

Information about GB Non-native Species Risk Assessments

The Convention on Biological Diversity (CBD) emphasises the need for a precautionary approach towards non-native species where there is often a lack of firm scientific evidence. It also strongly promotes the use of good quality risk assessment to help underpin this approach. The GB risk analysis mechanism has been developed to help facilitate such an approach in Great Britain. It complies with the CBD and reflects standards used by other schemes such as the Intergovernmental Panel on Climate Change, European Plant Protection Organisation and European Food Safety Authority to ensure good practice.

Risk assessments, along with other information, are used to help support decision making in Great Britain. They do not in themselves determine government policy.

The Non-native Species Secretariat (NNSS) manages the risk analysis process on behalf of the GB Programme Board for Non-native Species. Risk assessments are carried out by independent experts from a range of organisations. As part of the risk analysis process risk assessments are:

- Completed using a consistent risk assessment template to ensure that the full range of issues recognised in international standards are addressed.
- Drafted by an independent expert on the species and peer reviewed by a different expert.
- Approved by an independent risk analysis panel (known as the Non-native Species Risk Analysis Panel or NNRAP) only when they are satisfied the assessment is fit-for-purpose.
- Approved for publication by the GB Programme Board for Non-native Species.
- Placed on the GB Non-native Species Secretariat (NNSS) website for a three month period of public comment.
- Finalised by the risk assessor to the satisfaction of the NNRAP.

To find out more about the risk analysis mechanism go to: www.nonnativespecies.org

Common misconceptions about risk assessments

To address a number of common misconceptions about non-native species risk assessments, the following points should be noted:

- Risk assessments consider only the risks posed by a species. They do not consider the practicalities, impacts or other issues relating to the management of the species. They therefore cannot on their own be used to determine what, if any, management response should be undertaken.
- Risk assessments are about negative impacts and are not meant to consider positive impacts that may also occur. The positive impacts would be considered as part of an overall policy decision.
- Risk assessments are advisory and therefore part of the suite of information on which policy decisions are based.
- Completed risk assessments are not final and absolute. Substantive new scientific evidence may prompt a re-evaluation of the risks and/or a change of policy.

Period for comment

Draft risk assessments are available for a period of three months from the date of posting on the NNSS website*. During this time stakeholders are invited to comment on the scientific evidence which underpins the assessments or provide information on other relevant evidence or research that may be available. Relevant comments are collated by the NNSS and sent to the risk assessor. The assessor reviews the comments and, if necessary, amends the risk assessment. The final risk assessment is then checked and approved by the NNRAP.

*risk assessments are posted online at:

<https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=51>

comments should be emailed to nnss@fera.gsi.gov.uk

GB NON-NATIVE ORGANISM RISK ASSESSMENT SCHEME

For more information visit: www.nonnativespecies.org

Name of Organism:		<i>Trachemys scripta elegans</i> - Red-eared terrapin	
Objectives:		Assess the risks associated with this species in GB	
Version:		FINAL 04/04/11	
N	QUESTION	RESPONSE	COMMENT
1	What is the reason for performing the Risk Assessment?	A request is made for an assessment of the likely future spread and impacts of an organism in the Risk Assessment area	
2	What is the Risk Assessment area?	The UK, primarily southern England and the lowlands of south Wales	<i>Trachemys scripta elegans</i> is currently unable to reproduce in the wild anywhere in the UK under prevailing climatic conditions. However, individuals can survive in the wild for prolonged periods, so it is conceivable that future warming of the UK climate may allow any previously released, and still surviving, animals to breed successfully and <i>Trachemys scripta elegans</i> to therefore become more firmly established (and also to spread more rapidly) in the UK. If this does happen at some indeterminate future date, it would be most likely to occur in the southern half of England and the lowland areas of 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)	<i>Trachemys scripta elegans</i> (Wied, 1839), Testudines, Emydidae. Reptile, animal. Common names: red-eared terrapin, red-eared slider, red-eared turtle (Carr 1952; Ernst <i>et al</i> 1997; Pritchard 1967). In the past, <i>Trachemys scripta elegans</i> was by far the most commonly imported, and therefore introduced to the wild, of the three subspecies of <i>Trachemys scripta</i> (<i>T.s. scripta</i> , <i>T.s. elegans</i> and <i>T.s. troostii</i> [Seidel 2002]). The other two subspecies (mainly <i>T.s. scripta</i>) have been seen more regularly in the pet market since the import ban on <i>T.s. elegans</i> (Bringsøe 2006). However, they are relatively rarely imported in comparison, and also have a higher monetary value, so are less likely to be deliberately released into the wild in the UK. In any event, a risk assessment for these taxa would be almost identical to this one for <i>T.s. elegans</i> .
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)	[N.B. double click on this cell to see all relevant text.] <i>Trachemys scripta elegans</i> is considered to be among the world's top 100 most invasive species (Lowe <i>et al</i> 2000). However, apart from certain specific examples - mainly relating to competition with often endangered native terrapins (of which the UK has none) - there are actually very few documented examples of <i>Trachemys scripta elegans</i> having a significant negative impact on other wildlife, the environment, humans or national economies. In many northern European countries where it has been introduced into the wild but is unable to breed (as in the UK), it is not considered a threat at all (Bringsøe 2006). This species is a generalist omnivore (Bjorndal 1991; Bouchard & Bjorndal 2006; Parmenter 1980; Parmenter & Avery 1990) and can survive on a wide variety of food types - this clearly helps it to survive outside its natural range. However, there are in fact no reports of the conservation status of any species (including commercially valuable fish species) being affected by the feeding behaviour of <i>Trachemys scripta elegans</i> , either in the UK or elsewhere. In addition, since this species is unable to reproduce in the UK this attribute would only be relevant here where very large numbers had been released together into one water body. Often, however, only one or two individuals are present in UK water bodies. The strong competitive advantage that <i>Trachemys scripta elegans</i> enjoys over many native terrapins in the countries where it has been introduced (due to it having to compete with larger numbers of other terrapin species in the United States) is not a factor in the UK, which has no native terrapin species at all. Compared to the UK, however, <i>Trachemys scripta elegans</i> is a much more worrying conservation problem in mainland Europe, where this species can reproduce in Mediterranean climates and has also been shown to have a significant competitive advantage over, and thus pose a serious threat to, the native and already declining European pond terrapin, <i>Emys orbicularis</i> . This problem has been the subject of much study and conservation action in Europe (e.g. Arvy & Servan 1998; Cadi & Bertrand 2003; Cadi & Joly 2000; 2003; 2004; Luiselli <i>et al</i> 1997; Miele 2001; Parham & van Leuvan 2002; Polo-Cavia <i>et al</i> 2008; Servan & Arvy 1997).
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)	Red-eared terrapins have long been released into the wild completely at random, despite this being illegal, and there appears to be no effective way of controlling this practice while this species is still present in captivity. The UK and EU bans on imports (Adrado & Briggs 2002; Scalera 2007b), however, have dramatically reduced the numbers entering captivity in the first place, so deliberate releases are declining as a consequence and will no doubt continue to do so. Once released into the wild, this species is much easier to control.
10	Is the organism widely distributed in the Risk Assessment area?	NO (Go to 11)	There have been no comprehensive nationwide surveys of <i>Trachemys scripta elegans</i> distribution but this species has been reported from scattered sites around the UK, often in or close to urban areas (Froglife 1997, HCT 2008; Terrapin Rescue 2008). National efforts are now underway to gather national distribution data under the auspices of the National Amphibian and Reptile Recording Scheme or NARRS (HCT 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)	There are numerous ponds, lakes and rivers (including in many urban areas) that are potentially suitable for the long-term survival of this species in the UK - particularly any adult individuals released but, probably juveniles also, which can be very hardy (Packard <i>et al</i> 1997). However, natural reproduction is not possible under current climatic conditions so there is no way that multiplication of this species can occur in the UK. The only means by which numbers could increase again (rather than the steady decline currently occurring as individuals die off or are deliberately removed by humans) is either for mass importations and releases to resume, which is an unlikely scenario, or for the UK climate to warm up sufficiently rapidly, i.e. before all surviving terrapins die off, for this species to start reproducing and spreading naturally.
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)	Not relevant to this species.
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)	<i>Trachemys scripta elegans</i> naturally occurs in the central and southern United States (Conant & Collins 1991), an area with much hotter summers than the UK, although the spring and autumn weather there is often similar to that of summer in the UK. While this species is therefore able to feed during the mild UK summers, and to consequently survive for many years in the wild, it is completely unable to reproduce here as the consistent high temperatures required for the incubation of its eggs are not reached.
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)	There has been a report of pet <i>Trachemys scripta elegans</i> laying eggs outdoors under glass in the UK (D. Bird <i>pers. com.</i>), although it is not known if these eggs were viable. Apart from the requirement for suitable breeding sites to be adjacent to the water bodies inhabited, the large size of the adult female terrapins means that it would be virtually impossible for this species to breed unnoticed under such protected conditions in the UK.
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)	[N.B. double click on this cell to see all relevant text.] As a result of the massive international trade in this species, and the subsequent release into the wild of many thousands of unwanted pets, <i>Trachemys scripta elegans</i> has entered numerous new areas worldwide. These include various parts of the United States outside the original natural range in that country (Emer 2004; Gulf States Marine Fisheries Commission 2005; Hutchinson 1992; King & Krakauer 1966; Smith & Kohler 1978; Wilson & Porras 1983; Witzell 1999), parts of Central and South America (Acuna & Arturo 1992; de Sa & Solari 2001), various Pacific islands (Buden <i>et al</i> 2001; McCoid 1993), Southeast Asian countries such as Taiwan and Japan (Chen 2006; Chen & Lui 1998; Ota 1995; Uchida 1989), South Africa (Newberry 1984), the Middle East (Bouskila 1986a; 1986b) and numerous countries in Europe, such as Spain, France, the UK, the Netherlands, Denmark, Germany, Poland, the Baltic States, Italy and so on (Bringsøe 2001; 2006; Bruekers & van der Keijlen 1999; Capalleras & Carretero 2000; da Silva & Blasco 1995; de Roa & Roig 1997; Froglife 1997; HCT 2008; Lavasseur & Facheux 2003; Najbar 2001; Veysset 2003). However, not all of these reported "populations" are able to breed in the wild, especially in northern European countries such as the UK, and therefore cannot be said to pose a serious risk of becoming established (Böhme 2000; Lever 2003; Scalera 2007a). In Europe to date, <i>Trachemys scripta elegans</i> has only been reported breeding in areas with a Mediterranean climate and hot summers, such as the south of France (Cadi <i>et al</i> 2004) and Spain (Bertolero & Canicio 2000; Capalleras & Carretero 2000; Martínez-Silvestre <i>et al</i> 1997).
17	Can the organism spread rapidly by natural means or by human assistance?	YES (Go to 18)	<i>Trachemys scripta elegans</i> has primarily been spread in the UK by means of human assistance (i.e. deliberate releases and introductions). It is not known how far, or how rapidly, adult or juvenile terrapins can disperse by natural means in the UK (if at all), although most probably remain in the vicinity of the water body where they were released.

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)	[N.B. double click on this cell to see all relevant text.] Although the species as a whole is a generalist omnivore, adult <i>Trachemys scripta elegans</i> become largely herbivorous in the wild as they mature (Bjorndal & Bolten 1993; Hart 1983; Prévot-Julliard et al 2007). Fears about the mass predation of ducklings in the UK have therefore never materialised! This species is generally not likely to be a threat to the most endangered (e.g. UKBAP) plant or animal species since individual terrapins will invariably be noticed, especially while basking, at particularly sensitive sites and deliberately removed by wardens or conservation bodies. The basking behaviour of red-eared terrapins has been suggested as a potential problem for nesting water birds such as grebes in Europe (Folger 2001; 2002), although this has never been shown to have caused nesting failure and such birds also occur within the natural range of <i>Trachemys scripta elegans</i> (and a range of other terrapin species) in good numbers. There have been many studies of the connection between this species and <i>Salmonella</i> infections, some in the wild (Soccini & Ferri 2004), but especially in the pet trade (e.g. Meehan 1996; Orton & Henderson 1972; Reptiles & <i>Salmonella</i> 2008; Warwick et al 2001) - indeed, the risk from <i>Salmonella</i> in captive situations was one of the primary reasons the trade in this species was banned within the United States. However, there have been no reports of anyone directly catching and handling this species in the wild (e.g. conservationists, fishermen or researchers) contracting <i>Salmonella</i> poisoning, let alone members of the public using water bodies where it is known to be present.
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	<i>Trachemys scripta elegans</i> is extremely unlikely to present a risk to the Risk Assessment area under current conditions. However, this statement may need to be revised in the future if any potential climate changes were to create more suitable conditions in the UK for the successful reproduction of any surviving terrapins in the wild.
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	[N.B. double click on this cell to see all relevant text.] The only entry pathway (see: Kraus 2003) is via the international pet trade and the subsequent release by humans of unwanted pet terrapins into the wild. The trade in this species was formerly huge, with millions of mostly hatchling <i>Trachemys scripta elegans</i> (e.g. 52,122,389 individuals were exported from the USA between 1989 and 1997 [Telecky 2001]) being shipped around the world every year (Humane Society of the United States 1994; 2001; Invasive Species Specialist Group 2006; Moll 1995; Warwick 1985; 1991), with many thousands of the surviving animals ending up being dumped into the nearest available water body. With the ban on imports into the EU, however, this pathway has now effectively been closed, although <i>Trachemys scripta elegans</i> is a long-lived organism so releases of currently captive animals may still occur in the UK for some time to come. The EU import ban, incidentally, covers other, seldom traded terrapin species such as the painted turtle, <i>Chrysemys picta</i> , which is much harder than <i>Trachemys scripta elegans</i> and is therefore more likely to be able to reproduce in northern Europe should it ever be released too.
1.2	Choose one pathway from the list of pathways selected in 1.1 to begin the pathway assessments.	Deliberate release into the wild by humans		This is the only way by which <i>Trachemys scripta elegans</i> can reach the wild in the UK.
1.3	How likely is the organism to be associated with the pathway at origin?	very likely - 4	LOW - 0	<i>Trachemys scripta elegans</i> is specifically farmed in the area of origin for international export via the pet trade (Bonin 2004), a practice that despite some bans (such as within the USA itself and the EU) still continues.
1.4	Is the concentration of the organism on the pathway at origin likely to be high?	unlikely - 1	MEDIUM -1	Yes, but this is no longer relevant to EU countries.
1.5	How likely is the organism to survive existing cultivation or commercial practices?	moderately likely - 2	LOW - 0	There are some losses at all stages of farming and rearing, although <i>Trachemys scripta elegans</i> is a hardy species so these losses are not huge.
1.6	How likely is the organism to survive or remain undetected by existing measures?	very unlikely - 0	MEDIUM -1	When active, and not hibernating, this species needs to regularly bask in direct sunshine, particularly in a mild climate such as the UK, so is unlikely to remain undetected.
1.7	How likely is the organism to survive during transport /storage?	likely - 3	MEDIUM -1	Transport of this species is part of a deliberate trade, rather than being accidental, so it is very much in the commercial interests of the parties involved to ensure maximum survival of the animals during shipping.
1.8	How likely is the organism to multiply/increase in prevalence during transport /storage?	very unlikely - 0	LOW - 0	Impossible - almost all terrapins transported are hatchlings or juveniles so cannot reproduce. In addition, any adults shipped would be unable to engage in any kind of natural reproductive behaviour and any eggs that were laid during transport (for example, by previously gravid females) would be unlikely to remain viable.
1.9	What is the volume of movement along the pathway?	minor - 1	MEDIUM -1	This is no longer relevant to EU countries for <i>Trachemys scripta elegans</i> , although small numbers of the other two <i>Trachemys scripta</i> subspecies, and other similar terrapins, may still be imported. The volume of illegal imports is unknown but, although the worldwide reptile trade is massive, this is not likely to be significant for species of such minor commercial value.
1.10	How frequent is movement along the pathway?	very rarely - 0	MEDIUM -1	This is no longer relevant to EU countries for <i>Trachemys scripta elegans</i> . It is not known how often the other two <i>Trachemys scripta</i> subspecies are imported although this is likely to be infrequent.
1.11	How widely could the organism be distributed throughout the Risk Assessment area?	widely - 3	MEDIUM -1	Most often in, or close to, urban areas where this species was most often sold in large numbers by pet shops in the past and where most survivors are probably still kept in captivity. However, humans will travel some distance to release unwanted pets into the countryside as this is perceived to be kinder.
1.12	How likely is the organism to arrive during the months of the year most appropriate for establishment ?	moderately likely - 2	LOW - 0	In terms of trade and imports, this is no longer relevant to EU countries for <i>Trachemys scripta elegans</i> , although it is very likely that humans would only release already captive terrapins into the wild during the most suitable (warmer) months of the year.
1.13	How likely is the intended use of the commodity (e.g. processing, consumption, planting, disposal of waste, by-products) or other material with which the organism is associated to aid transfer to a suitable habitat?	N/A	LOW - 0	Not relevant to this species.
1.14	How likely is the organism to be able to transfer from the pathway to a suitable habitat?	unlikely - 1	LOW - 0	Most of the red-eared terrapins that still survive in captivity in the UK are probably owned by competent people, who have an interest in reptiles and properly understand their requirements, and who are more likely to realise the negative consequences of releasing these animals into the wild. The likelihood of this species being transferred in large numbers from captivity to the wild must therefore be substantially less than at the peak of the trade and can only decline further with appropriate education and publicity.

	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?	slightly similar - 1	LOW - 0	Climatic conditions within the UK are similar enough in comparison to the natural range of <i>Trachemys scripta elegans</i> in the United States to allow this species to feed and hibernate and thus survive for prolonged periods in the wild. However, climatic conditions are very different in one crucial aspect - it does not remain hot enough for long enough in the UK for this species to reproduce successfully.
1.16	How similar are other abiotic factors that would affect establishment in the Risk Assessment area and in the area of present distribution?	moderately similar - 2	LOW - 0	Many water bodies in the UK are probably similar in other abiotic aspects to those in the natural range of <i>Trachemys scripta elegans</i> .
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.	moderate number - 2	LOW - 0	There are numerous ponds, lakes and rivers (including in many urban areas) that are potentially suitable for the long-term survival of this species in the UK. For example, this species is fairly tolerant of a range of conditions so would be able to survive in a significant percentage of the estimated 400,000 or so ponds in the UK.
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?	occasional - 2	LOW - 0	Widespread throughout the Risk Assessment area, including suitable water bodies even in urban areas.
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	Not relevant to this species.
1.20	How likely is it that establishment will not be prevented by competition from existing species in the Risk Assessment area?	very likely - 4	LOW - 0	<i>Trachemys scripta elegans</i> has no competitors in the UK (see also: Herbold & Moyle 1986). A few other introduced terrapin species may occasionally be present in a water body, although red-eared terrapins often have a competitive advantage over many other species.
1.21	How likely is it that establishment will not be prevented by natural enemies already present in the Risk Assessment area?	likely - 3	MEDIUM -1	Hatchlings may be eaten by a few native UK species, such as otters or herons, or even other introduced species like the American mink. Once adult, however, this species would have few natural enemies in the UK.
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	Human management of UK water bodies tends to be more intense than in many parts of the range of <i>Trachemys scripta elegans</i> so would be more likely to hinder, rather than aid, establishment.
1.23	How likely is it that existing control or husbandry measures will fail to prevent establishment of the organism?	unlikely - 1	MEDIUM -1	There appears to be no direct control over the illegal practice of releasing unwanted pets into the wild, although increased public education and publicity will have an impact in preventing this practice.
1.24	How often has the organism been recorded in protected conditions, e.g. glasshouses, elsewhere?	very rare - 0	MEDIUM -1	Often deliberately kept as pets in protected conditions, such as greenhouses, although there are no records of 'wild' terrapins turning up in such structures.
1.25	How likely is the reproductive strategy of the organism and duration of its life cycle to aid establishment?	very unlikely - 0	LOW - 0	<i>Trachemys scripta elegans</i> is oviparous and lays clutches of between two and 30 eggs (Ernst <i>et al</i> 1994) in suitable warm, unshaded nesting sites. Within its natural range, incubation lasts between 59 and 112 days (Ernst <i>et al</i> 1997). Females mature at five years and males at between two and five years of age (Mitchell & Pague 1990). At present, however, <i>Trachemys scripta elegans</i> is simply unable to breed in the wild in the UK under current climatic conditions. Individuals of this species have been known to live up to 42 years in the wild, although most probably do not survive beyond 30 years (Harding 1997). The climate would therefore have to change rapidly enough to bring Mediterranean conditions to the UK within this timespan in order for this species to successfully reproduce in this country, i.e. before all animals still surviving in the wild (and that have escaped being deliberately removed by humans) have died off naturally.
1.26	How likely is it that the organism's capacity to spread will aid establishment?	very unlikely - 0	LOW - 0	In the UK, most individuals appear to remain close to their release site, although they may move some distance along rivers. Most dispersal in the natural range is by juveniles soon after hatching and this behaviour occurs during much warmer weather than is normal for the UK (Gibbons <i>et al</i> 1990).
1.27	How adaptable is the organism?	moderately adaptable - 2	LOW - 0	<i>Trachemys scripta elegans</i> is a fairly hardy and adaptable species, as witnessed by the ability of many individuals to survive once released into the wild in a wide range of countries around the world - but it is still not adaptable enough to be able to breed in the UK.
1.28	How likely is it that low genetic diversity in the founder population of the organism will not prevent establishment?	very unlikely - 0	LOW - 0	Not relevant as this species cannot breed in the UK.
1.29	How often has the organism entered and established in new areas outside its original range as a result of man's activities?	very many - 4	LOW - 0	See the comment for Question 16
1.30	How likely is it that the organism could survive eradication campaigns in the Risk Assessment area?	unlikely - 1	MEDIUM -1	Red-eared terrapins, like most similar species, are very easy to catch when suitable methods are employed - a wide range of commercial 'turtle traps' are available in the United States and can be ordered online from the UK. Due to the limited numbers of individuals usually present in the water bodies where they do occur, it would be extremely straightforward to eradicate this species given adequate resources.
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	MEDIUM -1	Deliberate releases may still occur for some time to come, although see the comment for Question 1.14.

	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	MEDIUM -1	Many red-eared terrapins appear to occur in urban areas where they are very unlikely to be able to spread, except along rivers and canals. In general, though, it would rarely be simultaneously warm and rainy enough to encourage long distance movements. In addition, this species is not producing the individuals that normally disperse in the native range (i.e. hatchlings and juveniles).
2.2	How rapidly is the organism liable to spread in the Risk Assessment area by human assistance?	rapid - 3	LOW - 0	Humans could easily (and indeed already have) spread <i>Trachemys scripta elegans</i> throughout the Risk Assessment area extremely rapidly.
2.3	How difficult would it be to contain the organism within the Risk Assessment area?	easily - 1	MEDIUM -1	See the comment for Question 1.30.
2.4	Based on the answers to questions on the potential for establishment and spread define the area endangered by the organism.	The UK, primarily southern England and the lowlands of south Wales	MEDIUM -1	N.B. This area is not at risk from <i>Trachemys scripta elegans</i> at present and would only be 'endangered' by this species if rapid climate change allowed animals to breed in the wild. However, by far the most serious risk posed by this species is to other species of terrapin (especially those already threatened by other factors) and, no matter how much the climate warmed, the UK would still have no native species of terrapin.

	Impacts	RESPONSE	UNCERTAINTY	COMMENT
2.5	How important is economic loss caused by the organism within its existing geographic range?	minimal - 0	LOW - 0	While this species can certainly cause ecological damage wherever competition with threatened native terrapins is an issue, the economic loss caused by <i>Trachemys scripta elegans</i> appears to be minor throughout its existing geographic range.
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	There are virtually no means by which <i>Trachemys scripta elegans</i> could cause direct negative economic effects. The three main risks would be due to: 1. predation on commercially valuable fish stocks (in fishing lakes or freshwater fish farms), although adults of this species are largely herbivorous and have almost no impact on fish populations; 2. the possible disruption of economically important activities (e.g. the leisure use of freshwater bodies) due to the perceived or actual dangers caused by pathogens, such as <i>Salmonella</i> , known to be carried by this species; 3. damage to commercial watercress beds due to the feeding activities of adult terrapins. These risks, however, are so minimal as to be unmeasurable.
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	Under current climatic conditions, the small numbers of <i>Trachemys scripta elegans</i> present in the UK would be unable to cause any noticeable losses in producer profits, e.g. to the fishing, leisure or watercress industries. Even if future climate change were to enable this species to successfully breed in the UK, and all subsequent control methods somehow failed, it is extremely unlikely that any losses to producer profits would be significant.
2.8	How great a reduction in consumer demand is the organism likely to cause in the Risk Assessment area?	minimal - 0	LOW - 0	Under current climatic conditions, the small numbers of <i>Trachemys scripta elegans</i> present in the UK would be unable to cause any noticeable reductions in consumer demand, e.g. to the fishing or leisure industries. Even if future climate change were to enable this species to successfully breed in the UK, and all subsequent control methods somehow failed, it is extremely unlikely that any reductions in consumer demand would be significant. In fact it is more likely that this species would be a source of a minor increase in consumer demand at some water bodies, country parks, etc. due to people bringing their children to such sites specifically to spot basking terrapins.
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	The number of exports that could ever conceivably be affected by <i>Trachemys scripta elegans</i> are tiny, with fish farming and watercress production being the two main possible candidates. However, fish farms are unlikely to be troubled by this species since adults are largely herbivorous. Commercial watercress production is also unlikely to be affected as individuals of this species would be very easy to remove in such environments.
2.10	How important would other economic costs resulting from introduction be? (specify)	minor - 1	LOW - 0	Minor costs would be associated with a survey and eradication programme if this was ever deemed necessary.
2.11	How important is environmental harm caused by the organism within its existing geographic range?	moderate - 2	LOW - 0	This is mainly relevant to other countries with warmer climates (where <i>Trachemys scripta elegans</i> is able to reproduce) and native species of terrapin.
2.12	How important is environmental harm likely to be in the Risk Assessment area?	minimal - 0	LOW - 0	The absence of native terrapins and the inability of this species to breed and multiply, mean that environmental harm (even to plant and animal species that may be consumed) is likely to be extremely minimal.
2.13	How important is social and other harm caused by the organism within its existing geographic range?	minimal - 0	LOW - 0	Not reported as important in any countries.
2.14	How important is the social harm likely to be in the Risk Assessment area?	minimal - 0	LOW - 0	Not likely to be important at all in the UK.
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	Impossible - there are no similar native species in the UK.
2.16	How probable is it that natural enemies, already present in the Risk Assessment area, will have no effect on populations of the organism if introduced?	moderately likely - 2	LOW - 0	Most terrapins in the wild are adults, which have few natural enemies in the UK, although if humans are also considered (e.g. boys with air guns) then a few individual terrapins may be negatively affected.
2.17	How easily can the organism be controlled?	easily - 1	MEDIUM - 1	See the comment for Question 1.30.
2.18	How likely are control measures to disrupt existing biological or integrated systems for control of other organisms?	very unlikely - 0	LOW - 0	Terrapin traps are unobtrusive and very unlikely to disrupt or disturb anything else at all.
2.19	How likely is the organism to act as food, a host, a symbiont or a vector for other damaging organisms?	unlikely - 1	MEDIUM - 1	There have been no reports of <i>Salmonella</i> infection caused by this species in the wild - this risk appears to be largely associated with the pet trade and other captive situations.
2.20	Highlight those parts of the endangered area where economic, environmental and social impacts are most likely to occur	The UK, primarily southern England and the lowlands of south Wales	MEDIUM - 1	N.B. this is not relevant at present as any economic, environmental and social impacts are likely to be extremely minimal under current conditions.

Summarise Entry	moderately likely - 2	LOW - 0	Although the import of <i>Trachemys scripta elegans</i> is now banned in the EU, significant numbers will still be alive in captivity. A continued risk, although it is now a small and almost certainly still declining one, therefore exists of people deliberately releasing unwanted pet terrapins into the wild in the UK.
Summarise Establishment	very unlikely - 0	MEDIUM -1	Since <i>Trachemys scripta elegans</i> is currently unable to reproduce in the wild under current climatic conditions in the UK (in Europe, recorded breeding has only occurred in areas with a Mediterranean climate with hot summers, such as Spain and the south of France), and the sole pathway for further releases into the wild has now been dramatically curtailed, this species appears very unlikely to become permanently established here. However, potential future climate change does not rule out the future limited establishment of this species. In the unlikely event that the UK develops a Mediterranean climate before all remaining red-eared terrapins have either died or been removed, this would be most likely to occur in southern England and parts of lowland south Wales.
Summarise Spread	slow - 1	MEDIUM -1	Most red-eared terrapins appear to have been randomly released into water bodies in, or close to, urban areas across the UK. Apart from along rivers and canals, they are very unlikely to be able to spread far from such locations. Even in more suitable rural areas, dispersal would normally occur in hot, wet conditions and it is rarely warm and rainy enough at the same time in the UK to encourage such long distance movements. In addition, since <i>Trachemys scripta elegans</i> is currently unable to breed in the UK, the age class that is responsible for most of the dispersal in the native range (i.e. the hatchlings and juveniles) is not being produced anyway.
Summarise Impacts	minimal - 0	LOW - 0	[N.B. double click on this cell to see all relevant text.] Although this species is a generalist omnivore, adult <i>Trachemys scripta elegans</i> tend to become largely herbivorous in the wild as they mature. This, coupled with the low numbers currently present in the UK, the inability of this species to breed here and the control of the entry pathway, indicates that impacts on other plant or animal species, or any economic or social interests, are minimal or non-existent. Individual terrapins will also invariably be noticed, especially while basking, at particularly sensitive sites and can easily be removed if necessary. The basking behaviour of red-eared terrapins has been suggested as a potential problem for some nesting water birds, although this has never been shown to have had a major impact. Concern has also been raised about this species and <i>Salmonella</i> , although this appears to be largely confined to the pet trade and captive situations and there have been no reports that anyone even deliberately catching and handling this species in the wild has ever contracted <i>Salmonella</i> poisoning. The single most damaging impact that this species has had in many of the countries where it has become established is competition with native, and often already declining, terrapin species. Since the UK has no native terrapin species, this is not a factor here.
Conclusion of the risk assessment	LOW - 0	LOW - 0	<i>Trachemys scripta elegans</i> is having very minimal impacts in the UK under the current situation of relatively low numbers of individuals present in the wild, the complete inability of this species to reproduce here, the limited potential for further spread without human assistance and an increasing recognition by the public that deliberate releases are undesirable. Furthermore, this species is very unlikely to establish itself and become a major problem here, even if climate change allowed it to breed. Even then, it would be relatively easy to control with only moderate resources.
Conclusions on Uncertainty		MEDIUM -1	This risk assessment is reliable for the current situation and present climatic conditions in the UK. It is possible, however, that future climate change may create unforeseen scenarios that would favour the more rapid establishment of this species and cause more severe impacts, although this is considered unlikely.

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