species Solutions.

Meadows, J., Emtage, N., & Herbohn, J. (2014). Engaging Australian small-scale lifestyle landowners in natural resource management programmes—Perceptions, past experiences and policy implications. *Land Use Policy*, *36*, 618–627. https://doi.org/10.1016/j.landusepol.2013.10.016

Meyerson, L. A., & Mooney, H. A. (2007). Invasive alien species in an era of globalization. *Frontiers in Ecology and the Environment*, *5*, 199–208. https://doi.org/10.1890/1540-9295(2007)5%5B199:IASIAE%5D2.0.CO;2

Miller, W. C., & Murthy, G. S. (2008). Gorse: Prospecting for valuable products in an invasive weed. Presented at the 2008 Providence, Rhode Island, June 29–July 2, 2008, American Society of Agricultural and Biological Engineers, p. 1.

Moss, S. R. (2008). Weed research: Is it delivering what it should? *Weed Research*, *48*, 389–393. https://doi.org/10.1111/j.1365-3180.2008.00655.x

National Gorse Taskforce. (2006). Gorse National Best Practice Manual. New Town, Tasmania.

National Health and Medical Research Council (Australia). (2025). National statement on ethical conduct in human research (2025). National Health and Medical Research Council, Canberra, Australia.

Neyret, M., Peter, S., Le Provost, G., Boch, S., Boesing, A. L., Bullock, J. M., Hölzel, N., Klaus, V. H., Kleinebecker, T., Krauss, J., Müller, J., Müller, S., Ammer, C., Buscot, F., Ehbrecht, M., Fischer, M., Goldmann, K., Jung, K., Mehring, M., … Manning, P. (2023). Landscape management strategies for multifunctionality and social equity. *Nature Sustainability*, *6*, 391–403. https://doi.org/10.1038/s41893-022-01045-w

Niemiera, A. X., & Holle, B. V. (2009). Invasive plant species and the ornamental horticulture industry. In *Management of invasive weeds* (pp. 167–187). Springer Netherlands. https://doi.org/10.1007/978-1-4020-9202-2_9

Novoa, A., Shackleton, R., Canavan, S., Cybèle, C., Davies, S. J., Dehnen-Schmutz, K., Fried, J., Gaertner, M., Geerts, S., Griffiths, C. L., Kaplan, H., Kumschick, S., Le Maitre, D. C., Measey, G. J., Nunes, A. L., Richardson, D. M., Robinson, T. B., Touza, J., & Wilson, J. R. U. (2018). A framework for engaging stakeholders on the management of alien species. *Journal of Environmental Management*, *205*, 286–297. https://doi.org/10.1016/j.jenvman.2017.09.059

O'Connor, S., & Kenter, J. O. (2019). Making intrinsic values work; integrating intrinsic values of the more-than-human world through the life framework of values. *Sustainability Science*, *14*, 1247–1265. https://doi.org/10.1007/s11625-019-00715-7

O'Farrell, P. J., & Anderson, P. M. (2010). Sustainable multifunctional landscapes: A review to implementation. *Current Opinion in Environmental Sustainability*, *2*, 59–65. https://doi.org/10.1016/j.cosust.2010.02.005

O'Keeffe, J., Buytaert, W., Mijic, A., Brozović, N., & Sinha, R. (2016). The use of semi-structured interviews for the characterisation of farmer irrigation practices. *Hydrology and Earth System Sciences*, *20*, 1911–1924. https://doi.org/10.5194/hess-20-1911-2016

Okumah, M., Yeboah, A. S., & Bonyah, S. K. (2020). What matters most? Stakeholders' perceptions of river water quality. *Land Use Policy*, *99*, 104824. https://doi.org/10.1016/j.landusepol.2020.104824

Oliffe, J. L., Kelly, M. T., Gonzalez Montaner, G., & Yu Ko, W. F. (2021). Zoom interviews: Benefits and concessions. *International Journal of Qualitative Methods*, *20*, 16094069211053522. https://doi.org/10.1177/16094069211053522

Onwudiegwu, C. A., Aigberua, A. O., & Elegbede, I. O. (2024). Uncontrolled bush burning and air quality. In S. C. Izah, M. C. Ogwu, & A. Shahsavani (Eds.), *Air pollutants in the context of one health: Fundamentals, sources, and impacts* (pp. 369–394). Springer Nature Switzerland. https://doi.org/10.1007/698_2024_1136

Parker, C., Scott, S., & Geddes, A. (2019). *Snowball sampling*. SAGE Research Methods Foundations.

Pascual, U., Balvanera, P., & Christie, M. (2023). Editorial overview: Leveraging the multiple values of nature for transformative change to just and sustainable futures—Insights from the IPBES values assessment. *Current Opinion in Environmental Sustainability*, *64*, 101359. https://doi.org/10.1016/j.cosust.2023.101359

Pascual, U., Balvanere Levy, P., Christie, M., & Baptiste, B. (2022). Summary for policymakers of the methodological assessment of the diverse values and valuation of nature of the intergovernmental science-policy platform on biodiversity and ecosystem services (IPBES). IPBES Secretariat, Bonn, Germany. https://doi.org/10.5281/zenodo.6522392

Ranyard, C. E., Kirkpatrick, J. B., Johnson, C. N., Barmuta, L. A., & Jones, M. E. (2018). An exotic woody weed in a pastoral landscape provides habitat for many native species, but has no apparent threatened species conservation significance. *Ecological Management & Restoration*, *19*, 212–221. https://doi.org/10.1111/emr.12338

Reardon-Smith, M. (2025). In the weeds: Thinking through anthropological and other social science approaches to invasive plant species and their control. *Environment and Planning E: Nature and Space*, *8*, 660–674. https://doi.org/10.1177/25148486241311796

Roberts, J., & Florentine, S. (2021). Biology, distribution and control of the invasive species *Ulex europaeus* (gorse): A global synthesis of current and future management challenges and research gaps. *Weed Research*, *61*, 272–281. https://doi.org/10.1111/wre.12491

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H. J., Nykvist,

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70337 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

B., de Wit, C. A., Hughes, T., van der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P. K., Costanza, R., Svedin, U., … Foley, J. (2009). Planetary boundaries: Exploring the safe operating Space for humanity. *Ecology and Society*, *14*, art32.

Rotherham, I. D. (2007). Wild gorse: History, conservation, and management. *FWAG Scotland*, *7*, 17–21.

Rymer, L. (1979). Ethnobotany and native distribution of gorse (*Ulex europaeus* L.) in Britain. *Environmental Conservation*, *6*, 211–213. https://doi.org/10.1017/S0376892900003064

Sample, M., Thode, A. E., Peterson, C., Gallagher, M. R., Flatley, W., Friggens, M., Evans, A., Loehman, R., Hedwall, S., Brandt, L., Janowiak, M., & Swanston, C. (2022). Adaptation strategies and approaches for managing fire in a changing climate. *Climate*, *10*, 58. https://doi.org/10.3390/cli10040058

Scott, A., Carter, C., Brown, K., & White, V. (2009). Seeing is not everything': Exploring the landscape experiences of different publics. *Landscape Research*, *34*, 397–424. https://doi.org/10.1080/01426390903009289

Selge, S., Fischer, A., & van der Wal, R. (2011). Public and professional views on invasive non-native species—A qualitative social scientific investigation. *Biological Conservation*, *144*, 3089–3097. https://doi.org/10.1016/J.BIOCON.2011.09.014

Shaik, R. S., Gurusinghe, S., Weston, L. A., & Downey, P. O. (2022). A historical perspective on plant invasion in Australia. In D. R. Clements, M. K. Upadhyaya, S. Joshi, & A. Shrestha (Eds.), *Global plant invasions* (pp. 129–149). Springer International Publishing. https://doi.org/10.1007/978-3-030-89684-3_6

Simberloff, D., & Rejmanek, M. (Eds.). (2019). 100 of the World's worst invasive alien species: A selection from the global invasive species database. In *Encyclopedia of biological invasions* (pp. 715–716). University of California Press. https://doi.org/10.1525/9780520948433-159

Soulé, M. E. (1990). The onslaught of alien species, and other challenges in the coming decades *. *Conservation Biology*, *4*, 233–240. https://doi.org/10.1111/J.1523-1739.1990.TB00283.X

Sriramamurthy, R. T., Bhalla, R. S., & Sankaran, M. (2020). Fire differentially affects mortality and seedling regeneration of three woody invaders in forest–grassland mosaics of the southern Western Ghats, India. *Biological Invasions*, *22*, 1623–1634. https://doi.org/10.1007/s10530-020-02207-7

Stout, J. C. (2007). Reproductive biology of the invasive exotic shrub, Rhododendron ponticum L. (Ericaceae). *Botanical Journal of the Linnean Society*, *155*, 373–381. https://doi.org/10.1111/J.1095-8339.2007.00719.X

Strijker, D., Bosworth, G., & Bouter, G. (2020). Research methods in rural studies: Qualitative, quantitative and mixed methods. *Journal of Rural Studies*, *78*, 262–270. https://doi.org/10.1016/j.jrurstud.2020.06.007

Stroh, P. A., Humphrey, T. A., Burkmar, R. J., Pescott, O. L., Roy, D. B., & Walker, K. J. (2023). *Ulex europaeus L. in BSBI Online Plant Atlas 2020*. Botanical Society of Britain and Ireland.

Taherdoost, H. (2022). What are different research approaches? Comprehensive review of qualitative, quantitative, and mixed method research, their applications, types, and limitations. *Journal of Management Science & Engineering Research*, *5*, 53–63.

Thompson, M., & Chauhan, B. S. (2022). History and perspective of herbicide use in Australia and New Zealand. *Advances in Weed Science*, *40*, e20210075.

Tsang, E. W. K. (2014). Generalizing from research findings: The merits of case studies. *International Journal of Management Reviews*, *16*, 369–383. https://doi.org/10.1111/ijmr.12024

United Nations. (2015). Transforming our world: The 2030 agenda for sustainable development. In: General assembly resolution a/RES/70/1.

Urban, M. C., Bocedi, G., Hendry, A. P., Mihoub, J.-B., Pe'er, G., Singer, A., Bridle, J. R., Crozier, L. G., De Meester, L., Godsoe, W., Gonzalez, A., Hellmann, J. J., Holt, R. D., Huth, A., Johst, K., Krug, C. B., Leadley, P. W., Palmer, S. C. F., Pantel, J. H., … Travis, J. M. J. (2016). Improving the forecast for biodiversity under climate change. *Science*, *353*, aad8466. https://doi.org/10.1126/science.aad8466

van Holstein, E., & Head, L. (2018). Shifting settler-colonial discourses of environmentalism: Representations of indigeneity and migration in Australian conservation. *Geoforum*, *94*, 41–52. https://doi.org/10.1016/j.geoforum.2018.06.005

van Oosten, C., Runhaar, H., & Arts, B. (2021). Capable to govern landscape restoration? Exploring landscape governance capabilities, based on literature and stakeholder perceptions. *Land Use Policy*, *104*, 104020. https://doi.org/10.1016/j.landusepol.2019.05.039

Vidal, D. F., Augusto, L., Bakker, M. R., Trichet, P., Puzos, L., & Domec, J. C. (2021). Understorey-overstorey biotic and nutrient interactions are key factors for *Pinus pinaster* growth and development under oligotrophic conditions. *Scandinavian Journal of Forest Research*, *36*, 563–574. https://doi.org/10.1080/02827581.2021.1992002

Walther, G. R., Roques, A., Hulme, P. E., Sykes, M. T., Pyšek, P., Kühn, I., Zobel, M., Bacher, S., Botta-Dukát, Z., Bugmann, H., Czúcz, B., Dauber, J., Hickler, T., Jarošík, V., Kenis, M., Klotz, S., Minchin, D., Moora, M., Nentwig, W., … Settele, J. (2009). Alien species in a warmer world: Risks and opportunities. *Trends in Ecology & Evolution*, *24*, 686–693. https://doi.org/10.1016/J.TREE.2009.06.008

Weeds Australia. (2024). Gorse, Furze [WWW Document]. https://weeds.org.au/profiles/gorse-furze/#prosection5

Westfield, J. P., Wandrag, E. M., & Stringer, L. C. (2025). Assessing the feasibility of productive weed use: A decision support framework for land stakeholders. *Anthropocene Science*, *4*, 268–282. https://doi.org/10.1007/s44177-025-00102-1

Westin, K., Wood, C., Vilhar, U., & Hedblom, M. (2023). Survey questionnaires: Data collection for understanding management conditions. In *Monitoring biodiversity*. Routledge.

Westwood, J. H., Charudattan, R., Duke, S. O., Fennimore, S. A., Marrone, P., Slaughter, D. C., Swanton, C., & Zollinger, R. (2018). Weed management in 2050: Perspectives on the future of weed science. *Weed Science*, *66*, 275–285. https://doi.org/10.1017/wsc.2017.78

Wilhelm, J. A., Smith, R. G., Jolejole-Foreman, M. C., & Hurley, S. (2020). Resident and stakeholder perceptions of ecosystem services associated with agricultural landscapes in New Hampshire. *Ecosystem Services*, *45*, 101153. https://doi.org/10.1016/j.ecoser.2020.101153

Willemen, L., Kenter, J. O., O'Connor, S., & van Noordwijk, M. (2023). Nature living in, from, with, and as people: Exploring a mirrored use of the life framework of values. *Current Opinion in Environmental Sustainability*, *63*, 101317. https://doi.org/10.1016/j.cosust.2023.101317

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Data S1. A copy of the questionnaire used for this research, which was distributed digitally to participants in Tasmania.

How to cite this article: Westfield, J. P., Wandrag, E. M., & Stringer, L. C. (2026). Linking perceptions of weeds with approaches to weed management. *People and Nature*, *00*, 1–14. https://doi.org/10.1002/pan3.70337

25758314, 0, Downloaded from https://besjournals.onlinelibrary.wiley.com/doi/10.1002/pan3.70337 by NICE, National Institute for Health and Care Excellence, Wiley Online Library on [27/05/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License