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:	***Astacus astacus (Linnaeus)* - Noble crayfish. (*Arthropoda; Crustacea; Astacida; Astacidae;***
	Objectives:	Assess the risks associated with this species in GB
	Version:	FINAL 21/03/11

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	Based on the location of existing populations and the restricted spread to date the areas considered as at risk are southern England and South Wales.
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)	*Astacus astacus* Linnaeus This species has features that distinguish it from other crayfish species; however, smaller specimens could be confused with other species to the untrained eye (Souty-Grosset *et al* ., 2006).
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)	This species is found at two locations in the Risk Assessment Area. It has spread from its original point of introduction in the River Chew catchment, but it is not as invasive as *P. leniusculus* and *A. Leptodactylus,* or as *O. limosus* is threatening to be (NBN Gateway).
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)	
9	Does the organism occur outside effective containment in the Risk Assessment area?	YES (Go to 10)	It is known to be established in the 'wild' at two locations in the Risk Assessment Area, in the River Chew catchment and in a pond in Bristol.
10	Is the organism widely distributed in the Risk Assessment area?	NO (Go to 11)	
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)	*A. astacus* will live in a range of freshwater habitat types and is polytrophic and will, therefore, feed on a range of food types (Souty-Grosset *et al* ., 2006).
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)?	NO (Go to 14)	
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?	YES (Go to 16)	*A. astacus* originally from central-eastern Europe and has spread within Europe to Scandinavia, down to Greece in the south and across France. Much of this spread occurred so long ago that this species is accepted as indigenous in many countries. It is reported from 39 European countries (Souty-Grosset *et al.* , 2006). It survives well in temperature climes and areas with temperature extremes greater than those found in England and Wales. Climate would not restrict the spread of this species in the risk assessment area.
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)	*A. astacus* has created many viable populations outside of its original range on mainland Europe and has established three, possibly four viable populations in south-west England.
17	Can the organism spread rapidly by natural means or by human assistance?	YES (Go to 18)	It can spread naturally but only slowly. With human assistance this species could spread to sites across the UK.
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)	There could be environmental impact in terms of damage to ecosystems, as well as physical damage caused by burrowing. Economic impact may be seen as damage to commercial fisheries.
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	There are six main pathways that have resulted in the establishment of non-native crayfish populations in the UK. 1. The sale of crayfish through pet shops and their subsequent release into the wild by the owners. This is now illegal for *A. astacu* s and even prior to the legislation closing this pathway this species was not widely sold through pet shops. 2. Human transfer; this includes anglers using crayfish as bait and/or for seeding purposes, i.e. to provide fish such as carp with a supplemental diet. It also includes the general public who may inadvertently or otherwise find crayfish in the wild and transfer them to their home aquarium, garden pond or local canal etc. 3. Introduction of crayfish for aquacultural purposes, either directly from their home range or from continental Europe. One wild population in England was established via this pathway. 4. Introduction for gastronomic purposes. Live crayfish can be bought in fish markets and from suppliers for the table, although this is not usually *A. astacus* . 5. With consignments of other aquatic animals, particularly fish either for stocking or hobbyists. 6. Transfer by predators, particularly birds, e.g. herons; this is known to have happen for *P. leniusculus* .
1.2	Choose one pathway from the list of pathways selected in 1.1 to begin the pathway assessments.	Human transfer		
1.3	How likely is the organism to be associated with the pathway at origin?	moderately likely - 2	MEDIUM -1	It is unlikely in the UK because of the limited distribution. However, anglers that travel onto the continent to fish may well visit waters containing this species.
1.4	Is the concentration of the organism on the pathway at origin likely to be high?	moderately likely - 2	MEDIUM -1	
1.5	How likely is the organism to survive existing cultivation or commercial practices?	very likely - 4	MEDIUM -1	This species is farmed on the continent and harvested from the wild.
1.6	How likely is the organism to survive or remain undetected by existing measures?	very likely - 4	LOW - 0	Highly likely to survive in the risk assessment area; new populations are likely to go undetected until they have become established at a site because they are difficult to detect at low density.
1.7	How likely is the organism to survive during transport /storage?	moderately likely - 2	LOW - 0	They are likely to stay alive if kept damp and cool.
1.8	How likely is the organism to multiply/increase in prevalence during transport /storage?	unlikely - 1	LOW - 0	It is possible that a gravid female could carry her eggs during transport. I suspect that even if transported during the mating season it would be unlikely that mating would take place if the animals were stressed and they may be immobile.
1.9	What is the volume of movement along the pathway?	minimal - 0	LOW - 0	Unknown, but based on the limited known distribution in the risk assessment area it is likely that very few animals move along this pathway.
1.10	How frequent is movement along the pathway?	very rarely - 0	LOW - 0	Unknown, but based on the limited known distribution in the risk assessment area it is likely that movements along this pathway are infrequent.
1.11	How widely could the organism be distributed throughout the Risk Assessment area?	widely - 3	LOW - 0	There are many suitable habitats in the risk assessment area that could support populations of *A. astacus* .
1.12	How likely is the organism to arrive during the months of the year most appropriate for establishment ?	very likely - 4	LOW - 0	Introduction at any time of year could result in a population becoming established. However, the most likely chance of an inadvertent introduction would be as a result of a berried female being bought back from the continent during the late autumn/winter months. Transport is more likely during the summer when more people travel abroad on holiday and the establishment in the risk area would most likely be as a result of a purposeful act.
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?	unlikely - 1	LOW - 0	If taken for the catering industry they are usually transported live and could therefore escape before use or even be released if not used. This species is not believed to be used in the catering industry in the UK, therefore this is unlikely. If found by a member of the public, angler etc., they could be taken and introduced to an aquarium, garden pond or other waterbody. This is unlikely for this species because their current distribution is limited but has certainly happened for *Pacifastacus leniusculus* .
1.14	How likely is the organism to be able to transfer from the pathway to a suitable habitat?	unlikely - 1	LOW - 0	Assuming that this is not a deliberate act to introduce this species to a new site then transfer in this way would be unlikely because this species is not generally transported within the UK. If it was then it would be reliant on several factors coinciding, namely, it being alive or at least alive enough to escape (i.e. not kept in ice), it was physically possible for it to escape from the container and then to be able to get into a drain to a watercourse or directly to a watercourse. At least one pair of crayfish or one berried female would have to escape in order for there to be a chance of establishing a new wild population.

	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 central and northern Europe there is generally a more extreme climate than the UK, with colder winters and longer warmer summers. It is possible that the summers and therefore water temperatures do not get warm enough to support prolific population growth but they do survive and populations are established.
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	In their original range they exist in a range of habitat types (Souty-Grosset *et al* ., 2006), all of which are present in the UK. The water quality and range of chemical compositions of the waterbodies in the UK is not believed to be a limiting factor.
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.	very many - 4	LOW - 0	This species will survive in a variety of habitats found across the UK, probably limited by the acidity of water and possibly water temperature. Currently it is found in the upper reaches of the River Chew catchment and in an ornamental pond in Bristol. They are polytrophic and eat predominantly plant matter as adults but will switch to a more varied diet if necessary.
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	See previous answer.
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	LOW - 0	
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	MEDIUM -1	Young crayfish will have competition for food from other crayfish, certain other macro-invertebrates and fish. As they get older it is likely that the only competition for food will be from other crayfish and fish.
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	MEDIUM -1	Crayfish do have predators naturally occurring in the UK (Hogger, 1988). Birds such as heron and fish such as pike and eels will all predate on crayfish. Young crayfish are more susceptible to predation but it is not likely that natural enemies would prevent establishment.
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)	very unlikely - 0	MEDIUM -1	There may be differences at a local level but in general terms there are few differences in how waterbodies are managed in the risk assessment area when compared to the present distribution.
1.23	How likely is it that existing control or husbandry measures will fail to prevent establishment of the organism?	likely - 3	LOW - 0	Not such an issue for this species because it is not widely distributed and is not, to my knowledge kept under controlled conditions.
1.24	How often has the organism been recorded in protected conditions, e.g. glasshouses, elsewhere?	N/A	MEDIUM -1	To my knowledge it has been recorded in flowing watercourses in the River Chew catchment and in an ornamental pond.
1.25	How likely is the reproductive strategy of the organism and duration of its life cycle to aid establishment?	likely - 3	LOW - 0	Based on the numbers of young produced and the longevity of this species, reproductive strategy is not a limiting factor in the spread of this species.
1.26	How likely is it that the organism's capacity to spread will aid establishment?	moderately likely - 2	LOW - 0	I have put moderately for this because, whilst it has spread, it has not spread to anything like the same degree as Signal Crayfish or Turkish Crayfish or as the Spiny Cheeked Crayfish appears to be doing.
1.27	How adaptable is the organism?	moderately adaptable - 2	MEDIUM -1	It lives in a wide variety of habitats on the continent although in the UK its distribution is limited.
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	It has now been established in the River Chew system since the 1980s and genetics does not appear to have been an issue, although it is not known how many individuals were originally introduced or anything about their genetic make-up.
1.29	How often has the organism entered and established in new areas outside its original range as a result of man's activities?	few - 1	LOW - 0	The original crayfish in the Chew catchment were introduced deliberately by, it is believed, fish dealers. It is not known how the population arrived at the pond in Bristol but it is most likely that this was done deliberately (Frayling M pers. comm.).
1.30	How likely is it that the organism could survive eradication campaigns in the Risk Assessment area?	likely - 3	LOW - 0	There has been no active attempt to eradicate this species although it would be susceptible to crayfish plague; this has caused extinctions on the continent. Other techniques such as trapping will not work. The use of biocides is an option for a pond population; it is unlikely that it would work in a complex river catchment, although further research is required to establish whether this is or is not a viable option. New innovative approaches are required for this and other crayfish species. These should be encouraged and considered for future research.
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)?	moderately likely - 2	LOW - 0	This species does not appear to be as invasive as some others but it has spread through natural migration and probably through man's activities. If a berried female were moved to a new water body then a new population could establish. It is likely that if a few animals could survive then a population would establish within a few years.

	Spread	RESPONSE	UNCERTAINTY	COMMENT
2.1	How rapidly is the organism liable to spread in the Risk Assessment area by natural means?	very slow - 0	LOW - 0	From the pond in Bristol it would depend on the proximity of the nearest watercourse, *Pacifastacus leniusculus* may, often as a result of overcrowding, walk over land to new waterbodies. It is not known if *A. astacus* would do this and there is no evidence to suggest that this has happened. However, in the Chew catchment there has been some spread, although not as rapid as the spread of signal crayfish in similar catchments.
2.2	How rapidly is the organism liable to spread in the Risk Assessment area by human assistance?	slow - 1	MEDIUM -1	Based on the change over the last thirty years spread is slow, but this could increase because the more it spreads the more chance there is of it being found and spread further afield. However, it is outcompeted by *P. leniusculus* and other North American species that carry *A. astaci* to which *A. astacus* succumbs.
2.3	How difficult would it be to contain the organism within the Risk Assessment area?	very difficult - 4	LOW - 0	Easy to contain and possibly control in a pond with some modifications but very difficult to control where it is widespread in the River Chew catchment.
2.4	Based on the answers to questions on the potential for establishment and spread define the area endangered by the organism.	South West England and South Wales	MEDIUM -1	Based on existing population it does not seem to be as invasive as some non-native crayfish species, however, it could potentially spread to a range of other waterbodies. It may be limited by water chemistry and the presence of other non-native crayfish species, particularly the North American species that carry plague. If spread was by human action, for example somebody on holiday in the south west, it is difficult to predict where a new population could appear. However, the most likely area would be in the vicinity of the existing populations and therefore the area endangered by this species would be south west England and South Wales, in waterbodies deemed suitable and not already colonised by a North American species.

	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 the River Chew this may affect angling quality, although few areas within its current distribution range are fished (Frayling M pers. comm.).
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	If this species were to spread then it could damage fisheries and wet wildlife sites that may be important at a local, national or international level. More research is required to determine the impact of this species on native wildlife. There is little information regarding impact in other countries where it has been introduced. In Scandinavia it was believed to be introduced in the middle ages and it is now accepted as indigenous. In France there are reports that this species is present at several locations but has not spread as prolifically as some other non-native crayfish species.
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	MEDIUM -1	
2.8	How great a reduction in consumer demand is the organism likely to cause in the Risk Assessment area?	minimal - 0	LOW - 0	Crayfish are not widely eaten in general and this species, if at all, only locally by individuals. On the continent this species is considered to be one of the best species of crayfish to eat (Skurdal & Turgbøl, 2002).
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	Some Signal Crayfish are exported from the UK but the distribution of *A. astacus* is so limited that there would be no impact on the export market
2.10	How important would other economic costs resulting from introduction be? (specify)	minor - 1	MEDIUM -1	Could impact on fisheries, reducing the value of the angling facility by feeding on submerged macrophytes and invertebrates. Potentially by removing bait from hooks before the fish can! On the continent they do burrow and it is not known to what degree they burrow on the River Chew. It is possible that extensive burrowing could have implications on the stability of flood banks, bank erosion on rivers and dams/head walls.
2.11	How important is environmental harm caused by the organism within its existing geographic range?	minor - 1	MEDIUM -1	*A. astacus* is not noted for its environmental impact. See answer to 2.10.
2.12	How important is environmental harm likely to be in the Risk Assessment area?	minor - 1	MEDIUM -1	This depends on the degree of spread and this has not been extensive to date (Frayling, M. pers. comm.) and the extent to which it may burrow and cause physical damage to flood banks, canal walls etc.
2.13	How important is social and other harm caused by the organism within its existing geographic range?	minor - 1	LOW - 0	
2.14	How important is the social harm likely to be in the Risk Assessment area?	minor - 1	MEDIUM -1	Depending on the degree of spread there could be damage to fisheries and possible physical damage to flood banks etc. that may lead to flooding. There is no evidence that this species could burrow so extensively as to result in a flood bank failure, but additional studies may provide more information.
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	This species is not known to interbreed with the White-clawed Crayfish.
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	The predators in the risk assessment area will also exist in the current geographical area. However, its spread has not been as vigorous as other non-native species and it is not understood why.
2.17	How easily can the organism be controlled?	very difficult - 4	LOW - 0	Possible to control numbers in a closed pond with an intensive ongoing trapping programme but eradication by this method is considered an impossibility. Biocides may be an option to eradicate a closed pond population; further research and trials are required on this subject. In rivers control is even more difficult. Work on biocides has been carried out in closed waters; this should be extended to flowing watercourses.
2.18	How likely are control measures to disrupt existing biological or integrated systems for control of other organisms?	unlikely - 1	LOW - 0	If a biocidal control were to be attempted then this would have a negative impact on all other invertebrates in the short term but these would be expected to return to normal in the longer term. Draining down ponds would also impact on other invertebrates and possibly fish, but invertebrates would recover and fish removed prior to the exercise and replaced afterwards. The use of crayfish plague is a possibility; more research is required to extract the plague from North American species and to determine a suitable method of inoculation. Plague has wiped out populations of *A. astacus* in Scandinavia and elsewhere. The use of plague would probably be the most cost-effective option currently available.
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 species does not carry crayfish plague but is a prey item for several species notably the American Mink *Mustela vison* (Skurdal & Turgbøl, 2002). It should be noted, however, that Mink will feed on a wide variety of food items.
2.20	Highlight those parts of the endangered area where economic, environmental and social impacts are most likely to occur		LOW - 0	Angling facilities and high quality aquatic habitats could suffer. Lowland rivers and other areas where flood defences play an important role may also be affected.

Summarise Entry	unlikely - 1	LOW - 0	Unlikely that somebody would deliberately bring a crayfish back to the UK, but certainly possible.
Summarise Establishment	moderately likely - 2	LOW - 0	If it was bought back to the risk assessment area then it is likely that it would be put into a waterbody of some description where it may well survive. One berried female could be the start of an established population.
Summarise Spread	slow - 1	LOW - 0	Evidence from the UK indicates that spread is slow. This may be simply because they were never as widespread as other species initially and so the chance of them spreading and being spread is less.
Summarise Impacts	minor - 1	LOW - 0	Possible impact on fisheries by interference with angling. Small chance of burrowing damage to banks. It is also not known how this species might interact with the White-clawed crayfish; there is a population of White-claws downstream of the Chew Catchment Nobles.
Conclusion of the risk assessment	LOW - 0		This species appears to be the least invasive of the non-native crayfish species present in the wild in the UK, being found in only two locations despite being introduced to one of them in the 1980s. It does not carry crayfish plague, though it would succumb to it. People are the most likely agents to spread this species around, either anglers or curious members of the public who probably do not appreciate the issues associated with non-native crayfish. If released to the wild it is very likely that it would survive but would not cause any immediate severe impact. The question to answer may be "Is the current spread so limited because it was only ever introduced to one site in the 1980s and might it 'take off' given the chance?" Unlike other species that have been introduced to multiple sites often in semi urban and well-visited areas.
Conclusions on Uncertainty		LOW - 0	There is some uncertainty because it is difficult to predict what may happen to populations in the UK and little work has been done in the UK. Much work on the continent has been associated with the aquaculture of this species rather than its environmental impact.

References

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