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 leptodactylus - Turkish Crayfish***
	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	*Astacus leptodactylus* has been confirmed in England and Wales but has not been recorded in Scotland or Northern Ireland. There are very recent reports of *A. leptodactylus* being offered for sale in Scotland.
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?	NO (Go to 6)	*Astacus leptodactylus* is made up of several sub-species some of which have been elevated to specific level and as such it is referred to as a species complex (Souty-Grosset *et al* ., 2006).
6	If not a single taxonomic entity, can it be redefined?	YES (Go to 7)	*A. leptodactylus* can be defined as a species complex which share some morphological traits. Various keys available, including Pöckl *et al.* (2006) and Gledhill *et al* . (1993).
7	Is the organism in its present range known to be invasive, i.e. to threaten species, habitats or ecosystems?	YES (Go to 9)	*A. leptodactylus* has shown to be an invasive species and has been shown to out-compete the native white-clawed crayfish *(Austropotamobius pallipes)* (Holdich *et al.,* 1995a; Holdich *et al.,* 1995b).
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)	This is a fecund species of crayfish producing 200-400 and sometimes more eggs each year. The females retain young until they moult and can leave. This species is used in the catering trade making it more susceptible to
9	Does the organism occur outside effective containment in the Risk Assessment area?	YES (Go to 10)	*A. leptodactylus* exists in open and connected water courses within the risk assessment area.
10	Is the organism widely distributed in the Risk Assessment area?	YES & the Future is not being considered (Go to 20)	Although not as widely distributed as the signal crayfish *Pacifastacus leniusculus, A. leptodactylus* is present in southeast England. Isolated populations are also present across England and into Wales. Some reports suggest that populations are being lost around London, possibly to crayfish plague. The EA reported *A. leptodactylus* mass mortalities in the River Colne near Colchester and the River Waveney; these were attributed to crayfish plague. (EA Press Release Aug 2008).
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)	
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.		
	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. leptodactylus* has a wide natural distribution which covers many climatic and habitat types, *A. leptodactylus* can also live in both fresh and brackish water (Souty-Grosset *et al* ., 2006; Holdich *et al.,* 1997). This means that *A. leptodactylus* has a good chance of increasing its distribution in the UK.
15	Could the organism establish under protected conditions (e.g. glasshouses, aquaculture facilities, terraria, zoological gardens) in the Risk Assessment area?	YES (Go to 16)	Should someone wish to farm this species they could only do so with a Defra licence. It is understood that a licence would only be issued if the rearing facility was totally secure.
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. leptodactylus* has spread from its native range in the Ponto-Caspian Basin, and has colonised most European countries.
17	Can the organism spread rapidly by natural means or by human assistance?	YES (Go to 18)	*A. leptodactylus* has high fecundity and can form dense populations (Souty-Grosset *et al* ., 2006).
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)	*A. leptodactylus* has been shown to outcompete the native white-clawed crayfish (*Austropotamobius pallipes*).
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?	moderate number - 2	LOW - 0	The main pathways that have resulted in the establishment of *A. leptodactylus* are, in order of priority: 1. Introduction for gastronomic purposes - live crayfish can be bought in fish markets and from suppliers for the table. 2. Anglers using crayfish as bait and/or for seeding purposes, i.e. to provide fish such as carp with a supplemental diet, and 3. Transfer by predators, particularly birds, e.g. herons. The last one is unlikely but it has been known to happen with *P. leniusculus* .
1.2	Choose one pathway from the list of pathways selected in 1.1 to begin the pathway assessments.	Human Transfer		Originally the catering trade was probably the main reason for the spread of *A leptodactylus* . Now it may be human transfer that presents the largest risk. *A. leptodactylus* is a highly regarded food source in parts of its range, particularly eastern Europe and Russia. Although purely speculative, it is possible that the influx of migrants from these areas in recent years may mean that this species becomes exploited as a food source in the UK and either intentionally or accidentally released as a result of this.
1.3	How likely is the organism to be associated with the pathway at origin?	moderately likely - 2	HIGH -2	*A. leptodactylus* is exported from Turkey as a food source to numerous countries. It could be imported to the UK for the catering industry from a variety of countries.
1.4	Is the concentration of the organism on the pathway at origin likely to be high?	very likely - 4	MEDIUM -1	Turkey exports in excess of 2000 tonnes of *A. leptodactylus* annually to other European countries. The scattered distribution of *A. leptodactylus* and distances between populations seems to imply that its spread has been facilitated by humans.
1.5	How likely is the organism to survive existing cultivation or commercial practices?	very likely - 4	MEDIUM -1	*A. leptodactylus'* ability to survive in a wide range of habitats and its high fecundity means that it is very likely to be able to spread its range once escaped or introduced to new areas.
1.6	How likely is the organism to survive or remain undetected by existing measures?	likely - 3	MEDIUM -1	Crayfish can easily be transported, even without water and checks are very rarely made. Populations are likely to go undetected until population densities become large.
1.7	How likely is the organism to survive during transport /storage?	very likely - 4	LOW - 0	Crayfish are easily stored and transported live as long as they are kept cool.
1.8	How likely is the organism to multiply/increase in prevalence during transport /storage?	moderately likely - 2	MEDIUM -1	If male and female crayfish are transported together in water they could mate, assuming that water temperature and quality were within acceptable limits and the animals were not too stressed. If transported in cold and damp conditions, rather than in water, mating is much less likely. A berried female could carry and hatch her eggs either in transit or at a receptor site.
1.9	What is the volume of movement along the pathway?	minor - 1	MEDIUM -1	This is unknown. However the smaller distribution of *A. Leptodactylus* compared to that of *Pacifastacus leniusculus* seems to imply that movement along the pathway is much smaller than that of *Pacifastacus leniusculus.* However only one berried female would need to be introduced to a receptor habitat in order to establish a population.
1.10	How frequent is movement along the pathway?	rarely - 1	LOW - 0	The relatively small number of populations seems to imply that this is a rare event.
1.11	How widely could the organism be distributed throughout the Risk Assessment area?	very widely - 4	MEDIUM -1	*A. leptodactylus* can survive in both a wide variety of climatic conditions and habitats. *A. leptodactylus* has been seen to inhabit lakes, streams, ponds, canals and rivers with various substrate and can also tolerate brackish waters (Souty-Grosset *et al* ., 2006).
1.12	How likely is the organism to arrive during the months of the year most appropriate for establishment ?	likely - 3	LOW - 0	*A. leptodactylus* is active throughout the year and has even been reported to be very active during winter.
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?	likely - 3	MEDIUM -1	Crayfish could be transferred in aquatic vegetation, with fish, water itself (ballast water), and as food.
1.14	How likely is the organism to be able to transfer from the pathway to a suitable habitat?	likely - 3	LOW - 0	Crayfish could be introduced manually or possibly escape from captivity if not stored securely.

	Probability of Establishment	RESPONSE	UNCERTAINTY	COMMENT
1.15	How similar are the climatic conditions that would affect establishment in the Risk Assessment area and in the area of current distribution?	very similar - 4	LOW - 0	*A. leptodactylus* can live in a wide range of climatic conditions. Its natural range covers a wide area and climatic conditions.
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	*A. leptodactylus* inhabits a wide variety of habitats including brackish water (Holdich *et al.,* 1997; Skurdal & Turgbøl, 2002) of which equivalents can be found throughout the UK.
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	Any fresh or brackish water habitats (i.e. thousands) could be potentially be colonised by *A. leptodactylus*. The main factors which would affect its ability to colonise a water body are predation pressure, pollution and the availability of food. Note that this species would succumb to crayfish plague and the presence of *P. leniusculus* , *Procambarus clarkii* or *Orconectes limosus* could prevent spread.
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 above.
1.19	If the organism requires another species for critical stages in its life cycle then how likely is the organism to become associated with such species in the risk assessment area?	N/A		
1.20	How likely is it that establishment will not be prevented by competition from existing species in the Risk Assessment area?	moderately likely - 2	LOW - 0	*A. leptodactylus* has been shown to out-compete the native white-clawed crayfish (*Austropotamobius pallipes)*. The greatest competitor to *A. leptodactylus* is likely to be fish species such as eels and pike. However, *P. leniusculus* will outcompete *A. leptodactylus* and will limit or prevent establishment.
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	*A. leptodactylus* is predated upon by fish and birds but due to its high fecundity it is unlikely that this would have any effect on established populations.
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	MEDIUM -1	Controls of movement of non-native crayfish in the UK are stringent compared to other European countries. *A. leptodactylus* has also been placed on Schedule 9 of the Wildlife & Countryside Act.
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 currently considered impossible to eradicate non-native crayfish populations although some control, is possible with a huge and continual effort. However, research in to the use of biocides may mean that it is possible to remove them from closed water bodies in the near future. Further research into the use of biocides in flowing water could prove beneficial. The Government Agencies should be receptive and supportive of new and perhaps innovative control options.
1.24	How often has the organism been recorded in protected conditions, e.g. glasshouses, elsewhere?	very rare - 0	LOW - 0	It has never been popular in the pet trade or at garden centres etc. They may be maintained in tanks prior to cooking.
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	They become sexually mature in their third year and typically produce between 200 and 400 eggs. They release large numbers of young in late spring, although many of these will be predated on.
1.26	How likely is it that the organism's capacity to spread will aid establishment?	very likely - 4	LOW - 0	In London *A. leptodactylus* were seen escaping from crates at Billingsgate Fish Market; it is likely that these formed the population in the Grand Union Canal. Another anecdotal tale is of a refrigerated lorry that broke down on the hard shoulder and the driver released the *A. leptodactylus* into a nearby watercourse so that they would not die. The wide range of environmental variables such as salinity, water temperature, flow velocity, depth etc. enables this species to establish successfully.
1.27	How adaptable is the organism?	moderately adaptable - 2	MEDIUM -1	The fact that it can tolerate such a wide range of physicochemical conditions probably means that it does not need to adapt to many situations.
1.28	How likely is it that low genetic diversity in the founder population of the organism will not prevent establishment?	likely - 3	MEDIUM -1	The actual numbers of animals introduced at any one site which have then become an established population, is not known. However, it is likely that some of the populations in the UK and across Europe were started from a small number of individuals and they have been established over some time.
1.29	How often has the organism entered and established in new areas outside its original range as a result of man's activities?	many - 3	LOW - 0	Considering the spread of crayfish in Europe including the UK, outside of its original range, this has become widespread as a result of man's activities. This is a popular eating crayfish; although it has not been farmed in England or Wales this has been the underlying cause of its spread.
1.30	How likely is it that the organism could survive eradication campaigns in the Risk Assessment area?	moderately likely - 2	MEDIUM -1	This species does succumb to crayfish plague *Aphanomyces astaci* and it may be possible to use this as an eradication method. This disease has resulted in local extinctions of European species. Biocides are still at an experimental stage but may also be a control option, although this may be easier and more successful in closed waterbodies (see 1.23).
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)?	likely - 3	LOW - 0	It is still likely that members of the public, anglers etc. will come across this species and deliberately move them around, even if only to their garden pond. It is not known how many are still sold live to the catering trade; this is another possibility as they could be on sale to the public in fish markets around the country.

	Spread	RESPONSE	UNCERTAINTY	COMMENT
2.1	How rapidly is the organism liable to spread in the Risk Assessment area by natural means?	intermediate - 2	MEDIUM -1	Not certain what the rates of expansion are for this species. In general crayfish move quicker downstream in flowing watercourses than up. They will expand along ditches and canals. In ponds they can get out and walk over land into other waterbodies. It is difficult to suggest how rapidly but clearly spread will happen. The only factors that may stop this species are North American species carrying *A. astaci* and major pollution incidents.
2.2	How rapidly is the organism liable to spread in the Risk Assessment area by human assistance?	intermediate - 2	MEDIUM -1	Rate of spread by human transfer is correlated to the number and type of sites the crayfish are currently at, since this influences the chance of a person finding one. This species is found in a variety of watercourses many of which will be used by anglers for example. It is suggested that the spread will not be as fast as *P. leniusculus* but will be faster that *P. clarkii* and certainly *A. astacus* . However, *O. limosus* does appear to be spreading at a relatively rapid rate. It is not clear why this is the case.
2.3	How difficult would it be to contain the organism within the Risk Assessment area?	very difficult - 4	LOW - 0	This species is too widespread to implement any effective containment.
2.4	Based on the answers to questions on the potential for establishment and spread define the area endangered by the organism.		LOW - 0	A wide variety of aquatic habitats in England, Wales, Scotland and Northern Ireland.

	Impacts	RESPONSE	UNCERTAINTY	COMMENT
2.5	How important is economic loss caused by the organism within its existing geographic range?	minimal - 0	LOW - 0	This species may impact on fisheries at a local level; this is likely to be more of a nuisance than have any real economic impact. Possible loss of macrophytes in ornamental ponds.
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	The only crop that could be affected would be other crayfish species, some of which are harvested from the wild in the UK. However, the main species *P. leniusculus* would not be damaged by *A. leptodactylus* , in fact the reverse would be true. *Astacus astacus* are said to be a very good crayfish for eating but as they only occur at two locations and possibly harvested from one of those it is unlikely that the two species will come into contact. If they did then *A. leptodactylus* would be expected to outcompete the *A. astacus.*
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	
2.8	How great a reduction in consumer demand is the organism likely to cause in the Risk Assessment area?	minimal - 0	LOW - 0	The demand for crayfish is extremely low compared to many other countries so any reduction would be minimal.
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 crayfish are exported from the UK, I believe only *P. leniusculus* . This species would not be affected by the spread of *A. leptodactylus* .
2.10	How important would other economic costs resulting from introduction be? (specify)	minor - 1	LOW - 0	Possibility of some impact on angling. In ponds with dense populations of *P. leniusculus* anglers report that crayfish remove bait from hooks before the fish. At least one angling club has had members refuse to renew their subscriptions because of this. This could happen with *A. leptodactylus* . The loss of aquatic macrophytes could affect fish recruitment. It could also lead to local extinctions of rare plants in certain sites and a general loss of macrophytes in ornamental ponds.
2.11	How important is environmental harm caused by the organism within its existing geographic range?	minor - 1	MEDIUM -1	I could not find records of this species burrowing. Impact on ecosystems as very dense populations would predate on other invertebrates and macrophytes.
2.12	How important is environmental harm likely to be in the Risk Assessment area?	minor - 1	MEDIUM -1	Depends on how much they spread. Could out-compete populations of *A. pallipes* , although most of these in the south east, where *A. leptodactylus* is prevalent, have already been lost. May also affect important and protected species such as the European protected Bullhead *Cottus gobio. P. leniusculus* has been reported as excluding *C. gobio* , it is likely that *A leptodactylus* could also have this effect. Would result in a loss of macrophytes through feeding and could impact on key species such as; Grass-wrack Pondweed *Potamogeton compressus* ; Floating Water-plantain *Luronium natans* and others. Also environmental harm as described in 2.11
2.13	How important is social and other harm caused by the organism within its existing geographic range?	minimal - 0	MEDIUM -1	Only impact would be on angling and aquatic macrophytes. Non-native crayfish species are prolific and do attain high population densities. This can affect angling in two ways; firstly by competing with the fish for available food and secondly by taking bait directly from anglers hooks. High population densities would also remove aquatic macrophytes resulting in a loss of fish spawning sites, habitat deterioration and an aesthetic impact.
2.14	How important is the social harm likely to be in the Risk Assessment area?	minimal - 0	MEDIUM -1	If it spreads then the only impact would be on angling. Would not affect those who harvest crayfish from the wild since they tend to harvest *P. leniusculus* and *A. leptodactylus* would not colonise these waters.
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	*A. leptodactylus* has been known to interbreed with *A. astacus* (Skurdal & Turgbøl, 2002) but there are no reports of interbreeding with *A. pallipes* .
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. Predators include Otter *Lutra lutra* , Heron *Ardea cinerea* and various fish species. It has been reported (Souty-Grosset, 2006) that *A. leptodactylus* became extinct in Lake Balaton, Hungary after the introduction of the European Eel *Anguilla anguilla* .
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. In rivers control is not a realistic option. Work on biocides has been carried out and this may work in closed waterbodies. However, research is not complete and it has not yet been fully reported. This species is susceptible to *A. astaci* and this could be considered as a control option. 'Traditional' approaches to control have generally been tried and tested. New approaches are essential if this, and other, non-native crayfish species are to be controlled.
2.18	How likely are control measures to disrupt existing biological or integrated systems for control of other organisms?	likely - 3	MEDIUM -1	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 could be removed prior to the exercise and replaced afterwards.
2.19	How likely is the organism to act as food, a host, a symbiont or a vector for other damaging organisms?	likely - 3	MEDIUM -1	This species does not carry crayfish plague but is a prey item for several species notably the American Mink *Mustela vison* . 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, waterbodies containing important aquatic macrophytes.

Summarise Entry	unlikely - 1	MEDIUM -1	Intentional. Either within the catering industry or as a deliberate act by an angler or a member of the public.
Summarise Establishment	very likely - 4	LOW - 0	This is a relatively fecund species tolerant of more extreme conditions than other crayfish species. They are found in a variety of different types of water body. It is already well-established in southeast England with other isolated populations across England and Wales.
Summarise Spread	intermediate - 2	MEDIUM -1	Could be spread by anglers and members of the public resulting potentially in infestations in new catchments. They do spread along watercourses and could cross catchments along canals. It is also possible that they could move through estuaries because of their tolerance of saline conditions.
Summarise Impacts	minor - 1	MEDIUM -1	They do not burrow but could impact on the general ecology by feeding on both flora and fauna. This could result in the loss of important species at a local level.
Conclusion of the risk assessment	LOW - 0		Not the worst non-native crayfish species but already reasonably well established.
Conclusions on Uncertainty		MEDIUM -1	

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