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, Pathway, Receptor or Policy	***Fallopia sachalinensis* - Giant Knotweed**	
Objectives:	Assess the risks associated with this species in GB	
Version:	FINAL 28/3/11	

N	QUESTION	RESPONSE	COMMENT
1	What is the reason for performing the Risk Assessment?		A request was made by the 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)	Not for this taxon and its hybrid with Japanese knotweed but there is one for its congener, Japanese knotweed.
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)	Fallopia sachalinensis - Giant Knotweed, (F. Schmidt ex Maxim) Ronse Decreane (syn. Polygonum sachalinense F.Schmidt ex Maxim., Reynoutria sachalinensis (F.Schmidt ex Maxim.) Nakai). Giant knotweed, *Fallopia sachalinensis* , this plant is much bigger and has differently shaped leaves than its congener, Japanese knotweed and it does hybridise with it and other members of this genus. The hybrid with *F. japonica* , *F. x bohemica* is intermediate in size and shape between the parents and may be at least partially fertile. Back crosses are also known (Pashley *et al.* 2003), and introgressed swarms are known from New England, USA (Gammon *et al.* 2007). The hybrid exhibits hybrid vigour and is reputed to be more invasive than the 2 parents as it has a more varied genome than the parents. (Mandak *et al* . 2004). Bailey (1996) has suggested that some records need to be checked because the hybrid has either been significantly under-recorded or not distinguished from *F. sachalinensis* . Several recent authors, Pashley (2003), Bailey (2003), Tiebre *et al.* (2007), Gammon *et al.* (2008), Gerber *et al.* (2008), deal with them as *Fallopia* spp; Japanese knotweeds s.l. or the *Fallopia* complex!
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)	It is not so well known as Japanese knotweed and is not so invasive (Bailey 1990) but in the Czech Republic at least, its hybrid is becoming more invasive than the parents.
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)	According to Moringo & Pautou (1998) this alien possesses most of the common attributes characteristic of an invader: clonal spread associated with an extraordinary high rate of proliferation of rhizomes, mechanisms for adaptation to adverse conditions and the use of competitive strategies to monopolize resources. The explosive spread can lead to loss of biodiversity in alluvial nature reserves and to modification in the regeneration of native plants. It is a problem to environment managers in urban amenity areas, waste ground, railway embankments and road verges. The three *Fallopia* taxa are believed to be the most invasive weeds in temperate terrestrial ecosystems (Child & Wade 2000). Riparian corridors are important for both invertebrates and vertebrates in intensively used landscapes and these are suffering from the *Fallopia* invaders by having fewer and less abundant species and less biomass (Pysek & Prach 1994).
9	Does the organism occur outside effective containment in the Risk Assessment area?	YES (Go to 10)	It is widely naturalised throughout temperate Europe, especially in parts of France and Germany and even into the alpine areas (Sukopp *et al.* 1995). It has also invaded most of America from Florida to Alaska and is found in Australia and New Zealand (Bailey *et al.* 2003).
10	Is the organism widely distributed in the Risk Assessment area?	YES & Future conditions/management procedures/policies are being considered (Go to 19)	It was first offered for sale in the UK in 1869 and had naturalised in Ireland by 1896 and in Britain by 1903, and it has greatly increased since the 1962 Plant Atlas. It is known from over 300 hectads sites in Britain and Ireland (Akeroyd 2002) but is only 15% as numerous as its congener, Japanese knotweed mainly because it is so much bigger and so was not planted as often.
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)?		The flowers produce nectar and so are insect pollinated and not capable of self pollinating (Bailey 1990). Probably a wide range of generalist pollinators and bees for certain carry out pollination (Defra Website).
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 thrive?		The plant prospers more rapidly in more southern and eastern parts of Europe, in wetter areas which are hot (S. Germany, France, Czech Republic). The further north the colonies are found the less rapid their spread, and this can be seen in British distribution (Akeroyd 2002).
15	Could the organism establish under protected conditions (e.g. glasshouses, aquaculture facilities, terraria, zoological gardens) in the Risk Assessment area?		Giant knotweed is mainly found in private estates and large gardens from where it has escaped, mainly to riversides (Hart *et al.* 1997).
16	Has the organism entered and established viable (reproducing) populations in new areas outside its original range, either as a direct or indirect result of man's activities?		The plant has been offered for sale for over one hundred years and when its owners have found how invasive it is and how it changes the ecology of its domain, many have thrown it out causing new colonies to form.
17	Can the organism spread rapidly by natural means or by human assistance?		Now that the plant is widely consolidated on river banks it is probably floods that spread it, when large rafts of vegetation and seeds are washed away, often to colonise downstream. There are 'Hot Spots' in Pembrokeshire, Merioneth, east Gloucester, north Essex, Leeds and Preston, where the plant does particularly well and usually male and female flowers are found, giving rise to viable seed and presumably seedlings (Pashley *et al.* 2003). The Giant knotweed around Glasgow are male sterile, just like the Japanese knotweed, and yet there are hybrids of the two which are fertile! Either pollen to produce the hybrid has come from elsewhere, or the male parent has died out or is rare and not been found (Hart *et al.* 1997). Seed and pieces of rhizome and stem can easily be moved elsewhere by transportation of soil, in the tread of tyres or on feet. The seeds encased in a calyx are easily blown or float away.
18	Could the organism as such, or acting as a vector, cause economic, environmental or social harm in the Risk Assessment area?		Fortunately this plant is not nearly as invasive or as frequent as Japanese knotweed and is rarely found on building sites; thus much less is spent on its control (Hollingsworth *et al.* 1998; Dukopp & Starfinger 1995; Mandak *et al.* 2003). However it does occur widely on riverbanks, causing serious deterioration of the biodiversity, negatively affecting plant and invertebrate assemblages in riparian habitats (Sukopp 1988; Pysek & Prach 1994; Kappes 2007; Gerber *et al.* 2008).
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	This weed is possibly more of a risk to the environment than to commercial enterprises, by fertilising the normally sterile Japanese knotweed to produce an even more invasive hybrid (Gammon & Kessili 2007), as in the Czech Republic (Bailey *et al.* 2007).
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?	very many - 4	LOW - 0	It is thrown out of estates and gardens and could be washed out of river banks and carried downstream to colonise elsewhere. It could be passed on from one estate to another. The rhizomes and seed can be moved around in contaminated soil and the seed can also be spread by wind and water currents. The plant is still offered for sale though only rarely.
1.2	Choose one pathway from the list of pathways selected in 1.1 to begin the pathway assessments.			Rhizome contamination of soil.
1.3	How likely is the organism to be associated with the pathway at origin?	moderately likely - 2	LOW - 0	Quite likely in Europe, including the UK.
1.4	Is the concentration of the organism on the pathway at origin likely to be high?	moderately likely - 2	LOW - 0	Movement of soil carries a moderate risk as finger nail-sized pieces of rhizome can produce full-sized plants. Like Japanese knotweed, this plant is fairly catholic in its habitat preferences. It is happy in both ruderal and semi-natural habitats.
1.5	How likely is the organism to survive existing cultivation or commercial practices?	moderately likely - 2	LOW - 0	It is not much of a problem on the farm where normal practices such as ploughing, herbicide use and grazing stock would control it. Colonies may need to be re-sprayed with herbicide 3 or 4 times before eradication is certain, and periodic checks need to be made for any re-growth (Rhoads & Block 2002).
1.6	How likely is the organism to survive or remain undetected by existing measures?	very likely - 4	LOW - 0	The seed especially could remain undetected until it became established as a plant.
1.7	How likely is the organism to survive during transport /storage?	very likely - 4	LOW - 0	Rhizomes could survive in transported soil for many months and the seeds and rhizome fragments could lodge in mud on tyres. The seed could probably survive for a year or two depending on temperature, humidity and amount of oxygen.
1.8	How likely is the organism to multiply/increase in prevalence during transport /storage?	very unlikely - 0	LOW - 0	Soil infected by seed or rhizome fragments could be dumped and start a new colony.
1.9	What is the volume of movement along the pathway?	moderate - 2	MEDIUM -1	Low to medium because contractors moving soil to different sites are probably aware of the dangers of the larger knotweeds.
1.10	How frequent is movement along the pathway?	often - 3	MEDIUM -1	It occurs from Cornwall to Shetland, in 99 out of 112 vice-counties and is still increasing (Stace 2003).
1.11	How widely could the organism be distributed throughout the Risk Assessment area?	very widely - 4	LOW - 0	The seed floats (with calyx attached) and together with the rhizomes are often transported down rivers to form new colonies, especially in times of flood. The seeds, although rarely formed, are likely to be carried on boats or railway wagons almost anywhere.
1.12	How likely is the organism to arrive during the months of the year most appropriate for establishment ?	likely - 3	MEDIUM -1	Soil transport in spring, summer and autumn, but could also arrive in winter and remain dormant until spring.
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	LOW - 0	Infected soil removal to another site during building work is a common means of spread, but there are strict regulations against this happening, at least concerning its much more frequent congener, *F. japonica* (Environment Agency Website).
1.14	How likely is the organism to be able to transfer from the pathway to a suitable habitat?	very likely - 4	LOW - 0	*Fallopia* is a pioneer colonist and has adaptations for tough environments; it proliferates in both urban and semi-natural habitats. It is resistant to a certain amount of salt spray and so colonises sea loch sides in Scotland, but growth and abundance is depressed by shady sites (Beerling1991). However, it does grow in open woodland in Norway (Fremstad 1997). It can outcompete *F. japonica* on alluvial influenced sandy river banks (Hart *et al.* 1997). In the Czech Republic the hybrid *F* . x *bohemica* is more invasive than the two parents (Mandac 2004).

	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?	similar - 3	LOW - 0	In winter the plant can endure temperatures down to -20C and in summer it tolerates quite high temperatures (southern France and southern Germany). It can tolerate much lower temperatures in the northern parts of its adopted range. In east Asia (latitude of north Africa), it occurs mainly in warm temperate areas with a high rainfall of *c*. >1500mm and where the winter temperatures are much lower, but the summer ones are much higher, than in the UK (Sukopp 1995).
1.16	How similar are other abiotic factors that would affect establishment in the Risk Assessment area and in the area of present distribution?	similar - 3	LOW - 0	It has a preference for moist sandy alluvial soils in full sun especially on river banks where it can even outcompete *F. japonica* (Hart *et al.* 1997). It craves a constant water supply and high temperatures during physiological activity and can be found at altitudes of up to 1000m in Japan (Sukopp & Starfinger 1995). In Britain and Ireland it is found on low-lying ground where it grows best in the wetter and warmer areas, especially in west Kent, Surrey, Middlesex, south Lancashire and Cheshire (Akeroyd 2002). Like Japanese knotweed, it also likes disturbed areas and it can withstand a certain amount of salt spray, which allows it to prosper by sea lochs in Argyll (Akeroyd 2002).
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 number.	many - 3	LOW - 0	It is spreading in many areas, often altering the natural ecology by forming dense stands by roadsides, riverbanks, woodland edges, waste ground and by sea lochs. In the decade from 1987 it has tripled in extent from just over 100 to over 300 hectads (Akeroyd 2002) and it is still spreading.
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	
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		Generalist pollinators could affect pollination but it appears to set so little seed that this method of spread is inconsequential (Hart *et al.* 1997).
1.20	How likely is it that establishment will not be prevented by competition from existing species in the Risk Assessment area?	likely - 3	LOW - 0	It has become very evident over the last 40 years, tripling the number of hectads in Britain and Ireland in that time (Akeroyd 2002). It was not sold as often as Japanese knotweed and this may partly account for it being less frequent in the wild.
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	Originally it was introduced as a fodder plant (Conolly 1977) and most large herbivores such as cattle, sheep and horses will graze it down, at least when it is young (Knotweed website). However, grazing only suppresses the plant and does not reduce spread and is not a method of control. The invertebrates don't seem to make much impression on it except in its native homelands, where it is not a pest!
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)	likely - 3	LOW - 0	This plant 'enjoys' disturbed ground, from brown field sites to rich alluvial soils or spoil heaps, and so what man does makes little difference. In its native Japan this species can be a pioneer colonist of lava deserts caused by volcanic eruptions, and so this plant has adapted to harsh conditions and benefits from eutrophication (Yoshioka 1974).
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	It is already well-established but it is in more recent years that measures have been taken against the larger knotweeds. Regulations to control the larger knotweeds are improving all the time, but we have a long way to go.
1.24	How often has the organism been recorded in protected conditions, e.g. glasshouses, elsewhere?	very rare - 0	LOW - 0	It mainly occurs in private estates and gardens but not in glass houses.
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	It can spread by allelogenic seeds (rarely) (Inoue *et al.* 1992), but its main method of spread is the very high rate of rhizome growth and it is a long-lived perennial. Pieces of rhizome as small as a pen top, or huge mats, can be broken off and washed down a river to start a new colony.
1.26	How likely is it that the organism's capacity to spread will aid establishment?	very likely - 4	LOW - 0	Its vegetative growth rate is enormous and has been described as explosive, at least in warmer parts of Europe (Sukopp 1995). Like its congener *F. japonica*, this plant is usually male sterile, at least around Glasgow, but hybrids have arisen between the two and these can be fertile, suggesting that male fertile Giant knotweed may be present (rare) or was at one time (Hart *et al.* 1997). In some towns it is the hybrid, F. x bohemica that is the predominant knotweed (Bailey *et al.* 1996).
1.27	How adaptable is the organism?	very adaptable - 4	LOW - 0	The plant has mechanisms for adaptation to adverse conditions and the use of competition strategies to monopolize resources; a warmer wetter climate will suit it even more (climate change). It is found over huge tracts of the world including the USA, Canada, New Zealand, most of Europe from Scandinavia to the Black Sea, to France, Germany and the Low Countries. As already mentioned, this species is a pioneer colonist; it withstands drought, heat, cold, sulphurous soil, being buried and even salt spray by sea lochs.

1.28	How likely is it that low genetic diversity in the founder population of the organism will not prevent establishment?	unlikely - 1	LOW - 0	It has been known in the wild for over 100 years and there has been no reported let-up in its spread; the New Plant Atlas (Akeroyd 2002) says it has increased greatly since 1962. It has a low genetic diversity, poor seed viability and rarity of seedlings point to asexual reproduction (Bailey 1994; Hollingsworth 1998).
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	It is found from Alaska to California and from Florida up the coast to New England and the Great Lakes, provinces in Canada, most of temperate Europe, especially in France, Germany and the Czech Republic, and parts of Asia and New Zealand.
1.30	How likely is it that the organism could survive eradication campaigns in the Risk Assessment area?	very likely - 4	MEDIUM -1	The Giant knotweed could possibly be eradicated from large tracts of its range, but there are often areas that are difficult to access and areas where it has been forgotten and so a source of spread is usually around. Sometimes it needs several resprayings over a year or two before it is eradicated (DEFRA website on knotweed). It is unlikely to be completely eradicated (medium/high).
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)?	unlikely - 1	LOW - 0	Because of the notoriety of these large knotweeds, including the Giant knotweed, most nurseries/plantsmen are unlikely to import any others. It is almost unbelievable however, that it is still available from some plant nurseries! The R.H.S. Plantfinder (2009) now only lists one nursery and one arboretum stocking this plant; previously there were a lot more and some may not be on the R.H.S. list.

	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	It possibly has more potential to spread by the small amount of viable seed produced (Hart *et al.* 1997), but this may be enough to maintain spread; the seed floats (rivers, lakes) and is wind dispersed. In floods, huge rafts of this plant's rhizomes can be washed downstream and colonise other areas when washed ashore.
2.2	How rapidly is the organism liable to spread in the Risk Assessment area by human assistance?	very rapid - 4	LOW - 0	The amount of spread caused by human activities has probably reduced greatly thanks to legislation but the huge cost of control may lead to more fly tipping! It possibly has the potential to spread by the small amount of viable seed produced (Hart *et al.* 1997), but this may be enough to maintain spread. The seed floats and may be dispersed by water and wind and could be blown into trains, lorries and boats, so ending up almost anywhere; these knotweeds often frequent railway banks and lorry parks (waste ground). However, more stringent controls are now in place to prevent spread by most human activities (Environment Agency 2006). Felling woodland or scrub clearance in areas where it is prevalent could well accelerate its spread, as it prospers best in full sun. Banning it could also help prevent its spread.
2.3	How difficult would it be to contain the organism within the Risk Assessment area?	very difficult - 4	LOW - 0	This species is found in 100 vice-counties, from Cornwall to Caithness and the Outer Hebrides (Stace 2003) and its hybrid with *F. japonica* occurs in 70% of these areas. *F. x bohemica* has been found to be more invasive than the parents because of hybrid vigour, at least in the Czech Republic. It will be interesting to see whether the biological control of the Japanese knotweed will have any effect on this species.
2.4	Based on the answers to questions on the potential for establishment and spread define the area endangered by the organism.	UK Lowlands butAlpine Zone in S. Europe.	LOW - 0	Roadsides, woodland edge, riversides, waste ground, wildlife corridors along rivers.

	Impacts	RESPONSE	UNCERTAINTY	COMMENT
2.5	How important is economic loss caused by the organism within its existing geographic range?	moderate - 2	MEDIUM -1	The two large knotweeds and their hybrid are similar in many respects. Almost all plants are female but males occur occasionally in the Giant knotweed. They form dense thickets, spreading rapidly to overwhelm native competitors easily. They have deep rhizomes to 3m making eradication difficult, needing repeated treatment of systemic herbicide, e.g. glyphosate. Herbivores seem to have little effect in controlling them. The following facts are mainly for Japanese knotweed but I suspect that the larger knotweeds are often confused and so at least some of the damage attributed to Japanese knotweed is actually caused by the Giant knotweed one or its hybrid. Bailey (1996) has stated that the Giant knotweed and the hybrid knotweed records need checking for accuracy. Some authors give the height of Japanese knotweed as up to 4m but Stace (1997) says up to 2m but the Giant knotweed, up to 3 m. These discrepancies may point to wrong identifications. Knotweeds can break through tarmac and thin layers of concrete and can penetrate some flood defences. An estimate of control costs for *F. japonica* is over £10,000 per hectare for a 3 year spraying scheme, with 2 sprays per year; the figures for this species would be proportionally less. A British Government review on non native species policy (2004) has suggested £1.56 billion to control knotweed countrywide. The damage caused by Giant knotweed is certainly hugely less than this but probably still considerable.
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?	minimal - 0	LOW - 0	Explosive spread can lead to disappearance of biodiversity in alluvial nature reserves and to a modification in the regeneration of native plants. Rarely a pest of crops (in USA only), and cattle and sheep can eat it. In its native Japan, young shoots of it are cooked and eaten like asparagus and so there is little threat from it being unpalatable even to humans. At least some country estates and large private gardens will be overrun by Giant knotweed.
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?	minor - 1	MEDIUM -1	A minister for the environment stated (in 1994) that to try to eradicate its congener, *F. japonica* from the UK would cost in the region of 1.5 billion pounds. One council in Wales estimated that it paid £300,000 annually for its control; probably the Giant knotweed would need lesser amounts spent on it.
2.8	How great a reduction in consumer demand is the organism likely to cause in the Risk Assessment area?	major - 3	MEDIUM -1	Because of the great expense of exterminating the larger knotweeds, developers prefer alternative sites that are knotweed free, and land values suffer in consequence. No data seen on the lack of consumer demand. Giant knotweed is not nearly as widespread or as invasive as the Japanese one but I suspect that mortgage lenders may well treat them similarly and refuse to lend money on properties where they occur.
2.9	How likely is the presence of the organism in the Risk Assessment area to cause losses in export markets?	unlikely - 1	LOW - 0	No data available but I would doubt it.
2.10	How important would other economic costs resulting from introduction be? (specify)	moderate - 2	LOW - 0	See para. 2.7. When hundreds of thousands of pounds are spent on herbicidal spraying, this is something that cash-strapped councils and land managers could do without.
2.11	How important is environmental harm caused by the organism within its existing geographic range?	major - 3	MEDIUM -1	Wildlife sites and nature reserves are damaged by biodiversity loss caused by this plant and it can restrict access to streams and riverbanks. Many native plants, of course, succumb to the herbicides as well as the intended target. The main problem is that the stands are so tall and dense that they easily shade out and outcompete many smaller plants. Whole habitats can be vastly changed by the huge invasive knotweeds and local extinctions of native species are likely.
2.12	How important is environmental harm likely to be in the Risk Assessment area?	major - 3	LOW - 0	Giant knotweed is usually not nearly as invasive as *F. Japonica*, except on alluvial river banks where it can even outcompete it (Hart *et al.* 1997). This plant can easily crowd out or shade out most herbaceous plants (Gerber *et al.* 2008)
2.13	How important is social and other harm caused by the organism within its existing geographic range?	moderate - 2	LOW - 0	It can penetrate flood defences and possibly make them weaker, but I would imagine that the dense mat of rhizomes may help to protect riverbanks. Stands of this plant look unsightly in winter and can act as traps for litter, adding to the untidiness of run-down areas.
2.14	How important is the social harm likely to be in the Risk Assessment area?	moderate - 2	LOW - 0	According to the Japanese knotweed Risk Assessment, infestations can be a sign of poverty as it is especially prevalent in industrial areas; developers are not inclined to want contaminated areas because it costs so much to eradicate the pest. No doubt the Giant knotweed will have a lesser effect (found only rarely on building sites) and drag land values down. Some ecologists welcome the plant as it adds another type of climax vegetation to riparian areas (Dickson 1996). Others (Gilbert 1994) argue that knotweeds are beginning to play a valuable role in the ecology of urban areas, but I would say that this is nonsense when our own native species are suffering, and they forget that next to habitat loss, aliens cause the most extinctions (Keane & Crowley 2002).

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?	very unlikely - 0	LOW - 0	Recent research has shown that hybrids can arise among the four related adventive taxa in this genus, and the hybrid *F. x bohemica* (*F. japonica x F. sachalinensis*) is believed to be much more invasive than the parents because of their increased genetic diversity. *F. japonica* is normally male sterile and so usually only multiplies vegetatively but it can be fertilised by other perennials in the genus, though seed set is rare. *F. sachalinensis* plants can be male sterile or hermaphrodite and its hybrids can be fertile, so with back crossing occurring also (in Wales), there can be quite a genetic mix (Gammon *et al.* 2007). There are two annual *Fallopias* in Britain, one native and rare, *F. dumetorum*, the Copse Bindweed, and the other, a neophyte, *F. convolvulus*, the Black Bindweed, but these do not seem to hybridise with the large perennial knotweeds.
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	Four other *Fallopia* species including one native one, *F. dumetorum*, the Copse Bindweed, occur in Britain but this latter species is a rare and very local annual. Herbivores or sap suckers from these plants have not been noted as having much affect on Giant knotweed. Time will tell whether the Japanese psillid shortly to be introduced to control the Japanese knotweed will attack the Giant knotweed one or its hybrid, *F. x bohemica*.
2.17	How easily can the organism be controlled?	very difficult - 4	LOW - 0	At a young stage, Giant knotweed would be easy to control with glyphosate, but once the plant has consolidated into a large colony (and growth is rapid), control becomes very difficult and combination treatments are necessary to exterminate it. Several websites are available, including a Defra one, on the control of Japanese knotweed, which is fairly similar to Giant knotweed only much more invasive and extensive. (Child *et al.* 1998, 2000).
2.18	How likely are control measures to disrupt existing biological or integrated systems for control of other organisms?	very likely - 4	LOW - 0	Spraying Giant knotweed with herbicide near *F. japonica* treated with the biological control, *Aphalaria itadori*, may well upset the control.
2.19	How likely is the organism to act as food, a host, a symbiont or a vector for other damaging organisms?	unlikely - 1	LOW - 0	This plant has been in British gardens since 1869 and no suggestion has been made as to it being a disease vector.
2.20	Highlight those parts of the endangered area where economic, environmental and social impacts are most likely to occur	very difficult - 4	LOW - 0	River banks, lake and sea loch shores (Akeroyd 2002), private estates (Hollingsworth pers. comm.).

Summarise Entry	very likely - 4	MEDIUM -1	Already established and widespread and climate change likely to increase its growth, as it prefers warmer wetter conditions in summer.
Summarise Establishment	very likely - 4	LOW - 0	Best suited to the warmer, wetter areas of the UK but has established in most areas.
Summarise Spread	rapid - 3	LOW - 0	Its spread in some parts of Europe is said to be explosive but I have not heard this in the UK. Usually transported as rhizomes in soil and down flooding rivers. Fortunately it only produces small amounts of seed but this may be enough to generate more colonies elsewhere, depending on wind direction.
Summarise Impacts	major - 3	LOW - 0	Potentially high in riparian areas; serious impact on biodiversity with losses of native plants and animals due to the dense thickets formed causing habitat change.
Conclusion of the risk assessment	HIGH -2		The conclusion is that this plant and its hybrid with Japanese knotweed should be targeted for extermination as soon as possible, before they colonise fresh areas. It may be best to treat the two large knotweeds and their hybrid as a single entity. A personal view is that this is likely to happen at present anyway, due to the similarity of the larger knotweeds.
Conclusions on Uncertainty		MEDIUM -1	It is possible that this plant and its hybrid may not be differentiated from Japanese knotweed by some councils, and so it may already be subject to control in some places.

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