



Five Fords Thermal Hydrolysis Plant

Invasive Plants Method Statement

October 2016

Dŵr Cymru Welsh Water

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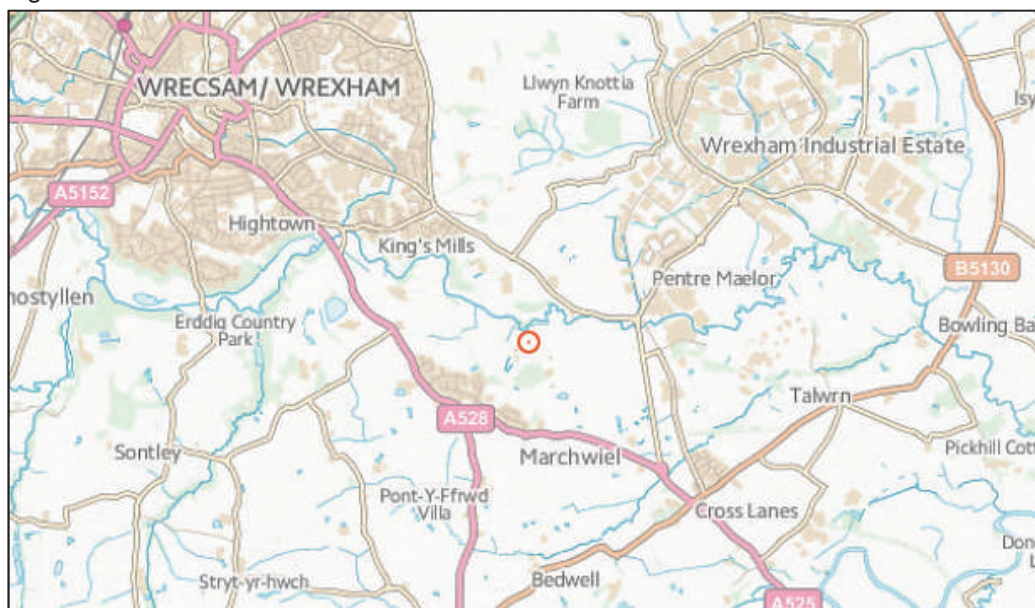
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1 Introduction

1.1 Project Background

Mott MacDonald Bentley (MMB) were commissioned by Dŵr Cymru Welsh Water (DCWW) to provide ecological support for the proposed Thermal Hydrolysis Plant at Five Fords Wastewater Treatment Works (WwTW). The WwTW lies between Wrexham, Wrexham Industrial Estate and the village of Marchwiel as shown in Figure 1.1 below centred on Ordnance Survey Grid Reference SJ 36054 48054.

Figure 1.1: Site Location Plan.



Source: Ordnance Survey Crown Copyright data @ Crown copyright and database 2015

The WwTW is situated in a predominantly rural area with the surrounding areas consisting of agricultural land, within the village and (ancient) parish of Marchwiel, approximately 2km to the south west of Wrexham. The WwTW is immediately bordered by areas of woodland, arable and pastoral fields and their associated hedgerows. The River Clywedog forms the northern boundary of the WwTW and the village of Marchwiel is located to the south.

1.2 Scope of the Report

A Preliminary Ecological Appraisal (PEA) was conducted by MMB to inform the design for the proposed works. The PEA included an extended Phase 1 habitat survey and a desk study. The Phase 1 survey did not identify any invasive species on site, probably due to seasonal identification constraints. However, the desk study reviewed previous ecological investigations that were carried out on site which included a study carried out by AECOM (2008) that observed Japanese knotweed and Himalayan balsam on the banks of the River Clywedog. The Ordnance Survey Grid Reference location for the Japanese knotweed was SJ 36159 48437, 750m upstream of the access bridge onto the site, and for the Himalayan balsam SJ 36310 48414, 600m upstream of the bridge.

Whilst these invasive species are not known to be present within the Thermal Hydrolysis Plant working area the recorded presence of Japanese knotweed and Himalayan balsam upstream of the River Clywedog means that there is potential for this plant to be present at the access road to the site, through seeds and plant debris migrating with the river flow and settling along the bank. Although not recorded on site, records indicate that Giant hogweed has also been identified within the local area and as such this has been included in the assessment.

During the 2016 WwTW access road improvement works, Himalayan balsam was recorded along the River Clywedog. No invasive species were recorded within the proposed works area for the Thermal Hydrolysis Plant. As a precautionary approach the works are to follow this method statement if any invasive species colonise the site during the works.

1.3 Scope of Works

The aim of this method statement is to provide a precautionary method of working if any invasive species are found within the site or colonise the site from the surrounding area during construction. The primary method for minimising the spread of these weeds should be to avoid disturbing any of the plants by altering working areas wherever possible. However, where this is not possible, the plant stands will be treated appropriately to prevent them from spreading as described in Section 3 of this report.

1.4 Relevant Legislation

The following list contains the relevant legislation in relation to invasive plants and their proposed treatment and disposal:

- **Environmental Protection Act 1990.** Defines the legal framework for duty of care for waste, contaminated land and statutory nuisance;
- **Ragwort Control Act 2003.** Inserts into the Weeds Act 1959 a new section enabling the government to make a code of practice on preventing the spread of ragwort;
- **Weeds Act 1959.** Enables the Secretary of State for the Environment, Food and Rural Affairs (or their delegates through the Natural Environmental and Rural Communities Act 2006) to enforce land occupiers where injurious weeds (including ragwort) are growing to take action to stop them spreading and fined if the order is not complied with;
- **Wildlife and Countryside Act 1981** (Section 14) Bans certain methods of killing or taking wild animals, including birds, and restricts the introduction and sale of certain non-native animals and plants. Also sets out the amended laws relating to public rights of way;
- **Wildlife and Countryside Act 1981** (Variation of Schedule 9) (England and Wales) Order SI 2010/609. Amends the Wildlife and Countryside Act 1981 by adding new species to the list of plants not to be planted or allowed to grow in the wild, including Himalayan balsam, floating pennywort and cotoneaster;
- **Environmental Permitting (England and Wales) Regulations SI 2010/675.** Provides a consolidated system for environmental permits and exemptions for industrial activities, mobile plant, waste operations, mining waste operations, water discharge activities, groundwater activities and radioactive substances activities. It also sets out the powers, functions and duties of the regulators; and
- **Control of Pesticides Regulations 1986** – requires any person who uses pesticides to take all reasonable precautions to protect the health of human beings, creatures and plants, and to safeguard the environment and in particular avoid pollution of water.

1.5 Identification of Invasive Weed Species

Appendix A provides a guide to Japanese knotweed, Himalayan balsam and Giant hogweed identification (NNSS, 2015).

1.6 How Invasive Plants Spread

The following section presents a short account of how invasive plants spread, as given by the Department of the Environment Food and Rural Affairs (DEFRA, 2013).

How Japanese Knotweed Spreads

Japanese knotweed does not spread from seeds in the UK as all of the plants recorded in the UK are female. It is spread when small pieces of the plant or rhizomes (underground root-like stems) are broken off. One piece of rhizome or plant the size of a fingernail can produce a new plant.

Pieces of plant or rhizome can be transported to a new location by:

- Water - if the parent plant is close to a river or stream;
- Moving soil which contains them; and
- Fly-tipping cut or pulled stems.

Individual plants can cover several square meters of land, joined up below ground by an extensive rhizome network. Herbicide treatment can be a very effective way of controlling Japanese knotweed, but a lack of regrowth does not mean the underground rhizome is dead. If the soil is disturbed, knotweed often regrows.

How Giant Hogweed Spreads

Giant hogweed produces large, umbrella-like flowers, each of which can produce up to 50,000 seeds. These seeds fall typically within 4m of the parent plant. Seeds can be transported by:

- Vehicles - particularly along roads and railways;
- Water - if the parent plant is close to a river or stream;
- Footwear; and
- Moving soil which contains them.

The seeds can remain dormant in the soil for up to 15 years. Even if you treat the plants with herbicides and they die, several thousand seeds are waiting in the ground below for the opportunity to take their place. Any control program needs to continue for several years, including checks for new growth. When managing giant hogweed it is important to maintain a healthy grass sward, either by using selective herbicides or by sowing grass mixes. A dense grass sward helps to prevent giant hogweed seeds from germinating.

Giant hogweed contains sap that is released when the plant is cut or by brushing against the plant. Contact with the sap causes skin to become sensitive to sunlight, resulting in painful blisters which appear up to two days after contact and may reoccur for several years.

How Himalayan Balsam Spreads

Himalayan balsam plants can produce around 2,500 seeds each year. The seedpods open in such a way that the seeds are thrown up to 7m away from the parent plant, helping the species to quickly spread. Seeds can also be transported by:

- Water - if the parent plant is close to a river or stream;
- Tracked vehicles;
- Footwear; and
- Moving soil which contains them.

Even if you remove these plants, or treat them with herbicides and they die, several hundred seeds can be waiting in the ground below for the opportunity to take their place. The seeds can survive for several years, so any control program needs to continue for a couple of years, including checks for new growth.

2 Biosecurity Risk Assessment

This section of the report assesses the risk of encountering invasive plants during construction of the Thermal Hydrolysis Plant. The methodology adopted is taken from local planning guidance provided by Wrexham County Borough Council.

2.1 Methodology

The following approach was adopted:

- Activities and associated hazards posed by invasive species were identified;
- For each activity/hazard, an assessment of the severity of impact and likelihood of activity to cause spreading of invasive species prior to control measures was undertaken;
- The overall risk factor was calculated; and
- Control measures to reduce the likelihood of invasive species spread were considered and the residual risk determined.

The assessment is shown in Table 2.1. Risks are assessed qualitatively using the following descriptors of severity and likelihood:

Severity of Impact:	1 Minimal
	2 Minor
	3 Moderate
	4 Likely
	5 Massive
Likelihood of Impact:	1 Very Unlikely
	2 Unlikely
	3 Possible
	4 Probable
	5 Very Likely

The risk factor is calculated as the product of the severity and likelihood so that an activity with a Moderate severity that was considered Probable to occur would have a risk factor of $3 \times 4 = 12$. Guidance is provided on actions to be taken dependent upon the calculated residual risk factor:

Risk Factor 1-4	OK to proceed
Risk Factor 5-12	Further controls should be applied to further reduce risk; and
Risk Factor 12+	Unacceptable risk.

This Method Statement is concerned with the potential for invasive plants to be present within the construction area; whilst no invasive plants have been positively identified within the site their presence in the wider area has been noted and consequently the potential for plants to be encountered requires consideration.

Table 2.1 Risk Assessment

Activity/ Hazard	Severity	Likelihood	Risk Factor	Mitigation	Severity	Likelihood	Residual Risk Factor
Top soil strip	3	5	15	Site inspection prior to excavation to identify presence of invasive plants. Any invasive plants to be removed and disposed of. Stockpiles controlled to prevent unnecessary spreading. Any affected soils to be stored separately.	3	1	3
Himalayan balsam and Giant hogweed seeds and Japanese knotweed infected soils spread to other parts of the wider site through reuse of soil	3	5	15	No soil to be moved from the construction site.	3	1	3
Spreading of infected soil on machinery	3	4	12	All machinery to be cleaned following use.	3	1	3

The control measures proposed will prevent the spread of invasive plants that may be present within the soil on the construction site.

3 Treatment of Invasive Weed Species

3.1 Method Statement

Prior to the commencement of works all construction staff shall be briefed in relation to the contents of this method statement which should then be displayed prominently within the site office.

3.2 Site Preparation

No invasive species have been recorded within the proposed Thermal Hydrolysis Plant works area. Construction staff are to remain vigilant during the works and are to report if any invasive plants have spread on site. Any new stands of invasive weeds will also need to be noted on the plans and marked out on site.

The outer edges of all unprotected stands of invasive weeds will be marked with highly visible orange mesh fencing, or similar to denote the presence of invasive weeds. Fencing is to be retained in place for the duration of the contract. Signs warning site workers of the presence of invasive weeds will be attached to the fencing at agreed locations.

3.3 Avoidance of Contamination and Suitable Treatment Methods

If the presences of invasive plants are confirmed, it may be possible to exercise avoidance measures to avoid their spread if the number of individual plants is low and if they are located away from high activity areas. If avoidance is not feasible, then suitable treatment methods are recommended.

Japanese knotweed

As previously discussed, the main cause for the spread of Japanese knotweed is either via fragmentation of the plant above ground, or through disturbance to its underground root system.

If a small number of knotweed plants are identified, and the plants can be avoided, fencing should be erected to provide an 'Exclusion Zone' around the plants. As the area of Japanese knotweed infestation can extend 7m horizontally from the nearest stem growth that can be seen, the exclusion zone should take this into account. Signs warning site operatives of the presence of Japanese knotweed should be put up in this area to prevent inadvertent trafficking.

Where access routes and working areas cannot be altered to avoid the plants, the focus should be on avoiding breaking the surface of the soil within these areas and containment of the plant parts within the areas which are already contaminated. Where this is not possible, then digging out the plants and the soil around it within a 7m diameter may be undertaken. This method should be employed with caution because it is likely that this soil will contain rhizomes which can establish themselves and spread the infestation. Potential contaminated soil should be regarded as 'controlled waste' under the Environmental Protection Act 1990,

and as discussed earlier, this requires disposal at licensed landfill sites or treatment on site in accordance with the Japanese knotweed code of practice.

It is highly recommended that the guidance document produced by the Environment Agency Managing Japanese knotweed on development sites is referred to prior to undertaking management works (Environment Agency, 2013).

Himalayan balsam

As the main cause for the spread of Himalayan balsam is via seed dispersal, the focus should be to avoid moving the soil within both the infected and adjacent areas where the seeds may have fallen. As with Japanese knotweed, where possible, fencing should be erected to provide an 'Exclusion Zone' around the plants. Where avoidance is not possible, it is recommended that bashing down or brush cutting to ground level is carried out before the plants set seed in April or early May. Small infestations can be controlled by hand-pulling as the species is shallow rooted. If cutting or hand pulling is to be carried out after this time, bag plant tops to prevent seed spread.

Giant hogweed

Giant hogweed spreads through seed dispersal. However, the main driver behind setting an exclusion zone around this plant is to protect the public and employees from the hazards of its toxic sap, as well as avoiding its spread.

For a small number of plants mechanical control can be employed by cutting down to ground level. It's imperative that the operator is wearing full protective clothing (with gloves, a hood and a full-face visor) to prevent skin contamination by the sap. Protective clothing should be washed down before being removed. If sap gets on the operator's skin, then the area should be covered to keep it out of the sun, and the person should go indoors immediately and wash the sap off their skin with soap and lots of water.

For larger infestations, chemical control can be undertaken using a non-residual herbicide such as glyphosate. The plants can be sprayed when the plants are growing actively but still less than about 1 m high. This is usually in April and May. The herbicide can be applied as a spot treatment to individual plants, using hand-held equipment, or as an overall spray using machine-mounted spray booms. In the latter instance, total weed control of all vegetation will occur and it may be necessary to reseed the treated area with grass and other native plants.

3.4 Cleaning

All machines are to be in a clean condition before entering an infected area. On leaving an infected area all machines are to be thoroughly cleaned only within these areas with a road pin, brush or shovel. The use of chemicals and washing with water is not advised.

4 References

AECOM, (2008). Five Fords Ecology Report.

GB Non-native Species Secretariat (2015). website.
<<http://www.nonnativespecies.org/home/index.cfm>>

DEFRA (2013). Environmental Management –Guidance. Japanese knotweed, giant hogweed and other invasive plants. <<https://www.gov.uk/japanese-knotweed-giant-hogweed-and-other-invasive-plants#identifying-invasive-plants>> (accessed February 2015).

MMB (2014). Five Fords Access Road Improvements. Preliminary Ecological Appraisal.

MMB (2016). Five Fords Thermal Hydrolysis Plant. Preliminary Ecological Appraisal.

Appendices

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A. Invasive Plants Identification Sheets

Japanese Knotweed

Species Description

Scientific name: *Fallopia japonica*

AKA: Japanese Bamboo, Pysen saethwr (Welsh), *Polygonum cuspidatum*, *Reynoutria japonica*

Native to: Japan, Taiwan, northern China

Habitat: Common in urban areas, particularly on waste land, railways, road sides and river banks

Tall herbaceous perennial with bamboo like stems. Often grows into dense thickets. Characteristic leaves and stems, persistence of last year's dead canes and distinctive rhizome (underground root-like stems) enables year round identification.

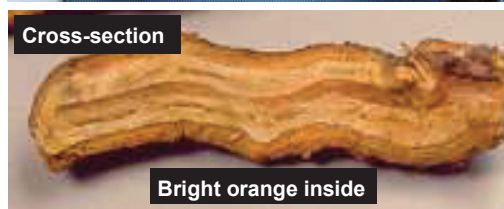
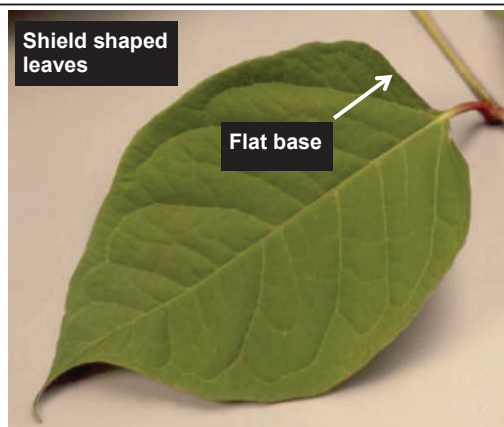
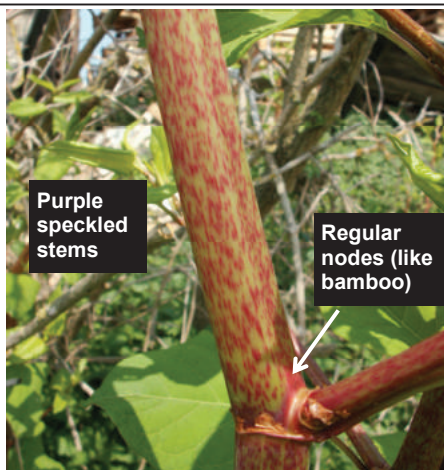
Introduced in the early 19th century as an ornamental plant. Now common and wide-spread across the UK. Spreads rapidly in the wild by natural means and as a result of spread by humans. Spread is solely by vegetative means, either fragments of rhizome or stem. Does not produce seed in the UK. Negative impacts include outcompeting native flora, contributing to river bank erosion and increasing the likelihood of flooding. Can also cause significant delays and cost to development as well as structural damage (it can grow through asphalt and some other surfaces).

Japanese Knotweed is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England, Wales and Scotland. As such it is an offence to plant or otherwise cause Japanese knotweed to grow in the wild. Under the Environmental Protection Act 1990, Japanese Knotweed is classified as controlled waste.

For details of legislation go to www.nonnativespecies.org/legislation.



Key ID Features



Identification throughout the year

Spring



Summer

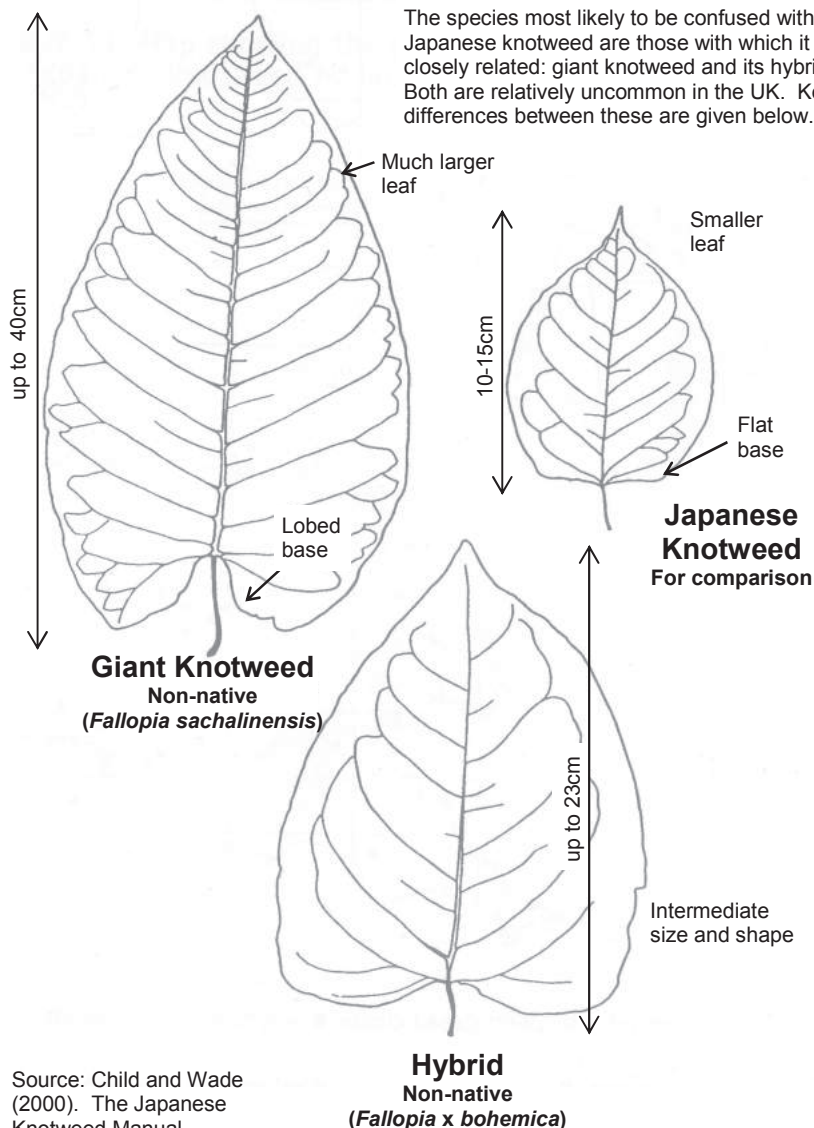


Winter



Similar Species

The species most likely to be confused with Japanese knotweed are those with which it is closely related: giant knotweed and its hybrid. Both are relatively uncommon in the UK. Key differences between these are given below.

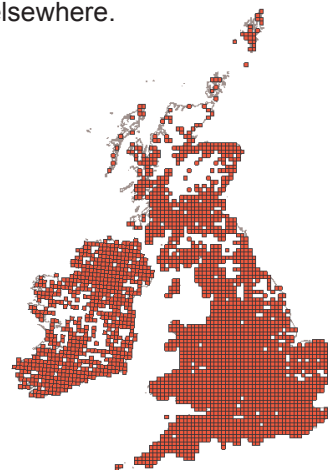


Source: Child and Wade (2000). The Japanese Knotweed Manual

Distribution

Widespread and common across the UK. Notably extensive infestations are found in the south-west of England, south Wales and Greater London, however similarly extensive populations can also be found elsewhere.

Source: NBN Gateway. Check website for current distribution



References and further reading:

- Blamey, M, Fitter, R and Fitter, A (2003) "*The Wild Flowers of Britain and Ireland. The Complete Guide to the British and Irish Flora.*" A & C Black
- Child, L E and Wade, P M (2000) "The Japanese Knotweed Manual". Packard
- Environment Agency (2006) "*The Japanese Knotweed Code of Practice*". Environment Agency
- Preston, C D, Pearman, D A and Dines, T A (editors) (2002) "*New Atlas of the British and Irish Flora*". Oxford University Press
- Stace, C (1999) "*Field Flora of the British Isles*". Cambridge University Press

Himalayan Balsam

Species Description

Scientific name: *Impatiens glandulifera*

AKA: Policeman's Helmet, Indian Balsam, Jac y Neidiwr (Welsh)

Native to: West and central Himalayas

Habitat: Found mostly on river banks and in damp woodland, can grow in other damp habitat

A tall, attractive, annual herb with explosive seed heads. 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.

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. Spreads solely by seeds, which are small and easily carried by wind or water.

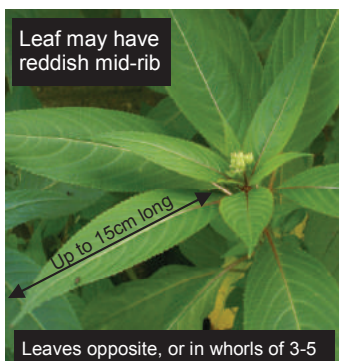
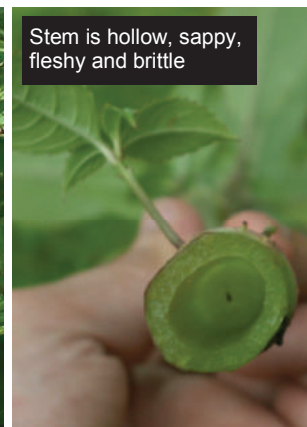
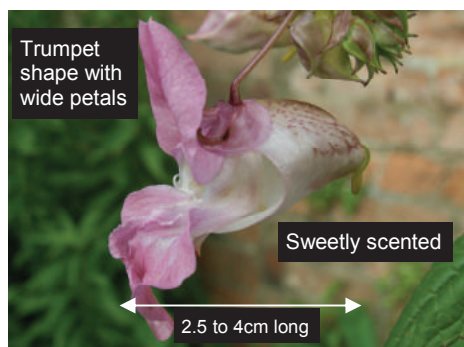
Out-competes native species in ecologically sensitive areas, particularly river banks. Where it grows in dense stands along river banks it can impede flow at times of high rainfall, increasing the likelihood of flooding. Die back of extensive stands over winter can leave river banks bare and exposed to erosion.

Himalayan balsam is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England and Wales. As such, it is an offence to plant or otherwise allow this species to grow in the wild.

For details of legislation go to www.nonnativespecies.org/legislation.



Key ID Features



Identification throughout the year

Can be identified at most times of the year: March-June by its seedlings, stem and leaf shape, from July to September by its stem, leaf shape and flowers. More difficult to identify over winter (October to February), look for hay like remains and distinctive root structure.



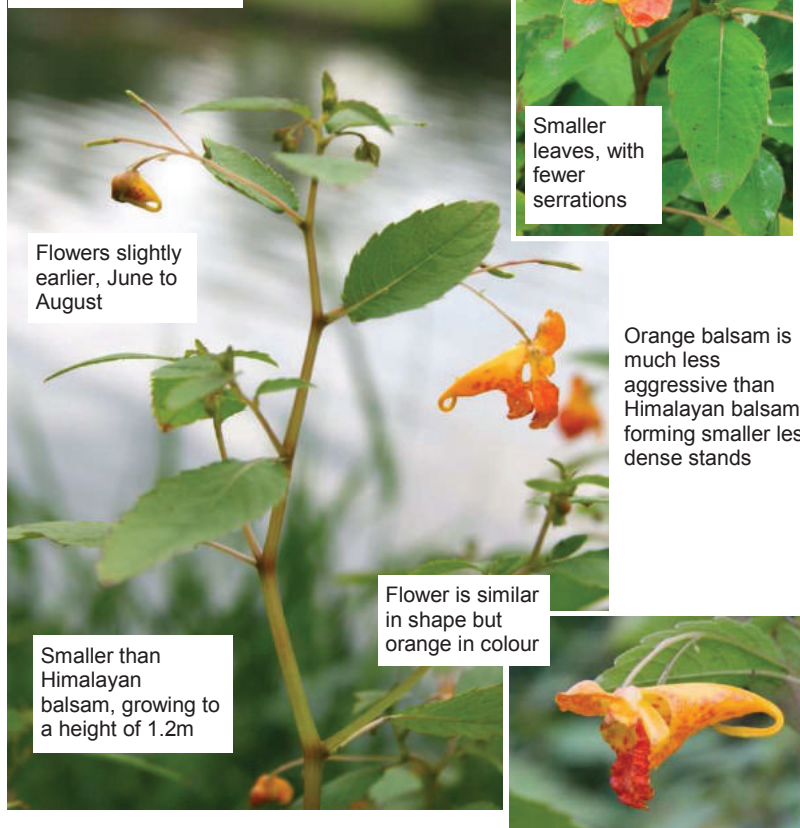
Hay like remains in winter



Root structure in winter

Similar Species

Orange Balsam Non-Native (*Impatiens capensis*)



Flowers slightly earlier, June to August

Smaller leaves, with fewer serrations

Orange balsam is much less aggressive than Himalayan balsam, forming smaller less dense stands

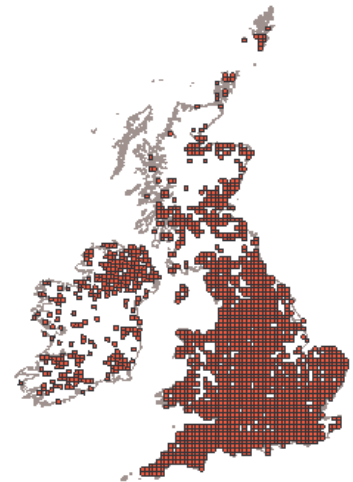
Flower is similar in shape but orange in colour

Smaller than Himalayan balsam, growing to a height of 1.2m

Distribution

Widespread and common across the whole of the UK. Primarily on riverbanks and in other damp areas.

Source: NBN Gateway. Check website for current distribution



References and further reading:

Blamey, M, Fitter, R and Fitter, A (2003) "The Wild Flowers of Britain and Ireland. The Complete Guide to the British and Irish Flora". A & C Black

Preston, C D, Pearman, D A and Dines, T A (editors) (2002) "New Atlas of the British and Irish Flora". Oxford University Press

Stace, C (1999) "Field Flora of the British Isles". Cambridge University Press

Giant Hogweed

Species Description

Scientific name: *Heracleum mantegazzianum*

AKA: Efwr enfawr (Welsh)

Native to: Caucasus mountains in south west Russia and Georgia

Habitat: Widespread, most common on river banks

Easy to identify when fully grown by height, size of leaves and size of flowers. Can be confused with native hogweed when not fully grown or when growth is stunted (e.g. regrowth after cutting).

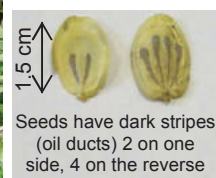
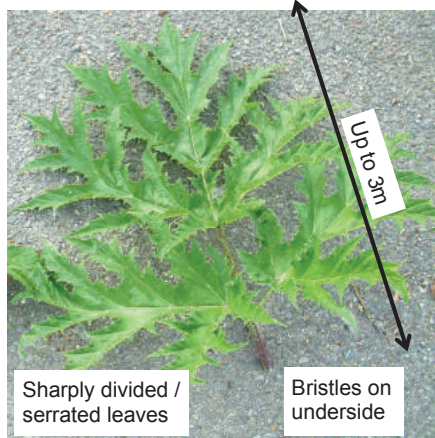
Introduced as an ornamental. First recorded wild in the UK in the late 19th century. Spreads solely by seeds, mainly through deliberate planting, wind dispersal and in water courses. Now common across much of the UK. Contact with any part of this plant must be avoided as even minute amounts of sap can cause blistering of the skin following exposure to sunlight. Other negative impacts include out-competing native flora, river bank erosion and increase in flood risk. Can cause delays/ additional costs on development sites where the plant must be removed as controlled waste in order to comply with legislation.

Giant hogweed is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England, Wales and Scotland. As such it is an offence to plant or otherwise cause this species to grow in the wild. Under the Environmental Protection Act 1990, giant hogweed is also classified as controlled waste.

For details of legislation go to www.nonnativespecies.org/legislation.



Key ID Features



Identification throughout the year

Spring



Summer



Winter



Similar Species

When in full height it is difficult to confuse giant hogweed with any other plant. While still growing or stunted, possibly as a result of disturbance, it can be confused with some other native plants. The most likely species with which it might be confused is hogweed.

Key differences between hogweed and giant hogweed include the height, width of stem, size of leaf, size of flower head and size of seed.

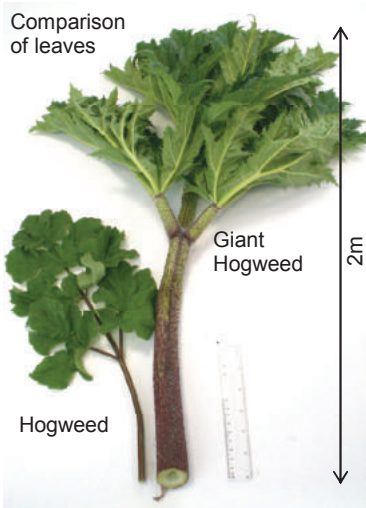


Hogweed flowers heads are much smaller, up to 15cm

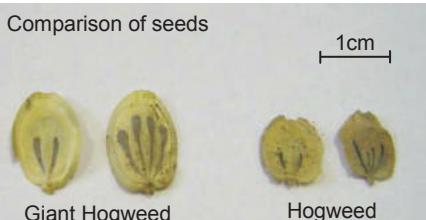
Hogweed
Native
(*Heracleum sphondylium*)



Comparison of stems



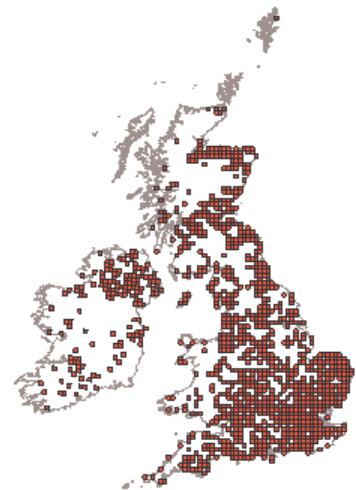
Comparison of leaves



Comparison of seeds

Distribution

Widespread and common across much of the UK. Extensive infestations are found particularly in Scotland and the north of England. Less abundant in Cornwall. Often associated with large rivers.



Source: NBN Gateway. Check website for current distribution

References and further reading:

- Blamey, M, Fitter, R and Fitter, A (2003) "The Wild Flowers of Britain and Ireland. The Complete Guide to the British and Irish Flora." A & C Black
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- Stace, C (1999) "Field Flora of the British Isles". Cambridge University Press