

UK Code of Practice for the Management of Invasive Non-Native Plants



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1. Introduction

An invasive non-native plant species is that which is not native to a particular area or country and when introduced, establishes itself and has the ability to spread, causing damage to the environment, the economy, our health, or the way we live. These plants typically have high reproductive rates, strong competitive abilities, and few natural predators or diseases in their new environments. As a result, they can dominate landscapes, disrupt ecological balance, reduce biodiversity, and cause economic damage to agriculture, forestry, and infrastructure.

This Code of Practice is issued by the Property Care Association (PCA). The Code of Practice should be read in conjunction with the Chartered Institute of Ecology and Environmental Management (CIEEM) Competency Standard for Invasive Non-Native Plants 2024.

This Code of Practice aims to provide guidelines that set the principles and standards to which PCA members work. The Code of Practice is based on best practices and provides a concise and thorough overview of the management of terrestrial invasive non-native plants. Information is given on associated matters and where appropriate, reference is made to other documents and legislation, however, these may differ from country to country. Background information that may be useful when dealing with clients is also provided. All information conforms to, or improves on recommendations provided by the Environment Agency (EA)^{1,2}, Invasive Species Ireland³, the Royal Institution of Chartered Surveyors (RICS)⁴, the Scottish Environment Protection Agency (SEPA)⁵, and Natural Resources Wales (NRW)⁶ for the survey and management of invasive non-native plants. This Code of Practice has been informed by the Great Britain Invasive Non-Native Species Strategy 2023 to 2030 produced by the Department for Environment, Food & Rural Affairs (Defra), Welsh Government and the Scottish Government¹³.

This Code of Practice is intended for use in England, Wales, Scotland, and Northern Ireland, providing information on the legislation that is relevant to invasive non-native plant management in these geographic regions. Not all legislation is covered and legislation changes from time to time. It is the responsibility of those reading this guidance to ensure that they are aware of and follow all legislation relevant to the work carried out and any changes to it.

This Code of Practice deals with the management of invasive non-native plants in those areas within which the management takes place. These can range from sites such as a garden or a development site, through a length of highway or rail line, to a Local Authority area or a river catchment. Determining the boundary (the red line or project boundary) for such sites or areas is important, for example, in determining the area in which management will take place, and in relation to waste management legislation.

In line with legislation, we have a responsibility to minimise the spread of invasive non-native plants, to ensure the UK's biodiversity is maintained for future generations to enjoy.



2. Training and accreditation requirements

Any person involved in the management of invasive non-native plants should have training commensurate with their duties. Examples of such training are the [courses provided by the Property Care Association \(PCA\)](#).

Any operator who uses herbicide professionally must possess the appropriate safe use of pesticide certificates of competence (see [section 9](#)). Examples of these are the City and Guilds/National Proficiency Tests Council (NPTC) Level 2 awards NPTC 151 and 152, previously PA1, and PA6AW.

Prior to works on any site, a surveyor should ensure that all necessary health and safety accreditation is possessed, and all necessary health and safety training has been carried out.

To work on a construction site, you will be required to hold a CSCS card or similar competency card. Those who have completed the [Certified Surveyor in Japanese Knotweed \(CSJK\)](#) qualification, will be able to apply for a card from [LISS](#), subject to paying the required fee and meeting additional Health and Safety requirements.



Rhododendron
Image courtesy of Aecom

3. Invasive non-native plants

3.1 Introduction to invasive non-native plants

This Code of Practice covers invasive non-native plants in the terrestrial environment and also species native to one part of a country that become or have become invasive in areas outside their natural range. The term *non-native plants* is used throughout this document and is the equivalent of *alien species* (as used by the Convention on Biological Diversity (CBD)) and *non-indigenous species* (as used by the OSPAR Commission, named after the Oslo and Paris conventions). The term refers to a plant species intentionally or unintentionally introduced outside its native range by human actions. An *invasive non-native plant* is any non-native plant that has the ability to spread causing damage to the environment, the economy, our health, and the way we live.

Many non-native plants have become naturalised, for example, different species of nettles which can both be invasive and damaging.

Effectively managing invasive non-native plants demands a holistic approach that integrates scientific knowledge, strategic planning, and coordinated interventions. This entails understanding the biology, behaviour, and lifecycles of these species, implementing preventive measures to curtail their spread, and deploying targeted control strategies tailored to specific habitats and plant species. This Code of Practice serves as a comprehensive manual for professionals engaged in invasive non-native plant management, offering vital insights, best practices, and standardised procedures. By adhering to the guidelines within this document, practitioners can improve their effectiveness in suppressing invasive non-native plants, mitigating environmental harm, and safeguarding the ecological integrity of diverse environments.

3.2 Impacts of invasive non-native plants

The negative impacts of invasive non-native plants include:

- **Environmental:** Invasive non-native plants negatively impact a wide range of terrestrial and aquatic habitats including disrupting habitats and ecosystems. Out-competing desired vegetation for resources like sunlight, water, and nutrients. Disrupting the balance of natural habitats, reducing biodiversity, spreading disease, and interfering with the genetic integrity of our native flora.
- **Economic:** The cost of invasive non-native plants runs into the millions of pounds. Japanese Knotweed alone is estimated to cost the British economy around £247 million per year. This cost is borne by many sectors including forestry, transport, energy, construction, aquaculture, recreation, and utilities¹⁴.
- **Social:** Some invasive non-native plants can impact human health by exacerbating allergies, creating breeding grounds for disease-carrying organisms, through poisoning, and posing physical hazards such as obstructing waterways and exacerbating flooding or increasing the risk of wildfires.

3. Invasive non-native plants

Table one:

Examples of some of the negative impacts of invasive non-native plants and the plants that cause them

	NEGATIVE IMPACTS	EXAMPLE INVASIVE NON-NATIVE PLANTS
ENVIRONMENTAL	Loss of biodiversity	Most invasive non-native plants
	Increased flooding risk by impeding river-water flow	Himalayan Balsam, Japanese Knotweed, Giant Hogweed, American Skunk Cabbage
	Increased riverbank erosion	
	Delays to development	Invasive Cotoneaster species, Japanese Knotweed, Giant Hogweed
	Aesthetic damage to gardens and landscaping	Invasive Bamboo species, Japanese Knotweed, Gunnera, Tree-of-Heaven
	Loss of amenity and recreational space	Invasive Bamboo species, Japanese Knotweed, Giant Hogweed, Rhododendron Ponticum, Monbretia
ECONOMIC	Adverse publicity for landowners	Invasive Bamboo species, Japanese Knotweed, Giant Hogweed
	Economic loss, primarily associated with control costs	Most invasive non-native plants
	Damaging built structures for example walls, drains and patios, typically exacerbating existing weakness or damage in such built structures	Invasive Bamboo species, Tree-of-heaven, Japanese Knotweed, Buddleia
	Financial institutions refusing to provide a mortgage or building insurance	Invasive Bamboo species, Japanese Knotweed, Giant Hogweed, Buddleia
	Impeding and/or preventing property sale	
	Diminution of property value	

3. Invasive non-native plants

Table one: Continued

	ADVERSE EFFECTS ON HEALTH	EXAMPLE OF INVASIVE NON-NATIVE PLANT
SOCIAL	Allergic reactions	Ragweed
	phytophotodermatitis	Giant Hogweed
	poisoning (also of livestock)	Rhododendron, Portuguese Laurel, Ragweed
	Loss of quiet enjoyment (as per Common Law)	Invasive Bamboo species, Tree-of-Heaven, Japanese Knotweed, Giant Hogweed
	Neighbour to neighbour disputes and, on occasions legal fees	Invasive Bamboo species, Japanese Knotweed, Giant Hogweed

Not all impacts of invasive non-native plants are negative. In urban environments, Cotoneasters are a low maintenance shrub popular on industrial estates and Buddleia can provide shelter and food for a range of wildlife. Himalayan Balsam, Three-Cornered Leek, or Montbretia can be aesthetically pleasing in addition to an attractive source of nectar for pollinators.

The serious nature of invasive non-native plants and the threats in terms of environmental, economic, and social damage have necessitated legislation to protect against these species (*see section 4*).



Buddleja davidii
Image courtesy of Aecom

3. Invasive non-native plants

3.3 Identification of invasive non-native plants

Accurate identification of invasive non-native plants is a crucial aspect of the effective plant management practices outlined in this Code of Practice. Surveyors undertaking invasive non-native plant assessments must be able to correctly identify a wide variety of invasive non-native plants and similar looking plant species. This includes the ability to distinguish features, growth habits, and ecological characteristics at different times of the year of at least those invasive non-native plants scheduled in relevant legislation (see section 4).

It is the responsibility of the surveyor to thoroughly inspect a property, site, or project area for invasive non-native plants, to document any findings accordingly, and to note any limitations during the assessment, for example recently cleared vegetation. Additionally, surveyors should utilise available resources such as [PCA Guidance Notes](#), [Non-Native Species Secretariate \(NNSS\) identification guides](#), photo galleries, online databases, and field guides. Accurate identification ensures the implementation of appropriate management measures tailored to the specific invasive non-native plant(s) present, minimising the risk of spread and potential ecological damage.



Japanese Knotweed

Image courtesy of Invasive Weed Management

4. Legislation relating to invasive non-native plants

The management of invasive non-native plants should be carried out in conformity with any relevant legislation in that geographic region. Associated legislation is continually changing and it is the responsibility of those managing the invasive non-native plant to remain up to date.

This Code of Practice does not attempt to provide an exhaustive list of all legislation that may be relevant to the management of invasive non-native plants but rather aims to provide a summary of the most relevant aspects of key legislation directly relevant to the management of invasive non-native plant control (*table two*). Health and safety regulations, not included in *table two*, must be followed at all times.

In England, Wales, and Northern Ireland the legislation makes it an offence to plant, or otherwise cause to grow in the wild (including allowing to spread) any plant listed in The Wildlife and Countryside Act 1981, Schedule 9 Part II, related to each country. In Scotland, the legislation makes it an offence to plant, or otherwise cause to grow any plant in the wild outside its native range.

In England and Wales, it is also an offence to import, keep, breed, transport, sell, or grow/cultivate or permit to reproduce any species listed on the *Alien Species list*.

Cut or excavated plant(s), including the surrounding soil, is classed as controlled waste, and as a result, appropriate waste legislation applies. This includes a duty of care with regards to the disposal of any part of the plant and surrounding soil, that may facilitate establishment in the wild and cause environmental harm.

If charged with committing an offence, the defendant would be required to prove that all reasonable steps were taken and all due diligence exercised in attempting to avoid committing the offence. As such, landowners should be encouraged to have a management plan for the invasive non-native plant(s) on their property and be able to demonstrate that it is being followed, for example hiring a PCA approved specialist to manage the plants appropriately.

Table two and the [PCA's Guidance Note on Legislation](#) provide valuable summaries of the legislation relevant to invasive non-native plant management. Additionally, in England, the [Environment Agency's Regulatory Position Statement 178: The treatment and disposal of invasive non-native plants](#)² must be followed and within Wales the Treatment and disposal of invasive non-native plants in Wales: RD 58*

**Not available online but can be requested from Natural Resources Wales (NRW).*



Cotoneaster Horizontalis
Image courtesy of Aecom

4. Legislation relating to invasive non-native plants

Table two: Legislation relating to invasive non-native plants

LEGISLATION	REGION	RELEVANCE
<u>Wildlife and Countryside Act 1981 (as amended)</u>	England/ Wales	You must not facilitate the spread of invasive non-native plants into the wild
<u>Wildlife and Natural Environment Act 2011</u>	Scotland	
<u>The Wildlife (Northern Ireland) Order 1985</u>	Northern Ireland	
<u>The Peace Plus Programme (Northern Ireland) Regulations 2023</u>		
<u>European Communities (Birds and Natural Habitats) Regulations 2011</u>	Republic of Ireland	
<u>Invasive Alien Species (Enforcement and Permitting) Order 2019</u>	England/ Wales	Gives effect to <u>EU regulations</u> on the prevention and management of the spread of invasive alien species. It lists species which are of special concern. The regulations apply to live specimens and anything they can reproduce from, such as seeds, spores and fragments of plants
<u>Environmental Permitting (England and Wales) Regulation 2016</u>	England/ Wales	Streamlines the legislative system for industrial and waste installations into a single permitting structure for those activities that have the potential to cause harm to human health or the environment
<u>Environmental Protection Act 1990</u>	United Kingdom	Waste containing invasive non-native plants propagules taken outside a site or management area is classified as ‘controlled waste’. As such, you must observe the appropriate Duty of Care for its proper handling and disposal. <i>See section 13</i>
<u>Environmental Protection (Duty of Care) (Scotland) Regulations 2014</u>	Scotland	
<u>Waste and Contaminated Land (Northern Ireland) Order 1997</u>	Northern Ireland	
<u>Waste Management Licensing (Northern Ireland) Regulations 2003</u>		
<u>The Controlled Waste and Duty of care Regulations (Northern Ireland) 2013</u>		

4. Legislation relating to invasive non-native plants

Table two: Continued

LEGISLATION	REGION	RELEVANCE
<u>Waste Management Act, 1996</u>	Republic of Ireland	The National Parks and Wildlife Service should be contacted if invasive non-native plants are discovered. It is likely that you will require a licence for transport and disposal and authorisation for on-site waste management
<u>Waste Management (Facility Permit and Registration) Regulations 2007</u>		
<u>Control of Pesticides Regulations 1986</u>	England Wales Scotland	<p>Any person using pesticides must take all reasonable precautions to protect the health of people and wildlife, hold a certificate of competence, only apply pesticides to target areas and in applicable locations, ensure the amount of pesticide used and the frequency of application are as low as reasonably practicable.</p> <p>Where required, approval from the relevant statutory agency must be obtained prior to use of pesticides in or near water (<i>see section 9.5</i>)</p>
<u>Control of Pesticides (Amendment) Regulations (Northern Ireland) 1997</u>	Northern Ireland	
<u>Statutory Instruments No. 155/2012 European Communities (Sustainable Use of Pesticides) Regulations 2012</u>	Republic of Ireland	
<u>Plant Protection Products (Sustainable Use) Regulations 2012</u>	United Kingdom	
<u>Treatment and disposal of invasive non-native plants : Regulatory position statement (RPS) 178</u>	England	
<u>Treatment and disposal of invasive non-native plants in Wales: RD 58*</u>	Wales	

*Not available online but can be requested from Natural Resources Wales (NRW)

4. Legislation relating to invasive non-native plants

Table two: Other legislation relevant to the management of invasive non-native species

LEGISLATION	REGION	RELEVANCE
<u>Infrastructure Act 2015</u>	England/ Wales	Environmental authorities may issue control orders under which landowners can be obligated to carry out species control operations for invasive non-native animal and plant species
<u>Wildlife and Natural Environment Act 2011</u>	Scotland	
<u>Anti-social Behaviour, Crime and Policing Act 2014</u>	England/ Wales	The Anti-social Behaviour, Crime and Policing Act 2014 does not specifically mention invasive plants; however, guidance has been released by the Home Office 11 providing information on how Community Protection Notices can be applied to Giant Hogweed, Japanese Knotweed and other invasive non -native plants. The updated legislation means that if a neighbour 'fails to act' regarding controlling, or preventing the growth of an invasive plant, then, providing certain criteria are met, a Community Protection Notice could be issued requiring action to be taken. Breach of any requirement of a Community Protection Notice, without reasonable excuse, would be a criminal offence, subject to a fixed penalty or prosecution
Common Law	England/ Wales	Under common law, with respect to private nuisance, an offence may have been committed where the actions of a land owner are causing a substantial and unreasonable interference with another person's land or his/her use or enjoyment of that land. Where reasonable action is not being taken to remediate nuisance caused by invasive plants, common law may apply

5. Inspection

Written reports will be necessary for invasive non-native plant(s) at various stages during the production and delivery of a property, site, or project area specific management plan (*see section 15*).

The area that is contractually covered for inspection, monitoring, and control should be agreed upon prior to the work commencing and subsequently marked up on a scaled map. It is typically referred to as ‘the property’ for residential dwellings, ‘the site’ for commercial or other types of properties, and ‘the project area’ for landscape scale management. Where possible catchment areas should be considered, for example, if Giant Hogweed or Himalayan Balsam is known upstream, then there might be an issue even if none is visibly present on-site and should be recorded at the time of the initial inspection.

5.1 Property, site and project area assessment

When a property, site, or project area assessment takes place it should be carried out by a PCA approved specialist, who is a suitably qualified and experienced in the identification, assessment, and management of at least those invasive non-native plants scheduled in relevant legislation (*see section 2*). The surveyor should note any limitations, for example, a survey undertaken in winter will have fewer visual indicators for identification. Site assessment should include:

- a thorough walkover survey of as much area within the property, site, or project area boundary as can be inspected safely
- a record of all invasive non-native plants that are visible above ground, typically identified by a stand reference. This should include the a guidance to its maturity, condition (including stunted or bonsai growth), and the total area of the infestation
- an assessment of all apparent site features that may affect any invasive non-native plant(s) management action, for example, proximity to other vegetation, underground services, built structures, and waterbodies and watercourses
- identification and assessment of pathways by which invasive non-native plant(s) could be brought onto, out of and, or around a property, site, or project area
- an inspection of the immediate property, site, or project area surroundings where possible, for example, neighbouring properties
- efforts should be made to determine the maturity of the invasive non-native plant(s) on-site. For example, longstanding infestations with many years of growth, where large seedbanks are present, are usually much more difficult to control
- a site history, including any previous control action, should be obtained
- any current management of affected areas, for example, if the area is mown. Current management might hinder treatment or increase the risk of spread, or could be beneficial to the overall management plan.

Details should be obtained of:

- planned or existing developments, including the timing and the location of proposed buildings and other structures
- any use of the site that could constrain invasive non-native plant management
- land use and practices within a project area that could affect management, for example, grazing or crop husbandry.

Where applicable, a pre-purchase survey can be conducted to assess the potential diminution in the value of properties or sites, including the control costs for any identified issues. This survey should be performed in conjunction with a report provided by a property valuation specialist.



5. Inspection

5.2 Mapping

A detailed and accurate distribution map should be produced which includes:

- the boundary of the property, site, or project area of specific interest
- the location and extent of visible invasive non-native plant(s)
- a buffer zone around a stand or stands of invasive non-native plant(s) of a suitable radius (see below)
- any areas not surveyed or inaccessible.

The radius of an appropriate buffer zone around a stand or stands of the invasive non-native plant(s) to prevent the spread of that species will depend on the specific invasive non-native plant(s) and the type of property, site, or project area. This will inform decisions on the precautions needed, for example, the erection of fencing and signage.

The map should be used to coordinate management and monitor spread. Where possible, a detailed base map should be obtained from the property owner or tenant or, for site and project areas, the client or commissioning body, to which information can be added. If such a map cannot be provided, a map, fit for purpose, should be obtained.

5.3 Invasive non-native plant hazard assessment

The risks posed by invasive non-native plant(s) should be assessed for the given property, site, or project area. The hazard assessment should take into account:

- the intended use of the property, site, or project area and any plans for development, or ground disturbance
- the location of invasive non-native plant(s) that have been identified on the property, site, or project area and/or adjacent to it
- any invasive non-native plant(s) in the context of the wider environment, for example, the potential for fly tipping occurring or the presence of plants upstream of the property, site, or project area to be managed
- the potential of breaching legislation that relates to any invasive non-native plant, its control, and disposal
- the potential for waste management issues
- where applicable, other relevant guidance produced by organisations, statutory agencies such as Defra and the Royal Institution of Chartered Surveyors (RICS)
- the likelihood of the invasive non-native plant(s) being spread onto, around and/or off the property, site, or project area.

Understanding the risks and potential pathways for invasive non-native plant infestations is essential to proactively reduce their capacity for spread. *Figure one* provides a framework for assessing risk and decision making. It can also be used to allow clients to understand the hazards associated with invasive non-native plants on their property, site, or project area.

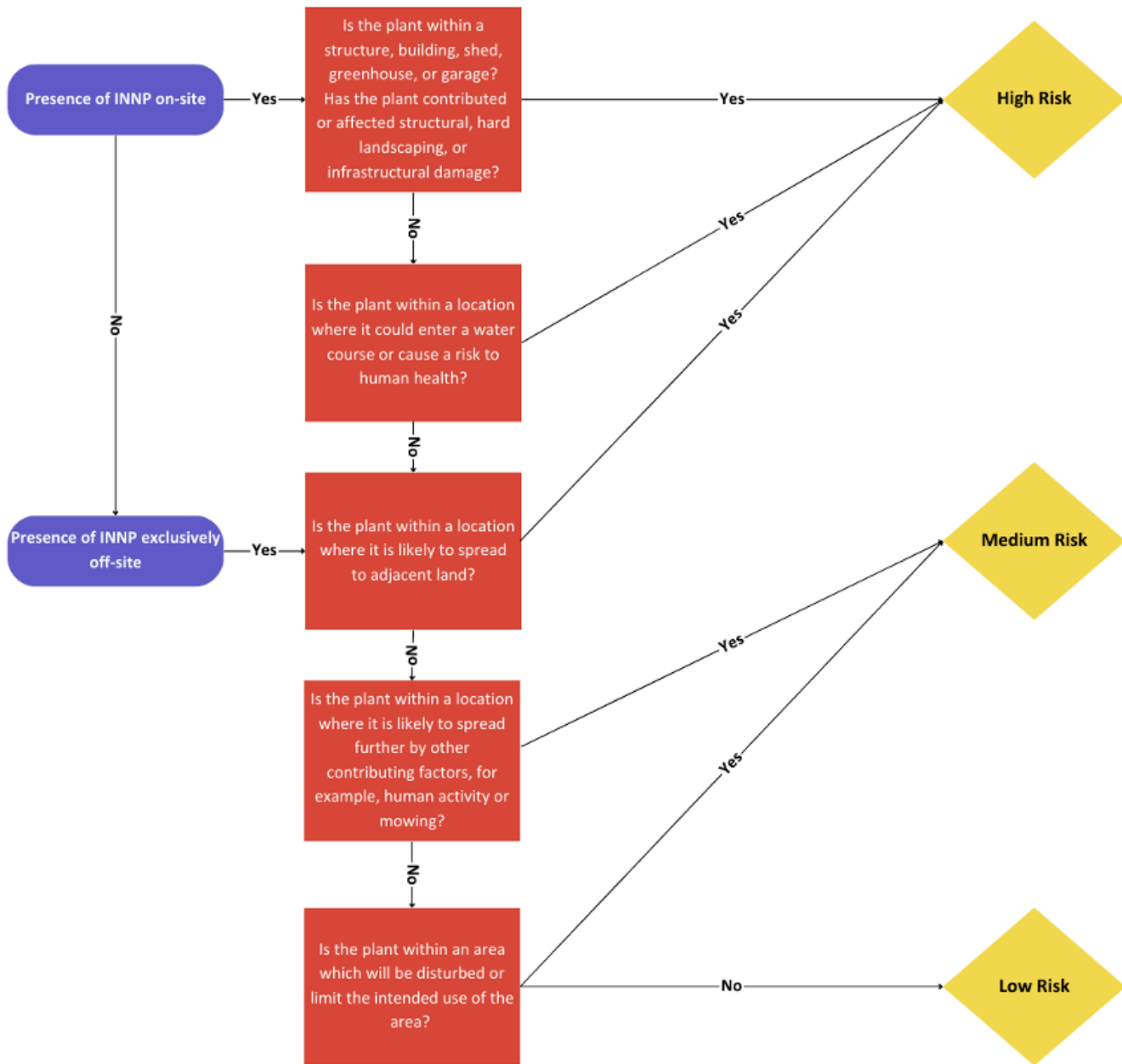


Invasive Bamboo Roots

Image courtesy of Southwest Knotweed

5. Inspection

Figure one: An example of a framework for assessing risk from invasive non-native plants



The importance of having a management plan in place to mitigate risks associated with litigation should be made clear to clients and landowners (see section 4).

Where the invasive non-native plant(s) are deemed to be a high risk, remediation should be undertaken to reduce the impact to the immediate area and wider environment, with special consideration to the management of any off-site infestations to prevent reinfestation elsewhere.

Where the invasive non-native plant(s) are deemed to be a medium risk, remediation should be undertaken to reduce the impact to the immediate area, with special consideration to prevent the infestation from spreading into adjacent lands, entering a water course or being accessible and becoming hazardous to human health.

Where the invasive non-native plant(s) are deemed to be a low risk, remediation and if applicable defensive measures or monitoring action should be taken to ensure the plant does not spread or become a medium risk or high risk.

6. Biosecurity

6.1 Prevention of spread off-site, onto and around a property, site or project area

Measures should be taken to ensure that any soil (or other material) that could potentially contain invasive non-native plant propagules is not moved around, onto or off a property, site, or project area, unless as part of a specific control action.

Site machinery or other vehicles should not be allowed to drive over areas that may be infested with any invasive non-native plant unless the operation is supervised by a PCA approved specialist and suitable precautions are taken to prevent the spread of plant propagules by wheels, tracks, or other transport methods such as setting up cleaning and wash down areas.

If excavation or soil disturbance is likely, measures should be implemented to reduce risk to human health. As a minimum, service plans of the worked area should be requested, ensuring that the excavation is scanned by a cable avoidance tool (CAT) by an individual who is competent and suitably trained. If services are suspected, or found, then hand digging or suitable safe excavation methods should be carried out. The contaminated soil should be removed in a way that does not spread the propagules of the invasive non-native plant.

All vehicles, equipment, and footwear should be free of plant propagules before leaving the site or a designated contaminated area within a site. If clothing is muddy or seeds could be attached, it should also be inspected and propagules removed.

Where appropriate, records of biosecurity inspections and/or measures should be kept for the entirety of the management plan.

To minimise the risk of spread, site managers and landowners should be instructed as follows:

- Relevant individuals should be notified of the presence of the invasive non-native plant(s) on the property, site, or project area and (except in the case of deliberate disturbance as part of control action) advised that the ground should not be disturbed and that the soil or associated material should not be removed
- An exclusion zone with restricted access should be established which includes the area in which the invasive non-native plant(s) have been found, along with a buffer extending to a suitable distance within which plant propagules could be present. Outside this “no disturbance zone”, the property, site, or project area can be used and maintained as normal
- Known stands should be indicated by erecting markers and, or barriers with an appropriate notice. This could take the form of coloured tape or appropriate fencing, possibly with a notice such as “Invasive Plant Treatment Area – Do Not Enter”
- If the invasive non-native plant is in the water, signs can be used to inform people and for small ponds, an exclusion zone should be established. For larger water areas, such as streams, rivers, canals, or lakes, exclusion may not be possible or practical.



6. Biosecurity

6.2 Prevention of spread onto a property, site or project area

It is important to consider all invasive non-native plants in the wider environment around a property, site, or project area. If an invasive non-native plant is growing on an adjacent site, or upstream of a property, site, or project area on a riverbank, then no matter how good on-site control is, the invasive non-native plant may recolonise on a recently cleared property, site, or project area.

If an invasive non-native plant is observed on an adjacent property, site, or project area:

- work in partnership with neighbouring landowners to tackle the problem together
- if the neighbouring landowner is unwilling to cooperate, offering to pay for the treatment on their land is often the most cost-effective approach
- if the neighbouring landowner will not cooperate, take advice by contacting the relevant authority, for example, a Police Wildlife Crime Officer or Local Authority
- if appropriate, install a vertical root barrier to help prevent spread (*see section 11*).

One of the main ways that many invasive non-native plants spread to new properties, sites, and project areas is by fly-tipping. This is where material infested with the propagules of the invasive non-native plant(s) is illegally dumped across property, site, or project area boundaries or within a property, site, or project area.

Where this practice is suspected, landowners or site managers should be instructed to:

- restrict vehicular access and keep gates or barriers locked
- watch out for any unusual activity, such as soil being dumped. If such activity is observed, immediate action should be taken to inspect any dumped material for invasive non-native plants and to report the incident to the appropriate authority
- watch out for freshly dumped soil or vegetative cuttings on a property and if found, inspect for the presence of invasive non-native plants or other hazardous material, such as asbestos.

All necessary precautions should be taken to ensure that topsoil brought onto the property, site, or project area is free of invasive plant material.

Where applicable, vehicles or personnel (footwear and clothing) should have limited/no access to enter a property, site, or project area if there is a risk that propagules such as fragments of rhizomes, suckers, or seeds might be brought into the site. Biosecurity checks should be undertaken on vehicles or personnel before their arrival to reduce the risks of propagules being brought into the property, site, or project area.



7. Developing an optimal integrated weed management (IWM) plan

7.1 Key factors to consider when developing an optimal integrated weed management (IWM) plan

The following should be considered when developing a management plan:

- the timeframe in which the work or project needs to be completed
- the suitability of different treatment options in relation to the client's objective to achieve control or eradication
- structural or environmental features that might affect control action, such as proximity to watercourses, desired vegetation, built structures, and underground services
- future plans for the property, site, and project area such as development or landscaping plans
- hazards or risks to human health identified during the property, site, or project area inspection, such as underground services and chemical contamination
- the sustainability of the management plan
- budget of the client.

The management plan needs to be outlined in detail in a suitable report (*see section 15*), which clearly states the objectives that you are contracted to deliver, the timescale and provides sufficient detail that, where applicable, it can be backed by a guarantee.

Management plans should aim to minimise:

- damage to the environment
- damage to existing built structures
- socioeconomic impacts
- the quantity of waste generated
- risk to operatives implementing the plan

7. Developing an optimal integrated weed management (IWM) plan

7.2 Control options

All appropriate measures should be taken to ensure a high quality service is provided to the client and that the management of the project conforms to the standards outlined in this document and other relevant guidance.

All control options should be overseen or carried out by a PCA approved specialist. The individual or company should be able to demonstrate relevant competency relating to invasive non-native plant identification and remediation.

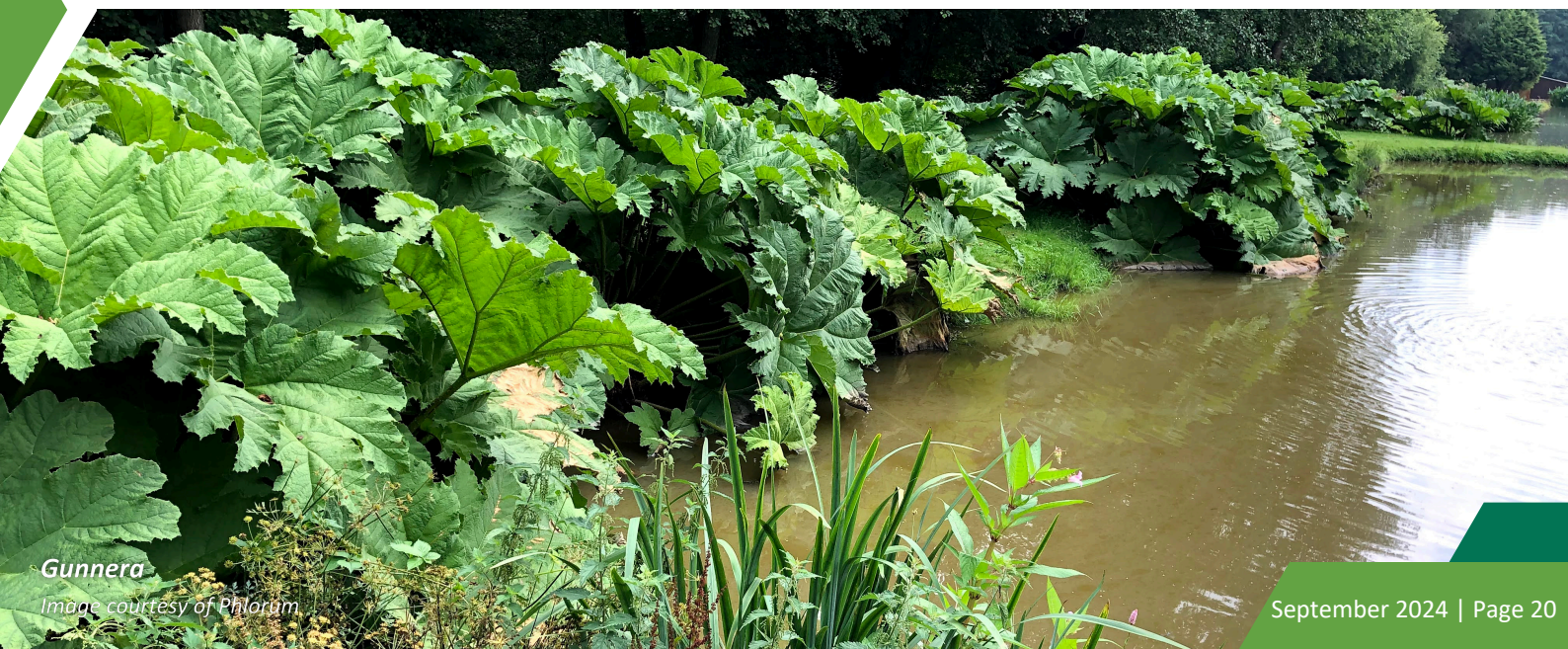
The choice of control option(s) depends on the property, site, or project area conditions and the nature and situation of individual stands. No two sites are ever the same and management plans should be tailored to the situation, conditions, and project needs.

[The Environment Agency \(EA\)](#), [Natural Resources Wales \(NRW\)](#), [Scottish Environment Protection Agency \(SEPA\)](#), [Northern Ireland Environment Agency \(NIEA\)](#), and [National Parks & Wildlife Service \(NPWS\)](#) can be contacted for guidance on the disposal of waste containing invasive non-native plants and the use of herbicides near water.

The client should be provided with management plans or guarantees that are proportionate to the recommended time to achieve full control of the target invasive non-native plant. Additionally, the control method should be proportionate to the property or site plans.

There are several recognised control options available for the management of invasive non-native plants, the advantages, and disadvantages associated with which are outlined in *table three*. These options may be used singly or in combination.

- **Herbicide treatment programme** (*see section 9*): applying herbicide to an invasive non-native plant in situ and a subsequent suitable monitoring period (*see section 8*)
- **Stockpiling or bunding** (on-site retention)*: The excavation and movement of invasive non-native plant material to an area of the site where it will not be disturbed and subsequently requires a suitable monitoring period (*see section 8*)
- **Screening** (sieving)*: The excavation of invasive non-native plant material and screening (sieving) the material through a mesh or other selective system to remove fragments of rhizome or runners, which are then disposed of correctly and safely (*see section 13*). The soil passing through the screen will still be classed as controlled waste and may still contain propagules of the invasive non-native plant(s). The screened soil can be reused on the site, however, it must be located where it is accessible and will not be disturbed. If herbicides are used before, during, or after screening, then all product label requirements of the herbicide must be adhered to and should not be used as a prophylactic measure. This method requires a suitable secondary remediation strategy to manage any regrowth in addition to a suitable monitoring period (*see section 8*)



Gunnera

Image courtesy of Phlorum

7. Developing an optimal integrated weed management (IWM) plan

- **Fragmentation, cultivation, and crown removal:** Digging and breaking up propagules within the soil, or removing crown or stump material to increase the leaf surface area to rhizome or runner volume ratio and disturbing, opening up, and aerating the soil. This method is not suitable for all invasive non-native plants and can produce a negative outcome in some circumstances. This method requires a suitable secondary remediation strategy to manage any regrowth in addition to a suitable monitoring period (*see section 8*)
- **Cut stump treatment:** Cutting down a shrub or tree and treating the stump with herbicide subsequently requires a suitable monitoring period (*see section 8*)
- **Burial on-site*:** The excavation of invasive non-native plant material with burial at another part of the site at an appropriate depth to prevent regrowth and subsequently requires a suitable monitoring period (*see section 8*) for the target invasive non-native plant, covering the excavation area, burial area, stockpile area, and haul route
- **Root barrier membrane*:** Prevention of horizontal and vertical growth of invasive non-native plant(s) by installing a vertical and/or horizontal membrane barrier. This requires a secondary remediation strategy, otherwise in time the invasive non-native plant is likely to grow around any membrane. The secondary remediation strategy requires a suitable monitoring period (*see section 8*)
- **Removal to landfill*:** A single, non-residual herbicidal treatment, where applicable, should be undertaken at least two weeks before excavation commences (providing the product label conditions are met) with subsequent excavation and transport of invasive non-native plant material to a licensed landfill using haulage vehicles. Checks should be undertaken to ensure the haulage company is appropriately licensed and the landfill is capable of accepting the contaminated soil. A controlled or supervised excavation should be undertaken to remove all invasive non-native plant propagules. This method requires a suitable monitoring period (*see section 8*), covering the excavation area, stockpile area, and haul route.

*For some invasive non-native plant remediation and in certain circumstances, herbicide treatment before work can reduce the vigour of the plants and reduce the risk of re-establishment if spread.



Ground Elder
Image courtesy of Aecom

7. Developing an optimal integrated weed management (IWM) plan

Table three: A summary of control options with advantages and disadvantages

	ADVANTAGES	DISADVANTAGES
HERBICIDE TREATMENT	<ul style="list-style-type: none"> • Cost effective • Treatment can be carried out in situ, limiting the capacity for the plant to spread further • If applied correctly it can quickly reduce the capacity of the plant to spread on/off site • Quickly reduces the capacity of the plant to impact built structures • Generally considered easier to administer than other methods. 	<ul style="list-style-type: none"> • Can take a number of years to achieve acceptable results, especially where stands are mature • Herbicide treatment alone should not be recommended on properties or sites with future development plans that involve the soil being dug and disturbed • Construction works cannot continue in areas still containing the plant and the risks associated with landscaping treated soils and this should be made clear to the client and mitigated for • The use of some herbicides is restricted near waterbodies • Some herbicides can persist in the soil • Herbicide remediation may not completely control an invasive non-native plant, for example, due to deep rhizome in the ground or runners and seeds distant from the parent plant that were not killed by the herbicide. For some species this is a control not an eradication method • Effective control requires knowledge and appropriate training in the use of herbicides (<i>see section 9</i>) • If soil containing invasive non-native plant propagules is to be removed from a property, site or project area, it must be classed as controlled waste, even if it has been treated with herbicides. Where there has been a recent persistent herbicide application, the soil may be classified as hazardous waste and further soil testing would be required • Monitoring visit and a management programme will be required at the end of the herbicide treatment programme (<i>see section 8</i>).
SCREENING (SIEVING)	<ul style="list-style-type: none"> • Can be cost effective but often more expensive than bunding • Reduces the amount of material needing to be disposed of to a waste facility • The treated soil can be re-used on a site as fill or in soft landscaping areas, reducing the need to import soil • Environmentally beneficial, reducing the amount of waste to landfill and reduces the amount of herbicide required. 	<ul style="list-style-type: none"> • All screened soil is still classed as controlled waste • The screened soil should not be considered 100% free of the invasive non-native plant material and needs to be accessible for future monitoring visits • Invasive non-native plant propagules, such as rhizome, runner fragments, suckers and seeds, could still be present in the soil leading to re-infestation, which would require a secondary remediation process of either herbicide treatment or removal to target any potential regrowth • Propagules can be accidentally spread during soil movement • Soil type, soil makeup and weather conditions dictate if screening is appropriate or not • A waste (environmental) permit is required if using soil screening and/or a picking station • Monitoring visits and a management programme will be required of the screened area, stockpile area, reused soils area and haul route upon completion (<i>see section 8</i>).

7. Developing an optimal integrated weed management (IWM) plan

Table three: Continued

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">FRAGMENTATION OR CULTIVATION OF PROPAGULES</p>	<ul style="list-style-type: none"> Increases the leaf surface area to rhizome or runner volume ratio Breaks up and aerates the soil It can increase the effectiveness of herbicides It can improve the potential for successful management on sites where the invasive non-native plant is persistent Crown removal removes a large amount of surface and underground biomass. 	<ul style="list-style-type: none"> There may be a need to remove above ground vegetation including desirable plants which would need to be disposed of A large area should be dug to ensure all soil containing rhizome or runners has been included Rhizome located deeper in the soil, or runners distant from the parent plant, may be missed and result in regrowth Crown or stump removal can be time consuming or impractical for large infestations. The removed crown must be disposed of appropriately (<i>see section 13</i>) This method has the same general disadvantages as the herbicide treatment and monitoring programme A secondary remediation process, for example herbicide treatment, will be required Monitoring visits and a management programme will be required upon completion of the secondary remediation method (<i>see section 8</i>).
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">BURIAL</p>	<ul style="list-style-type: none"> Does not require a set-aside area for control Work can continue immediately after burial Quickly removes the invasive non-native plant from an undesirable area In some situations, shallow construction such as pathways or car parks can take place on top of the burial site. 	<ul style="list-style-type: none"> Restrictions will remain on the site. For example, in some areas, deep excavation would interfere with buried material The use of the area above the burial site is limited, for example, no deep piling or deep excavation works Typically it requires a large hole to receive material, so it may not be possible if the soil is shallow or the water table is high The appropriate Environment Agency specific to the country of works must be notified Propagules can accidentally be spread during movement Soil type, soil makeup and weather conditions dictate if burial is appropriate or not Monitoring visits and a management programme will be required for the excavation area, burial area, stockpile area and haul route upon completion (<i>see section 8</i>).
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">ROOT BARRIER</p>	<ul style="list-style-type: none"> Can install a geosynthetic membrane to reduce the chance of horizontal and vertical spread of rhizome and runners Can be used to protect structures, hard surfaces and services Work can continue immediately after installation in areas protected by root barriers. 	<ul style="list-style-type: none"> Tears or damage in the membrane or poorly sealed seams between sheets can be exploited by growing rhizome or runners Can be hard to install during unfavourable weather conditions Contaminants in the soil can cause issues to the integrity of the root barrier Surface drainage and underground water tables can affect installation and ponding can occur, all of which should be taken into consideration Root barrier installation is a form of control or prevention to be used in conjunction with other methods, as it is not in itself a method of eradication A secondary remediation process, for example, herbicide treatment will be required Monitoring visits and a management programme will be required upon completion of the secondary remediation method (<i>see section 8</i>).

7. Developing an optimal integrated weed management (IWM) plan

Table three: Continued

EXCAVATION AND DISPOSAL TO LANDFILL	<ul style="list-style-type: none"> Quickly removes the invasive non-native plant from an area No restrictions left on-site post excavation and work can continue immediately after removal It is fast and efficient compared to other remediation methods. 	<ul style="list-style-type: none"> Expensive relative to other methods Requires expertise by the clerk of works as small amounts of missed propagules could cause regrowth Disposal to landfill reduces valuable landfill capacity Requires haulage which adds to traffic, damages the environment, increases the risk of the invasive non-native plan spreading, and in the long term is unsustainable. As such, disposal to landfill should only be considered as a last resort when the invasive non-native plant cannot be suitably disposed of on-site Monitoring visits and a management programme will be required of the excavation area, stockpile area and haul route upon completion (<i>see section 8</i>).
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Note: A monitoring programme (*see section 8*) is required in all areas where invasive non-native plants are herbicide treated, excavated, stockpiled, screened, buried, transported, stored, or disturbed.



Horizontal Root Barrier

Image courtesy of Conservation Land Services

8. Monitoring

Monitoring aims to check for regrowth after completed remediation such as herbicide treatment or a full excavation. Monitoring visits should be carried out at suitable times of the year, for example in early summer for Himalayan Balsam or late summer for Japanese Knotweed. The monitoring visits should cover all locations within the contracted area and use the same procedure as when the property, site, or project area was initially surveyed.

Notes should be made on any regrowth including any regrowth outside of the originally infested area(s) along with any evidence of interference or disturbance. Changes should be recorded in plant distribution, as well as plant height and health. It is advisable to take photographs of the identified infestation areas each visit.

Monitoring should take place over a minimum of two full growing seasons or be aligned with recommendations specific to the target plant. If several invasive non-native plants are present, monitoring visits should be appropriate for each target plant.

The information collected during a monitoring visit should be sufficient to decide on any follow up control of regrowth. Control measures could be undertaken at the same time as the monitoring, for example, digging and removing plants. It may also necessitate a return visit to allow the plant to put on further growth to ensure an efficient uptake of herbicide.

If regrowth is present, the minimum requirement of undertaking herbicide treatments to control regrowth is required, however, in some instances, it might be more appropriate to adopt other methods, for example, dig and removal.

Table four highlights the recommended monitoring timeframes for several scheduled invasive non-native plants. This is not an exhaustive list of all invasive non-native plants, and where applicable other sources of information may be required to determine suitable monitoring periods.



Spanish Bluebell
Image courtesy of Aecom

8. Monitoring

Table four: Summary of recommended monitoring timeframes for some scheduled invasive non-native plants (Source PCA 2018²⁵)

INVASIVE NON-NATIVE PLANT SPECIES	SUGGESTED MINIMUM NUMBER OF FULL GROWING SEASONS	TIME OF YEAR FOR MONITORING
American Skunk-cabbage	Two years with further visits every two years, for the next six years	Early / mid summer
Bamboo (invasive species)	Two years with a further visit in two years	Late summer / early autumn
Butterfly-bush (Buddleia)	Two years with further visits every two years, for the next four years	Early / mid-summer
Cotoneaster (invasive species)	Two years	Early / mid-summer
Giant Hogweed	Three years	Early / mid-summer
Himalayan Balsam	Two years	Late spring / early summer
Japanese Knotweed	Two years	Late summer / early autumn
Japanese Rose	Three years	Mid / late summer
Rhododendron	Two years with further visits every two years, for the next six years	Early / mid summer
Tree-of-Heaven	Two years	Early / mid-summer
Variegated Yellow Archangel	Two years with a further visit in five years	Early / late summer



Giant Hogweed

Image courtesy of Phlorum

9. Herbicide use

9.1 Regulations

A herbicide must be used only in accordance with the directions on the product label and with all relevant legislation. There may be further permitted uses, such as Extensions of Authorisations, or Specific Off-Label Approval, information about which can be obtained from the [Chemical Safety Directorate](#)⁸. These are typically minor uses for commercial growers and will likely only apply to very specific situations and circumstances. The user assumes the risk to persons or property that arises from any use of the herbicide product and risks must be clearly set out within a site specific risk assessment.

Any person involved in the professional application of herbicides should possess the appropriate pesticide certificate of competence for the safe use of herbicide and hand-held herbicide applicators, such as NPTC Level 2 award in the safe application of pesticides module 151 (formerly PA1 & PA6) in England, Wales, Scotland, and Northern Ireland. Persons involved should also have achieved the NPTC Level 2 award in the safe application of pesticides module 152 (formerly PA6AW) if treating near waterbodies, or module 156 (formerly PA6INJ) if stem injecting. The list of accepted/compulsory accreditations will be updated in line with European Communities Plant Protection Products (Sustainable Use) Regulations 2018 (*see section 4*).

Advice should only be sought from a British Agrochemical Standards Inspection Scheme (BASIS) qualified advisor. Pesticide manufacturers have a technical helpline number on the product label, which will enable the enquirer to freely speak to a qualified advisor.

Any company using herbicides must be registered with Defra under the [Official Controls Regulation 2020](#).¹⁸

9.2 Herbicide choice

The following factors should be considered when choosing an appropriate herbicide:

- Is this a permitted activity, as stated on the herbicide label?
- Is it suitable for use on a given site, for example, proximity to water or sensitive habitats?
- Is approval needed? For example, an AqHerb01 license is needed for treating near a waterbody within England (*see section 9*)
- Is it suitable for the intended use of the site following treatment? For example, is the active ingredient within the herbicide persistent in soil, potentially preventing other species from being planted at a later date?
- Is it approved for the area of use? For example, is it permitted for use within a residential garden?
- Is it a selective or non-selective herbicide? For example, what other species could be affected through its use?
- Is the time of year and plant condition suitable for the application of the chosen herbicide?
- Are weather conditions suitable?
- Should an adjuvant be used?
- Is the correct nozzle and lance being used for the situation?

If in doubt, consult a BASIS qualified adviser. The technical helpline number can be located on the product label.



Dwarf Knotweed

Image courtesy of The Property Care Association

9. Herbicide use

9.3 Herbicide records

Records of herbicide use must be made in accordance with all relevant legislation. A record must be made of the type, condition of the target plant including height, concentration, and quantity of herbicide used, the operative's name, weather conditions, and date of application. Additional information such as nozzle type and lance used can be very useful. A herbicide spray visit record (SVR) must be completed after each treatment and kept for a minimum of three years in line with regulatory requirements outlined in [Article 67 of the Regulation \(EC\) No 1107/2009 of the European Parliament and of the Council](#) ²⁴.

9.4 Herbicide treatment: optimal plant condition and timing

Different herbicides have different methods of action and are absorbed and transported by plants in different ways, as such the condition of a plant and timing of application impacts the effectiveness of the herbicide. Invasive non-native plants that spread by seed should be treated before the plant sets seed. Prior to using herbicide on any invasive non-native plant, an operator should be trained in the appropriate use of different types of herbicides for species control (*see section 9.1*).

Failing to allow plants to reach an appropriate condition prior to herbicide treatment can increase the amount of time required for treatment, as well as increase costs. The condition of the plant should also be taken into consideration, for example, water stress can reduce herbicide uptake. The number of herbicide treatments required per year should be determined by the surveyor, utilising guidance from industry experience, academic studies, and herbicide product labels. *Table three* provides a summary of the length of time monitoring should be undertaken for a given species (*see section 8*).



9. Herbicide use

9.5 Herbicide treatment: use near waterbodies and watercourses

It is the responsibility of the user to check with the relevant regulatory authority if an agreement or approval is needed prior to herbicide application near a body of water.

In England, for all herbicide applications near waterbodies and watercourses (within one metre of the bank top when using a knapsack sprayer), there is a requirement to obtain written approval from the [Environment Agency](#)²⁷ (EA), prior to spraying and only products approved for use in or near water can be used. The [AgHerb01 application form](#)¹⁹ should be sent to the Environment Agency (EA), which will then assess whether there is any risk to drinking water supplies, water for spray irrigation, or wildlife. The process of approval takes approximately two to four weeks.

In Wales, [Natural Resources Wales](#)¹⁷ (NRW) should be contacted, where required. No formal approval is required if using approved herbicide near water in low risk areas. In high risk areas, such as Sites of Special Scientific Interest (SSSI), RAMSAR, Special Areas of Conservation, or Special Protection Areas, close to water abstraction, approval from Natural Resources Wales (NRW) will be required prior to spraying.

In Scotland, for operations near watercourses, legislation states that any works conducted that abide by the General Binding Rules (GBR) no longer require approval from the [Scottish Environmental Protection Agency](#)⁵ (SEPA).

In Northern Ireland, pesticides are prohibited for use between five and 200 metres of a watercourse depending on the quantity of water from that source used for human consumption. Permission can be sought from the [Northern Ireland Environmental Agency](#)²⁰ (NIEA) to make applications within these limits, however it is unlikely to be granted.

9.6 Herbicide treatment: stem injection

Stem injection is an alternative method for the application of herbicide to some invasive non-native plants, for example, Japanese Knotweed. This system has been found to be effective, however, this has not been validated by scientific scrutiny and there is conflicting evidence with respect to its long term effectiveness. Some research shows no measurable difference between stem injection directly into the cane and application via a knapsack to the leaf, apart from using a knapsack being quicker and less herbicide being used.

This technique can be used when appropriate at the discretion of a qualified specialist, such as those who possess the City and Guilds/NPTC Level 2 award Operating Hand-held Pesticide Injection Equipment module 156 (formerly PA6INJ).



American Skunk Cabbage

Image courtesy of The Property Care Association

9. Herbicide use

9.7 Herbicide treatment: monitoring

After herbicide treatment control, follow up monitoring visits should be carried out at suitable times of the year, during the active growth period of the invasive non-native plant (*table three*). If regrowth is found, a decision will need to be taken as to whether and what type of further remediation should be carried out. The monitoring visits should cover all locations within the contracted area and use the same procedure as when the property, site, or project area was initially surveyed (*see section 8*).

Evidence of any regrowth, including any new growth outside of the originally infested areas along with any evidence of interference or disturbance, should be recorded. Changes in plant distribution, as well as plant height and health, should also be recorded. Photographs of the areas should be added to the management plan after each visit.

The final monitoring visit should be carried out after the completion of the remediation action and where there has been a suitable period of monitoring for the target plant (at least two full growing seasons) with no evidence of invasive non-native plant growth. The minimum period to achieve successful control, which includes remediation and monitoring is three years. In this context, the growing season refers to the entire active growth period in a given year.

Although a suitable monitoring period for the target plant is usually sufficient to determine if regrowth will take place, if the affected ground is disturbed after this period, regrowth can sometimes occur due to exposing seed banks or dormant parts of the plant.

Herbicide treatment alone should not be recommended on properties, sites or project areas, where there is the potential that the soil will be transported off-site, disturbed, or dug at a later date, thereby risking spread or regrowth. Clients should be advised that deep or buried rhizomes, runners, or seeds can remain dormant, but viable, for many years, even after above ground material has been successfully treated with herbicide.



Hottentot fig

Image courtesy of Aecom

10. Excavation, transport, and disposal of contaminated material to landfill

Detailed criteria, with respect to invasive non-native plant waste management, are provided by England's Environment Agency in the [Regulatory Position Statement \(RPS\) 178²](#), for Wales, information is provided in the *Treatment and disposal of invasive non-native plants in Wales: RD 58* would also be useful across the UK and the Republic of Ireland.

Several of the control methods listed in *section 7*, involve the excavation and subsequent transport of infested soil to a landfill site. When undertaking excavation or transporting infested soil, the following should be considered:

- If the invasive non-native plant is treated with herbicide, this should be with a non-residual herbicide, such as glyphosate
- If infested material is being transported around or off-site, a haulage route should be set out in advance and precautions should be taken to prevent the spillage of infested soil and the spread of invasive non-native plant material
- Tracked vehicles are more likely than tyred vehicles to facilitate the spread of propagules such as rhizomes, roots, runners, berries, stolons, or seeds. To mitigate this risk, extra precautions should be taken, including planning the excavation in a way that minimises the time the tracks are in contact with infested soils
- Excavation should take place at a safe distance from built structures or property boundaries including brick wall boundaries and should consider the requirements of the [Party Wall Act 1996¹⁶](#). [The Health and Safety at Work Act 1974²²](#) specifically highlights that destabilising buildings or undermining structures is considered a criminal offence
- Where excavations are being undertaken, all relevant health and safety requirements should be adhered to, including but not limited to permit to dig, Cable Avoidance Tool (CAT) scanning for buried services and obtaining underground service plans
- A Clerk of Works who is a PCA approved specialist, capable of demonstrating their competency in controlling or eradicating the target invasive non-native species should be present on-site to:
 - determine the extent of soil to be excavated to ensure that all propagules are removed
 - provide technical advice on all biosecurity with respect to invasive non-native plant(s) on the property, site, or project area
 - determine and check that excavation continues to a depth and area sufficient to enable the removal of the invasive non-native plants
 - inspect the area for propagules that might persist in the soil, in the case of rhizomes, roots and runners, regularly checking the face and extent of the excavation
- Trees and other ecological constraints such as nesting birds, must be considered prior to control works
- Excavation should continue, subject to ecological, physical, infrastructural, health and safety, and other site-specific constraints, until all visible propagules have been removed
- Reduced depth excavation could be used if suitable precautions are taken to prevent regrowth, for example, lining the void with a root barrier membrane
- Upon completion of the remediation works, the excavated area should be made good, for example, backfilling or if possible revegetating the affected area using an appropriate seed mix (*see section 14*)
- If any material containing or possibly containing propagules remains on the property, site, or project area, for example, in a bund or burial, the location should be mapped and the information passed to the relevant individual(s) or agencies
- Bunds containing invasive non-native plant material should be fenced off, signage erected and maintained for the entire remediation period
- If being taken off-site, infested soil should be disposed of following the appropriate waste regulations and duty of care (*see section 13*).

11. Root barrier membranes

Several of the control methods listed in *section 7*, involve the use of a root barrier membrane. When using such geosynthetic membranes, the following information should be taken considered:

- when being used to prevent horizontal spread, the vertical membrane should be buried to an appropriate depth and distance beyond visible growth, to contain or limit the invasive non-native plant growth. On its own, a vertical membrane is not a solution; it must be combined with control action, such as a herbicide treatment and monitoring programme
- the barrier should not be damaged or punctured as invasive non-native plants may penetrate any weakness in it
- where a membrane is installed horizontally to control vertical growth consideration should be given to using a membrane that is water permeable to prevent drainage issues whilst able to prevent the spread of rhizomes, runners, and roots. Alternately non permeable membrane could be installed on a gradient
- where the barrier is along or close to a property, site, or project area boundary, consideration should be given to the increased risk of horizontal spread and encroachment into adjoining properties or sites
- the presence of the membrane should be recorded and accurately mapped and the information passed to the relevant individual(s) to ensure the membrane is not disrupted by future developments, landscaping or services related works
- a high specification membrane sheeting should be used and it should be fit for purpose²
- the membrane should be chosen to reduce the need for sealing overlapped sheets. The seams of the membrane should be sealed as per the manufacturer's specifications.



12. Winter stem removal

While it is not always essential to remove winter stems, this may be necessary because they:

- risk exacerbating winter flooding where present on the banks of rivers, for example, Giant Hogweed and Japanese Knotweed
- are aesthetically unappealing
- present a hazard such as injury to faces or eyes
- can impede access when dense
- can impede herbicide application with respect to reaching new growth with a proportion of the herbicide landing on old stems, reducing the efficiency of the control

If necessary, stems can be removed by cutting and mulching, but not pulling. Stems should only be cut once the invasive non-native plant is considered “out of season” which is usually during the winter period. They should be cut at approximately 10 cm above ground level to remove the risk of picking up fragments of propagules. Once cut stems have dried, they can be safely dealt with (see *section 13.1*). Cut stems may still be classed as controlled waste depending on the plant species and must be disposed of following the appropriate duty of care if taken off-site. Stem removal should be supervised by a PCA approved specialist.



13. Waste management

Detailed criteria, with respect to invasive non-native plant waste management, are provided in [Regulatory Position Statement \(RPS\) 178²](#) and *Treatment and disposal of invasive non-native plants in Wales: RD 58* which could be considered “best practice” across the UK and the Republic of Ireland.

13.1 Winter stems

Once winter stems have been cut 10 cm above ground level (*see section 12*) they should be either:

- cut down or mulched and retained in the area of infestation
- incinerated on-site (*see section 13.3*)
- disposed of as controlled waste at an appropriate waste management facility (*see section 13.5*)

Stem removal should always be supervised by a PCA approved specialist.

If not properly controlled, the removal of winter stems can increase the risk of spreading invasive non-native plant material. Where it is not essential to remove the winter stems, they should be left on-site as stems of some species provide valuable overwintering habitat for insects.

13.2 Cleared vegetation

Any vegetation cut down which contains invasive non-native plant stems should be treated as controlled waste in the same way as in *section 13.1*.

13.3 Incineration

Controlled burning of dried stems, rhizomes, runners, crown material seeds, and other propagules, if approved, can help reduce the amount of material for which disposal will be required.

Incinerations can be carried out if the material is:

- transported to a commercial incineration facility licensed to receive such material
- transported to a contractor’s licenced incineration facility, for example, in their yard
- incinerated in a commercial transportable incinerator on-site
- burned in an open fire (bonfire) on-site.

Burning must take into account any local bylaws and the potential to cause a nuisance or pollution, such as odour, fumes, or smoke. The relevant local authority must be contacted before burning. The Environment Agency (EA) in England will require a small works license, although approval for burning in built up areas is rarely granted.

Most invasive non-native plant propagules can survive superficial burning. To ensure complete control, material should be placed in the heart of the fire and should be reduced to ash. The ash and associated remains should be either buried on-site or disposed of as controlled waste.

Incineration should always be supervised by a PCA approved specialist.

13. Waste management

13.4 On-site waste burial

The depth of the void used to bury invasive non-native plant contaminated material on-site will vary depending on the development plans, for example, soft versus hard standing and whether the material is to be sealed within a membrane. The appropriate regulator should be consulted for advice and their respective guidance^{1,2,3,5,6}.

The structure of the void and the potential for compaction of the waste within it should be assessed by a structural engineer to minimise the risk of settlement within the void. All excavations must be done safely and in compliance with the current guidance as issued by the Health & Safety Executive (HSE) [Structural stability industry health & safety](#)¹².

The use of a marker layer in the form of coloured plastic sheeting can be useful to indicate the presence of an invasive non-native plant burial area. The location of the burial area, its depth, and detailed working restrictions on or near the burial area should be accurately recorded in relevant property, site, or project area documentation and relayed to the client and any other relevant stakeholders.

13.5 Off-site removal to landfill

If invasive non-native plant material is to be disposed of off-site at a landfill, the landfill site that is receiving the contaminated materials must be approved to receive and supply evidence of its licensing to receive invasive non-native plant waste.

Before any invasive non-native plant waste is moved off-site, it may be necessary for soil samples to be taken from the affected area(s) to undergo testing at a suitable laboratory for any hazardous substances, such as asbestos. A short site history will be required before soil samples are taken, as this will often determine what contaminants need to be tested for. If contaminants are present, the soils may be classed as hazardous (depending on quantity and chemical makeup) and a Waste Acceptance Criteria (WAC) analysis is required. The soil analysis results must be sent to the receiving landfill site for their approval before they will accept the waste. The range of contaminants required to be tested for will depend on the existing and previous use of the property, site, or project area and surrounding area. Care should be taken when collecting soils that may contain invasive non-native plant propagules and the receiver notified and samples managed accordingly.

All waste material should be removed from the property, site, or project area by a suitably licensed waste carrier. If a contractor organises the waste haulage and landfill themselves, they must be an appropriately registered [waste dealer](#)²¹.

All producers, carriers, and waste facilities have a duty of care to ensure that the waste is handled and treated properly. All waste removed from property, site or project area should be accompanied by a Waste Transfer Note, or if hazardous, a Consignment Note, which clearly states the presence of the identified invasive non-native plants and the waste destination of the waste. A Waste Acceptance Note must also be obtained from the waste facility that states the material containing the invasive non-native plant(s) has been received.

Waste Transfer Notes or Consignment Notes should be checked by the PCA approved specialist overseeing the works before signing, and copies of all transfer and consignment documentation should be filed and kept for the legally required periods: two years for a waste transfer note and three years for a consignment note.



Excavation

Image courtesy of The Knotweed Company

14. Revegetation post invasive non-native plant management

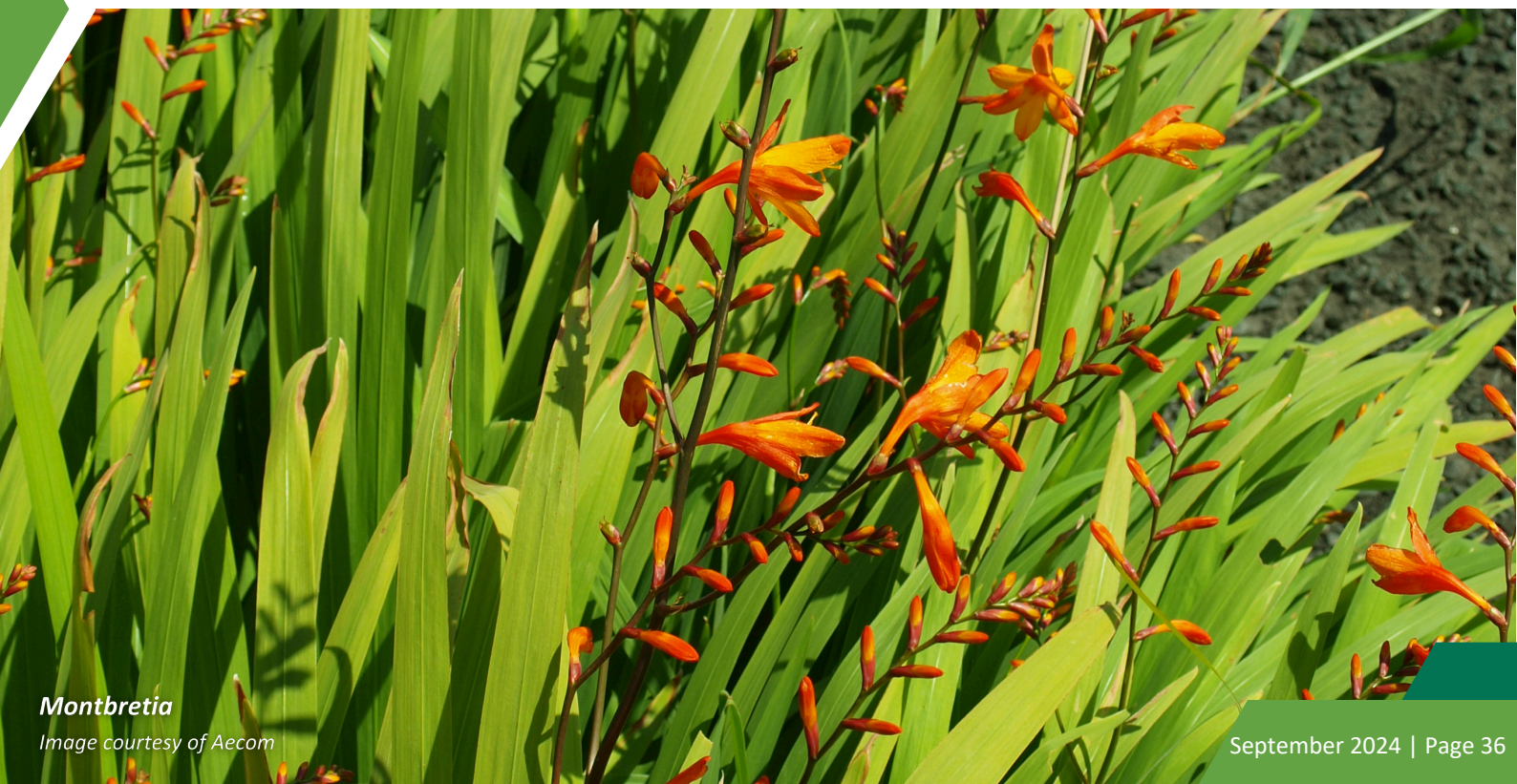
The management of invasive non-native plants usually involves either herbicide treatment, excavation, or a combination of both and typically results in bare soil. Incorporating revegetation into an invasive non-native plant management plan is considered essential. To prevent recolonisation by other invasive non-native plants, remediation such as re-seeding, should be included in the planning and costing for an invasive non-native plant project. This will:

- stabilise disturbed soils to avoid:
 - soil erosion particularly where soils are left exposed over winter, the habitat is alongside a watercourse or natural revegetation is likely to take a long time
 - unsightly patches of bare ground within the landscape, particularly in public areas such as parks and playing fields
- reducing the likelihood of colonisation by undesirable species either the re-invasion of the plant just controlled, or other invasive non-native plants or other problematic species
- support the re-establishment of the original flora, less the invasive non-native plant(s)
- provide the opportunity to enhance the biodiversity of the habitat by sowing or planting appropriate species.

The development of a healthy plant community is an important part of sustainable invasive plant management and can meet other objectives, such as the appearance of a site, wildlife habitat development, and maintenance of ecological function. Remediation works such as reseeded or use of turf or plug plants should be supervised or carried out by a PCA approved specialist. Care should be taken to ensure that the remediated habitat is built into ongoing site management in order to maintain and sustain the desired vegetation.

Where a company or insurance backed guarantee has been issued (*see section 18.1*) with respect to a treatment area, any potential impact of replanting works on the guarantee should be made clear to the client and where necessary, appropriate mitigation should be put in place.

Further information is available on the PCA Guidance Note on [Revegetation following Invasive Non-Native Weed Treatment](#)¹⁰.



Montbretia

Image courtesy of Aecom

15. Reports

It is important to provide detailed reports of invasive non-native plant control work, the sections below outline the minimum information that should be provided. The document [Japanese Knotweed Site Survey Reports & Management Plans](#)⁹ and [Exemplar Report](#)²⁶, can be adapted for other invasive non-native plants and serve as useful tools to support report writing.

15.1 Site assessment

Reports that include the findings of a property, site, or project area assessment should include as a minimum:

- the property, site, or project area location
- details of the contracting organisation and/or client
- a description of the property, site, or project area and the immediate surrounding area
- an accurate record of the invasive non-native plant infestation, including photographs
- a scaled map with dimensions, which should mark the location of all invasive non-native plant stands and provide an indication of the potential extent of the plants, such as rhizome, runner network, or seed bank
- an outline of development plans for the property, site, or project area (if applicable)
- an outline of any remedial work that has been carried out to date (where applicable)
- an assessment of the risks associated with the invasive non-native plant(s) within the property, site, or project area
- an assessment of the risks associated with any invasive non-native plant(s) present in the immediate surroundings or in the wider environment (if applicable).

15.2 Management plan

A management plan should cover the whole of a property, site, or project area (not just those areas with an invasive non-native plant infestation) and if necessary adjacent land and, or any watercourses. Additional information can be found in the [Japanese Knotweed Site Survey Reports & Management Plans](#)⁹ and the [Exemplar Report](#)²⁶.

As a minimum it should include:

- the objectives of the management plan
- an evaluation of control options (if applicable)
- a detailed description of the control actions to be taken
- an assessment of the risks associated with any control action
- a description of how the success of the control action will be evaluated
- advice on how to prevent spread around and off-site
- advice on how to prevent additional invasive non-native plants arriving at the property, site, or project area
- a treatment schedule
- a full breakdown of the costs associated with the control action
- an understanding and breakdown of any relevant integrated weed management procedures
- a detailed and accurate distribution map (*see section 5.2*).



Invasive Bamboo

Image courtesy of Southwest Knotweed

15. Reports

15.3 Update report

Where work or monitoring is ongoing over an extended timeframe, reports should be provided to clients periodically, such as at the end of each year. As a minimum, update reports should include:

- an assessment of the effectiveness of control action to date
- an update of all control actions taken, including spray visit records (SVR) and winter or vegetation clearance
- the location and extent of any invasive non-native plants found beyond the distribution determined during the previous property, site, or project area assessment
- an assessment of any new and/or changed features that might impact the effectiveness of the management plan or increase the risk of spread or re-infestation
- a description of any newly identified invasive non-native plants in the local or wider environment and an assessment of their impact on the management and monitoring programme.

15.4 Completion report and certificate

Once control action has been completed successfully, as determined by the criteria outlined in the management plan, a final report should be provided that should include as a minimum:

- an outline of all control actions carried out
- a completion certificate that confirms the treatment is complete and the invasive non-native plant(s) at the property, site, or project area have been remediated.



Varigated Yellow Archangel
Image courtesy of Aecom

16. Warranty / guarantee

Where applicable, contractors should be able to provide clients with assurances that the work specified and subsequently undertaken will be effective in controlling the growth of the invasive non-native plant(s).

Control action and site inspection will continue until the treatment schedule has been completed or it is deemed that the invasive non-native plant(s) infestation is no longer capable of any further growth.

Where appropriate, and at the discretion of the contractor, guarantees and insurance may be provided to clients. These provide additional levels of protection to the client in respect of any failure of the specified controls and most commonly cover a period of five to ten years.

17. Costs

Where applicable, all costs to the client should be provided upfront with a breakdown of the services and products included, with no hidden costs. Any potential risks that could increase costs at a later date should be detailed and fully explained to the client.

When as a result of site investigations or following the commencement of work, it is found that additional work is needed, the client should be made aware of the full implications of these extra costs before additional work is undertaken or additional costs are incurred.



18. Insurance and bonds

Membership of the Property Care Association (PCA) entitles members with access to several exclusive insurance services. Basic information about these products is available from the member contractor and more detailed information is available directly from the respective insurance providers.

18.1 Insurance Backed Guarantees (remedial work)

If a contractor wishes to issue a guarantee against the regrowth of an invasive non-native plant for example, Japanese Knotweed following control and monitoring, an Insurance Backed Guarantee (IBG) can be purchased. The IBG can be claimed on by the Policyholder to meet the cost of the retreatment of an invasive plant which would have been covered by the written guarantee originally provided by the contractor, where the contractor has ceased trading and is unable to honour the terms of their written guarantee. The IBG (certificate of insurance) can only be issued by the insurer when all work to remediate an invasive non-native plant are complete and a completion certification has been issued by the contractor. IBGs are generally issued for up to 10 years.

Further information regarding IBGs is available through [QANW](#)²³.

19. Acknowledgements

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Thank you to Aecom, Conservation Land Services, Environment Controls, Invasive Weed Management, Japanese Knotweed Ltd, Phlorum, Southwest Knotweed and The Knotweed Company which allowed the reproduction of their images in this document.

20. Definitions

Active ingredient	The chemical component of a pesticide that kills or debilitates a plant or other pest.
Adjuvant	A substance or substances which when added to a pesticide increases the efficacy of the treatment.
Berry	Fruit with a fleshy surround to the seeds.
Biodiversity	The number and variety of organisms found within a specified geographic region.
Bonsai	Distorted growth of Japanese Knotweed (or other plants) usually caused by herbicide treatment, bacterial infection or damaged rhizomes/roots.
Bund	An embankment or constructed barrier that forms a boundary or provides containment.
Cane	Tall, hollow, Bamboo or Bamboo-like stem.
Catchment	The land area from which all run-off water flows to form a waterway. Its boundary is the natural features, such as hills and mountains, which surround it. It is also known as a drainage basin.
Corm	A short swollen underground storage stem, arising on top of the previous year's growth.
Crown	Visible part of the rhizome from which a bud or buds will emerge. It looks like a crown when the stems are cut.
Dormant	Invasive plants may readily enter a dormant state (total or partial). This is a defensive measure which is triggered by unfavourable growing conditions and occurs as part of the plant's natural growing cycle each winter. Longer periods of dormancy may often be the result of various factors including herbicide treatment, where the plant can persist for a number of years or decades.
Herbicide	A type of pesticide used to kill plants.
Internode	The plant stem between two nodes.
Insurance Backed Guarantee (IBG)	A company guarantee that is backed by insurance, such that in an event of a company being unable to discharge its obligations under the guarantee, due to insolvency, and obligations are met by the insurer.
Invasive non-native plant (INNP)	A plant species that is not native to a particular area or country and, when introduced, establishes itself and has the ability to spread causing damage to the environment, the economy, our health, or the way we live.
Integrated Weed Management (IWM)	A coordinated, controlled and sustainable strategy for the prevention, detection and control of invasive non-native plants. Control measures would include physical, biological, cultural and chemical, with hybrid options also considered.

20. Definitions

Management	The action(s) taken to plan, control or eradicate invasive non-native plants including follow up remediation of soils and habitat and surveillance.
Node	The horizontal ring around a stem from which side-stems and leaves emerge. Each stem will have a number of nodes, which segment into internodes.
PCA approved specialist	An individual or company within membership of the Property Care Association (PCA). The individual or company has to demonstrated competency relating to invasive non-native plant identification and remediation as part of their membership criteria.
Perennation	The process by which certain plants or plant parts survive from one growing season to the next, typically through adverse conditions like winter or drought. This is achieved through specialised structures such as corms, tubers, rhizomes, or seeds. These structures store nutrients and allow the plant to regrow when favourable conditions return.
Pesticide	A chemical used to kill a pest. There are several groups of pesticides, known as herbicides, fungicides, or insecticides.
Propagule	Any part of plant capable of growing into a new organism, for example, seed, cutting or rhizome section.
Residual	(with respect to pesticides including herbicides) A residual herbicide is designed to provide long lasting activity in the soil. Typically used on arable crops or where weed control is required over a period of weeks or months.
Rhizome	A modified stem which grows under the soil surface. Roots are found growing from rhizomes and buds, which may also form new shoots. Rhizomes typically last for more than one season and serve for both vegetative propagation and perennation.
Root	The usually underground organ that lacks leaves or nodes; absorbs water and mineral salts; usually it anchors the plant to the ground.
Stolon	A creeping stem above ground that roots at the tip to form a new plant that may eventually become independent of its parent.
Seed	The unit of reproduction of a flowering plant, capable of developing into another such plant.
Species	A fundamental category of taxonomic classification, ranking below a genus or subgenus and consisting of related organisms capable of interbreeding.
Stand	A term used to describe the visible area occupied by an invasive non-native plant.

20. Definitions

Stems	The above ground part of the plants, typically emerging from a crown or directly from the underground rhizome.
Sucker	A secondary shoot that arises from the base or root system of a plant, often at a distance from the main stem. These shoots typically emerge from lateral roots and can develop into new plants if left to grow. While they can be beneficial for propagation, suckers can also drain nutrients from the main plant and may need to be managed or removed to maintain the health and structure of the primary plant.
Terrestrial	Those plants (or animals) that live on land as opposed to living in water.
Viable	Vegetative or seed material which is capable of growing into a new plant.
The wild	The Department of the Environment and Rural Affairs (Defra) defines the wild as <i>“The diverse range of natural and semi-natural habitats and their associated wild native flora and fauna in the rural and urban environments in general. This can also be broadly described as the general open environment.”</i> Whether an introduction (release or escape) is into <i>the wild</i> may be dependent on the ecology of the species in question, the potential affected environment and what constitutes the wild must be judged on a case-by-case basis. Residential back gardens or managed estates are typically not considered <i>the wild</i> .
Weed	Any plant that grows where it is not wanted and competes with cultivated plants for resources like water, nutrients, sunlight or causes damages to the wider environment.

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