Information for community and voluntary groups in Wales

Practical control of Japanese knotweed

Llywodraeth Cymru
Welsh Government

You can find general information on Japanese knotweed here. This leaflet explains what needs to be considered when thinking about a project to manage Japanese knotweed and other invasive knotweeds.

Who is responsible?

Responsibility for controlling Japanese knotweed nearly always lies with the landowner unless the leaseholder is responsible for land management. If you cannot find out who owns the land in question, you can contact the Land Registry.

Landowners do not have to control Japanese knotweed and other invasive knotweeds on their land. However, planting or causing the invasive plant to grow in the wild is a criminal offence under the Wildlife and Countryside Act 1981. Actions that are highly likely to cause it to spread include dumping material contaminated with knotweed (e.g. soil and grass cuttings) and mowing, strimming and flailing above ground growth. Encroachment of Japanese knotweed on to neighbouring property may give rise to a liability under a private nuisance claim.

Further, where individuals are acting unreasonably and persistently in a way that has a detrimental effect on the quality of life of those in that locality, for example by allowing the unmanaged growth of knotweed, local authorities and the police have the power to issue community protection notices under the Anti-social Behaviour, Crime and Policing Act 2014. Further information is available here.

Why control Japanese knotweed?

Invasive knotweeds are long-lived (rhizome-forming perennial), competitive dominant plants. Rapid growth early in the year and a dense, compact canopy restricts native plant species access to light. Decomposing leaves and knotweed stems additionally form a thick mulch that limits the germination of native plant species.

Competitive growth causes negative ecological and socioeconomic impacts, including:

- **Reduced habitat availability and quality –** reduction of native plant, invertebrate and vertebrate species diversity, altered soil conditions and reduced ecosystem services.
- **Habitat alteration and degradation –** direct negative impacts upon terrestrial and freshwater food webs. Invasive knotweed growth also creates negative socioeconomic impacts.
- **High management costs –** estimated at more than £8.8 million per annum in Wales alone.
- **Property valuation –** the presence of invasive knotweeds can affect property value and obtaining a mortgage on affected properties.
- **Limited soil binding capacity –** invasive knotweed rhizomes (roots) do not bind soil as effectively as the root systems of native flora, increasing the risk of embankment collapse and erosion.
- **Access restriction –** amenity areas may become inaccessible due to uncontrolled growth (e.g. loss of riverbanks for fishing).
- **Litigation –** recent court cases have established Japanese knotweed and other invasive knotweeds can give rise to both criminal and civil liability.

Contractor accreditations

Before starting your project, consider who will be best placed to undertake the work – is it appropriate to engage a specialist or to get specialist training yourself? When looking for a contractor, the following accreditations and registrations are recommended:

- Amenity Forum Membership
- BASIS Professional Register
- BASIS Amenity Training Register
- BASIS Nominated Storekeeper (NSK) Professional Register

Membership of one of the following trade associations is recommended:

- Property Care Association (PCA)
- Invasive Non-Native Specialists Association (INNSA)

Project planning

Goal setting

Before starting your project, think carefully about how your group will approach the project. In most cases, the overall goals of the project will be to:

- Bring invasive knotweed under control and long-term management with herbicide
- Limit further spread and dispersal of the plant through effective treatment and management prioritisation
- Minimise the ecological damage that knotweed is causing and also limit the impact of control treatments in the project area

To achieve these goals, before starting your project think carefully about the following:

- **Project resources –** what resources are available to deliver your project? How much and how long is funding available? Do you have volunteers that are suitably trained to apply herbicides? These considerations are essential to plan and deliver your project effectively.
- **Geographic scale –** scale is very important. Managing large areas of knotweed infested land is physically demanding and there is a narrow opportunity for effective treatment with glyphosate-based herbicides (June to October, weather dependent). How much can you realistically manage in the time available? **It is better to manage smaller, prioritised areas of knotweed well than spread project resources too thinly.**
- **Surveying the project area –** it is important to determine the number and size of invasive knotweed stands (patches) that you will be treating – this may require a survey programme if little is known about invasive plant distribution in the project area. However, in some cases, the location of knotweed may be well known, or there may be more knotweed present than you can manage in one or two growing seasons; in such cases it may be advisable to map the knotweed as it is being treated to save time and reduce labour costs.
- **Pathways of spread and dispersal routes –** regardless of the scale that you are operating at, ensure that you understand how knotweed spreads within the project area (e.g. paths, walkways) and also think about spread from other areas (e.g. neighbouring land, rivers etc.). Prioritise treatment in areas where knotweed is spreading quickly and/or where the plant is being introduced into the project area.
- **Treatment prioritisation and scheduling –** working out how much invasive knotweed you will be treating is important in terms of treatment prioritisation and scheduling, as larger patches (more than 100m^2) of knotweeds may take 3- 5 years (or more) to bring under good control with herbicides and will require follow-up treatments throughout this time. Do not stretch resources too thinly – it is better to bring a smaller number of stands under effective control than treat a large number of stands for insufficient time. Where possible, prioritise upstream sites in riparian areas and stands in high traffic areas to prevent further disturbance and spread.

Health & Safety

Invasive knotweeds are often found growing along riverbanks and other difficult to access areas. Carry out a health and safety risk assessment so you understand the risks. Take care accessing such areas to survey and/or undertake treatment of invasive knotweed as dense growth may obscure uneven ground and trip hazards and wet habitats such as riverbanks can be very slippery.

Biosecurity

Why is biosecurity important? In short, because you don't want to make an invasive species problem worse! Biosecurity is a way of working that reduces the risk of introducing or spreading invasive non-native species, pests and diseases. It is necessary to draw up a biosecurity risk assessment and plan for your project as invasive knotweeds spread from small fragments of rhizome; these can be transported on machinery, vehicles and even on muddy boots.

As a minimum, the following basic biosecurity advice should be followed:

- Arrive at the site with clean footwear and vehicle.
- Ensure footwear is clean (visually from soil and debris) before leaving the site.
- Ensure vehicle is kept clean - in particular remove any accumulated mud before leaving the site.
- Make use of facilities provided onsite to clean footwear/ equipment.
- Keep access to a minimum.
- If practical do not take vehicles onto premises, keep to established tracks and park vehicles on hard standing.
- Where possible avoid areas of livestock and areas with known plant disease.
- Plan visits so that the riskiest visit is the last one of the day.

For the most up to date biosecurity information please follow the link to the GB NNSS website.

Survey

The following key records are recommended:

- Survey and treatment dates
- Surveyor name
- Location – record knotweed growth on a map (electronically if possible), this can be used to prioritise treatment and manage treatment load over time
- Annual digital photographs of stands to assess control progress
- Approximate area of each individual stand – create 3 or more size classes to help plan treatment load (e.g. Class 1 = 1-25m^2, Class 2 = 25-100m^2, Class 3 = larger than 100m^2)
- Assign each stand an identifiable code (e.g. JK001)
- Approximate stand density (e.g. 'thick - near road' or, 'not dense, growing under trees')
- Note proximity to watercourses
- Provide landowner information
- Provide land designation and habitat type
- Slope of the land being treated and surroundings
- Site notes – any specific notes and/or control measures recommended

Project implementation

Invasive knotweed IPM testing

In 2018, Jones et al. published the first set of results from the world's largest ongoing field-trial on Japanese knotweed control, using an Integrated Pest Management (IPM) approach. All practical control treatments, other than biological control and remediation/eradication methods were tested over a three-year period. Key findings from this research are used to inform the approaches to invasive knotweed control and management recommended here.

All findings and recommendations provided below are applicable to the control and management of all invasive knotweeds found in Wales (Japanese, Dwarf, Giant and Bohemian (hybrid).

The research tested physical and chemical control methods to identify the most environmentally and economically sustainable means of controlling invasive knotweeds. **While the ultimate aim of an IPM approach is to minimise pesticide use, if there are no other effective control methods herbicides may be used sparingly as a last resort.**

IPM control methods and the results of research are discussed below to help determine the most suitable method for your project:

1. **Physical –** e.g. soil cultivation to disrupt weed establishment.
2. **Biological –** biocontrol or bioherbicides.
3. **Chemical –** herbicides or plant protection products (PPPs).
4. **Integrated –** truly integrated systems combine cultural, physical, biological and/or chemical methods; integrated herbicide management systems use a range of PPPs to mitigate selection of resistant weed populations.

Physical

- Over 3 years, Jones et al. (2018) results were unable to show that physical control methods were effective against invasive knotweeds – depletion of below ground rhizome energy reserves through complete suppression and/or removal of above ground growth is not possible within decadal timescales.
- Physical control methods are likely to result in spread below ground and/or further dispersal of knotweed plant fragments above ground.
- Examples of physical control methods include: cutting using hand tools, strimmer, mower, flail, thrasher; pulling; surface covering with geomembrane/geotextile; composting; burning and hand-digging. **All are highly likely to lead to increased spread.**
- Where spread and/or dispersal onto neighbouring land occurs as a result of the application of ineffective treatments, **both criminal and civil liability may arise**.

Biological

- Grazing should not be used as previous research shows that this does not control knotweed growth effectively. Similarly to physical control methods, depletion of rhizome energy reserves by grazing is likely to take decades.
- Livestock cannot be deployed safely in many situations and stock are likely to transport plant material during feeding, causing further spread.
- Biocontrol – to date, no data has been published regarding the efficacy of the CABI Psyllid biocontrol agent *Aphalara itadori* released in 2010.
- Bioherbicide – CABI are developing a bioherbicide based on the leaf spot fungus *Mycosphaerella polygoni-cuspidati*; any resultant product registered for use in the UK is unlikely to be available for some years.

Timing of invasive knotweed growth stages and treatment application

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Growth stages: approximate - species, weather and altitude dependent												
Bud development		■	■	■								
Stem growth			■	■	■	■	■					
Green leaves			■	■	■	■	■	■	■	■		
Flowering								■	■	■		
Die back									■	■	■	
Dormancy	■	■									■	■
Treatment application - glyphosate-based herbicide												
Biannual foliar spray						First spray		Second spray				
Stem injection								■	■	■		
Annual foliar spray								■	■	■		

Chemical

- Spread and/or dispersal onto neighbouring land as a result of the application of ineffective herbicide treatments **could give rise to both criminal and civil liability.**
- Results of the Jones et al. (2018) research showed, that of the herbicide products currently available, glyphosate applied at the time when invasive knotweeds are most vulnerable to its effects is the most effective control treatment. Glyphosate was found to be the most effective herbicide tested when it was applied at the correct time of the year - from mid-summer into late autumn (depending on the weather). This is when resources start to be drawn down from above ground growth into the rhizome. If these herbicides are applied sooner in the year, herbicide is not transported down into the rhizome and there is little to no impact on above ground growth in subsequent years.
- The following three treatments performed significantly better than all other control methods tested:

1. **Biannual foliar spray –** half of maximum permitted application rate (see product label) applied twice per year
2. **Stem injection –** maximum permitted stump treatment application rate (see product label) applied once per year; however, it used 15 times more herbicide than either foliar spray treatment. When knotweed is growing amongst rare and/or desirable vegetation or rain is forecast, stem injection can be a useful targeted application method
3. **Annual foliar spray –** maximum permitted application rate (see product label) applied once per year; **did not perform as well as biannual foliar spray and stem injection, but is less labour intensive and more sustainable.**

- Spray enhancers – always use a spray enhancer (adjuvant/surfactant) to increase the rainfastness of foliar spray treatments.
- Herbicide application may be extended into November if weather conditions permit (i.e. more than 50% green leaves still attached to plant).
- Do not exceed the dose of herbicide specified on the product label – this is illegal. Further, beyond a threshold dose, higher doses and/or more frequent herbicide treatment does not improve control outcomes.
- **None of the herbicide treatments tested during the Jones et al (2018) study resulted in knotweed eradication –** although excellent long-term control and management was achieved using glyphosate-based herbicides.

Integrated

- When glyphosate-based herbicides were combined with other physical control methods or other herbicides, control efficacy was reduced compared with using glyphosate-based herbicides alone.
- Where spread and/or dispersal onto neighbouring land occurs as a result of the application of ineffective treatments, **both criminal and civil liability may arise.**

What permissions are necessary?

- Gain the landowner's written permission before starting any knotweed treatment on public or private land.
- Obtain written permission from Natural Resources Wales (NRW) before starting any knotweed treatment in or near water, including water abstraction points, drainage channels, streams, rivers, ponds, lakes, reservoirs, canals and dry ditches.
- Obtain written permission from Natural Resources Wales (NRW) before starting any invasive knotweed treatment on protected/designated sites (e.g. Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), Special Areas of Conservation (SACs).

Operator accreditations

There is a legal requirement for all individuals undertaking herbicide-based control of invasive knotweeds to have the NPTC or Lantra Level 2 Award in The Safe Application of Pesticides using Pedestrian Handheld Equipment (QCF) (PA6). The following unit endorsements are all recommended:

- **PA6A (151)** Operating Pedestrian Handheld Applicators Fitted with Hydraulic Nozzles or Rotary Atomisers to Apply Pesticides to Land (PA6A)
- **PA6AW (152)** Operating Pedestrian Handheld Applicators fitted with Hydraulic Nozzles or Rotary Atomisers to Apply Pesticides to or Near Water (PA6AW)
- **PA6INJ (156)** Operating Handheld Pesticide Injection Equipment (PA6INJ)

This document does not provide guidance on suitable personal protective equipment (PPE) for herbicide application, or the storage and disposal of pesticides as up-to-date information is provided as part of relevant NPTC or Lantra Awards.

Knapsack sprayers

Knapsack sprayers are lightweight and portable and are the most frequently used tool for invasive knotweed control. Use reputable brands to ensure safety, reliability, adequate tank capacity and ease of use. For most projects, telescopic lances should be used with knapsack sprayers to ensure good coverage of tall knotweed plants. Always use nozzles that produce medium-size spray droplets (e.g. Cooper-Pegler blue flat fan nozzle), as these maximise herbicide delivery and minimise spray drift.

Monitoring

Monitoring is important to make sure that treatment is maintained for as long as necessary to achieve effective control. Where this is supplemented with a complete digital photo record, project progress can be monitored, particularly over larger areas. Photos can be taken at the same time as treatment in the first years of the control programme. Once control is achieved, revisits (with photos) can be conducted every other year to check for any regrowth. Invasive knotweed regrowth following treatment with glyphosate-based herbicides can look very different to a healthy plant – some common examples of this are shown below in images A-C.

Funding

Natural Resources Wales Funding update gives an overview of the money available from various sources to groups and charities for environmental projects and causes.

Please note that this leaflet is for information only. If you have any specific legal concerns regarding Japanese knotweed, we recommend that you take legal advice.

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