RISK ASSESSMENT SUMMARY SHEET

Updated: September 2015

Alpine newt (*Icthyosaura alpestris*)

- Distinctive newt from mainland Europe with bright orange-red spotless belly.
- Popular pet species, deliberately introduced to some private ponds where it has established and is able to breed.
- Scattered populations across England and Scotland.
- Potentially serious impacts on native amphibians as this species is a known carrier of chytrid fungus.

History in GB

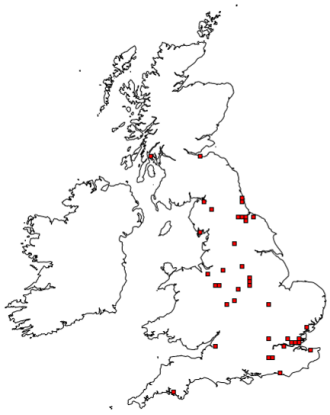
Deliberately introduced at some point in the 20th Century; records of introductions exist post WWII but one colony predates this. Current distribution includes scattered populations across England and one in Scotland (Edinburgh). Additional reports exist of individuals in other areas.

Native distribution

Native to mainland Europe

Amphibia web, 2015

Distribution in GB



NBN Gateway, 2015

Impacts

Environmental (major)

- Known carrier of amphibian chytrid fungus which can have serious impacts on native amphibian species. Some of the GB populations have already tested positive for the disease.
- May also compete with native newts and impact on local invertebrate communities and other amphibians through predation.

Economic (minimal)

- Minimal costs associated with development of advice notes for landowners/surveyors.

Social (minimal)

- None known

Introduction pathways

Pet trade (very likely) - a popular pet species, sometimes housed in outdoor terrariums which pose a greater risk of animals escaping into the wild.

Contaminant of aquatic plants (moderately likely) - accidental import as eggs on aquatic plants via nurseries.

Spread pathways

Natural (minor) - a number of existing established populations have shown low natural spread.

Human (major) - already established and breeding in private sites where it has been introduced and it is possible further unrecorded introductions will take place in future. Also a risk of eggs being spread on contaminated plants if these are not checked thoroughly.

Summary

	Risk	Confidence
Entry	LIKELY	HIGH
Establishment	LIKELY	HIGH
Spread	RAPID	HIGH
Impacts	MODERATE	MEDIUM
Conclusion	HIGH	HIGH

RISK ASSESSMENT FOR: *Ichthyosaura alpestris*, Alpine Newt

COVERING PAGE - ABOUT THE PROCESS

It is important that policy decisions and action within Great Britain are underpinned by evidence. At the same time it is not always possible to have complete scientific certainty before taking action. To determine the evidence base and manage uncertainty a process of risk analysis is used.

Risk analysis comprises three component parts: risk assessment (determining the severity and likelihood of a hazard occurring); risk management (the practicalities of reducing the risk); and risk communication (interpreting the results of the analysis and explaining them clearly). This tool relates to risk assessment only. The Non-native Species Secretariat manages the risk analysis process on behalf of the GB Programme Board for Non-native Species. During this process risk assessments are:

- Commissioned using a consistent template to ensure the full range of issues is addressed and maintain comparable quality of risk and confidence scoring supported by appropriate evidence.
- Drafted by an independent expert in the species and peer reviewed by a different expert.
- Approved by the NNRAP (an independent risk analysis panel) only when they are satisfied the assessment is fit-for-purpose.
- Approved 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 and GB Programme Board if necessary.

Common misconceptions about risk assessments

The risk assessments:

- Consider only the risks (i.e. the chance and severity of a hazard occurring) posed by a species. They do not consider the practicalities, impacts or other issues relating to the management of the species. They also only consider only the negative impacts of the species, they do not consider any positive effects. They therefore cannot on their own be used to determine what, if any, management response should be undertaken.
- Are advisory and therefore part of the suite of information on which policy decisions are based.
- Are not final and absolute. They are an assessment based on the evidence available at that time. Substantive new scientific evidence may prompt a re-evaluation of the risks and/or a change of policy.

Period for comment

Once placed on the NNSS website, risk assessments are open for stakeholders to provide comment on the scientific evidence which underpins them for three months. Relevant comments are collated by the NNSS and sent to the risk assessor for them to consider and, if necessary, amend the risk assessment. Where significant comments are received the NNRAP will determine whether the final risk assessment suitably takes into account the comments provided.

To find out more: published risk assessments and more information can be found at https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=22

GB NON-NATIVE ORGANISM RISK ASSESSMENT SCHEME

Name of organism: *Ichthyosaura alpestris*, Alpine Newt
Author: Danial Winchester
Risk Assessment Area: Great Britain (England, Scotland, Wales and their islands)
Reason for conducting the assessment: To assess the risk posed by this species to Great Britain.

Draft: Final (April 2016) – Draft 1 (May 2012); Peer Review (May 2012); NNRAP review (June 2012); Draft 2 (January 2013); NNRAP review (February 2013); Draft 3 (September 2013); NNRAP review (October 2013); Draft 4 (April 2015)
Signed off the by the NNRAP: October 2013
Approved by the Programme Board: September 2015
Placed on NNSS website: November 2015

SECTION A – Organism Information and Screening		
Stage 1. Organism Information	**RESPONSE**	**COMMENT**
1. Identify the organism. Is it clearly a single taxonomic entity and can it be adequately distinguished from other entities of the same rank?	*Ichthyosaura alpestris alpestris* It is a single taxonomic entity and can be distinguished from other European *Lissotriton* newt species.	There are a number of sub-species within mainland Europe, however the alpine newt found in GB is *Ichthyosaura alpestris alpestris*. This is a full species and will be the species refered to in this risk assessment (Laurenti, 1768). A large part of central Europe is inhabited by the full species *I. alpestris alpestris*; whereas other parts of mainland Europe contain the following sub-species: Montenegro is inhabited by *I. alpestris serdarus*; central Greece by *I. alpestris veluchiensis*; northern Italy by *I. alpestris apuanus*; southern Italy by *I. alpestris inexpectatus*; northern Spain by *I. alpestris cyreni* (AmphibiaWeb: Information on amphibian biology and conservation. [web application]. 2012. Berkeley, California: AmphibiaWeb. http://amphibiaweb.org).
2. If not a single taxonomic entity, can it be redefined? (if necessary use the response box to re-define the organism and carry on)	N/A	N/A
3. Does a relevant earlier risk assessment exist? (give details of any previous risk assessment)	No	

4. If there is an earlier risk assessment is it still entirely valid, or only partly valid?	N/A	
5. Where is the organism native?	Alpine newts are native to mainland Europe. They can be found in the following countries: Albania; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czech Republic; Denmark; France; Germany; Greece; Hungary; Italy; Liechtenstein; Luxembourg; Macedonia; Montenegro; Netherlands; Poland; Romania; Serbia; Slovakia; Slovenia; Spain; Switzerland and Ukraine. The species occurs from sea level to around 2, 500 m asl (Switzerland and French Alps) (Jan Willem Arntzen, Mathieu Denoël, Sergius Kuzmin, Vladimir Ishchenko, Pedro Beja, Franco Andreone, Robert Jehle, Per Nyström, Claude Miaud, Brandon	Listed as Least Concern in view of its wide distribution, tolerance of a broad range of habitats, presumed large population, and because it is unlikely to be declining fast enough to qualify for listing in a more threatened category. Some taxa within *I.a. alpestris*, including polyphenisms (populations with no observed genetic variation from *I.a. alpestris*) are severely threatened and close to extinction. This is the case for most of the 87 known paedomorphic populations (only a few of these are considered not to be threatened). Subspecies of *I.a. alpestris* that probably qualify for listing in a threatened category include *I.a. veluchiensis*, *I.a. inexpectatus*, *I.a. lacusnigri* and *I.a. cyreni* (M. Denoël pers. comm.). The neotenous subspecies *I.a. serdarus*, endemic to Zminicko Lake, in Montenegro, is considered to be highly endangered by Kalezic and Dzukic (2001). The alpine newt subspecies *I.a. inexpectatus* is restricted to a few sites on the Catena Costiera in Calabria, southern Italy. It is threatened through significant alteration of the aquatic habitats; this subspecies *inexpectatus*, would qualify as Vulnerable if assessed separately. It is present at fewer than 5 locations and potential threats are habitat loss and the introduction of predatory fish to the lakes where they live. Populations from southern Greece, which might be taxonomically distinct, are probably also threatened (Jan Willem Arntzen, Mathieu Denoël, Sergius Kuzmin, Vladimir Ishchenko, Pedro Beja, Franco Andreone, Robert Jehle, Per Nyström, Claude Miaud, Brandon Anthony, Benedikt Schmidt, Agnieszka Ogrodowczyk, Maria Ogielska, Jaime Bosch, Milan Vogrin, Miguel Tejedo 2009).

	Anthony, Benedikt Schmidt, Agnieszka Ogrodowczyk, Maria Ogielska, Jaime Bosch, Milan Vogrin, Miguel Tejedo 2009).	
6. What is the global distribution of the organism (excluding Great Britain)?	Alpine newts have a native distribution in mainland Europe.	
7. What is the distribution of the organism in Great Britain?	Populations are known in Surrey; South-east London; Brighton; Birmingham; Shropshire; Warwickshire; Edinburgh; Co. Durham and Sunderland (Lever. C. 2009). Alpine newt records are present from Argyl and Lothian in Scotland through to Cumbria, Northumbria, West and South Yorkshire, Northamptonshire, West Midlands, Bristol, Devon, Hertfordshire, Essex, Kent, Surrey and East Sussex (Pers.com J.Wilkinson ARC 2012).	The Sunderland populations appear to have died out when the ponds were in-filled in 1987 and 1988 (Lever. C. 2009).

8. Is the organism known to be invasive (i.e. to threaten organisms, habitats or ecosystems) anywhere in the world?	It is thought to be a vector of chytrid fungus and some animals have tested positive to chytrid fungus, but not enough data is available to determine whether this species poses a real threat to native amphibians. It is possible that alpine newts could have other impacts on native amphibian species other than disease transmission, however there is little evidence to provide more details.	https://secure.fera.defra.gov.uk/nonnativespecies/factsheet/factsheet.cfm?speciesId=2215 GB non-native species secretariat species information – Alpine newt. Wilkinson. J (2012)
Stage 2. Screening Questions		
9. Has this risk assessment been requested by the **GB** Programme Board?	Yes If yes, go to section B (detailed assessment) If no, got to 10	

SECTION B – Detailed assessment

PROBABILITY OF ENTRY

Important instructions:

- Entry is the introduction of an organism into GB. Not to be confused with spread, the movement of an organism within GB.
- For organisms which are already present in GB, only complete the entry section for current active pathways of entry or if relevant potential future pathways. The entry section need not be completed for organisms which have entered in the past and have no current pathways of entry.

QUESTION	RESPONSE	CONFIDENCE	COMMENT
1.1. How many active pathways are relevant to the potential entry of this organism? (If there are no active pathways or potential future pathways respond N/A and move to the Establishment section)	moderate number	medium	Active pathways are from import via the pet trade, plus accidental import as eggs on aquatic plants via nurseries (Lever. C. 2009) Little information could be obtained on the approximate numbers of alpine newts being imported; and therefore what proportion of those animals could escape into the wild. It is possible that another active pathway could be accidental import with fish for aquarist trade. Alpine newts kept in captivity have the potential to escape into the wild, particularly if those animals are kept in outdoor terrariums. There is the additional risk that biosecurity measures for captive animals vary between pet owners, and some may have poor biosecurity measures; such as poor cleaning and sterilising of terrariums/equipment and disposal of waste material, such as waste water.

1.2. List relevant pathways through which the organism could enter. Where possible give detail about the specific origins and end points of the pathways. For each pathway answer questions 1.3 to 1.10 (copy and paste additional rows at the end of this section as necessary).	Pet trade Eggs on aquatic plant imports Potential adults and larvae in fish imports	medium	Active pathways are from import via the pet trade, plus accidental import as eggs on aquatic plants via nurseries (Lever. C. 2009)
Pathway name: Pet trade			
1.3. Is entry along this pathway intentional (e.g. the organism is imported for trade) or accidental (the organism is a contaminant of imported goods)? (If intentional, only answer questions 4, 9, 10, 11)	intentional	medium	This species is a colourful animal and is therefore a popular animal for exotic pet owners, with imports coming from breeders/dealers within the EU.
1.4. How likely is it that large numbers of the organism will travel along this pathway from the point(s) of origin over the course of one year? Subnote: In your comment discuss how likely the organism is to get onto the pathway in the first place.	likely	medium	It is reasonably likely that alpine newts from breeders/dealers in the UK will be sold within the UK, and less likely that animals from within mainland Europe (especially *Ichthyosaura alpestris alpestris*) will be imported. Sub-species of alpine newt may be sold from specialist breeders in mainland Europe.
1.9. How likely is the organism to be able to transfer from the pathway to a suitable habitat or host?	likely	medium	Animals kept in outdoor vivariums or released into garden ponds have a higher likelihood of escaping. Escapes are possible by those animals kept in indoor vivariums/aquariums but are less likely to escape outdoors unless there is direct access to the outside.
1.10. Estimate the overall likelihood of entry into GB	very likely	medium	If alpine newts are kept and bred in outdoor

based on this pathway?			vivariums or introduced in garden ponds then they could escape from that vivarium / garden into neighbouring ponds and suitable terrestrial and wetland habitats.
Pathway name: Aquatic plant imports			
1.3. Is entry along this pathway intentional (e.g. the organism is imported for trade) or accidental (the organism is a contaminant of imported goods)? (If intentional, only answer questions 4, 9, 10, 11)	accidental	medium	Alpine newts lay their eggs on leaves of aquatic plants which they fold in order to protect the eggs. If aquatic plants are imported from regions where alpine newts are present, then it is possible that the eggs may remain hidden and be imported accidentally. It could be possible that larvae may be accidentally imported with aquatic plants and fish stock. Further information is needed on whether larvae are accidentally imported with fish or aquatic plants into GB (Personal opinion)
1.4. How likely is it that large numbers of the organism will travel along this pathway from the point(s) of origin over the course of one year? Subnote: In your comment discuss how likely the organism is to get onto the pathway in the first place.	moderately likely	medium	It is possible that large numbers alpine newt eggs and larvae could escape detection through importation with other goods over the course of one year, such as stated in 1.3, It depends on how rigorous the checks before importation and prior to entry into GB are.(Personal opinion)
1.5. How likely is the organism to survive during passage along the pathway (excluding management practices that would kill the organism)? Subnote: In your comment consider whether the organism could multiply along the pathway.	unlikely	medium	If aquatic plants are given thorough bio-security checks before importation then eggs may be seen and destroyed, however there is not enough information to determine whether this could happen. (Personal opinion) Newt eggs may remain undiscovered within importations of aquatic plants, especially if the plants are protected and packed well and would survive transit. Newt larvae could survive accidental importation with

			aquatic plants and fish and as pointed out in 1.4 could avoid detection. Juveniles and adult newts could survive during passage as they don't need to be constantly immersed in water. Post-metamorphic juveniles are smaller and may avoid detection due to their size.
1.6. How likely is the organism to survive existing management practices during passage along the pathway?	unlikely	medium	See previous answer to 1.5
1.7. How likely is the organism to enter GB undetected?	unlikely	medium	See previous answer to 1.5
1.8. How likely is the organism to arrive during the months of the year most appropriate for establishment?	moderately likely	medium	If aquatic plants are imported in the spring, when they establish better in ponds; then they may already have newt eggs on folded leaves. Larvae could also be in amongst imported aquatic plants during spring and summer months. Post-metamorphic stages are more likely to be in an aquatic phase during spring and summer months, and therefore could be imported amongst aquatic plants.
1.9. How likely is the organism to be able to transfer from the pathway to a suitable habitat or host?	likely	medium	Imported aquatic plants with newt eggs could hatch within outdoor facilities at the dealer's premises and from there could escape and establish in the wild.
1.10. Estimate the overall likelihood of entry into GB based on this pathway?	moderately likely	medium	It is moderately likely that any imported aquatic plants would come via an aquatics nursery, rather than direct to customers from an importation company. However, I would suggest that a majority of aquatic nurseries propogate their own aquatic plants or use UK based growers to provide stock and are less likely to

			import aquatic plants from mainland Europe. ?
End of pathway assessment, repeat as necessary.			
1.11. Estimate the overall likelihood of entry into GB based on all pathways (comment on the key issues that lead to this conclusion).	very likely	medium	Entry into GB is probably via pet trade imports as it is a colourful and therefore popular animal and can be easily kept in outside vivaria where it could escape from. Accidental introduction as eggs on imported aquatic plants is moderately likely, particularly as aquatic plants are less likely to be checked for eggs. Accidental import of other life stages, such as larvae and post-metamorphic juveniles/adults (aquatic phase) may be possible with imports of aquatic plants and fish for ponds.

PROBABILITY OF ESTABLISHMENT

Important instructions:

- For organisms which are already well established in GB, only complete questions 1.15 and 1.21 then move onto the spread section. .
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QUESTION	RESPONSE	CONFIDENCE	COMMENT
1.12. How likely is it that the organism will be able to establish in GB based on the similarity between climatic conditions in GB and the organism's current distribution?	very likely	high	This species survives in northern European countries and is already established in a number of counties in England, plus Edinburgh in Scotland. The climate conditions in parts of its natural range are similar to that in GB.
1.13. How likely is it that the organism will be able to establish in GB based on the similarity between other abiotic conditions in GB and the organism's current distribution?	likely	high	Alpine newts are currently established in a number of counties (Lever. C. 2009). Therefore the abiotic conditions are appropriate. .
1.14. How likely is it that the organism will become established in protected conditions (in which the environment is artificially maintained, such as wildlife parks, glasshouses, aquaculture facilities, terraria, zoological gardens) in GB? Subnote: gardens are not considered protected conditions	likely	high	Alpine newts can be easily kept in glasshouses and outdoor vivaria, and will breed if there is a pond provided.
1.15. How widespread are habitats or species necessary for the survival, development and multiplication of the organism in GB?	moderately widespread	high	Alpine newts have established themselves in gardens and private estates within UK, and in the case of those in Beambrook near Newdigate, Surrey have travelled from their original release site to neighbouring gardens with ponds. Aquatic habitats, such as ponds where the species can breed are widespread throughout the UK and therefore could be used by alpine newts as breeding

			ponds. Terrestrial habitats, such as grassland, woodland and hedgerows can also be used as corridors for alpine newts to move between breeding ponds and other potential breeding ponds. Alpine newts have been recorded travelling 1 km from a known site in Kent (Beebee and Griffiths, 2000).
1.16. 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 GB?	NA	NA	
1.17. How likely is it that establishment will occur despite competition from existing species in GB?	very likely	high	Alpine newts co-exist with other amphibian species in Europe and are established in parts of UK where they co-exist in ponds with other native amphibians. Pers.obs D. Winchester 2011
1.18. How likely is it that establishment will occur despite predators, parasites or pathogens already present in GB?	likely	high	As previously mentioned populations of alpine newts are already established in UK.
1.19. How likely is the organism to establish despite existing management practices in GB?	likely	high	See answer 1.18
1.20. How likely are management practices in GB to facilitate establishment?	moderately likely	medium	Aquatic plants with newt eggs could be accidentally transferred to other ponds if bio-security measures are not secure.
1.21. How likely is it that biological properties of the organism would allow it to survive eradication campaigns in GB?	likely	high	Ponds can be ring-fenced with amphibian fencing and ponds drained to remove newt larvae, eggs and aquatic adults during spring, however some terrestrial adults and juveniles may be present outside the amphibian fencing. .
1.22. How likely are the biological characteristics of the organism to facilitate its establishment?	unlikely	medium	Alpine newts are known to be breeding in ponds in a number of localities within GB and alpine newts can disperse between ponds with suitable connective

			habitat. It is unlikely that they would be able to disperse across barriers such as large conurbations, highways and mountain ranges and survive without human assistance.
1.23. How likely is the capacity to spread of the organism to facilitate its establishment?	likely	high	Alpine newts have been recorded travelling 1 km from a known site in Kent (Beebee and Griffiths, 2000).
1.24. How likely is the adaptability of the organism to facilitate its establishment?	likely	high	Alpine newts are adapted to live in high and low altitudes in their native range, and can therefore tolerate a range of temperatures. The environmental and habitat conditions in parts of its natural range are similar to that in UK.
1.25. How likely is it that the organism could establish despite low genetic diversity in the founder population?	likely	high	Alpine newts have been established in ponds at the Beambrook site near Newdigate, Surrey for over 100 years and this site is currently on private land with no public access via public or permissive rights of way; so unlikely to have had further introductions in the last ten years in order to increase genetic diversity. However this site was an aquatic plant nursery and aquarists and may have had further introductions of alpine newts when it was an aquatic plant nursery and aquarists; therefore there may have been more genetic variation within the population of alpine newts on site. Private gardens may also have similarly low genetic diversity in established alpine newt populations (Personal opinion). An example of an amphibian species establishing well from a small number of founders is the marsh frog *Pelophylax ridibundus* which were introduced to a garden near Stone in Oxney, Kent in 1932. Twelve animals were introduced from Hungary, which then

			escaped and spread to other parts of Romney Marsh. This species is now well established in Kent and other parts of UK
1.26. Based on the history of invasion by this organism elsewhere in the world, how likely is to establish in GB? (If possible, specify the instances in the comments box.)	likely	high	Alpine newts have become established outside of their natural range in southern Franc in the limestone plateau of Larzac. This has followed from an introduction in 1990 and surveys in 2003 have found alpine newts in a pond 1.5 km from the original introduction site (Denoël. M, 2005). Alpine newts are already established in GB.
1.27. If the organism does not establish, then how likely is it that transient populations will continue to occur? Subnote: Red-eared Terrapin, a species which cannot re-produce in GB but is established because of continual release, is an example of a transient species.	NA	NA	See previous comment 1.26.
1.28. Estimate the overall likelihood of establishment (mention any key issues in the comment box).	very likely	high	This species is already established and breeding in UK (Lever. C, 2009 & pers.comm J. Wilkinson, 2012).

PROBABILITY OF SPREAD

Important notes:

- Spread is defined as the expansion of the geographical distribution of a pest within an area.

QUESTION	RESPONSE	CONFIDENCE	COMMENT
2.1. How important is the expected spread of this organism in GB by natural means? (Please list and comment on the mechanisms for natural spread.)	minor	medium	A number of established populations have low natural spread, such as Beambrook, near Newdigate, Surrey. However, some animals have been recorded further away (1 km) from a known site in Kent (Beebee and Griffiths, 2000). Further studies of established sites and surveys of ponds outside these sites is needed. Alpine newts have become established outside of their natural range in southern Franc in the limestone plateau of Larzac. This has followed from an introduction in 1990 and surveys in 2003 have found alpine newts in a pond 1.5 km from the original introduction site (Denoël. M, 2005).
2.2. How important is the expected spread of this organism in GB by human assistance? (Please list and comment on the mechanisms for human-assisted spread.)	major	high	The alpine newt is a popular species for pet trade and is able to breed in captivity. This species is established and breeding in private sites where it has been introduced, such as Beambrook near Newdigate, Surrey. It is therefore possible that further unrecorded introductions of this species will take place in the future. Introducing aquatic plants from areas where alpine newts are present to new areas could lead to new introductions if these plants are not checked for newt eggs.

2.3. Within GB, how difficult would it be to contain the organism?	difficult	medium	It could be difficult to contain the spread of alpine newts from site to site either by natural spread or by human assisted spread. Captive breeding of this species is established in UK and engaging the pet trade and internet pet forums in highlighting the legal aspects and other risks that this species potentially poses if deliberately released into the wild is one way to educate. However, you are assuming good will and compliance amongst these communities.
2.4. Based on the answers to questions on the potential for establishment and spread in GB, define the area endangered by the organism.	Alpine newt records are present from Argyl and Lothian in Scotland through to Cumbria, Northumbria, West and South Yorkshire, Northamptonshire, West Midlands, Bristol, Devon, Hertfordshire, Essex, Kent, Surrey and East Sussex (Pers.com J.Wilkinson ARC 2012 NB this does not answer the question	medium	Alpine newts are likely to be limited in there ability to disperse and become established when they encounter some physical barriers like major roads, urban conurbations, mountains and major river corridors. They are less likely to survive as a breeding population in ponds with fish, which is similar to native newt species. As they appear to be in areas across the UK it may be that climate is not a limiting factor in their survival.
2.5. What proportion (%) of the area/habitat suitable for establishment (i.e. those parts of GB were the species could establish), if any, has already been colonised by the organism?	1 – 5%	medium	This is difficult to determine accurately with confidence, however the current known distribution of alpine newts in GB shows it has a restricted range.

2.6. What proportion (%) of the area/habitat suitable for establishment, if any, do you expect to have been invaded by the organism five years from now (including any current presence)?	1 – 5%	medium	Based on how this species has spread I predict that 1 – 5 % of the area/habitat suitable for establishment and currently unoccupied across GB could be invaded five years from now.
2.7. What other timeframe (in years) would be appropriate to estimate any significant further spread of the organism in Great Britain? (Please comment on why this timeframe is chosen.)	10	medium	Research can be undertaken to determine the current distribution of alpine newts in GB. Following this research it could be possible to predict how many populations are unrecorded, and then model the possible spread. Providing the resources are available through a network of organisations, such as Amphibian and Reptile Conservation, County Amphibian and Reptile Groups with recorders, and both non-statutory and statutory organisations, this could be achieved in 10 years.
2.8. In this timeframe what proportion (%) of the endangered area/habitat (including any currently occupied areas/habitats) is likely to have been invaded by this organism?	10-33	medium	Where alpine newts are already present and conditions are suitable then they are likely to be successful breeders and if there is connectivity to other similar habitats with fish free ponds then they are likely to occupy those areas. If they are able to breed succesfully then the population will likely increase in those areas.
2.9. Estimate the overall potential for future spread for this organism in Great Britain (using the comment box to indicate any key issues).	moderately	high	This species has already been recorded 1 km from its nearest breeding population, so potential for natural dispersal is high. This species can also be transported accidently as eggs on aquatic plants, plus human assisted spread is possible as the animal is easy to breed in captivity and could be intentionally released into the wild.

PROBABILITY OF IMPACT

Important instructions:

- When assessing potential future impacts, climate change should not be taken into account. This is done in later questions at the end of the assessment.
- Where one type of impact may affect another (e.g. disease may also cause economic impact) the assessor should try to separate the effects (e.g. in this case note the economic impact of disease in the response and comments of the disease question, but do not include them in the economic section).
- Note questions 2.10-2.14 relate to economic impact and 2.15-2.21 to environmental impact. Each set of questions starts with the impact elsewhere in the world, then considers impacts in GB separating known impacts to date (i.e. past and current impacts) from potential future impacts. Key words are in bold for emphasis.

QUESTION	RESPONSE	CONFIDENCE	COMMENTS
2.10. How great is the economic loss caused by the organism within its existing geographic range **excluding GB**, including the cost of any current management?	minimal	high	There is no current research that suggests that this species has an economic impact and it is not currently managed within its existing geographic range.
2.11. How great is the economic cost of the organism **currently** in GB **excluding management** costs (include any past costs in your response)?	minimal	medium	There is uncertainty about the economic cost.
2.12. How great is the economic cost of the organism likely to be **in the future** in GB **excluding management** costs?	minimal	medium	There is uncertainty about the economic cost.
2.13. How great are the economic costs **associated with managing** this organism **currently** in GB (include any past costs in your response)?	minimal	medium	This species is currently not physically managed in the UK. However, there are minimal economic costs associated with this species, such as producing advice notes for landowners/landmanagers and also for surveyors in order to identify the species and how to deal with the species. There are also minimal economic costs with producing this Risk Assessment for alpine newts.
2.14. How great are the economic costs **associated with**	minimal	medium	There is uncertainty about the economic cost.

managing this organism likely to be **in the future** in GB?			
2.15. How important is environmental harm caused by the organism within its existing geographic range **excluding GB**?	minimal	medium	There is uncertainty about the economic cost and research is needed.
2.16. How important is the impact of the organism on biodiversity (e.g. decline in native species, changes in native species communities, hybridisation) **currently** in GB (include any past impact in your response)?	moderate	medium	Alpine newts are associated with being vectors for amphibian chytridiomycosis, and those tested for the fungus have tested positive. It is possible that they may out-compete native newts within GB, although more studies need to be undertaken to determine this. Alpine newts will predate on both aquatic and terrestrial invertebrates. If an alpine newt population was large and present in a pond known for its endangered invertebrates, then the newts could have a negative effect on that invertebrate community or a particular invertebrate species. No detailed studies have been found that confirm this at present.
2.17. How important is the impact of the organism on biodiversity likely to be in the **future** in GB?	major	high	Alpine newts have a high risk in spreading amphibian chytridiomycosis to other amphibians within GB, particularly if more animals are deliberately introduced or escape into the wild.
2.18. How important is alteration of ecosystem function (e.g. habitat change, nutrient cycling, trophic interactions) caused by the organism **currently** in GB (include any past impact in your response)?	minimal	low	Currently not known.
2.19. How important is alteration of ecosystem function (e.g. habitat change, nutrient cycling, trophic interactions) caused by the organism likely to be in GB in the **future**?	minimal	low	Currently not known.
2.20. How important is decline in conservation status (e.g. sites of nature conservation value, WFD classification)	minor	low	Alpine newts that are known to occur in nature reserves could have potential negative impacts on reducing

caused by the organism **currently** in GB?			nature conservation value, particularly through spread of chytrid disease to other amphibians and outcompeting amphibians (Pers.com J.Wilkinson ARC 2012). It is not known whether alpine newts are vectors for Rana virus. Alpine newts will predate on both aquatic and terrestrial invertebrates. If an alpine newt population was large and present in a pond known for its endangered invertebrates, then the newts could have a negative effect on that invertebrate community or a particular invertebrate species. No detailed studies have been found that confirm this at present. There are currently no recorded alpine newt populations in sites, such as breeding ponds used by endangered native amphibians such as natterjack toads and northern-clade pool frogs. As amphibian chytridiomycosis is thought to be transmitted from infected animals in ponds, breeding ponds for northern-clade pool frogs and natterjack toads need to be monitored carefully to ensure that there is no risk of alpine newts invading these sites. Alpine newts recorded within 700 m of known rare or important amphibian population sites should be removed to prevent risk of disease transmission.
2.21. How important is decline in conservation status (e.g. sites of nature conservation value, WFD classification) caused by the organism likely to be in the **future** in GB?	minor	low	It is less likely that alpine newts will naturally colonise nature reserves where species such as northern pool frogs or natterjack toads are present, particulary with the latter species as the habitats are unlikely to succesfully support alpine newts. It is also less likely

			that alpine newts will be deliberatley released in nature reserves where these species are present as both northern pool frogs and natterjack toads have a limited distribution in the UK.
2.22. How important is it that genetic traits of the organism could be carried to other species, modifying their genetic nature and making their economic, environmental or social effects more serious?	minimal	high	Alpine newts are highly unlikely to interbreed with native newt species as they are not within the same genera.
2.23. How important is social, human health or other harm (not directly included in economic and environmental categories) caused by the organism within its existing geographic range?	minimal	high	There are no records of alpine newts causing harm to society or human health.
2.24. How important is the impact of the organism as food, a host, a symbiont or a vector for other damaging organisms (e.g. diseases)?	major	high	Alpine newts are associated with being vectors for amphibian chytridiomycosis, and those individuals tested for the fungus have tested positive. There is a high risk of alpine newts spreading this fungus to other native amphibian species. This spread could be facilitated by introduction of this species to new areas by human assistance.
2.25. How important might other impacts not already covered by previous questions be resulting from introduction of the organism? (specify in the comment box)	minimal	high	Currently not known.
2.26. How important are the expected impacts of the organism despite any natural control by other organisms, such as predators, parasites or pathogens that may already	major	high	It is possible that they may out-compete native newts within GB, although more studies need to be undertaken

be present in GB?			to determine this. More research is needed on whether there are native parasites, predators or pathogens that could control alpine newts in existing populations within GB.
2.27. Indicate any parts of GB where economic, environmental and social impacts are particularly likely to occur (provide as much detail as possible).	Areas where northern pool frogs and natterjack toads are present could theoretically be at risk from alpine newts, and these areas are limited to those species nature reserves in Norfolk, Cumbria, Sefton, Dorset, Bedfordshire, Hampshire, Surrey and Kent.	medium	Alpine newts are widely spread across GB, but are currently not known to be in areas designated for protected biodiversity, such as endangered aquatic invertebrate or amphibian communities. There are currently no recorded alpine newt populations in sites, such as breeding ponds used by endangered native amphibians such as natterjack toads and northern-clade pool frogs. To ensure that there is no risk of alpine newts invading these sites. Alpine newts recorded within 700 m of known rare or important amphibian population sites should be removed to preve

RISK SUMMARIES

	RESPONSE	CONFIDENCE	COMMENT
Summarise Entry	likely	high	Entry into GB via pet trade and accidental introduction by eggs on imported water plants or with imported fish for ponds.
Summarise Establishment	likely	high	Established in GB in a number of pathways; • Deliberate release from private collections • Escapes from outdoor vivariums / private collections • Accidental release as eggs on imported aquatic plants • Accidental release as adults or larvae with imported fish for ponds.
Summarise Spread	rapidly	high	Records of alpine newt populations are widespread across GB. This species has already been recorded 1 km from its nearest breeding population, so potential for natural dispersal is high. Alpine newts are colourful and have the potential to be collected by people who could introduce them into gardens, which could then escape into the wider countryside.
Summarise Impact	moderate	medium	Alpine newts are associated with being vectors for amphibian chytridiomycosis, and those individuals tested for the fungus have tested positive. It is possible that they may out-compete native newts within GB, although more studies need to be undertaken to determine this. It is possible that they could have an impact on common frog and common toad populations in areas where alpine newts are in high numbers; as they will predate on tadpoles of these species. Again, more studies need to be undertaken to determine this.

			Alpine newts will predate on both aquatic and terrestrial invertebrates. If an alpine newt population was large and present in a pond known for its endangered invertebrates, then the newts could have a negative effect on that invertebrate community or a particular invertebrate species.
Conclusion of the risk assessment	high	high	Alpine newts have the potential to spread amphibian chytridiomycosis and are widespread across GB with a number of established breeding populations. Although currently alpine newts are not found in areas with populations of endangered natterjack toads and re-introduced northern clade pool frogs. There is a potential risk that if they are introduced to these sites that could transmit amphibian chytridiomycosis. If an alpine newt population was large and present in a pond known for its endangered invertebrates, then the newts could have a negative effect on that invertebrate community or a particular invertebrate species. It is possible that they could have an impact on common frog and common toad populations in areas where alpine newts are in high numbers; as they will predate on tadpoles of these species. They have potential to out-compete native newts and due to their colourful appearance and popularity with pet trade are likely to be spread by humans, or escape from outdoor enclosures and garden ponds.

Additional questions are on the following page ...

ADDITIONAL QUESTIONS - CLIMATE CHANGE			
3.1. What aspects of climate change, if any, are most likely to affect the risk assessment for this organism?	Increase in annual temperatures	medium	Increase of annual temperatures due to climate change could potentially increase breeding success through hatching rates of eggs. Other sub-species of alpine newts from parts of Europe with higher temperatures could then potentially breed in GB if released into the wild. Increase in annual temperatures could affect water levels in ponds during the breeding season, which would have an affect on amphibian breeding success. This could have a negative affect on alpine newts if water levels in ponds are too low for breeding success. Disease dynamics could change as an aspect of climate change. Stress due to climate change could make native amphibians more vulnerable to infection by *Batrachochytrium dendrobatidis* which is associated with alpine newts, as this species can act as a vector. If the distribution of alpine newts increases with natural spread due to climate change then there is a risk that disease transmission could increase to other native amphibians.
3.2. What is the likely timeframe for such changes?	10 years	medium	Currently not known.
3.3. What aspects of the risk assessment are most likely to change as a result of climate change?	Distribution	medium	Population distribution across GB. Disease dynamics are an aspect that could change as a result of climate change. Studies in parts of the world, such as Spain have observed a significant association between change in local climatic variables and the occurrence of amphibian chytridiomycosis within that

			region (Bosch *et al*. 2007).
ADDITIONAL QUESTIONS - RESEARCH			
4.1. If there is any research that would significantly strengthen confidence in the risk assessment please summarise this here.	[insert text]		A number of areas of research would aid further assessment for this species impact. 1. How far do alpine newts spread naturally from known breeding ponds in different habitats? 2. Current distribution of alpine newts in UK and what is the predicted spread? 3. Affect of climate change on distribution within UK through natural spread. 4. Affect of climate change on disease dynamics with alpine newts and risk of increased spread to native amphibians. 5. Do alpine newts out-compete native newts in UK? 6. Do alpine newts have a serious impact on native frog, toad and invertebrate populations through predation? 7. Are there native parasites, predators or pathogens that could control alpine newts in existing populations within UK? 8. Do alpine newts have an economic impact? And is it managed within its existing geographic range? 9. Do alpine newts have a wider environmental impact in the UK?

Please provide a reference list on the following page ...

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