

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:		<i>Allium triquetrum</i> L. - Three-cornered Leek, Triquetrous Garlic, Stinking Onion, White Bluebell, Onion Flower, Three-cornered Garlic. Liliaceae	
Objectives:		Assess the risks associated with this species in GB	
Version:		FINAL 16/3/11	
N	QUESTION	RESPONSE	COMMENT
1	What is the reason for performing the Risk Assessment?		This species is a known invasive weed and is increasing its range in the milder parts of the UK. In some parts of Britain it has become well established and occurs in great abundance. This risk assessment is intended to assess its potential for further spread and its likely impact on the parts of Britain that have not been colonised. It is also intended to help assess the ease and value of completing the risk assessment itself.
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)	<i>Allium triquetrum</i> L. Liliaceae
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)	The species is already known to be invasive in lowland Britain, particularly in west Cornwall, the Channel Islands and along the south coast of England. Where it is well established in Britain, many road verges are dominated by its white flowers in spring. It has also become naturalised in Ireland, Turkey-in-Europe, the Azores, Canaries and Madeira, South Africa, Argentina, Western USA, Australia and New Zealand (http://www.kew.org/wcsp/monocots). It is listed as noxious in California and Oregon (USDA Plants database - http://plants.usda.gov/) and Victoria, South Australia and Tasmania (www.weeds.org.au/noxious.htm).
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)	It is a non-native, bulbous perennial herb, able to colonise semi-natural habitats. In areas where it has become established it is often the dominant species along many road verges during the growing and flowering season. It is thought to be a threat to the Bluebell in such habitats, and certainly there is anecdotal evidence of localised Bluebell decline (R.J. Murphy, pers. comm.).
9	Does the organism occur outside effective containment in the Risk Assessment area?	YES (Go to 10)	<i>Allium triquetrum</i> is a native of West and Central Mediterranean; Portugal, Southern Spain (including the Balearics), France (including Corsica), Italy (including Sardinia and Sicily), Algeria, Morocco and Tunisia (http://www.kew.org/wcsp/monocots). It was introduced into cultivation by 1759 and first became established on Guernsey by 1849 and Jersey in 1851. The first wild occurrence on mainland Britain was in Cornwall in 1872. By 1909 (Davey, 1909) it had become thoroughly established in West Cornwall (even being considered as native) and has since continued to consolidate its presence and expand its range into England (in Devon it arrived in 1901 and in Somerset 1958). In Ireland it is well established along the south-eastern seaboard. Overall, in Britain, it has substantially increased since the 1962 Atlas (Perring, 1962).
10	Is the organism widely distributed in the Risk Assessment area?	NO (Go to 11)	Yes and No. <i>Allium triquetrum</i> is widely distributed throughout lowland Britain in that it is found throughout England, Ireland, and Wales, and has a very small presence in Scotland. However, in much of its British range it is of sparse occurrence and has great potential to spread. The species is found in 13% of the 10km squares mapped in the New Atlas of the Flora of Britain and Ireland. In West Cornwall it is found in 81% of the 2km squares mapped in the Flora of Cornwall (French, 1999).
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?	YES (Go to 12)	Suitable habitat exists, especially road verges, hedge bases and disturbed waste ground. Suitable habitat is not a limiting factor as such habitat is probably equally common in the parts of Britain that have not yet been colonised by <i>Allium triquetrum</i> .
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)?	YES (Go to 13)	Ants are an important vector for the dispersal of seed, and undoubtedly explain its rapid spread at many localities. The seeds have an oil-bearing appendage which is attractive to ants. The ants carry the seed away to eat the oil and then discard the seed, thus assisting with dispersal. However, ants are not an absolute requirement for the spread of <i>Allium triquetrum</i> , because Man provides important alternative pathways by deliberate planting and the movement of contaminated soil and garden refuse, etc.

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.	YES (Go to 14)	
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?	YES (Go to 16)	<i>Allium triquetrum</i> has become best established in the mildest parts of Britain, where the climate is most comparable to the western Mediterranean origin of the species. This is one of the species most likely to further increase its range in Britain as global warming takes effect.
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 original range, either as a direct or indirect result of man's activities?	YES (Go to 17)	Mans activities have been instrumental to the spread of <i>Allium triquetrum</i> beyond its original range. Its cultivation as a garden plant (chiefly for its flowers, but it is also edible) and subsequent escape has been the main mechanism by which it has substantially extended its original range. It has then escaped into the wild and become naturalised in great abundance at many sites. In the wild, in Britain, it is most often seen in proximity to habitation.
17	Can the organism spread rapidly by natural means or by human assistance?	YES (Go to 18)	It will spread rapidly within a localised area by natural means, but needs human assistance to reach new areas at a distance.
18	Could the organism as such, or acting as a vector, cause economic, environmental or social harm in the Risk Assessment area?	YES OR UNCERTAIN (Go to 19)	It poses a slight economic, environmental and social risk. It has not been deemed to be a cause for concern in Britain and so local authorities have not spent money on its eradication, but is considered noxious in parts of the USA and Australia. It has caused some environmental damage in that it has become a dominant on a few cliff top maritime grassland areas. It has been reported as a bulbfield weed on the Isles of Scilly (Lousley, 1971) but is not known as such on the mainland.
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	
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?	few - 1	LOW - 0	The seeds are distributed by ants. Passing traffic also assists with seed dispersal (air turbulence effect), as indicated by the observation that this species is more abundant along busy roads than in nearby minor roads. It has also been observed that it spreads faster down hill than up (R.J. Murphy pers. comm.). The plant is also dispersed by Man, by the movement of bulb-contaminated soil or by deliberate introduction to gardens which then escape. At the majority of distant new localities its introduction to the wild has been the result of garden escapes.
1.2	Choose one pathway from the list of pathways selected in 1.1 to begin the pathway assessments.			The deliberate planting of <i>Allium triquetrum</i> in gardens by Man followed by its escape into the wild. <i>A. triquetrum</i> is readily available in horticultural nurseries. For example, the RHS Plant Finder (http://www.rhs.org.uk/rhsplantfinder/plantfinder.asp) lists 21 nurseries stocking <i>A. triquetrum</i> in all parts of the UK and Ireland (accessed 11 September 2008).
1.3	How likely is the organism to be associated with the pathway at origin?	very likely - 4	LOW - 0	The origin here is taken to mean horticultural supplier, as new introductions are most likely to have been purchased from such suppliers.
1.4	Is the concentration of the organism on the pathway at origin likely to be high?	moderately likely - 2	MEDIUM - 1	The amount of <i>Allium triquetrum</i> bulbs, or seeds, kept by the supplier is likely to reflect the demand. The overall demand is not thought to be high.
1.5	How likely is the organism to survive existing cultivation or commercial practices?	unlikely - 1	MEDIUM - 1	It is not generally known to be an agricultural weed except as a bulbfield weed on the Isles of Scilly (Lousley 1971). On the mainland the horticultural fields are sprayed with herbicides which prevent its growth.
1.6	How likely is the organism to survive or remain undetected by existing measures?	moderately likely - 2	LOW - 0	It will remain undetected during the spring and autumn months when it is present only as a bulb. Also it can be spread by very small bulbs which can grow leaves for several seasons without flowers and so go unnoticed.
1.7	How likely is the organism to survive during transport /storage?	very likely - 4	LOW - 0	It would most likely be transported as a bulb, or as seeds, when the object is to introduce it to a garden.
1.8	How likely is the organism to multiply/increase in prevalence during transport /storage?	very unlikely - 0	LOW - 0	Not likely.
1.9	What is the volume of movement along the pathway?	minor - 1	LOW - 0	Deliberate planting in gardens by Man accounts for a small volume of movement, but as only a small volume is needed to establish a viable population, it is a very significant factor in the spread of the species to new areas.
1.10	How frequent is movement along the pathway?	occasionally - 2	HIGH - 2	No detailed information available about sales of <i>Allium triquetrum</i> bulbs. It cannot be great otherwise its rate of colonisation of new areas throughout Britain would have been appreciably greater (as monitored by BSBI atlas surveys).
1.11	How widely could the organism be distributed throughout the Risk Assessment area?	moderately widely - 2	LOW - 0	<i>Allium triquetrum</i> is extending its range in the milder parts of Britain and the areas of Britain that are suitable for its establishment are increasing due to global warming.
1.12	How likely is the organism to arrive during the months of the year most appropriate for establishment ?	likely - 3	LOW - 0	The seed is best sown in spring and the dormant bulbs in late summer. Horticultural suppliers are most likely to supply plants at the appropriate time of year.
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?	N/A		
1.14	How likely is the organism to be able to transfer from the pathway to a suitable habitat?	very likely - 4	LOW - 0	Suitable habitat for <i>Allium triquetrum</i> is usually found close to human habitation and so it is able to spread into the wild with relative ease.

	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?	moderately similar - 2	LOW - 0	<i>Allium triquetrum</i> will currently become established in the milder parts of the UK. In Cornwall, which has the greatest concentration in Britain, it is found where the mean minimum day temperature in January is above 2 degrees centigrade and the mean maximum day temperature in January is above 7 degrees centigrade. It is frost tolerant. There are examples of where it once established and subsequently disappeared (Preston, 2002), which suggests that parts of Britain are close to the edge of its potential range.
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	It prefers a rich, moist, well-drained soil and thrives in both light (sandy) and medium (loamy) soils.
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	Many habitats are suitable for it, especially road verges, the base of hedges and disturbed waste ground. It is tolerant of shade but does not do well in woodland.
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	Similar habitats to where it is found today are widespread, however, its spread is limited by climatic factors rather than habitat availability.
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?	very likely - 4	LOW - 0	Ants are beneficial for the dispersal of seed but are not a requirement. Ants are ubiquitous and so this association is very likely.
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	In the habitats most suited to <i>Allium triquetrum</i> it can become a dominant species and so is little affected by competition from existing species. In general it produces leaves and flowers before more competitive species, and so completes its life cycle before competition with other species becomes an issue.
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	It has a dearth of natural enemies in Britain. The whole plant is said to repel insects and moles (Riotte, 1978).
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)	unlikely - 1	LOW - 0	No differences of note, although people are much less likely to purchase it for their gardens in areas where it is already established, because they will be familiar with its rate of spread.
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	The habitats where it is most abundant are generally subject to minimal control or husbandry (e.g. road verges and the base of hedges), at the time when it is in leaf or flowering. The trimming of hedges and road verges usually takes place later in the year.
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?	likely - 3	MEDIUM - 1	It is able to grow during the winter and early spring months when many other species are dormant.
1.26	How likely is it that the organism's capacity to spread will aid establishment?	very likely - 4	LOW - 0	Once a plant has grown and flowered at a new site its rate of spread can be very rapid ('with the speed of an epidemic' - Lousley, 1971) and it gets naturalised very quickly. I myself have seen a few plants become hundreds within a couple of years.
1.27	How adaptable is the organism?	not adaptable - 0	MEDIUM - 1	No information.
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	Low genetic diversity in the founder population has not prevented establishment in the areas of Britain where it has become thoroughly naturalised.
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 was originally introduced as a garden plant and although it is rarely deliberately grown in gardens today, in areas where it has become naturalised in the wild, this species can still be bought from specialist horticultural suppliers (Fisher, 1991), and so continues to be introduced to new areas of Britain via this pathway. The rapid increase in the purchase of goods from the internet, must be increasing the potential for the spread of this species to new areas, because there are so many suppliers to choose from.
1.30	How likely is it that the organism could survive eradication campaigns in the Risk Assessment area?	likely - 3	MEDIUM - 1	It is too well established for complete eradication to be successful, however, in areas where it is newly established, distant from other colonies, eradication could be contemplated.
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		

	Spread	RESPONSE	UNCERTAINTY	COMMENT
2.1	How rapidly is the organism liable to spread in the Risk Assessment area by natural means?	rapid - 3	MEDIUM -1	Once established a rapid spread can be anticipated where the climate is suitable. A very rapid spread was experienced in the Channel Islands, the Isles of Scilly and West Cornwall. However, its spread into East Cornwall and beyond has been much slower. This probably reflects the less mild climate.
2.2	How rapidly is the organism liable to spread in the Risk Assessment area by human assistance?	intermediate - 2	MEDIUM -1	The rate of spread mainly depends on the ad hoc purchase of <i>Allium triquetrum</i> bulbs from horticultural suppliers. This is difficult to quantify, and the estimate is a judgement, based on its 20th century spread to new areas of Britain (Perring, 1962, 1982 and Preston 2002).
2.3	How difficult would it be to contain the organism within the Risk Assessment area?	very difficult - 4	LOW - 0	Very difficult, especially as it continues to be sold by horticultural merchants.
2.4	Based on the answers to questions on the potential for establishment and spread define the area endangered by the organism.		LOW - 0	Its present distribution can be best seen on the BSBI website (http://www.bsbimaps.org.uk/atlas/main.php). From this it can be anticipated that it will continue to spread along the south coast of England, along the milder western seaboard of Britain, and in lowland areas of Southern England and Wales.

	Impacts	RESPONSE	UNCERTAINTY	COMMENT
2.5	How important is economic loss caused by the organism within its existing geographic range?	minimal - 0	LOW - 0	In horticultural fields its economic impact is part of the normal weed control measures undertaken. It is not additional to that already done.
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	MEDIUM - 1	It inhibits the growth of legumes (Riotte, 1978). No evidence has been uncovered that this has proven to be an actual problem in crop production.
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?	minimal - 0	LOW - 0	Not a problem in most cultivated fields because it is controlled by the existing regime of herbicides used to control agricultural weeds. It may be an issue for organic horticultural holdings.
2.8	How great a reduction in consumer demand is the organism likely to cause in the Risk Assessment area?	minimal - 0	LOW - 0	No information.
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	No information.
2.10	How important would other economic costs resulting from introduction be? (specify)	minimal - 0	LOW - 0	Other economic costs have been minimal in the parts of Britain where it has already established, and so are likely to be minimal for new areas.
2.11	How important is environmental harm caused by the organism within its existing geographic range?	minor - 1	LOW - 0	It has only had a significant effect on a few localised areas of environmental importance, such as some cliff top SSSIs in Penwith, West Cornwall. Coastal Maritime Grassland is one of the few semi-natural habitats which can be adversely affected by <i>Allium triquetrum</i> . There are a few cliff top locations on the south coast of West Cornwall that have become dominated by it. The life cycle of <i>A. triquetrum</i> means it only affects low growing spring flowering plants. Bluebells are considered to be at greatest risk (R.J. Murphy, pers. comm.), however, <i>A. triquetrum</i> has had little impact on the main Bluebell habitats (coastal heaths, woods and moors). There is anecdotal evidence that <i>A. triquetrum</i> has replaced the Bluebell along road verges and at the base of hedges (R.J. Murphy, pers. comm.). <i>Allium triquetrum</i> would appear to have a competitive advantage because it comes into growth and flowers earlier than Bluebells (a month or more earlier). However, the impact is somewhat lessened by the fact that Bluebell bulbs are found much deeper in the soil.
2.12	How important is environmental harm likely to be in the Risk Assessment area?	minor - 1	LOW - 0	It has a very localised impact on environmentally sensitive habitats and rarely affects well established, truly wild places. The biodiversity value of invaded sites, during the growing season of <i>Allium triquetrum</i> , is often low as it forms a dense monocultural mass. However, it does not appear to have any effect on biodiversity during the rest of the year, when it persists as a bulb.
2.13	How important is social and other harm caused by the organism within its existing geographic range?	minimal - 0	LOW - 0	Social harm is of little importance. The fact that this plant is on sale indicates it is perceived to be a beneficial species. It also has some useful properties. For example, the juice of the plant is used as a moth repellent and the bulb, leaves and flowers are edible.
2.14	How important is the social harm likely to be in the Risk Assessment area?	minimal - 0	LOW - 0	Slight or imperceptible harm. Even in areas of Britain where it has become rampant, like West Cornwall, no evidence has come to light that it is perceived to be a cause of social harm by the general public. However, <i>A. triquetrum</i> is known to be a serious invasive pest among at least well-informed gardeners.
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	It does not hybridise with any native species.
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	An important factor in its success so far would appear to be a lack of natural predation. Indeed, it does not appear to be prone to herbivores or pathogens during its short spring growth period.
2.17	How easily can the organism be controlled?	difficult - 3	MEDIUM - 1	It can be killed off using various chemical treatments (an internet search suggested Brush Off (metsulfuron methyl) or Kamba 500), however, such treatment is likely to be only appropriate in a restricted number of semi-natural locations and may be counter-productive if the objective is to re-establish Bluebells. The continued sale of <i>Allium triquetrum</i> increases the difficulty of controlling the spread of this species. Control or eradication without the use of chemicals is very labour intensive and can take many years. Each year the pre-flowering plants and their bulbs need to be dug up and appropriately disposed.
2.18	How likely are control measures to disrupt existing biological or integrated systems for control of other organisms?			No information.
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	None known.
2.20	Highlight those parts of the endangered area where economic, environmental and social impacts are most likely to occur		LOW - 0	Coastal maritime grassland, organic, spring bulb, horticultural fields and commercial gardens.

Summarise Entry	likely - 3	LOW - 0	The entry of <i>Allium triquetrum</i> largely depends on the intervention of Man. In most cases it has been introduced to new areas as a garden plant. It continues to be sold by horticultural suppliers (many of which are on the internet) and this ensures the likelihood of its entry to new areas of Britain. Where it is already established in the wild, further, shorter distance, spread can be expected. Global warming is increasing the area of land suitable for colonisation.
Summarise Establishment	likely - 3	LOW - 0	It becomes established by escaping from cultivation. Seed dispersal over short distances by ants probably explains the majority of initial garden escapes. Suitable habitat is usually readily available close to habitation.
Summarise Spread	intermediate - 2	LOW - 0	Once established in the wild it can spread very rapidly if conditions suit. The availability of suitable habitat is not usually a limiting factor, but climate is. The air-turbulence created by fast moving vehicles assists its spread along road sides.
Summarise Impacts	minor - 1	LOW - 0	It has a low economic and social impact and a relatively minor environmental one. Its economic impact would be greatly increased if it were to become one of the alien species (such as Japanese Knotweed) that is subject to control measures.
For pathway/policy risk assessment Assess the potential for establishment and economic/environmental/social impacts of another organism or stop			
Conclusion of the risk assessment	MEDIUM -1	LOW - 0	<i>Allium triquetrum</i> is a highly invasive plant in areas where the climate is suitably mild and favourable habitat occurs. It is highly likely to spread to new areas of Britain. Global warming is likely to markedly increase the area of suitable land for it to colonise.
Conclusions on Uncertainty		LOW - 0	

References

- Davey, F. Hamilton (1909). *Flora of Cornwall*. Penryn. Reprinted, with Supplement, 1978. Wakefield.
- Govaerts, R., Snijman, D.A., Marcucci, R., Silverstone-Sopkin, P.A. & Brullo, S. 2008. *World Checklist of Alliaceae*. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.kew.org/wcsp/monocots> accessed 11 September 2008.
- Fisher, J. (1991). *A colour guide to rare wild flowers*. Constable, London.
- French, C.N., Murphy, R.J. & Atkinson, M.G.C. (1999). *Flora of Cornwall*. Wheal Seton Press, Camborne.
- Lousley, J.E. (1971). *The Flora of the Isles of Scilly*. David & Charles, Newton Abbot.
- Perring, F.H. & Walters, S.M. (1962). *Atlas of the British Flora*. Thomas Nelson, London.
- Perring, F.H. & Walters, S.M. (ed.) (1982). *Atlas of the British Flora*. 3rd ed. BSBI, London.
- Preston, C.D. Pearman, D.A. & Dines, T.D. (eds.) (2002). *New Atlas of the British Flora*. Oxford University Press, Oxford.
- Riotte, L. (1978). *Companion Planting for Successful Gardening*. Garden Way, Vermont.
- <http://www.bsbimaps.org.uk/atlas/main.php> (accessed 11 September 2008).
- <http://www.kew.org/wcsp/monocots>
- <http://plants.usda.gov/>. (accessed 15 Sept. 2008).
- <http://www.rhs.org.uk/rhsplantfinder/plantfinder.asp> (accessed 11 September 2008).
- <http://www.weeds.org.au/noxious.htm>