Information about GB Non-native Species Risk Assessments

The Convention on Biological Diversity (CBD) emphasises the need for a precautionary approach towards non-native species where there is often a lack of firm scientific evidence. It also strongly promotes the use of good quality risk assessment to help underpin this approach. The GB risk analysis mechanism has been developed to help facilitate such an approach in Great Britain. It complies with the CBD and reflects standards used by other schemes such as the Intergovernmental Panel on Climate Change, European Plant Protection Organisation and European Food Safety Authority to ensure good practice.

Risk assessments, along with other information, are used to help support decision making in Great Britain. They do not in themselves determine government policy.

The Non-native Species Secretariat (NNSS) manages the risk analysis process on behalf of the GB Programme Board for Non-native Species. Risk assessments are carried out by independent experts from a range of organisations. As part of the risk analysis process risk assessments are:

- Completed using a consistent risk assessment template to ensure that the full range of issues recognised in international standards are addressed.
- Drafted by an independent expert on the species and peer reviewed by a different expert.
- Approved by an independent risk analysis panel (known as the Non-native Species Risk Analysis Panel or NNRAP) only when they are satisfied the assessment is fit-for-purpose.
- Approved for publication by the GB Programme Board for Non-native Species.
- Placed on the GB Non-native Species Secretariat (NNSS) website for a three month period of public comment.
- Finalised by the risk assessor to the satisfaction of the NNRAP.

To find out more about the risk analysis mechanism go to: www.nonnativespecies.org

Common misconceptions about risk assessments

To address a number of common misconceptions about non-native species risk assessments, the following points should be noted:

- Risk assessments consider only the risks posed by a species. They do not consider the practicalities, impacts or other issues relating to the management of the species. They therefore cannot on their own be used to determine what, if any, management response should be undertaken.
- Risk assessments are about negative impacts and are not meant to consider positive impacts that may also occur. The positive impacts would be considered as part of an overall policy decision.
- Risk assessments are advisory and therefore part of the suite of information on which policy decisions are based.
- Completed risk assessments are not final and absolute. Substantive new scientific evidence may prompt a re-evaluation of the risks and/or a change of policy.

Period for comment

Draft risk assessments are available for a period of three months from the date of posting on the NNSS website*. During this time stakeholders are invited to comment on the scientific evidence which underpins the assessments or provide information on other relevant evidence or research that may be available. Relevant comments are collated by the NNSS and sent to the risk assessor. The assessor reviews the comments and, if necessary, amends the risk assessment. The final risk assessment is then checked and approved by the NNRAP.

*risk assessments are posted online at:
https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=51
comments should be emailed to nnss@fera.gsi.gov.uk

GB NON-NATIVE ORGANISM RISK ASSESSMENT SCHEME

For more information visit: www.nonnativespecies.org

	Name of Organism:	***Fallopia japonica* - Japanese Knotweed**	
	Objectives:	Assess the risks associated with this species in GB	
	Version:	FINAL 23/03/11	
N	**QUESTION**	**RESPONSE**	**COMMENT**
1	What is the reason for performing the Risk Assessment?		Request made by GB Programme Board
2	What is the Risk Assessment area?	GB	
3	Does a relevant earlier Risk Assessment exist?	NO OR UNKNOWN (Go to 5)	
4	If there is an earlier Risk Assessment is it still entirely valid, or only partly valid?		
A	**Stage 2: Organism Risk Assessment SECTION A: Organism Screening**		
5	Identify the Organism. Is the organism clearly a single taxonomic entity and can it be adequately distinguished from other entities of the same rank?	YES (Give the full name & Go to 7)	Japanese Knotweed - *Fallopia japonica* (Houtt. Rinse Decraene); *Reynoutria japonica* (Houtt.); *Polygonum cuspidatum* (Siebold and Zuccarini) (Environment Agency, 2006; Beerling *et al.* 1994).
6	If not a single taxonomic entity, can it be redefined?		
7	Is the organism in its present range known to be invasive, i.e. to threaten species, habitats or ecosystems?	YES (Go to 9)	Not known to be invasive in its native range in Japan, but invasive in Europe and the UK (Child and Wade, 2000).
8	Does the organism have intrinsic attributes that indicate that it could be invasive, i.e. threaten species, habitats or ecosystems?	YES or UNCERTAIN (Go to 9)	Rejected as invasive in the UK plant pheloung spreadsheet.
9	Does the organism occur outside effective containment in the Risk Assessment area?	YES (Go to 10)	There is no effective containment in the Risk Assessment area. Since its introduction the species has spread throughout the British Isles; only the Orkney Islands are exempt. [www.cabi.org/japaneseknotweedalliance]
10	Is the organism widely distributed in the Risk Assessment area?	YES & Future conditions/management procedures/policies are being considered (Go to 19)	
11	Does at least one species (for herbivores, predators and parasites) or suitable habitat vital for the survival, development and multiplication of the organism occur in the Risk Assessment area, in the open, in protected conditions or both?		
12	Does the organism require another species for critical stages in its life cycle such as growth (e.g. root symbionts), reproduction (e.g. pollinators; egg incubators), spread (e.g. seed dispersers) and transmission, (e.g. vectors)?		
13	Is the other critical species identified in question 12 (or a similar species that may provide a similar function) present in the Risk Assessment area or likely to be introduced? If in doubt, then a separate assessment of the probability of introduction of this species may be needed.		
14	Does the known geographical distribution of the organism include ecoclimatic zones comparable with those of the Risk Assessment area or sufficiently similar for the organism to survive and		
15	Could the organism establish under protected conditions (e.g. glasshouses, aquaculture facilities, terraria, zoological gardens) in the Risk Assessment area?		
16	Has the organism entered and established viable (reproducing) populations in new areas outside its		
17	Can the organism spread rapidly by natural means or by human assistance?		

18	Could the organism as such, or acting as a vector, cause economic, environmental or social harm in the Risk Assessment area?		
19	This organism could present a risk to the Risk Assessment area and a detailed risk assessment is appropriate.	Detailed Risk Assessment Appropriate GO TO SECTION B	Japanese Knotweed is included in the UK Technical Advisory Group Alien Species Group list of high impact invasive non-native species (UKTAG, 2007). In Scotland, waterbodies will be classified as being at risk of failing to reach required standards of Water Framework Directive as a result of morphological alterations brought about by the presence of this species. In England and Wales, waterbodies that are otherwise at high status will be downgraded to 'good' where UKTAG high impact species occur (Environment Agency, 2008).
20	This organism is not likely to be a harmful non-native organism in the Risk Assessment area and the assessment can stop.		

B	SECTION B: Detailed assessment of an organism's probability of entry, establishment and spread and the magnitude of the economic, environmental and social consequences			
	Probability of Entry	**RESPONSE**	**UNCERTAINTY**	**COMMENT**
1.1	List the pathways that the organism could be carried on. How many relevant pathways can the organism be carried on?	many - 3	LOW - 0	1) Inappropriate disposal of garden waste material and waste from development/building sites (including soil) (Environment Agency, 2006); 2) Inappropriate removal methods used where it is already a problem (e.g. mechanical flails, live cuttings left on site etc.) (Environment Agency, 2006); 3) Downstream spread of rhizome material from river banks (Child and Wade, 2000); 4) Transport of contaminated topsoil, for example during road building and construction (Bailey and Conolly, 2000; Centre for Hydrology and Ecology, 2004); 5) Intentional introduction as ornamental garden plant (its original introduction pathway and still an occasional cause for spread to unaffected areas) (Environment Agency, 2006; continuing introduction to gardens witnessed personally).
1.2	Choose one pathway from the list of pathways selected in 1.1 to begin the pathway assessments.	Inappropriate disposal of contaminated soil or waste		
1.3	How likely is the organism to be associated with the pathway at origin?	moderately likely - 2	LOW - 0	No longer likely to originate from Asia due to import controls, but moderately likely within the risk assessment area and adjacent areas of the UK due to the species being so widespread; most Japanese Knotweed infestations on development sites started as a result of fly-tipped waste (Environment Agency, 2006).
1.4	Is the concentration of the organism on the pathway at origin likely to be high?	moderately likely - 2	LOW - 0	Dependant on the individual site it has come from. Where present it is likely to be in large quantities so fragments likely in transported soil etc.
1.5	How likely is the organism to survive existing cultivation or commercial practices?	very likely - 4	LOW - 0	Plant fragments are very likely to survive for prolonged periods (many years) (Environment Agency, 2006).
1.6	How likely is the organism to survive or remain undetected by existing measures?	very likely - 4	MEDIUM -1	Soil movement within the UK does not require evidence that the species is not present. Where it is known to exist legislation requires certain measures for disposal but these may not always be taken. For example, where moving waste plant material or contaminated soil offsite it must be taken to a site that has either an environmental permit (England and Wales), a waste management licence (Northern Ireland and Scotland), or a pollution prevention and control (PPC) permit (Northern Ireland and Scotland). [www.netregs.gov.uk]
1.7	How likely is the organism to survive during transport /storage?	very likely - 4	LOW - 0	Plant fragments are very likely to survive for prolonged periods (many years) (Environment Agency, 2006).
1.8	How likely is the organism to multiply/increase in prevalence during transport /storage?	unlikely - 1	MEDIUM -1	The organism does not multiply during transport, but if stored (for example in an area of contaminated soil on a development site) will continue to grow and spread. Plant material is highly likely to remain viable following both transport and storage enabling rapid vegetative spread at new sites (Environment Agency, 2006).
1.9	What is the volume of movement along the pathway?	moderate - 2	MEDIUM -1	Likely to vary greatly dependent on where site waste material originates from.

1.10	How frequent is movement along the pathway?	often - 3	HIGH -2	Movement of soil and other waste material occurs frequently, particularly in relation to development sites, so there is a high likelihood of regular transport and inappropriate disposal of material containing the species.
1.11	How widely could the organism be distributed throughout the Risk Assessment area?	very widely - 4	LOW - 0	This species is well established throughout the UK. Where present on river systems it spreads rapidly (Environment Agency, 2006; Child and Wade, 2000).
1.12	How likely is the organism to arrive during the months of the year most appropriate for establishment ?	very likely - 4	LOW - 0	Because propagation is vegetative a fragment of plant only 1g in weight (the size of a penny) can produce a new plant, so whatever time of year material is dumped it is likely that enough will survive to produce new plants during the growing season (Environment Agency, 2006).
1.13	How likely is the intended use of the commodity (e.g. processing, consumption, planting, disposal of waste, by-products) or other material with which the organism is associated to aid transfer to a suitable habitat?	very likely - 4	MEDIUM -1	The species is generally disposed of with soil and when transported/disposed of inappropriately will often be deposited in ideal habitats (river embankments, lay-bys, building sites etc.) (Environment Agency, 2006).
1.14	How likely is the organism to be able to transfer from the pathway to a suitable habitat?	very likely - 4	LOW - 0	The species appears able to establish in a wide variety of habitats and so can spread even in urban settings [www.cabi.org/japaneseknotweedalliance].

	Probability of Establishment	RESPONSE	UNCERTAINTY	COMMENT
1.15	How similar are the climatic conditions that would affect establishment in the Risk Assessment area and in the area of current distribution?	very similar - 4	LOW - 0	The species is well established throughout the UK so should be able to spread to currently unaffected areas within the UK.
1.16	How similar are other abiotic factors that would affect establishment in the Risk Assessment area and in the area of present distribution?	very similar - 4	LOW - 0	The species seems able to spread anywhere regardless of soil type etc. (Environment Agency, 2006).
1.17	How many species (for herbivores, predators and parasites) or suitable habitats vital for the survival, development and multiplication of the organism species are present in the Risk Assessment area? Specify the species or habitats and indicate the	very many - 4	LOW - 0	Propagation is vegetative so the species is not dependent on any fertilising organisms, and does not have strict habitat requirements as seems able to grow anywhere (Environment Agency, 2006). Although the species can be suppressed to a small degree by
1.18	How widespread are the species (for herbivores, predators and parasites) or suitable habitats vital for the survival, development and multiplication of the organism in the Risk Assessment area?	widespread - 4	LOW - 0	The species does not have strict habitat requirements and seems able to spread anywhere (Environment Agency, 2006).
1.19	If the organism requires another species for critical stages in its life cycle then how likely is the organism to become associated with such species in the risk assessment area?	N/A		
1.20	How likely is it that establishment will not be prevented by competition from existing species in the Risk Assessment area?	very likely - 4	LOW - 0	As plants are already established in the RA it is clear that competition is not a problem. The organism appears to outcompete many native species (Environment Agency, 2006).
1.21	How likely is it that establishment will not be prevented by natural enemies already present in the Risk Assessment area?	very likely - 4	LOW - 0	There do not appear to be any natural enemies to this organism. Grazing by livestock may suppress spread, but is not likely to prevent it entirely as the plant will continue to grow if grazing ceases. [www.cabi.org/japaneseknotweedalliance]
1.22	If there are differences in man's management of the environment/habitat in the Risk Assessment area from that in the area of present distribution, are they likely to aid establishment? (specify)	N/A	LOW - 0	Occurs throughout, with local land management not appearing to have a significant affect on its ability to colonise.
1.23	How likely is it that existing control or husbandry measures will fail to prevent establishment of the organism?	very likely - 4	LOW - 0	Already well established and existing controls are not effective except in those areas where management programmes are in place for a number of years.
1.24	How often has the organism been recorded in protected conditions, e.g. glasshouses, elsewhere?	N/A		
1.25	How likely is the reproductive strategy of the organism and duration of its life cycle to aid establishment?	very likely - 4	LOW - 0	Vegetative propagation common and rhizomes below ground remain viable if vegetative growth is removed (Environment Agency, 2006).
1.26	How likely is it that the organism's capacity to spread will aid establishment?	very likely - 4	LOW - 0	
1.27	How adaptable is the organism?	adaptable - 3	MEDIUM -1	Does not have strict requirements and appears able to spread anywhere. (Environment Agency, 2006).
1.28	How likely is it that low genetic diversity in the founder population of the organism will not prevent establishment?	very likely - 4	LOW - 0	Existing spread has been mainly by vegetative propagation, so there does not appear to be a need to increase genetic diversity to ensure establishment (Child and Wade, 2000).
1.29	How often has the organism entered and established in new areas outside its original range as a result of man's activities?	very many - 4	LOW - 0	Much new establishment has been as a result of mans activities. The other main pathway is erosion of riverbanks, although this is often facilitated by inappropriate engineering works nearby (Child and Wade, 2000).
1.30	How likely is it that the organism could survive eradication campaigns in the Risk Assessment area?	very likely - 4	LOW - 0	To date all eradication campaigns have been localised and many have been unsuccessful as eradication is undertaken on an *ad hoc* basis. The species continues to spread.

1.31	Even if permanent establishment of the organism is unlikely, how likely is it that transient populations will be maintained in the Risk Assessment area through natural migration or entry through man's activities (including intentional release into the outdoor environment)?	N/A		Permanent establishment of the species is highly likely. In its introduced range, the species occupies more than half of the 10 km squares used to map plant distribution in the British Isles and is only absent from the Orkney Islands. [www.cabi.org/japaneseknotweedalliance]

	Spread	RESPONSE	UNCERTAINTY	COMMENT
2.1	How rapidly is the organism liable to spread in the Risk Assessment area by natural means?	rapid - 3	LOW - 0	Once established it moves relatively quickly through river systems as fragments which break off are carried downstream to establish new stands (Environment Agency, 2006). Natural spread is also possible through rhizome growth (Child and Wade, 2000).
2.2	How rapidly is the organism liable to spread in the Risk Assessment area by human assistance?	rapid - 3	MEDIUM -1	The frequent occurrence of the plant in areas where human assistance is the likely form of transport is high (e.g. roads, rail, gardens, tips, waste ground). If disposed of incorrectly, humans can spread this species to new areas (Environment Agency, 2006; www.netregs.gov.uk).
2.3	How difficult would it be to contain the organism within the Risk Assessment area?	very difficult - 4	LOW - 0	It will be very difficult to prevent further spread to other parts of the UK. In its introduced range, the species occupies more than half of the 10 km squares used to map plant distribution in the British Isles and is only absent from the Orkney Islands. [www.cabi.org/japaneseknotweedalliance] Prevention of spread outwith the UK should be possible dependent on restrictions for transport of waste and topsoil (although its distribution already covers much of mainland Europe from southern France and northern Italy to Norway. Beyond Europe it is found in many states in the USA from California to Washington and throughout Canada and is increasingly being reported as a nuisance weed in New Zealand and Australia).
2.4	Based on the answers to questions on the potential for establishment and spread define the area endangered by the organism.	4	LOW - 0	The majority of the RA area is at risk. In its introduced range, the species occupies more than half of the 10 km squares used to map plant distribution in the British Isles and is only absent from the Orkney Islands. [www.cabi.org/japaneseknotweedalliance]

	Impacts	RESPONSE	UNCERTAINTY	COMMENT
2.5	How important is economic loss caused by the organism within its existing geographic range?	major - 3	MEDIUM -1	Natural England have quoted the species as causing considerable damage as it can grow through concrete, damage property and destroy habitats. The economic implications are not known in Scotland (Natural England, 2009). Japanese Knotweed costs the British economy thousands of pounds each year to manage. It damages buildings, delays developments, and forces out native plants (www.cabi.org/japaneseknotweedalliance). Research has estimated that in Wales alone, the cost for a three year eradication programme would have been £76 million for such a programme starting in 2007. In addition, it is expected to cost many millions of pounds to deal with invasive weeds such as Japanese Knotweed on land destined to host the infrastructure of the 2012 London Olympics (Defra, 2008).
2.6	Considering the ecological conditions in the Risk Assessment area, how serious is the direct negative economic effect of the organism, e.g. on crop yield and/or quality, livestock health and production, likely to be? (describe) in the Risk Assessment area, how serious is the direct negative economic effect of the organism, e.g. on crop yield and/or quality, likely to be?	major - 3	LOW - 0	It is not reported to cause economic loss to agriculture in terms of crop yield etc. However the cost to land managers of control in riparian areas, where approximately 10,000 km of watercourse is estimated to be affected, is calculated at £52 million. This assumes both banks are affected to a width of 2 m from the edge of the water. Assuming 0.5% of the total land area of Britain, this is only 1% of every square affected and is likely to be an underestimate. 1200 km^2 may be affected by Japanese Knotweed, the cost of eradication is approximately £1.56 billion (Defra, 2003).
2.7	How great a loss in producer profits is the organism likely to cause due to changes in production costs, yields, etc., in the Risk Assessment area?	moderate - 2	LOW - 0	It has a major affect on developers, who are required to remove it, infrastructure managers, who control it to prevent blockages to access etc., and land managers to prevent erosion/biodiversity issues. For example building developments will have to transfer the costs of removal/disposal to the ultimate buyer of the building or face a reduction in profits - actual costs not known.
2.8	How great a reduction in consumer demand is the organism likely to cause in the Risk Assessment area?	moderate - 2	HIGH -2	Alteration in habitat structure and biological communities (caused by Japanese Knotweed and other riparian invasive non-native species) is known to impact directly on salmonid fisheries. As well as hindering conservation efforts & the viability for angling, the presence of these plant species pose great management and access concerns if left uncontrolled (The Living River Project - The River Avon System Non-native Invasive Plant Strategy, www.wsrt.org.uk/news/aliens.html). Freshwater angling makes a significant economic impact in Scotland, resulting in the Scottish economy producing over £100m worth of annual output, which support around 2,800 jobs and generates nearly £50m in wages and self-employment income to Scottish households (Scottish Executive, 2004).
2.9	How likely is the presence of the organism in the Risk Assessment area to cause losses in export markets?	very unlikely - 0	LOW - 0	Not applicable.
2.10	How important would other economic costs resulting from introduction be? (specify)	major - 3	MEDIUM -1	The cost of control in riparian areas, where approximately 10,000 km of watercourse is estimated to be affected is calculated at £52 million. This assumes both banks are affected to a width of 2 m from the edge of the water. Assuming 0.5% of the total land area of Britain, this is only 1% of every square affected and is likely to be an underestimate. 1200 km2 may be affected by Japanese Knotweed, the cost of eradication is approximately £1.56 billion. (Defra, 2003).

2.11	How important is environmental harm caused by the organism within its existing geographic range?	major - 3	LOW - 0	Plant diversity where the organism has established is considerably reduced. Impacts on river bank stabilisation and flooding can also affect local habitats. Eradication generally uses herbicides which can also affect native species in the locality, and once removed a bare area is left unless artificially re-seeded.
2.12	How important is environmental harm likely to be in the Risk Assessment area?	major - 3	LOW - 0	Existing range and RA area are the same thing.
2.13	How important is social and other harm caused by the organism within its existing geographic range?	moderate - 2	MEDIUM -1	As well as hindering conservation efforts & the viability for angling the presence of these plant species pose great management and access concerns if left uncontrolled (The Living River Project - The River Avon System Non-native Invasive Plant Strategy, www.wsrt.org.uk/news/aliens.html). Legal disagreements occur between landowners over the presence and spread of Japanese Knotweed, which could be considered social harm (Child and Wade, 2000).
2.14	How important is the social harm likely to be in the Risk Assessment area?	moderate - 2	MEDIUM -1	Existing range and RA area are the same thing.
2.15	How likely is it that genetic traits can be carried to native species, modifying their genetic nature and making their economic, environmental or social effects more serious?	unlikely - 1	MEDIUM -1	Japanese Knotweed does not hybridise with native plants in the UK (Child and Wade, 2000).
2.16	How probable is it that natural enemies, already present in the Risk Assessment area, will have no affect on populations of the organism if introduced?	very likely - 4	LOW - 0	Although grazing appears to reduce the speed of spread it is not a recognised method of eradication and is not thought likely to affect the overall population of the species (www.cabi.org/japaneseknotweedalliance; www.devon.gov.uk/index/environmentplanning/natural_environment/biodiversity/japanese_knotweed/control_of_knotweed.htm).
2.17	How easily can the organism be controlled?	very difficult - 4	LOW - 0	Individual stands can be eradicated by mechanical or chemical methods. However because the species can spread rapidly throughout river systems, complete eradication can only be achieved through large scale strategic programmes. In addition, rhizomes may remain dormant for at least 20 years so the lack of visible regrowth is not evidence of eradication; dormant rhizome may regrow if it is disturbed. Because much riparian land is privately owned, and there is no legislative basis through which to force a landowner to eradicate the species within his own boundaries, it is the practicalities and financial constraints of attempting such an approach which have so far impeded their success (Environment Agency, 2006); www.devon.gov.uk/index/environmentplanning/natural_environment/biodiversity/japanese_knotweed/control_of_knotweed.htm).
2.18	How likely are control measures to disrupt existing biological or integrated systems for control of other organisms?	very unlikely - 0	MEDIUM -1	
2.19	How likely is the organism to act as food, a host, a symbiont or a vector for other damaging organisms?	unlikely - 1	MEDIUM -1	No information available.
2.20	Highlight those parts of the endangered area where economic, environmental and social impacts are most likely to occur		LOW - 0	Any urban area (for example, economic development sites, particularly urban regeneration areas), rural or riparian area.

Summarise Entry	very likely - 4	LOW - 0	The species is well established throughout the UK and is still spreading (www.netregs.gov.uk).
Summarise Establishment	very likely - 4	MEDIUM -1	It can thrive in a wide variety of habitats and so is likely to continue to establish in new sites throughout the risk assessment area (Environment Agency, 2006).
Summarise Spread	rapid - 3	MEDIUM -1	Readily transported as fragments in soil or transported by water through river systems (Environment Agency, 2006).
Summarise Impacts	major - 3	MEDIUM -1	Can have major impacts on biodiversity, integrity of river morphology etc. in localised area, with a lesser impact elsewhere. Impact can be high in urban areas/developments where buildings are undermined (Environment Agency, 2006).
Conclusion of the risk assessment	HIGH -2	MEDIUM -1	
Conclusions on Uncertainty		LOW - 0	

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