

**INVASIVE NON NATIVE SPECIES
POLICY AND ACTION PLAN**

DRAFT

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1. Background

In recognition of the increasing environmental, economic, legal and social problems caused by invasive non-native species (INNS), and more specially in this case plant species, Newport City Council have prepared this policy and action plan in order to assist in the control, containment and awareness of the most problematic species threatening the area.

Invasive non-native species (INNS) are those plants, animals, fungus or diseases that have been artificially introduced to a new country where they are not native or indigenous, are able to sustain a viable population and critically, are causing environmental, economic or social (or a combination of these) problems. INNS can be terrestrial, aquatic or marine and all are affected and no corner of the world and no continent remain untouched by INNS.

Disclaimer

While care has been taken to ensure that information contained in this publications is as accurate as possible, the research and knowledge regarding INNS is rapidly change and evolving therefore legislation and best practice guidance can also alter surprisingly quickly.

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The policy was commissioned by Newport City Council and prepared by Knotweed Control Swansea Limited for the purpose of raising awareness of and action against invasive non-natives within Newport City Council.

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2. Scope

The scope of this Policy and Action Plan is to help in the prevention, control, containment and raise awareness of several problematic non-native plant species within the administrative boundary of Newport City Council Authority. The document is aimed at;

- Council staff, Elected Members;
- Businesses, organisations and individuals they work with;
- Residents and organisations for whom they work.

This policy is limited to plant species and specific related pathogens with details of several that are already problematic in the Newport area although it must be noted that other invasive non-native plants, animals, fungus, protist, archaeon and bacterium species, which make the 5 Kingdoms of life, can also be hugely problematic and a watching belief to monitor these potential species should be ongoing.

3. Summary of INNS and NCC management response

Invasive non-native species	NCC general management regime (subject to change in accordance with any new research)
Japanese knotweed	<i>Chemical</i> -Sprayed once per year between August-October or stem injection. Aquatic approved herbicide
Himalayan balsam	<i>Physical</i> -hand pulling the plant before the seed pods develop, generally before May. <i>Chemical</i> -Aquatic approved herbicide where access is difficult
<i>Rhododendron ponticum</i>	<i>Mechanical/Chemical</i> -Fell trees/bushes followed by approved herbicide to prevent regrowth and coppicing of trees
<i>Phytoptherora ramorum</i> & <i>Phytophthora keroviae</i>	Contact NRW for further advice
Giant hogweed	<i>Mechanical</i> -Cut to prevent seed dispersal. This <u>does not</u> kill the plant. <i>Chemical</i> - Aquatic approved herbicide to be sprayed between late April and early June and again in July or August.
New Zealand Pigmyweed	<i>Physical/mechanical</i> - not preferred option as it can spread fragments in running water courses. It can also take root on land. <i>Chemical</i> -Aquatic approved herbicide submerged treated ideally Feb/March, dry areas treated between April-end of November
Parrots feather	<i>Physical/mechanical</i> - cut/pulled/dredged material must be completely removed <i>Chemical</i> -Aquatic approved herbicide

4. Invasive non-native species (INNS) in Newport

3.1. Japanese knotweed (*Fallopia japonica*)

Background

- Japanese knotweed (*Fallopia japonica*), known under many common and scientific names including Japanese Bamboo, Pysen saethwr (Welsh), *Polygonum cuspidatum*, *Reynoutria japonica* is a large fast growing, perennial plant belonging to the dock or Polygonaceae family.
- Native to eastern Asia Japan, Taiwan, northern China and Korea, Japanese knotweed was introduced into the UK in the mid-nineteenth century as an ornamental plant initially and then fodder plant for animals and bank stabiliser along embankments in the nineteenth century.
- Japanese knotweed is problematic in many places where it is not native especially in North America and Europe and has been listed by the International Union for the Conservation of Nature (IUCN) as one of the [world's 100 worst invasive species](#).
- Japanese knotweed is very tolerant of a wide range of conditions and is particularly successful on disturbed land so thrives in urban areas, areas of development and along transportation corridors and waterways

ID features

- Spring buds with red and then lime green growth in early spring
- Rapid growth with leaves unfurling growing up to 10cm at its maximum
- Grows up to 2m in thick stands monoculture
- Stems are speckled red and green, hollow, fluid filled chambers
- Heart shaped (cordate) leaves with a flat leaf base and drip tip 5–15 cm
- Leaves on typically zig zag branching stems or canes
- Creamy white flowers or inflorescence about 3 mm in the autumn
- produces papery unviable papery seeds turning brown as they ripen and fall
- In the autumn leaves yellow and fall with and frosts killing any green growth
- The hollow woody stems persist erect throughout the winter with a dense leaf litter
- Established knotweed created large knotty crowns
- Produces chemicals to stop other plants growing or germinating (allelopathy)



Propagation

- Propagation is by rhizomes (modified underground stems) and crown material taking only 0.7gm the size of a pea to create a new plant.
- Rhizomes can extend up to 7m out from each plant and 3m deep although depends on many factors including the soil medium, length of time on site and weather during the growing season.
- Seeds are not generally viable in the UK but seedlings don't tend to last

Problems

Damage caused by Japanese knotweed is often exaggerated but if left untreated it can be problematic spreading quickly over large distances especially on disturbed or neglected ground. Problems can include:

- damage to walls, foundations, flood defences, hard surfaces, underground services and drains
- increases erosion and instability and flooding in river
- expensive and time consuming to treat
- reduction in value of land and property
- inability to sell land and property
- refusal of planning applications
- refusal of mortgage
- delays in construction projects
- reduces biodiversity by outcompeting other species
- can harbour litter, rats and other pest with potential for human health issues
- aesthetically unsightly
- restriction of access to riverbanks for amenity use
- result in adverse publicity

Control, treatment and monitoring

There are many control methods and combinations used for Japanese knotweed control depending on site of infestation, time and money available but all controls require time and care and there must be vigilant monitoring of the site for a period of time and care not re-infect the site from other sources.

a. Chemical or herbicide control

- The chemical or herbicide control takes several years but is the most cost effective control method.
- Herbicides are normally applied via foliar spray or stem injection, depending on the herbicide used.
- Aquatic approved herbicides should be used “near” water courses or bodies which should be applied by a suitable qualified and experienced operator with appropriate safety precautions.
- In Wales under the Control of Pesticides Regulations 1986 [Simple Agreement or Higher Risk Agreement for the use of Herbicide near water or a designated site](#) may be required from Natural Resources Wales. .

b. Physical or mechanical control

- Physical or mechanical control *could be undertaken by*;
 - **Digging/ excavation**

This creates a lot of spoil as the rhizomes on average extend 3m down and 7m in all directions around the visible above ground growth although this can also be to a greater or lesser distances.

- Any Japanese knotweed material is a “controlled waste” under the **Environmental Protection Act (1990)** and any created by the above will need to be managed by one of the following methods.
 - **Landfill**; This is an expensive method and as Japanese knotweed or if the certain herbicides are used it can be a “hazardous waste”,
 - **Burial on site**; 3m deep if encapsulated or 5m if topped with a specialised membrane. Natural Resources Wales need to be informed at least 1 week before burial
 - **Burning or incineration**; All safety precautions and local agreements must be sort to burn or incinerate material and the material should be TOTALLY burnt. Ash remains are technically still a controlled waste.
 - **Composting**; Material needs to be COMPLETELY decomposed. Woody hard crown and rhizome material may be very hard to compost. Composted material is technically still controlled waste.

c. Combined physical & chemical/ herbicide control (the bund)

- This method involves the excavation of contaminated Japanese knotweed soil and placing it on a specialised membrane then undertaking herbicide/ chemical control over a suitable time frame.
- The material is still classed as controlled waste but can be used for landscaping on site although care must be taken to monitor for any regrow of viable rhizome or crown material.

Prevention of spread using membranes or root barriers

- Membrane or root barriers can be used for example where adjoining landowners are not co-operating with a cross boundary infestation or where the land cannot be dug and are normally used in conjunction with other treatment methods including herbicide treatment and excavation
- Using a specialised membrane or root barrier to stop lateral or vertical growth with a 50 year guarantee is normally suggested in the Environment Agency's [Managing Japanese knotweed on Development Sites: Code of Practice](#)¹. (this publication was withdrawn 11 July 2016 but it is still the only best practice for development sites)

Biosecurity

- Japanese knotweed is a highly invasive with a piece of rhizome as small as 0.7gm the size of a pea having the ability to regrow into a new plant and colonise a new area quickly. Good site hygiene is essential.
- Recommended in the Environment Agency's [Managing Japanese knotweed on Development Sites: Code of Practice](#)
 - A 7m zone exclusion fencing be erected to avoid disturbance
 - Warning signs are displayed to raise awareness of the Japanese knotweed
 - A Japanese knotweed Clerk of Works (JKCoW) employed for works near and around the knotweed
 - Tool box talks be given to construction workers on site
- Knotweed material cannot be put in council refuse collection normal or green waste or taken to Civic Amenity Sites

Legislation

Professional advice should always be sought regarding the legalities of Japanese knotweed as it is a complex and new area of law more so than many other invasive non-native species. However the following points can be used for basic guidance. Although not illegal to have Japanese knotweed on your land:

- Japanese knotweed could be deemed as **private nuisance** where Japanese knotweed causes someone unreasonable interference with the enjoyment or use of their land.
- This can become a **public nuisance** where an act or omission endangers or interferes with the lives, comfort, property or common rights of the wider public.
- If a vendor omits information or lies about a property being affected by Japanese knotweed on the TA6 Property Information Form (since 2013) you could be in breach of the **Misrepresentation Act 1965**.
- Japanese knotweed is listed in **Schedule 9, of the Wildlife and Countryside Act 1981** where it is an offence to plant or cause to grow wild.
- Under the **Environmental Protection Act 1990** all Japanese knotweed material is a "controlled waste" and if treated with certain chemicals under the *Hazardous Waste Regulations 2005* it is a "hazardous waste". Both controlled and hazardous wastes require specific conditions for transportation and disposal.

¹ [Managing Japanese knotweed on Development Sites: Code of Practice](#) Published - September 2006 / updated July 2013.

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- The **Town and country Planning Act (1990)** has provision for local authorities to add a planning condition which can force developers or land owner to clear up their land if it is deemed to “adversely affects the amenity” of the neighbourhood so have been used with regard to Japanese knotweed
 - The **Anti-social Behaviour Crime and Policing Act (2014)** does not explicitly refer to Japanese knotweed but councils & the police have powers to issue community protection notices (CPNs) where there is a proven detrimental effect of a persistent or continuing nature on the quality of life of those in the locality, and that the conduct is unreasonable. Failure to comply with a CPN is a criminal offence

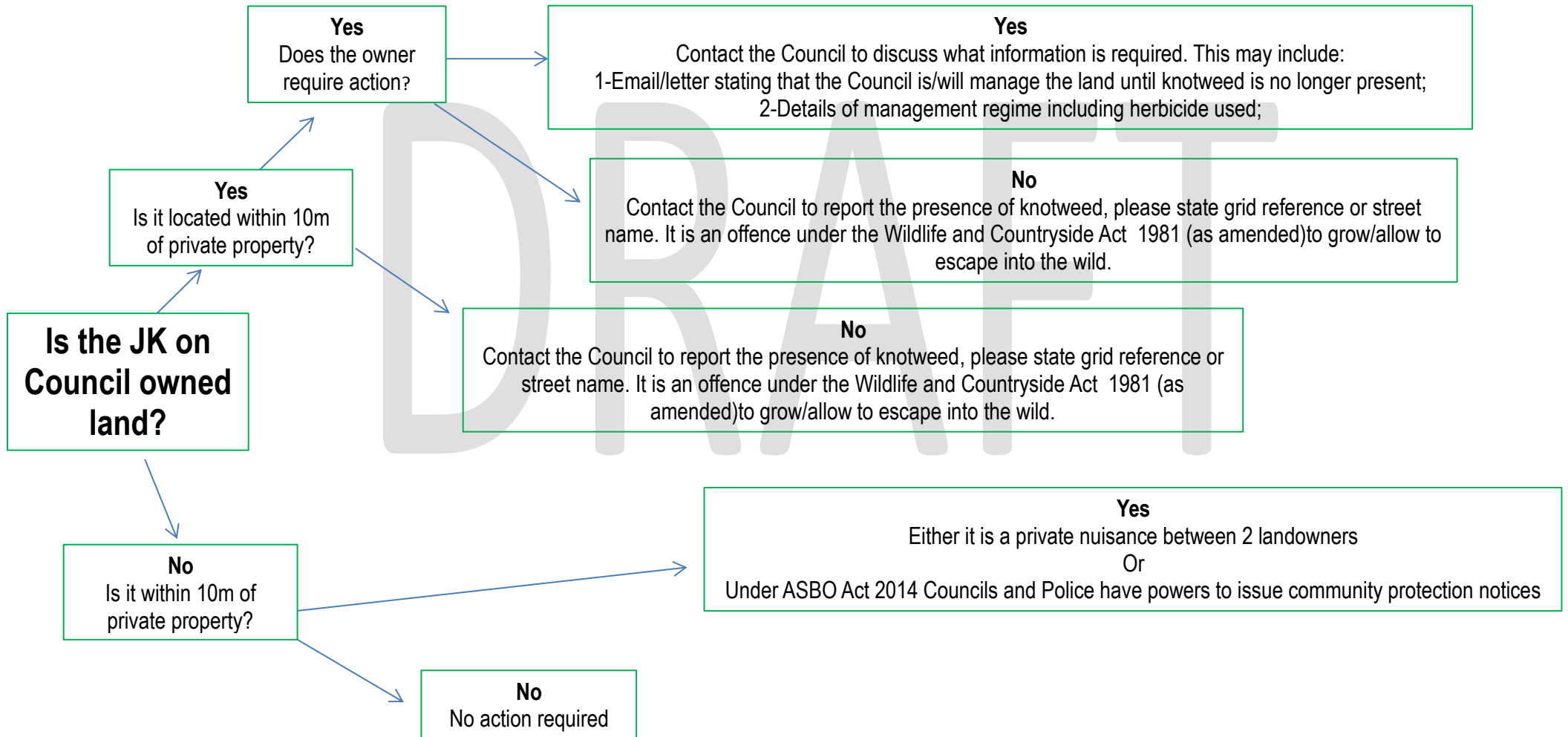
Japanese knotweed Hybrids

Japanese knotweed (*Fallopia japonica*) has a close relative, Giant knotweed (*Fallopia sachalinensis*) with which it can hybridise (*Fallopia x bohemica*). It can also produce a hybrid with another related plant, the Russian vine or Mile a Minute (*Fallopia baldschuanica*).

Both hybrids have the ability to produce seeds but they rarely develop into viable plants in the UK. Giant knotweed and the hybrids are generally larger than Japanese knotweed and their leaves are heart shaped and round at the base with Giant knotweed leaves having hairs on the underside.

All of these hybrids are required to be treated the same as Japanese knotweed.

Figure 1 Advice for land owners affected by with Japanese knotweed (JK)



4.1.1 Advice for property or land owners affected by Japanese knotweed

Advice to a private land owners (with regards to Japanese knotweed) is a complex situation which requires each case to be looked at individually. The information below is intended to be a guide for landowners who are concerned about a knotweed being present close by.

Steps for private property or land owners concerned about Japanese knotweed i.e. selling/buying or re-mortgaging:

1. Establish land ownership with the Japanese knotweed through the Land Registry (please note there might be multiple owners including public and private owners as well as unregistered land).
2. Approach the land owner(s) and try to reach an amicable arrangement regarding the treatment. There is no legal obligation for a land owner to eradicate the Japanese knotweed on their land but if it affects others there could be a legal case against the land owner who refuses to undertake any action. It is however prudent for all those affected to work together to get the Japanese knotweed controlled as it could also affect the value of their land/ property.
3. You will also want to bear in mind if you want to sell or re-mortgage in the future there might be certain requirements if you later want to sell or re-mortgage your house for example:
 - a) A report assessing the risk to a named property;
 - b) A 3 year + management & monitoring programme;
4. If no amicable arrangement can be reached then advice can be sought through:
 - a specialised Japanese knotweed surveyor who might be work as an intermediary
 - the council to see if under the Anti-social Behaviour Crime and Policing Act (2014) they are able to issue Community Protection Notice (CPNs):
 - Approach a solicitor to ask advice about legal action where there might be a private nuisance.

The Royal Institution of Chartered Surveyors (RICS) refers to the potential effects of knotweed being within a 7m radius of the property/garage etc. This is to take into consideration the below ground growth.²

Newport City Council will provide the following confirmation if the site is owned and managed by Newport City Council:

“As a landowner, Newport City Council has a responsibility under the Wildlife and Countryside Act 1981 (as amended), to prevent the spread of Japanese knotweed from their land, into the wild, or onto neighbouring property.

In order to comply with this responsibility, Newport City Council employs an annual Japanese knotweed treatment programme on Council owned land, where access and budget allows.

It can take a number of years of repeated treatment to eliminate the species, and in some sites only the perimeter of the knotweed stand will be treated in order to prevent encroachment onto neighbouring property. “

² RICS, *Japanese Knotweed and Residential Property*. 1st Ed. 2012.

http://www.rics.org/Global/Japanese_Knotweed_and_residential_property_1st_edition_PGguidance_2012.pdf

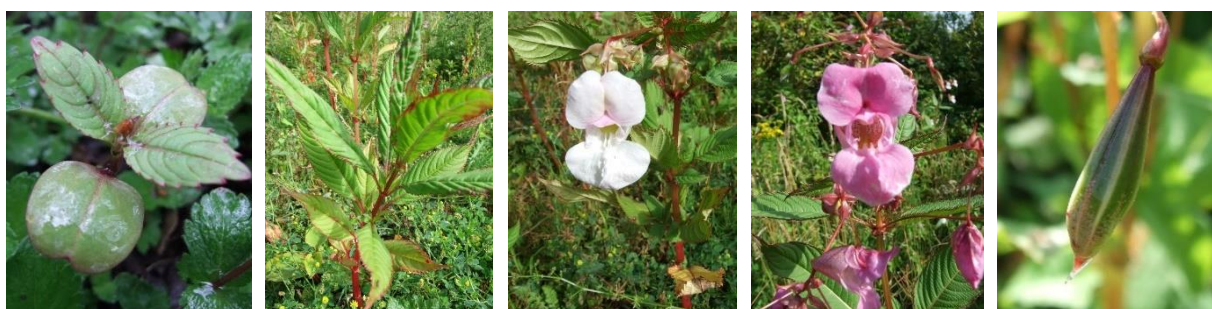
4.2 Himalayan balsam (*Impatiens glandulifera*)

Background

- Himalayan balsam (*Impatiens glandulifera*) also known as Policeman's Helmet, Indian Balsam and Jac y Neidiwr in Welsh is a tall non-hardy annual plant with a hollow stems and whorled, serrated narrow leaves.
- Introduced as a garden plant in the early 19th century and first recorded in the wild in 1855. Often favoured by the general public for its aesthetic appeal and is still deliberately planted on occasion. Now widespread in the UK, especially along urban rivers.
- Although easy to identify as a mature plant with its pink-purple flowers, fleshy stem and characteristic leaves, the seedlings and last year's dead stems of this annual are more difficult to spot.

ID features

- 2 seed leaves are rounded and first true and other leave elliptical with serrated edges
- Leaves and side branches arise from stem joints
- Leaves up to 15cm long, opposite or in whorls of 3-5
- Stem is hollow, sappy, fleshy and brittle
- Stem up to 2m tall green to red early in the year, turning pink to red in summer with reddish mid-rib
- Short roots with distinctive structure
- Sickly sweetly scented, trumpet shape flowers light to dark pink (rarely white) often with spots and markings inside give rise to explosive seed pods in summer
- Explosive seed capsule, approx. 2.5cm long, hanging on red stalks can send seeds 6m from mother plant



Propagation

- The plant spreads solely by seeds, which are small and easily carried by wind or water and are thrown from explosive seed cases which can be sent 6m from the parent plant.
- Each plant can product up to 15,000 seeds which can remain viable in the soil for 2-5 years so control needs to continue even if the source of infection is removed.
- Upstream sources of seeds also need to be eliminated.

Problems

There are many problems caused by **Himalayan balsam** but not on man-made structures. Problems occur where it colonises river banks or steep slopes such as;

- Himalayan balsam quickly can become dominant, shading out and growing faster than other species
- Spread quickly especially on disturbed or neglected land
- Reduces native biodiversity by out competing native plant species for space, light, nutrients and pollinators,
- As an annual, Himalayan balsam dies back in the winter, so where the plant grows in riparian systems or steep slopes leaving bare and liable to erosion
- Erosion and dumps sediments into the river causing problems with spawning fish and invertebrates
- Dead plant material and sediment can also enter the river, increasing the risk of flooding.

Control & treatment

- Himalayan balsam is an annual plant and therefore the key objective for control of Himalayan balsam is to exhaust the plants seed bank.
- This is done by repeatedly removing adults before they set seed. Seed bank longevity is about 2 years and control programmes should be undertaken for the whole of this period followed by a 5 year monitoring programme.
- Currently there are 3 known control methods for Himalayan balsam:

a. Physical / Mechanical control

- Hand pulling the plant including the flat root base is the most effective way of removing plants in small areas.
- Care should be taken to remove the whole plant as plants can regrow within the same season if cut and not fully removed or if settles back in moist soil.
- In larger areas brushcutting, strimming or scything can be undertaken however the plants must be cut below the lowest node otherwise it can coppice the plant and make more flowers which makes more seeds, exacerbating the problem.
- Grazing animals generally don't eat Himalayan balsam but they are be vectors spreading the can also achieve control but cutting should not be attempted once the seed heads have formed, as this would effectively spread the plant further than would otherwise.
- Continual monitoring should be undertaken to prevent reseeding as cut plants can regrow.
- The first monitoring visit should be timed shortly after cutting, as Himalayan Balsam has been known to re-grow within weeks of control.

b. Chemical/ Herbicide Control

- Herbicide treatment should be the last resort generally for most invasive species but it can be used for high density large populations and as Himalayan balsam is so easy to pull or cut herbicide treatment is not recommended or an environmentally sustainable or responsible option.
- Aquatic approved herbicides should be used as Himalayan balsam is almost always "near" water courses or bodies which should be applied by a suitable qualified and experienced operator with appropriate safety precautions.
- Chemical control would need to be repeated with viable seeds generating in future years.

Biosecurity

- Himalayan balsam seeds are very small and can easily be transferred around and off site
- Care must be taken with personnel working amongst and within 6 m of flowering and especially seeding Himalayan balsam where they can be carried in folds of clothing and in the treats of footwear.
- Again, horses and livestock should also be kept away from seeding Himalayan balsam as they can easily be transferred around and off site
- There should be correct disposal of Himalayan balsam plants and seeds. Do not discard plants with developed seed heads outside the existing area of contamination.
- There should be careful control of movement of soils contaminated with seed or control if and when the seed germinate from soil moved to new locations for several years as seeds remain viable.
- The traditional intense management of hospital grounds with formal plant borders, lawned areas and urban trees generally leave little chance for Himalayan balsam to establish and survive.
- However Himalayan balsam in hedgerows and less intensely managed area can become reservoirs or vectors for the seeds and plants, sustaining the population and re-infecting.

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- The site should have on going management of the Himalayan balsam especially if there is a reservoir or reoccurring sources of seed.

Legislation

- Himalayan balsam is listed in **Schedule 9, of the Wildlife and Countryside Act 1981** where it is an offence to plant or cause to grow wild.

4.3 *Rhododendron ponticum* (& *P. ramorum* & *P. kernoviae*)

Introduction

- *Rhododendron ponticum* is a non-indigenous evergreen shrub belonging to the Ericaceae family.
- Native in south-west Europe and southwest Asia, the UK stock is believed to come from Spain.
- It was originally introduced as seed in 1763 to be used as a plant in gardens, parks, and as a horticultural exhibit
- It was also extensively planted in western Victorian hunting estates to provide shelter for game species.
- *Rhododendron ponticum* grows particularly well in the climate and soils of the British Isles, and is common on acid, peaty or sandy soils in woodland, heathland, rocky hillsides, river banks, gardens and parks in areas of high humidity, a combination found predominantly on the west of Britain and Ireland.

ID features

- This large, perennial evergreen
- Large woody shrub with thick leathery untoothed evergreen leaves 6-12cm
- Leave alternate along the stem but more or less forming a rosette at the stem
- Flowers which arises a cluster of pink-purple 5-petalled flowers in May-Jun
- Dull green pale underside
- Stems / trunk often dense and twisted up to 15cm in diameter and 5m tall
- Seeds pods are formed after flowering



Propagation

- Mature plants can also produce suckers, coppice and layer when in contact with the ground.
- Mature plants generally over 10 years old produce hundreds of thousands of seeds.
- Seeds can be carried long distances by the wind hundreds of meters or more on the wind and can remain viable for several years in the soil.

Problems

- *Rhododendron ponticum* is a carrier of *Phytophthora ramorum* and *Phytophthora kernoviae*, which has a major impact on oak, beech, larch and nursery stock (see **11.5. *Phytophthora ramorum* and *Phytophthora kernoviae***)
- *Rhododendron ponticum* out competes or eliminates native plants by cutting out light and through chemical warfare (allelopathy) inhibiting growth and germination
- Rhododendron has been shown to reduce the numbers of earthworms, birds and plants and regenerative capacity of a site, leading to a reduction in the biodiversity of the area.
- Physical access to a site can be reduced by the density and size of mature bushes,
- Rhododendron tissue contain significant quantities of phenols and other potentially toxic chemicals poisoning.

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- Anecdotal information suggests that honey from rhododendron is toxic to humans 'Honey intoxication' or mad "honey disease" and results in relatively short-lived intestinal and cardiac problems but is rarely fatal. The severity of symptoms depends on the amount of contaminated honey consumed.
 - It is a problem in commercial forests where management costs then rise as the bushes need to be treated prior to other activities being carried out.
 - The ground flora takes some time to recover due to the residual chemicals in the soil produced by the Rhododendron plants

Control, treatment and monitoring I

Where the Rhododendron covers an extensive area and is mature with mixed age plants there should be a detailed control plan with prioritisation phased over several years using several controls in combination as it is unlikely control can be undertaken in a short time frame.

a. Physical / Mechanical control

- In the first instance old mature shrubs or 10 years, which produce hundreds of thousands of seeds should be removed to stop the next generation of plants
- These can be felled via chainsaw, bow saw or ring barked (bark removed in a ring around the trunk) but this will not kill the plant as the readily will coppice and sucker which will require herbicide treatment or further physical control.
- Large stumps can be ground to reduce likelihood of regrowth
- Small seedlings can be hand pulled but this is hard work a labour intensive. This can be aided with tools that help lever out the seedling but is still hard work especially over large areas.
- Where possible, cut woody material can be;
 - Chipped and used as mulch,
 - Green material rotted down into compost for use at a later date.
 - Burnt on site (bonfire)- beware of smoke
 - Incinerated on site e.g. Burn (air burner) - expensive

b. Chemical /herbicide control

- Application of herbicide can be via
 - a. stem treatment (drill and inject),
 - b. eco plugs for large plants (drill and plug banged into place for a slow release)
 - c. stump treated applied to cleanly recent cut large stems via paint brush or spray
 - d. or foliar spray application (knapsack) for smaller saplings, plants or coppiced regrowth

Legislation

- *Rhododendron ponticum* is listed in **Schedule 9, of the Wildlife and Countryside Act 1981** where it is an offence to plant or cause to grow wild.

4.4 Phytophthora ramorum & Phytophthora kernoviae

Introduction

- Phytophthora ramorum and Phytophthora kernoviae
- P ramorum is the most serious tree disease problem to have affected forests in Wales. In the last year it has spread very rapidly and is now causing very serious economic, social and environmental impacts.
- Known as sudden oak death in America where it is has caused the death of large numbers of native American oak (Quercus) species and tanoak (Lithocarpus densiflorus)
- Known as Ramorum dieback or ramorum disease in Europe.
- In the UK, they are found more commonly on shrubs such as Rhododendron and Viburnum but a wide range of shrubs and trees where it may cause browning of leaves, lesions or cankers, wilting and dieback.
- The closely-related P. kernoviae causes similar symptoms to P. ramorum.
- Both cause leaf lesions, twig/branch dieback, bleeding lesions on bark and can lead to death of the plant and are oomycetes are fungus-like organisms are loosely related to bleeding canker and other blights.
- The first UK finding was in 2002 and P. ramorum has now been found at hundreds of sites in England and Wales as well as in Scotland, Northern Ireland and the Channel Islands.
- It can effect beech (Fagus sylvatica), Japanese larch (Larix kaempferi), European larch (Larix decidua) and other shrubs and trees in gardens, amenity areas and woodland, usually associated with infected Rhododendron ponticum.
- In the UK the majority of findings of P. ramorum have been on nurseries, affecting container-grown ornamental plants such as Rhododendron, Viburnum and Camellia.



ID Features

- *Phytophthora ramorum* and *P. kernoviae* are aerial pathogens and do not cause root decay.
- Symptoms vary according to the host and the *Phytophthora* species, but there are a number of general features to look out for.
- *P. ramorum* infects the leaves and shoots of ornamental shrubs such as rhododendron, viburnum, pieris and camellia. Although it does not usually kill these plants, infected leaves of some of these 'foliar hosts' can generate many spores and in sufficient numbers these spores can then infect the bark of some tree species.
- Typical symptoms on rhododendron include leaf-blackening, wilted shoots and die-back. On leaves it blackens the leaf stalk extending into the leaf along the mid-vein
- The progress of the disease can be so rapid that shoots wilt and the leaves hang down.
- On larch trees shoots and foliage can be affected and look wilted with withered shoot tips and orangey needles turning to black, known as 'branch dieback'. The infected shoots shed their needles prematurely. Trees with branch dieback can have a number of resin cankers or wounds on the branches and upper trunk.
- These resin cankers ooze fluid from infected bark. These are visible as a black resin, which can dry to a crust on the trunk. The inner bark under this bleeding area is usually discoloured and dying.

Propagation

- Spread of these *Phytophthora* species is favoured by wet or humid conditions.
- Spores are splashed around to create new infections on leaves or bark of neighbouring susceptible trees and shrubs.
- Each species is also capable of producing a long-lived resting structure which can contaminate soil, and can be spread around on boots, vehicle tyres and the feet of animals.
- Water is also a transport mechanism, and *P. ramorum* has been found in rivers and streams near to some outbreak sites.
- The most important means of long-distance spread, however, is the transportation of infected plants.

Control, treatment and monitoring

- Land owners including councils should not attempt to control the disease themselves
- If an outbreak of either pathogen is confirmed, a Statutory Notice will be issued detailing the eradication and containment action required

Suspected *P. ramorum* or *P. kernoviae*

If there is suspected outbreak;

- Cordon off the area concerned and restrict public access.
- Do not handle or move the plants.
- Inspect other susceptible plants for symptoms and keep under review. Include the perimeters of sites containing trees or likely hosts such as 'wild' Rhododendron.
- Do not apply anti-Phytophthora fungicides to plants where infection is suspected. Such fungicides are likely to suppress but not eradicate the pathogens.
- Restrict or, where practical, avoid the use of overhead watering with plants known or thought to be infected.
- Provide the authorities concerned with all necessary documentation and records including, where appropriate, plant passport information.
- Ensure biosecurity measures are put in place,

Legislation

- If either disease is confirmed, is subject to EU phytosanitary measures in the form of a Statutory Notice will be issued detailing the eradication and containment actions required
- Ensure all the required actions including any stipulated removal and destruction of plant material, containers and associated soil or growing media are implemented as soon as possible within the timeframe laid out in the Statutory Notice.

Other information

- If you suspect that *P. ramorum* or *P. kernoviae* could be present it is a notifiable disease and special help must be sought but check the symptoms before reporting it using Tree Alert [Report a sighting using Tree Alert](#) or emailing treehealth@naturalresourceswales.gov.uk

4.5 Giant hogweed (*Heracleum mantegazzianum*)

Background

- Giant hogweed (*Heracleum mantegazzianum*) is part of the carrot or umbellifers family also known as Cartwheel Flower, Giant Cow Parsnip or in Welsh Efwr Enfawr,
- It is widespread throughout the UK and occasionally through Wales but mainly in the east and south west by streams and rivers and along roadsides large riverbanks catchments.
- Originally from the Caucasus Mountains in Southern Russia and Georgia Giant hogweed was first introduced to the UK in the late nineteenth century as an ornamental plant. It is also widely grown as an ornamental in Europe due to its striking appearance, usefulness in flower arranging and role for bees.

ID features

- This large, normally biennial or short-lived perennial,
- Produces a rosette of large leaves before flowering that can take up to four
- Large serrated leaves up to 2m across and 1.5m long grow in rosette with fine bristles on underside
- Stems are hollow up to 100mm in diameter & 5m tall with green, red or purple blotches with fine sharp bristles.
- Large flower heads are made up of several hundred small white flowers up to 1m across
- Due to the plants ability to produce vast amounts of seed it has now spread throughout the country resulting in a loss of biodiversity where established due to the suppressing of native vegetation.
- Plant dies back and becomes dormant and survives over winter as a large fleshy tap root.



Propagation

- Flowers in mid-summer producing up to 80,000 seeds about 8mm in size that can remain viable for up to 15 years.
- Seeds are distributed short distances on the wind and longer distanced by along river catchments.

Problems

There are many health and environment problems caused by Giant hogweed where it colonises river banks or wet areas;

- Contact with any part of this plant must be avoided small hairs on the leaves and stems will result in skin irritation and severe blistering which occur between 12 and 48 hours after exposure.
- Damaged skin heals very slowly, leaving residual pigmentation that can develop into recurrent dermatitis when exposed to the sun for many years.
- It is the health hazards of this species that are one of the main reasons for concern over its spread Protective clothing must be worn when coming into contact with this plant.
- Giant Hogweed competes with natural vegetation, reducing grass and other low-growing plants. In amenity areas, established colonies compete strongly with, and rapidly replace, most other plants except trees.
- Along river banks, it can almost totally replace the natural vegetation and threaten biodiversity.

Control, treatment and monitoring

- It must be a priority to prevent the plant flowering and setting seed and creating the next generation of plants as well as on going monitoring and removal of potential new plants from germinating seeds
- The flower heads can be cut off after the seeds have formed but before they start falling off the head (late August/September).
- If the plant is small the best method is to bag the head first and cut the stem below.
- This can be done with a bin liner and aims to stop any seeds from falling. Seed heads should be allowed to dry out as above and burnt or left to rot.
- This method will not kill the plant but prevent it from seeding.
 - a. Physical / Mechanical control
 - b. Chemical /herbicide control

a. Physical / Mechanical Control

- Plants at biennial stage can be removed with a fork or spade provided care is taken not to come into contact with the sap.

b. Chemical / Herbicide Control

- Aquatic approved herbicides should be used as Giant hogweed is almost always “near” water courses or bodies which should be applied by a suitable qualified and experienced operator with appropriate safety precautions. .
- Spraying is very effective, plants can be treated with glyphosate once active growth has resumed usually from March onwards. Due to the large numbers of viable seed, annual treatment and monitoring will be necessary for a number of years to prevent reinfestation.
- Glyphosate based herbicide can be applied to the plant foliage between late April and early June and again in July or August. Spray is usually directed on to the leaves of the plant and the sites are revisited annually to check for regrowth of old plants or new plants from seed.
- Glyphosate based herbicide can also be applied through stem injection

Biosecurity

- Giant hogweed seeds are large and prolific 50,000 per plant and easily be transferred around and off site
- Care must be taken with personnel working amongst Giant hogweed with regards to the blistering
- There should be careful control of movement of soils contaminated with seed as this is classed as a controlled waste
- There should long term management and monitoring as the seeds can remain viable for up to 15 years.

Legislation

- Giant Hogweed is listed in **Schedule 9, of the Wildlife and Countryside Act 1981** where it is an offence to plant or cause to grow wild.
- Under the Environmental Protection Act 1990, giant hogweed is also classified as controlled waste.

4.6 *Crassula helmsii*

Background

- Common names; New Zealand Pigmyweed or Australian Swamp-stonecrop. Also known sometimes as *Tillaea aquatica* or *Tillaea recurve* and Briweg Seland Newydd (Welsh)
- Native to Australia and New Zealand it was introduced into the UK in 1911 from Tasmania as an oxygenating plant for ponds, first sold in 1927 and recorded wild in Essex in 1956 since the 1970s, has spread rapidly. Spread via aquatic plant sales (now banned England for sale) and often as a stowaway with releases from fin tanks or garden ponds.
- Distribution is widespread in England and Wales. Spreading northwards and is very common in the south-east of England and much less common in Scotland.
- It is aquatic up to 3m deep in still or slow flowing water bodies or terrestrial around pond or lake margins and can be submerged, emergent and terrestrial.

ID features

- Round stem cross section
- Leaf are joined around the stem forming a collar
- Leaves up to 2cm long in opposite pairs
- Very small whitish-green to pink flowers may be present with 4 petals 1cm
- Leaves fleshy when emergent or terrestrial, flatter when permanently submerged
- Identification of terrestrial, emergent and submerged forms
- Terrestrial: growing away from the water's edge or left as water level falls, creeping stems and aerial, fleshy leaves.
- Submerged up 3m depth; elongated stems with sparse flat leaves able to form extensive mats
- Emergent in water <0.6m deep: densely packed leaves intermediate between terrestrial & submerged form



Propagation

- Reproduces from very small stem fragments
- Does not produce viable seed in the UK.

Problems

- Forms dense mats and can impede drainage, causing flooding.
- Displaces other aquatic plant species depleting the water of oxygen.
- Reduces amenity use of the waterbody.
- Very invasive and hard to control

Control, treatment and monitoring

a. Physical / Mechanical control

- Physical removal of the *Crassula* must be done with extreme care as the smallest bit of plant can break off
- Where the *Crassula* is terrestrial it can be removed by turf stripping but Natural Resources Wales should be contacted if disposal off site is required
- Hot foams have been used in ecologically sensitive areas although these only seem to be successful in terrestrial areas or shallow ponds

b. Chemical /herbicide control

- Aquatic approved herbicides should be used as *Crassula helmsii* is almost always “near” water which should be applied by a suitable qualified and experienced operator with appropriate safety precautions.
- Foliar spray with glyphosate based herbicide is effective once they are actively growing.

c. Combined control

- Where the *Crassula* is terrestrial it can be removed by turf stripping
- Water bodies can be drained and a combination of herbicide and omission of UV for several months

e. Environmental control

- Near the sea salt water can be used to ingress areas of *Crassula* which kills off the plants

Biosecurity

- Great care must be used not to move part of the plant around or off the site.
- The [Check Clean and Dry³](#) principle should be used to ensure no seeds or material is taken off site

Legislation

- *Crassula helmsii* is listed in **Schedule 9, of the Wildlife and Countryside Act 1981** where it is an offence to plant or cause to grow wild.

Please note:

- There are 5 plants, listed below in **England** including *Crassula helmsii* that are prohibited for sale in **England** due to their significant negative impacts on biodiversity and the economy under the **Wildlife and Countryside Act 1981 (prohibition on Sale etc. of Invasive Non-native Plants) (England) Order 2014**
 - Water Fern, *Azolla filiculoides*,
 - Parrot’s Feather, *Myriophyllum aquaticum*
 - Floating Pennywort, *Hydrocotyle ranunculoides*
 - Floating Water Primrose, *Ludwigia peploides*
 - Australian Swamp Stonecrop, *Crassula helmsii*

³ [Check Clean and Dry](http://www.nonnativespecies.org/checkcleandry/) <http://www.nonnativespecies.org/checkcleandry/>

4.7 Parrot's feather (*Myriophyllum aquaticum*)

Background

- Parrot feather (*Myriophyllum aquaticum*) is a perennial plant also known as Brazilian watermilfoil and Myrdd-ddail (Welsh), *Myriophyllum brasiliense*, *Myriophyllum proserpinacoides*
- Parrot feather gets its name from its feather-like leaves arranged around the stem in whorls of 4-6.
- It grows in still or slowly flowing water and most often found in nutrient rich waters including ponds, reservoirs, gravel pits, streams, canals and ditches.
- Grown in water gardens in UK since 1878 the initial spread was due to improper disposal of garden and aquarium plants and was first recorded in the wild in 1960.
- Still found in some garden centres, often under one of its pseudonyms although illegal for sale in England
- Parrot feather is native to the Amazon River in central and south America, but it can now be found on every continent except Antarctica

ID features

- Aquatic perennial, grows in emergent and submerged form all similar in appearance.
- Changes form depending on the conditions, varying between submerged to emergent foliage.
- Emergent shoots appear in spring when the plant becomes more conspicuous and can grow to 2m tall
- Emergent growth, blue-green colour in whorls of 4-6 and feather-like leaves make very distinctive
- Submerged leaves are more fragile and, after death, decompose quickly.
- Inconspicuous flowers at base of leaves between May and August. Small (2mm) and white.
- Stem breaks easily, brown roots present around nodes
- Dies down in winter but can be found submerged throughout the year.



Propagation

- Only female plants have become established in the UK reproducing asexually via very brittle stem fragments break off creating new plants.
- Does not produce viable seed in the UK.

Problems

- Causes flooding by blocking watercourses and drainage channels.
- Can rapidly dominate a water body displacing native species.

Control, treatment and monitoring

a. Physical / Mechanical control

- Mechanical control is effective for removing large infestations of this plant in areas. Care should be taken to stop downstream of stem fragments which are especially brittle
- Chemical control of remaining plants should be undertaken

b. Chemical /herbicide control

- Aquatic approved herbicides should be used as Parrots feather is an aquatic plant which should be applied by a suitable qualified and experienced operator with appropriate safety precautions.
- Foliar spray with glyphosate based herbicide is effective once they are actively growing.

c. Combined control

- Chemical control will lead to a short-term eradication of this species, as recolonisation from original sources will often occur. It is important to establish where the infestation has come from and take action to eliminate the source of material

d. Environmental control

- Stem apices are better than other parts of the stem for regrowth, so during control, limit the number of loose stem apices produced.
- As parrots feather is not tolerant of fast flow increasing can be used as a control but care must be taken with the displaced plants
- Could be controlled by increasing shade by planting trees or placing a floating opaque material over the water surface in early spring. Shade needs to be maintained for at least twelve months for good control.
- Reduction in the nutrient loading to the water may help reduce the parrot's feather's vigour helping re-establishment of the native species.

Biosecurity

- Great care must be used not to move part of the plant around or off the site.
- The [Check Clean and Dry](#) principle should be used to ensure no seeds or material is take off site

Legislation

- Parrot's feather is listed in **Schedule 9, of the Wildlife and Countryside Act 1981** where it is an offence to plant or cause to grow wild.

Please note:

There are 5 plants, listed below in **England** including Parrot's Feather, that are prohibited for sale in **England** due to their significant negative impacts on biodiversity and the economy under the **Wildlife and Countryside Act 1981 (prohibition on Sale etc. of Invasive Non-native Plants) (England) Order 2014**

- Water Fern, *Azolla filiculoides*,
- Parrot's Feather, *Myriophyllum aquaticum*
- Floating Pennywort, *Hydrocotyle ranunculoides*
- Floating Water Primrose, *Ludwigia peploides*
- Australian Swamp Stonecrop, *Crassula helmsii*

5 Species Alert List

These six species are part of a [species alert list](#) issued as part of the GB rapid response protocol in order to activate fast response to minimise and monitor spread and where possible control or eradicate.

1. Invasive garden ant (*Lasius neglectus*)

Lasius neglectus is a small invasive ant, native to south-eastern Europe, Turkey and Uzbekistan. In Europe it is a widespread pest which forms super colonies that are a nuisance in buildings and can have severe negative impacts on native invertebrates.

Unusual and persistent infestations in houses or large numbers of small, dark ants during winter.

If you suspect you have found this species, collect voucher specimens for identification and contact: pbb502@york.ac.uk



2. Water Primrose (*Ludwigia grandiflora*)

Water primrose is an invasive non-native plant from South America which has become a serious pest in other countries, including France, where it smothers water bodies reducing the numbers of native species and potentially increasing the risk of flooding. It has started to be found in some parts of England and Wales.

Quite distinctive in floating form, more care is needed to distinguish it from other species when it is growing in the margins of water bodies. Spreads primarily by plant fragmentation but also by seeds.



3. Quagga Mussel (*Dreissena rostriformis bugensis*)

The Quagga Mussel is a highly invasive non-native freshwater mussel from the Ponto-Caspian region, very similar to Zebra Mussel. It can significantly alter whole ecosystems by filtering out large quantities of nutrients and is also a serious biofouling risk blocking pipes smothering boat hulls and other structures.

There is no effective eradication method for quagga mussel once established. Good biosecurity is essential to help slow the spread of these species. See [Check, Clean, Dry](#)

Report sightings of either species via [Quagga Mussel recording form](#) or email altrnonnative@ceh.ac.uk



4. Asian hornet (*Vespa velutina*)

The Asian hornet arrived in France in 2004 with a consignment of porcelain where it spread rapidly ever since

As a highly effective predator of insects, including honey bees and other beneficial species, it can cause significant losses to bee colonies, and potentially other native species.

Active months between April and November (peak August/September). Inactive over the winter.

Report sightings via the Asian Hornet Watch App



Do not under any circumstances disturb or provoke an active hornets' nest.

[Asian Hornet Watch app for iPhone](#)

[Asian Hornet Watch app for android](#)

[Online recording form for Asian Hornet](#)

5. Killer shrimps (*D. villosus* and *D. haemobaphes*)

Sometimes known as 'killer shrimps', these species are invasive non-native species that have spread from the Ponto-Caspian Region of Eastern Europe.

They are both voracious predators that kill a range of native species, including young fish, and can significantly alter ecosystems.

Good biosecurity is essential to help slow the spread of these species. See [Check, Clean, Dry](#)

Report sightings of either species via alernonnative@ceh.ac.uk



6. Carpet Sea-squirt (*Didemnum vexillum*)

Carpet Sea-squirt is a highly invasive non-native marine animal that could threaten conservation, fishing and the shellfish industry.

Thought to be originally from Japan, it has become a pest in other countries by smothering native species and interfering with fishing, aquaculture and other activities.

It has recently been found in some marinas in England and Wales and there are strong concerns that it will spread more widely.

Report sighting on the [Didemnum vexillum recording page](#) or email alernonnative@ceh.ac.uk



6. General INNS Actions for Newport City Council

1. Communication and awareness

- Develop and agree an internal coordinated approach to INNS
- Ensure staff are fully aware and have training with regards to INNS relevant to their area of work
- Ensure affective communication of INNS issues to relevant Council staff
- Influence others to reduce the impact of INNS e.g. through planning conditions, training, events, action, advice enforcement etc.
- Develop a system of dealing with complaints or potential litigation claims
- Ensure information and advice given to the general public is kept up to date
- Explore funding an INNS point of contract/ expert internally for advice and information on INNS

2. Control of INNS

- Survey INNS including species, sites/ location of highest risk & operations of high risk
- Prioritise INNS action
- Work with partners and the general public to control INNS
- Ensure suitable level of resource and funding in place
- Ensure the appropriate control is used for the specific INNS
- Ensure all control is undertaken by Newport City Council to ensure compliance with relevant legislation and good practice guidance
- Investigate availability of funding for INNS awareness & control

3. Record & Monitoring

- Record & monitor INNS information locally so that risk is continually reassessed & re-evaluated.

4. Biosecurity

- Develop and put in place suitable biosecurity measures and protocols should be put in place to prevent INNS spread especially with high priority species, sites/ locations and high risk operations
- Ensure bad practice is stopped e.g. strimming of Japanese knotweed
- Work with partners to reduce spread of INNS

5. Horizon scanning

- Be aware of national and regional INNS trends to be able to minimise negative impacts in good time

7. Department Specific INNS Actions for Newport City Council

Chief Executives

- Ensure the environmental, economic & social impacts of INNS are fully understood by elected members
- Ensure appropriate training about INNS is undertaken by all relevant staff especially high risk operations
- Ensure appropriate biosecurity measures put in place throughout the council

Head Of People

Human Resources

- Appropriate CPD/ training/ awareness/ induction for staff/ operations of high risk
- Create a designate INNS officer as a point of contact to sign post staff for advice

Head Of Law & Regulation

Enforcement

- Ensure enforcement of ASBO/ CPN (2014) where appropriate
- Ensure compliance with PPP Regs (2012) regarding procurement/ user/ transport/ disposal of pesticides with regards to operators qualifications, calibration & testing of equipment
- Ensure compliance with W&C Act 1981
 - not allowing INNS to be release/ spread/ grow in the wild and
- regarding the planting of schedule 9 plants and avoiding other invasive species

Strategic Director People

Education

- Develop a long term JK control plan for school grounds
- Ensure biosecurity measure enforced in place in school grounds
- Ensure biosecurity measures enforced when pond dipping (aquatic plant INNS and amphibian disease)
- Ensure compliance with W&C Act 1981 re new planting/ landscape schemes not having plants from Schedule 9 & avoid other invasive plant species
- Ensure good practice with regard to JK & INNS in new school builds

Social services

- Develop a long term JK control plan for green spaces, verges & highways
- Deal with complaints from private land owners near housing land infected with JK
- Review contracts of tenants looking after gardens to see who is responsible for INNS control – reassess if required
- Ensure tenants allow access for JK if in a management programme
- Ensure tenants informed about not putting JK in green or other waste
- Ensure compliance with W&C Act 1981 re new planting/ landscape schemes not having plants from Schedule 9 & avoid other invasive plant species
- Ensure compliance with Plant Protection Products (Sustainable Use) Regulations(2012) regarding pesticides purchase/ use/ transport/ disposal

Head Of Finance

Procurement

- Ensure compliance with PPP Regs (2012) regarding procurement/ user/ transport/ disposal of pesticides with regards to operators qualifications, calibration & testing of equipment
- Ensure tenders for JK/ INNS control works/ operators are qualified/ experienced & undertake suitable biosecurity measures
- Ensure compliance with W&C Act 1981 re new planting/ landscape schemes not having plants from Schedule 9 & avoid other invasive plant species

Strategic Director Place

Planning

- Planning conditions under T&C Planning Act (1990) put in place for applications
- Ensure compliance with W&C Act 1981 re new planting/ landscape schemes not having plants from Schedule 9 & avoid other invasive plant species
- Ensure good practice with regard to JK & INNS in new builds or infrastructure projects

Estates

- Ensure INNS especially JK are considered when selling or purchasing property/ land

Street scene

- Develop a long term JK control plan for NCC owned sites
- Ensure the correct training to ensure best practice in the prevention of spread and control of INNS
- Ensure compliance with PPP Regs (2012) regarding procurement/ user/ transport/ disposal of pesticides with regards to operators qualifications, calibration & testing of equipment
- Ensure monitoring & aware of biosecurity on leisure facilities especially on course fishing sites where [Check Clean Dry](#) procedures should be followed
- Ensure compliance with W&C Act 1981 & ensure new highways schemes/contracts/planting/ landscape schemes do not have plants from Schedule 9 & avoid other invasive plant species
- Events- ensure suitable INNS awareness/ action/
- Raising awareness survey, control & monitor INNS plants listed on W&C Act (1981) Schedule 9 to ensure compliance re spread in the wild.

Customer service

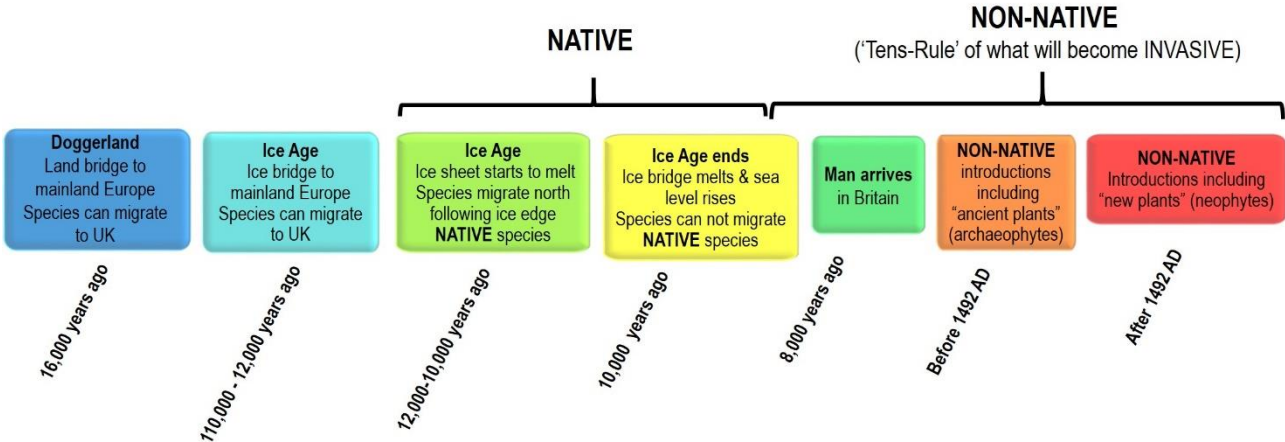
- Ensure staff dealing with complaints about INNS are suitable trained/ have the correct information potential for legal action may require specific requirements from private property/ land owners
- Ensure staff are aware of procedures for complaints with regard to JK/ INNS
- Pass onto relevant department/agency/ contractor

Waste / Recycling

- Ensure compliance with EP Act (1990) by making sure controlled waste (JK/ GH) is;
 - covered is transported appropriately (covered) to an appropriately site (licenced landfill with tonnage and costings agreed beforehand) with correct paper work in place (waste transfer notes)
 - NOT collected/ left at amenity sites through domestic waste (especially green waste)
 - NOT collected/ left at amenity sites through commercial waste (especially landscapers)
 - enforcement is undertaken where offences are committed
 - JK or GH material)
 - Staff at civic amenity & landfill sites are aware of the issues

APPENDIX 1 -Where did invasive non-native species (INNS) come from?

In the UK, INNS have arrived since we became an island nation since the last Ice Age.



During the Ice Age, 16,000-10,000 years ago, the UK mainland was linked to mainland European via a land and ice bridge with this larger land mass called Doggerland. Towards the end of the Ice Age, the ice sheets started melting and plants and animals slowly colonised the land, moving north as the conditions became warmer and more suitable for growth. These species that arrived under their own steam are now known as **NATIVE SPECIES**.

However as temperatures rose further, all the ice melted sea levels rose and the flooding created the English Channel separating the UK from mainland European and stopping any more natural colonisation. Then around 8,000 years ago, man arrived in Britain bringing new animals and plants and these species are referred to as **NON-NATIVE SPECIES**. Synonymous names include; alien, non-indigenous, foreign, exotic, introduced species. Although these terms have specific meaning depending on where in the world they are closely associated do tend to be used interchangeably.

Of those species that are brought into the UK only a minority of have serious negative impacts and it is these problematic species we call **INVASIVE NON-NATIVE SPECIES**.

Synonymous names include invasive non-native species (INNS), invasive alien species (IAS) and invasive non-indigenous and although these terms have specific meaning they do tend to be used

The 'Tens-Rule' (Williamson and Fitter, 2006)

- 10% introduced species appear in the wild
- 10% become established, self-sustaining
- 10% of these become pests

Put in context for example

- 15,000 UK introduced plants
- 1500 appear in wild
- 150 establish permanently
- 15 become problematic

How do Invasive non-native get to the UK?

Due to the increase in the movement of people and goods around the world, the opportunity for the introduction of species outside of their natural range is on the increase. The different ways in which species are transported from one place to another, are called 'pathways'. Common pathways include the release of

fish for fisheries into the wild, escape from farms and horticulture, within ship ballast water and the spread through man-made corridors such as canals.

The different ways in which species are transported from one place to another, are called 'pathways'. Common pathways include the release of fish for fisheries into the wild, escape from, within ship ballast water and the spread through man-made corridors such as canals.

INNS arrive in the UK generally by at least one mechanism and once here they are normally by more than one mechanism drawing in the individual species own strengths and attributes. These mechanisms of arrival include

Deliberate or intentional introduction

This is by far the largest cause of invasive non-native species introduction both here in the UK and throughout the world. Examples of deliberate or intentional introductions include rainbow trout from recreational fishermen, American mink by animal rights activists and releases of pets too big or problematic for owners.

Accidental or unintentional introduction

Accidental or unintentional introduction occurs when species are transported by vectors and the species escape into the wild. Examples of these species could be Japanese knotweed and other garden escapes, hitch hikers like as Brown rats on ships, marine invasive in ships' ballast water, Japanese wireweed brought in on Pacific oyster spat, killer shrimp on boats.

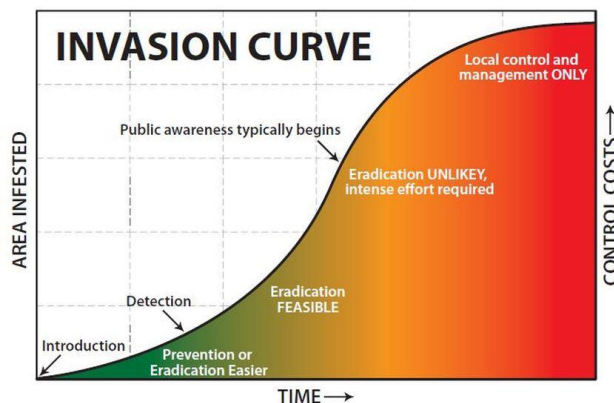
- Horticultural garden escapes (such as cotoneaster or variegated archangel)
- Pet, zoo or private collection escapes (e.g. Ringed parakeets, deer, edible dormice)
- Agricultural escapes (e.g. boar, ash die back)

Natural introduction

The species get to the UK under their own steam or via natural processes normally as a secondary movement such as mobile species such as harlequin ladybird or Asian hornet from mainland Europe and extreme weather.

The pattern of Invasion or "Invasion Curve"

However all species show a typical pattern known as the "Invasion Curve" where infested area, time and although control cost are all specific to each species and the local conditions, the invasion follows the same model. Quick action against a species on introduction can lead to eradication (e.g. Asian hornet) but once established only local control is possible (e.g. Japanese knotweed)



However this model assumes there is no re-introduction and although individual Asian hornet nests can be eradicated as they are highly mobile as indicated before new colonies can easily in a hold.

Establishment and spread

The initial establishment and subsequent spread of invasive non-native species are facilitated by;

- Speed of growth and therefore ability to colonise new areas quickly
- High volume of seeds, offspring or viable propagules so prolific reproduction)
- Tolerant of a wide range of growing conditions
- Lag effect when initial population is ignored and are able to become established.

-
- Having no natural enemies or predators.
 - All the energy that would otherwise be spent on protection from enemies or predators goes into growth
 - Native habitats are normally in some way disturbed, damaged or stressed so easier to
 - Many are very mobile species so able to spread quickly.
 - Climate change/ global warming could enable species range shift, enable new non-native as well as established non-native species to become invasive.
 - Chemical warfare (allelopathy) in plants inhibiting growth and germination of other plant species

APPENDIX 2 General Problems caused by invasive non-native species (INNS)

There are some generic problems with INNS, for example aquatic plants causing flooding. However but each site and situation have their own problems, often complex and cumulative and associated with other issues. Issues are often divided into environmental, economic and social problems

Environmental Problems

Again environmental issues cause by INNS are complex and often cumulative with causing great problems over time compounding and escalate other issues. This list is an indication of some of the problems but it is not by any means an exhaustive list.

- Alters ecology and ecosystem services; out competes for space, light and other resources, predated on, interbreeds / hybridises & transmits diseases to native species
- Alters geomorphology or landscape; Chinese mitten crab that buries into estuary banks causing collapse.
- Alters hydrology or water bodies by increasing erosion, the risk of flooding, sedimentation and eutrophication in water bodies affecting water quality, increase/decrease run-off
- Alter soil chemistry – chemical warfare stopping growth or germination of other plant species

“Invasive alien species are one of the primary threats to biodiversity on most islands & have caused serious ecological & economic damage & high social costs” Wong et al., 2005 (Millennium Ecosystem Assessment)

“INNS are one of the ‘Four Horsemen’ of this ecological apocalypse, along with habitat destruction, over-exploitation & extinction cascades” Jared Diamond, 2013 (Pulitzer Prize-winning scientist)

Economic Problems

Annual losses caused by INNS to UK economy estimated at £1.7 billion. (CABI Report 2010 [The economic cost of invasive non-native species on Great Britain](#)) £1,291,461,000 and here in Wales along losses are £125,118,000 to Wales with £56 Million to treat Japanese knotweed in Wales. These large costs are duplicated worldwide with Australia, Brazil, India, South Africa, the United Kingdom and the United States have been calculated in the range of \$300 billion per year (Pimentel et al., 2001; 2005) - 5% of world economy!

There are many negative economic implications for INNS partly due to the reduction in value of land and property but also the potential damage to structures, costs of remediation and associated delays in projects and on and development. Specific problems include;

- Damage to structures, property & infrastructure
- Delays in development
- In agriculture INNS can be pathogens of crops and weed species
- Pests in the forestry industry such as *Phytophthora ramona* on larch plantations, ash died back, longhorn beetle, grey squirrel on timber
- Flood damage; clean-up costs, flood defence, increased insurance costs,
- Blocking sewers and clogging waterways
- Cost of removal/control
- Degraded natural environment leads to income from reduced recreation, tourism
- Legal costs
- Damage to reputation and relations with neighbouring land owners

Social Problems

Health and recreation can all be adversely affected by INNs to a greater or lesser degree depending on the species and location

- Health
 - Giant hogweed full thickness burns with severe blistering and photo-sensitivity
 - Disease vectors; Chinese mitten crabs carry Asian lung fluke, terrapins carry Salmonella,
 - Oak processionary moth have hairs that when they feel threatened, shoot hairs that are irritants
 - Ragweed pollen can cause many people to have severe allergic reactions
 - Negative effects on mental health, fitness & well being
- Recreation
 - Fishing: reducing access, increased sedimentation affects water way ecology and fish species
 - Canoeing: access issues
 - Natural beauty lost affecting bird watching/ natural history lovers
 - Walkers, runners, dog walkers; make places less appealing can lead to antisocial behaviour starting with littering escalation to fly tipping and arson
- Lifestyle
 - Effects house owners/ land owners
- Food production

Ecosystem Services and Green Infrastructure

Another way of evaluating problems caused by INNS is the looking at the disruption of the essential and beneficial services provided by robust and health native habitats. Collectively these benefits are known as ecosystem services (see [UK National Ecosystem Assessment](#)) or sometimes green infrastructure.

Although a new area of study, we know that INNS have a huge negative impact on all aspects of ecosystem services and green infrastructure however the full consequences is not fully realised or evaluated.

The importance of the green infrastructure is recognised in [Newport City Council Well-being Statement & Objectives](#) which specifically states “recognising that protecting our green infrastructure & heritage / cultural assets is fundamental to our tourism economy, as well as contributing to health and well-being & supporting our inward investment offer.” therefore the affect the INNS have on this must also be taken into consideration.



APPENDIX 3 Legislation

Domestic Legislation

- The ***Wildlife and Countryside Act 1981*** to date has been the principal legislation dealing with non-native species where ;
 - **Part I Section 14(1)** makes it illegal to keep/ sell/ release/ allow to escape any animal not ordinarily resident or a regular visitor to Great Britain as listed on **Schedule 9**.
 - to plant or otherwise cause to grow in the wild any plant listed in **Schedule 9**.
- Under the ***Environmental Protection Act 1990*** all Japanese knotweed material is a “controlled waste”. However if treated with certain residual chemicals or in soils contaminated with heavy metals or other certain waste under the ***Hazardous Waste Regulations 2005*** it is then classed as a “hazardous waste”. Both controlled and hazardous wastes require specific conditions for transportation and disposal.
- The ***Anti-social Behaviour Crime and Policing Act (2014)*** does not explicitly refer invasive non-native plants, but councils & the police have powers to issue Community Protection Notices (CPNs) where there is a proven detrimental effect of a persistent or continuing nature on the quality of life of those in the locality, and that the conduct is unreasonable. Failure to comply with a CPN is a criminal offence
- Under the ***Infrastructure Act (2015)*** in Wales Welsh Ministers and Natural Resources Wales (others in other UK counties) are able to serve ‘Species Control Agreements’ & ‘Orders’ on land owners who allow non-native invasive species to establish on their land. In Wales we have a [Code of Practice for Species Control Provisions in Wales](#)
- ***Well-being of Future Generations (Wales) Act (2015)*** is about improving the social, economic, environmental and cultural well-being of Wales through a joined-up approach using 7 well-being goals with a set of national indicators to measure whether we are achievements.
- ***Environment (Wales) Act (2016)*** sets out Wales' approach to planning and managing natural resources at a national and local level with a general purpose linked to statutory 'principles of sustainable management of natural resources'
 - **Section 6 - Biodiversity and resilience of ecosystems duty**
This places a duty on public authorities to ‘seek to maintain and enhance biodiversity’ and seek to ‘promote the resilience of ecosystems’ (this replaces the Natural Environment and Rural Communities Act 2006 (NERC Act 2006) Section 40 duty). Public authorities will be required to report on the actions they are taking to improve biodiversity and promote ecosystem resilience.

European Law

- **Water Framework Directive 2000 Transgressed to UK law 2003**. Designed to improve water body management throughout Europe does not explicitly mention alien species but Annex II lists specific pressures to which water bodies may be subjected, including.....‘...**other significant anthropogenic impacts on the status of surface water bodies**’ which could include invasive non-native species.
- **EU Regulation on Invasive Alien (Non-Native) Species 2014** imposes restrictions on a list of species known as ‘species of Union concern’, published in Commission **Implementing Regulation 2016/1141**. These are species whose potential adverse effects across the European Union are such that concerted action across Europe is required. The list is drawn up by the European Commission and managed with Member States using risk assessments and scientific evidence.

APPENDIX 4 Organisations

Invasive non-native species are a threat on a global level now as never seen before. This is due to the ease and relative cheap cost of transporting people and goods around the world. There is action and communication on an international level right down to the very local level trying to record the effect and minimise the potential damage INNS cause.

Global; Invasive Species Specialist Group (ISSG)

The [Invasive Species Specialist Group \(ISSG\)](#) is a global network of scientific and policy experts on invasive species, organised under the auspices of the Species Survival Commission (SSC) of the International Union for Conservation of Nature (IUCN). ISSG aims to reduce threats to natural ecosystems and the native species they contain by increasing awareness of invasive alien species, prevention, control or eradication

European; Delivering Alien Invasive Species Inventories for Europe

Delivering Alien Invasive Species In Europe (DAISIE) project providing a 'one-stop-shop' for information on biological invasions in Europe. Delivered via an international team of stakeholders and experts. The general objectives of DAISIE are to:

- create an inventory of invasive species that threaten European habitats
- structure the inventory for prevention and control of biological invasions
- understanding of the environmental, social, economic and other impacts
- To use shared experiences of Member States for early warning

The Non-native Species Secretariat

The [Non-native Species Secretariat \(NNSS\)](#) has the responsibility for helping to coordinate the approach to invasive non-native species in Great Britain. We are responsible to a Programme Board which represents the relevant governments and agencies of England, Scotland and Wales. The NNSS has produced a website in order to help those interested in finding out more about invasive non-native species and to facilitate those working on this subject in Great Britain. Use the website site to:

- keep up-to-date with action, news, project and events
- find out what is happening in GB to help tackle these problems
- source of information about specific species including ID, locations, problems
- invasive non-native species risk assessments

Wales Biodiversity Partnership (Invasive Non-Native Species Group)

The overarching aim of the [Wales Biodiversity Partnership \(Invasive Non-Native Species Group\)](#) is to minimise risk and reduce negative impacts caused by invasive non-native species in Wales, more specially

- co-ordinate the response of all relevant sectors to the environmental, social and economic challenges
- provide a forum where policy can be developed and lead responsibilities agreed.
- promote the integration of policy and practice across sectors, and provide a framework for action, in particular identifying requirements for advice and research.
- Contribute to and support wider action on invasive non-native species at GB and local level

Local Action

Last but not certainly not least there are plenty of conservation organisations, charities, friends of groups and individuals out there getting on with the direct control of and awareness of the threat of invasive non-native species. They are working on private land, nature reserves, parks, pocket green spaces throughout the whole of the planet arguably doing more than any other formal state sponsored organisation or group.

Great Britain Invasive Non-native Species Strategy & Implementation plan

The main strategy regarding invasive non-native species is [The Great Britain Invasive Non-native Species Strategy August 2015](#) which works together with a [The Great Britain INNS Strategy 2015 - Implementation plan](#). The strategy covers the period 2015 to 2020 replacing the [first strategy published in 2008](#).

This strategy sets out key aims and actions for addressing the threats posed by invasive non-native. Our vision is that if this Strategy is fully implemented, biodiversity, quality of life and economic interests in GB will be better protected against the adverse impacts of INNS because there will be:

- widespread awareness and understanding of the risks and adverse impacts associated with INNS, and greater vigilance against these;
- integration of INNS within the broader biosecurity agenda; o a strong sense of shared responsibility across government, key stakeholder organisations, land managers and the general public for action and behaviour that will reduce the threats posed by INNS;
- a guiding framework for national, regional and local mitigation, control or eradication initiatives helping to reduce the detrimental impact of INNS; and
- improved co-ordination and co-operation on INNS issues at a European and international level.

APPENDIX 6 Biosecurity

Biosecurity is about preventing or reducing the risk of introducing or spreading invasive non-native species particularly easily transported species such as plants and disease. Biosecurity measures should be put in place by all staff out and about on infected or potentially infected sites ensure planned into the earliest stages of visiting or working on sites. It is common sense but very easy to overlook and become complacent.

Plan ahead

Know the invasive species you are dealing with and know the method of spread so you can avoid cross contamination is essential. Also you should know the site and avoid areas known to have any invasive non-native.

Plan so that the most risky visit is the last one of the day and do you have the right resources to ensure strict biosecurity protocols are followed. Check critical control points such as access and entry points, key in controlling what comes onto a site, or what leaves.

Ensure you have biosecurity protocols in place for the following;

Personal: hand sanitising gel, check clothing and shoes – foot baths I needed

Vehicles: If practical do not take vehicles onto premises, keep to established tracks and park vehicles on hard standing and keep access to a minimum. Remove accumulated mud before leaving the site.

Equipment Nets, trays etc. Check, Clean, Dry between sites or use appropriate disinfectant

Basic level biosecurity

There should be a basic level of biosecurity employed on every site visit especially ecologically sensitive areas or sites where invasive non-native species are known to be located.

Medium level biosecurity

Visits to ponds with invasive plants e.g. Crassula, Parrot's feather, Azolla, etc.

Handling Rhododendron plants

Direct handling of animals e.g. amphibian/ reptile/ mammal surveys.

High level biosecurity

Surveying/sampling aquatic situations involving many sites in different parts of the country

Visiting areas with ongoing/recent disease outbreaks –e.g. Phytophthora

Where possible avoid all contact with potentially infectious material e.g. avoid touching Rhododendron, especially if it looks wilted/dying (transmission of Phytophthora)

Avoid entering water in areas of known Chytrid infection/ crayfish plague

Animal disease outbreaks

Giant hogweed & Japanese knotweed classed as controlled waste under Environmental Protection Act (1990)

Giant hogweed being hazardous to health and well being

Further Information

[Free NNS biosecurity e-learning](#)

[Be Plant Wise](#)

[Check Clean Dry](#)

[Biosecurity in the field](#)

[Biosecurity for events](#)

[Flatworm Code of Practice](#)

[Horticultural Code of Practice](#)

[Pet Code of Practice](#)

[Importing goods and products](#)

[Importation of non-native animals](#)

[Gardening without harmful invasives](#)

APPENDIX 7 Ecosystem restoration

The restoration and re-establishment of healthy robust native habitats after affective INNS control has long been recognised as good practice. Not only does this reduce the potential of reinfection from the original problematic plant but also to reduce the likelihood of other INNS species colonising a bare patch of land especially as INNS are all too often pioneering species that grow and established very quickly.

The GB Strategy recognises this is a Key Action 5.7 where appropriate after control of an INNS.

The associated with restoration the Strategy calls for the production of guidance on how and when to restore habitats in response to the EU IAS Regulation. In that regulation Article 20 states that Member States shall carry out appropriate restoration measures to assist the recovery of an ecosystem that has been damaged by an Invasive Alien Species of Union Concern. It does not prescribe what these measures should be but states that they should include at least:

“Supporting the prevention of re-invasion and should increase the ability of the ecosystem to resist, absorb, accommodate or recover from its impact.”

There are currently 37 species (14 plants and 23 animals) on the current EU list of which 18 are present in the UK. The eradication of 4 are underway and 12 others are widely spread.

17. Further Information

Organisations

[Centre for Agriculture and Biosciences International \(CABI\)](#)
[Centre for Ecology & Hydrology \(CEH\)](#)
[Department for Environment, Food and Rural Affairs \(DEFRA\)](#)
[Environment Agency](#)
[GB Non-native Species Secretariat](#)
[UK Government](#)
[Welsh Government](#)
[Wales Biodiversity Partnership Invasive Non Native Species Group](#)
[Plantlife: Invasive, non-native plants](#)
[Royal Horticultural Society](#)

Identification

Booy, O., Wade, P.M. and Roy H. (2015) Field Guide to Invasive Plants & Animals in Britain, Bloomsbury
Child, L.E. and Wade, P.M. 2000. The Japanese Knotweed Manual. Packard Publishing, Chichester.

Pesticides

DEFRA's [Code of Practice for Using Plant Protection Products 2008](#)
Crop Protection Association [Amenity Best Practice: Using Pesticides in the Community 2013](#)
[Amenity Forum](#) is the leading organisation within the UK amenity sector for promoting safe and environmentally friendly use of pesticides.
[BASIS](#) is an independent standards setting and auditing organisation for the pesticide, fertiliser and allied industries.

Biosecurity

[Check-Clean-Dry](#)
[Be Plant Wise](#)
[Pathway Action Plans](#)

General Recording

[PlantTracker](#)
[Invasive Alien Species in Europe](#)
[South East Wales Biodiversity Records Centre \(SEWBRc\)](#)