

Section 7

Problem or Nuisance Species

Problem species are defined as those whose presence may have a significant effect on the cSAC species and habitats. In addition to those that are a threat to the cSAC, some species affect the River Avon System SSSI interests and BAP species. However, it is outside of the scope of this strategy to address them.

Species that pose actual or potential threats to the habitat structure and biology of the cSAC are:

- Non-native invasive plants
- Flocks of unmated mute swans
- Signal crayfish
- Fish-eating birds.

In addition, fish such as brown and rainbow trout may be considered as problem species if stocked at excessive levels (for further information refer to Section 5, fisheries management).

Particular attributes related to problem species are relevant to the species and habitats of the River Avon cSAC, and are shown in Table 14.

Table 14. Relevant attributes related to problem or nuisance species

Habitat structure	Extent of refuges
	Area of emergent riparian vegetation
	Extent of submerged and marginal plants
	Extent and composition of <i>Ranunculus</i> communities
Habitat structure (rivers)	Structure and composition of marginal vegetation
Habitat structure (fens/ swamp)	Structure and composition of tall fen and swamp vegetation
Biological disturbance	Introductions

7.1 Non-native Invasive Plant Species

7.1.1 Bankside Species

The impacts and management of non-native invasive plants have become a major concern in many habitats of conservation importance, due to their dominance over native species and difficulty in control. Non-native invasive species grow to the exclusion of other, less-competitive organisms, which leads to a change in the vegetation community. Rivers provide good conditions for the arrival and spread of invasive plants such as Japanese knotweed (*Polygonum japonica*), Himalayan balsam (*Impatiens glandulifera*), and giant hogweed (*Heracleum mantegazzianum*) (IACR 2002). These riparian plants may not directly alter the composition of the in-channel plant community, but can influence conditions in the following way:

- Loss of Desmoulin's whorl snail habitat by out-competing preferred vegetation.
- Loss of bankside vegetation diversity.
- Increased shading and/or siltation (through greater bank erosion).
- Alteration of local geomorphology as well as vegetation, possibly leading to localised flood events (due to Japanese knotweed growing in river channels on exposed bars).

7.1.1.1 Distribution

Japanese knotweed, Himalayan balsam and giant hogweed are all present on the Avon cSAC. There are pockets of Japanese knotweed dotted around the catchment, particularly in Salisbury. At Wilton the Environment Agency is currently involved in eradicating stands at flood defence works. Himalayan balsam is found at low levels through out the catchment – for example, in the Ham carrier and the Dockens Water downstream of Blashford Lakes study centre. Giant hogweed is present at low levels, particularly on the River Nadder and around Ringwood, and is not as virulent as other the other species mentioned.

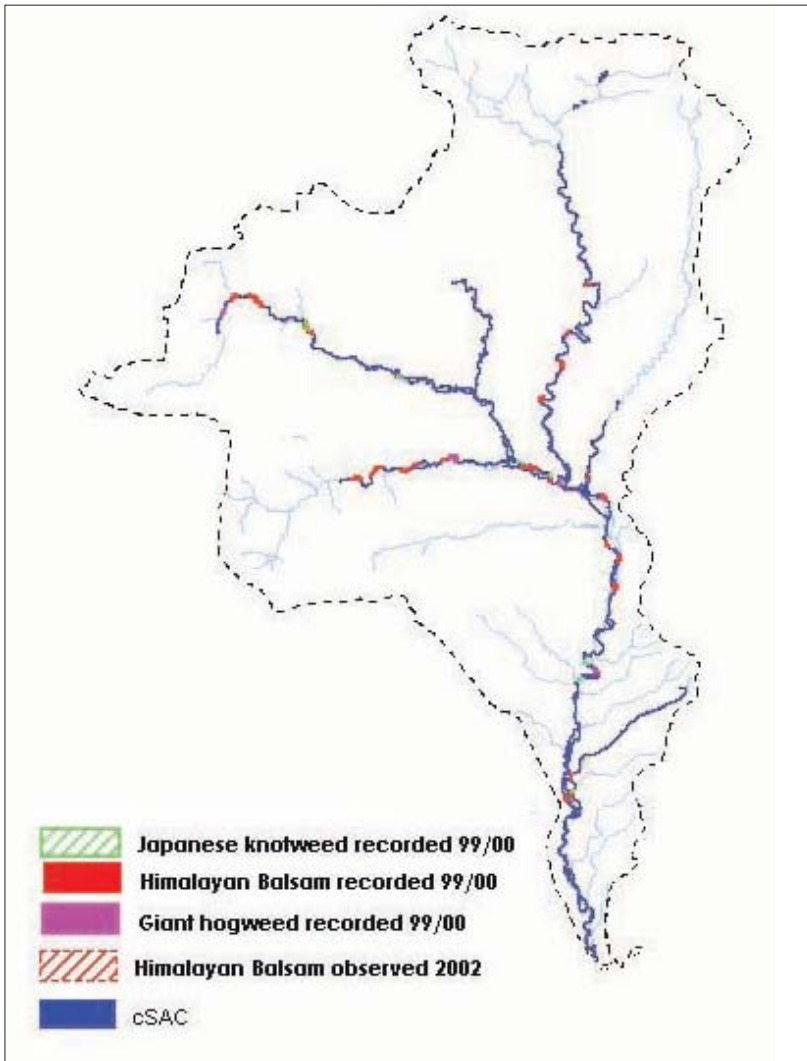


Figure 16. Distribution of Japanese knotweed, Himalayan balsam and giant hogweed recorded in 1999/2000 and observed in 2002.

Figure 16 shows the location of invasive plant species recorded during the 1999/2000 *Ranunculus* survey (Grieve 1999/2000). The survey did not include the Dockens Water, but it is known that Himalayan balsam is present there.

7.1.2 Aquatic species

Species such as Australian swamp stonecrop (*Crassula helmsii*), floating pennywort (*Hydrocotyle ranunculoides*), parrot's feather (*Myriophyllum aquaticum*) and curly waterweed (*Lagarosiphon major*) have had an impact on still and slow-flowing habitats

(ponds, drains, canals). They have not impacted flowing water habitats as yet. In particular, curly waterweed may have the potential to cause a problem in rivers in the UK.

Free-floating aquatic species tend to be confined to static water, usually among emergent vegetation at the margins, or forming floating mats behind obstacles such as fallen trees. Least, or American, duckweed (*Lemna minuscula*) and water fern (*Azolla filliculoides*) occur in these habitats. Invasive aquatic plants can have the following effects:

- Replacing native vegetation, including possible perturbations to *Ranunculus* communities, salmon, bullhead and lamprey habitat.
- Coverage can be so great that the plants die underneath, impacting on water quality by reducing the oxygen available for fish and invertebrates. This die-back may contribute to elevated levels of organic matter deposited on the river bed, reducing substrate suitability for cSAC species.

7.1.2.1 Distribution

Least duckweed is widespread throughout the Avon cSAC, but is confined to the marginal vegetation

(N Grieve pers. com.). Small amounts of North American skunk cabbage (*Lysichiton americanus*) have recently appeared in New Forest streams. Water fern is found in ditches, for example on the Bourne, and around Breamore. Current information suggests that floating pennywort and other invasive species are absent, although they could be present and not recorded. Australian swamp stonecrop is widespread and abundant in several of the Blashford Lakes. Parrot's feather is present near Ringwood and Kingston Common.

7.1.3 Strategic Approach to Invasive Plants

Invasive plant species can be extremely difficult and costly to eradicate even if present at low levels. In the case of Japanese knotweed, management can require several years of repeated action. It would be prudent to begin a control strategy for both aquatic and emergent invasive plant species before they become widespread and prohibitively costly to eradicate. The example of the River Frome may be taken as a warning against inactivity: seven years ago the Frome had small patches of Himalayan balsam that were left uncontrolled, and it now has extensive monocultures of the plant (A Frake pers. com.).



Sue Scott

If left unchecked, non-native plants such as swamp stonecrop can over-run indigenous species and have a negative impact on habitats, such as in the ditch above (not in the cSAC). So far in the Avon system, stonecrop is only widespread in the Blashford Lakes.

In order to develop a comprehensive future strategy for invasive plants, the following must be considered:

- Policy measures to prevent the sale of existing and future invasive plant species
- Information provision and awareness raising
- Collation of existing information on locations of invasive plants
- Development and implementation of effective management techniques.

7.1.3.1 National legislation and policies

There is currently no control on the purchase of many invasive plant species; indeed it is likely that these species are still being planted, which will have implications for the future. National legislation regarding the sale of aquatic invasives would limit the potential for new aquatics to get into gardens and subsequently rivers. English Nature is currently challenging the sale of invasive alien species through the DEFRA review of non-native species policy. The proposal is to add aquatic invasives such as Australian swamp stonecrop to Japanese knotweed and others, which are already illegal to sell. The outcome of the review should be known in early 2003.

There is legislation in the WCA making it illegal to let certain species escape into the wild, but it is unlikely that this legislation is effectively enforced.

Action underway	Delivery		
	By whom	Mechanism	Date
Continue to work to influence the DEFRA review of non-native species, to help prevent the sale and spread of invasive non-native plants.	EN, EA, WTS	Policy review	Ongoing

7.1.3.2 Awareness raising and information provision

At a national level, English Nature, the Environment Agency and the Wildlife Trusts are working to raise awareness of invasive plant species by distributing information to garden centres and the horticultural trade. A database and practical guide to alien invasive plant species are under development and are due to be launched on the English Nature website in 2003.

At a local levels, awareness raising of problem species with landowners, fishing clubs, the general public and retailers is required to reduce the risk of further introductions of invasive plants into the Avon cSAC.

Dorset Wildlife Trust has a campaign to target garden centres in the county. The profile of invasive plant species needs to be raised within the Avon catchment by undertaking a co-ordinated local publicity campaign. There is a wealth of available literature on identifying and controlling invasive plant species and this needs to be actively promoted in the Avon catchment. Publicity information should be tailored to the catchment and include;

- Names and photos of invasive plants
- Why they are a problem
- Who to contact if you see invasive plants
- Where to get advice on management.

There are numerous existing routes through which to disseminate information in the catchment, including newsletters, the press and the Internet. The key is to publicise the issues from several sources, reaching as wide an audience as possible.

Action underway	Delivery		
	By whom	Mechanism	Date
Continue to work at a national level to raise awareness of the impacts of non-native species.	EN, EA, WTs	Publicity campaigns	Ongoing
Continue to work nationally to promote sound practice among garden centres, the horticultural trade and contractors regarding the sale and introduction of non-native plants.			
Action required	Delivery		
	By whom	Mechanism	Date
Undertake a co-ordinated Avon-wide publicity campaign to inform and educate the public regarding the need to take a responsible attitude to the introduction and control of invasive plant species.	*EA, EN, WTs, LA 21	Publicity campaigns	2004?
Inform and educate target groups on identification, sources of advice and management of invasive non-native plants.	EN, LA 21, fisheries and landowner interests	Workshops	2004?

7.1.3.3 Collation of existing data

Existing data on the extent and distribution of invasive plants in the cSAC must be collated in order to manage the existing affected sites and identify any new sites. Current information is patchy, is stored in a

number of locations and is not in a single accessible format. Table 24 details the existing data and suggests actions.

Table 24 . Summary of available data on invasive plants species.

Source of data	Format	Action required
Environment Agency RHS (25% coverage)	Tick box in electronic database Possible to extract	Extraction and mapping in GIS
English Nature <i>Ranunculus</i> database (100% coverage)	Access database	(Mapped information on bankside invasive plants and aquatic species for the cSAC in GIS (excludes Dockens Water))
Biological Record Centres	Paper (vole survey) River monitor data on paper	Extract and map in GIS Check content
Salisbury Project	Paper map for parts of Salisbury	Extract and map in GIS
National plant databases	?	Investigate level of data for Avon cSAC
JNCC rivers database	Electronic database	Extract and map in GIS if applicable

The English Nature *Ranunculus* survey data, including observations of invasive plants, has been input to a GIS-compatible database. This allows mapping of aquatic and bankside invasive plants in the whole cSAC (excluding the Dockens Water) and provide a comprehensive baseline for future reference. Other sources of data can be used to cross-check and add to this database.

Action required	Delivery		
	By whom	Mechanism	Date
Collate information on invasive plant species locations for storage in a central database that is compatible with both Mapinfo and Arcview geographic information systems.	*EN, EA, CERC, CERC, LA, HA, WTs, all bodies undertaking survey Fisheries and landowner interests	Data collation	2004

7.1.3.4 Monitoring

Once the baseline dataset has been established, monitoring of the extent and location of invasive species is required in order to inform decisions on management. Recording is undertaken sporadically by the Environment Agency and others, usually as an aside to surveys whose primary focus is not invasive plants. These data are potentially useful, and need to be captured centrally.

Fishing clubs have detailed knowledge of their stretches of river, and their help would be invaluable in logging invasive non-native plant species and monitoring growth. In order for fishing clubs to monitor invasive plants, some training on plant identification may be required. A standard logbook could be issued for recording and periodic submission to the central administrator of the invasive plants database. Similarly, volunteers from Wildlife Trusts and other organisations could be more involved in monitoring invasive plants.

Action required	Delivery		
	By whom	Mechanism	Date
Ensure that relevant data on invasive plants collected as part of other surveys are input to the invasive species database.	*EN, EA, CERC, HA, WTs, all bodies undertaking survey, fisheries and landowner interests	Data management	2004?
Improve and develop existing recording networks and reporting mechanisms to collect and store information on invasive plants.		?	2004?

7.1.3.5 Advisory service and management

Advice on eradication techniques, health and safety, licences and disposal of invasive plants is already available from the Environment Agency.

In order to minimise the spread of invasive plants, a system must be in place to prioritise the most extensive or rapidly spreading patches of invasives, and carry out management projects. In several counties, including Cornwall and Devon, a forum has been created to identify patches of Japanese knotweed and allocate responsibility for control of the plant. This type of approach is suggested in order to take action on invasive species in the Avon catchment. Following the creation of a forum, a programme of management needs to be put in place. Table 25 contains recommendations for action on particular species. Managing Japanese knotweed presents particular difficulties and should be treated on a case-by-case basis.

Table 25. Summary of recommended action for invasive non-native plant species in the River Avon cSAC.

Plant	Current status	Recommended action	Priority
Japanese knotweed	Present in isolated patches	Eradicate	High
Himalayan balsam	Present in isolated patches		
Giant hogweed	Present in isolated patches	Eradicate	Medium
North American skunk cabbage	Present in New Forest streams at low levels		
Water fern	Present in ditches, not spreading	Monitor	Low
Least duckweed	Present in river margins, not spreading		
Parrot's feather	Absent, prefers still waters	Monitor Eradicate if detected	High
Australian swamp stonecrop	Absent, prefers still waters		
Floating pennywort	Absent, prefers still waters		
Curly waterweed	Absent, prefers still waters		

Action underway	Delivery		
	By whom	Mechanism	Date
Continue to provide an advisory service on management of invasive non-native plant species	EA	Advisory service	Ongoing
Action required			
Create an invasive plant species forum in the Avon catchment, to identify target areas for action and to instigate a programme of appropriate management.	*EN, EA, CERC, LA, HA, WTs, all bodies undertaking survey, fisheries and landowner interests	Forum	2004

Research is being undertaken nationally into biological control methods for invasive plants and should be taken into account once the results are available.

7.2 Mute Swans

In the upper Avon, mute swans feed in the river, and where large flocks are concentrated they can significantly deplete the *Ranunculus* beds, reducing structural and biological habitat diversity. In the middle and lower Avon, the increased depth of channel prevents serious damage occurring. Mute swan grazing has a marked local effect on *Ranunculus* beds in the upper River Avon system, in some instances due to or related to other impacts known to be affecting the *Ranunculus* communities. The effects of intensive swan grazing are:

- Depletion of the *Ranunculus* community and grazing of re-growth, preventing a recovery.
- Reduction of refuges for salmon parr and bullhead due to removal of the *Ranunculus* community.

Refer to Section 2.6.2.8 for further information on the ecological effects of swan grazing.

7.2.1 Strategic Approach to Mute Swan Grazing

In recent years, the populations of mute swans on the upper River Avon and the River Wylye have expanded considerably, with large flocks of unmated mute swans occupying parts of these river valleys. Currently, numbers north of Salisbury seem to have stabilised, while south of Salisbury numbers increased until the mid-1990s but may now be stabilising (D.Trump, pers. com). From the English Nature *Ranunculus* survey (Grieve *et al.* 1999 and 2000) swan grazing was estimated to have affected approximately 30% of the overall cSAC length.

On a narrow stretch of river the establishment of breeding pairs upstream and downstream of a flock can contain them, but it is hard to establish a breeding pair where a large group of juveniles exist. Current management by Wiltshire Fishery Association is aimed at encouraging breeding pairs by avoiding disturbance and providing nesting material and habitat. Recently, black swans have been increasing in numbers, which pressurises the breeding mute swans, as cobs of both species fight for territory.

Action underway	Delivery		
	By whom	Mechanism	Date
A contract to carry out a literature review of the existing information on mute swans on the Avon has been let by English Nature.	EN	Review	2002
Action required			
Collate information on mute swans for storage in a central database that is compatible with both Mapinfo and Arcview geographic information systems.	*DEFRA, EN, EA, fisheries interests	Data collation	2004

7.2.1.1 Collation of existing data

In order to develop a strategy for managing mute swan grazing, the existing information on swan populations in the cSAC must be collated. Table 26 details available data on factors affecting numbers and impacts of mute swans and suggests actions to make the data more accessible.

7.2.1.2 Proposed way forward

It is clear that some fundamental questions must be answered in order to formulate a plan of action to address the effects of mute swans, and to define the role of each interested body. It is also clear that no one body is responsible for or will be able to resolve the issues.

Table 26. Summary of available data on mute swans.

Factor	Details	Available information	Comments
Attractors	Food (land use) improved grassland winter cereals <i>Ranunculus</i> (post-winter barley)	Habitat preference survey by ADAS (then part of MAFF) on Wylve, 1985-8, 1991-2 and 1995-6. Primarily looked at land use but had some elements of in-channel habitat. CSL undertook similar studies 1997-2000 following licensed egg control.	Extract data
	Access points Pools and meanders	WFA knowledge (not recorded)	Needs to be recorded on maps
Physical habitat at preferred locations		Life in UK Rivers geomorphological study, RHS (EA 25% coverage) <i>Ranunculus</i> survey RHS component and swan observations Habitat preference surveys by ADAS and CSL	Extract data and correlate preferred locations and physical habitat (in-channel and land use)
Locations of flocks and numbers		BTO mute swan surveys, <i>Ranunculus</i> survey, DEFRA (MAFF/ADAS) maps 1985-8, 1989, 1991-2 and 1995-6, and CSL studies 1997-2000. David Stone (swan upper) at the Horticultural Research Inst, Stafford. Angling sources in the lower Avon (data passed to D Stone) Further information may be available from Wiltshire Ornithological Society. WFA experience of herding, use of barriers etc.	Collate, extract data and maps. Analyse to see if there are preferred locations
Other factors	Management		Needs formal recording, particularly which techniques work under what circumstances.
	Behaviour		Behaviour is not well understood
Summary of information relating to the Wylve Valley	Deterrence	DEFRA work (little available information). Limited use of shell crackers in 1984-5.	Feasibility of techniques unknown
	Population and habitat use	A summary paper Mute Swans in the Wylve Valley: <i>Population dynamics and habitat use</i> (1994), Trump DPC <i>et al.</i>	Extract useful data

The main questions are:

- Is the impact of swan grazing having a significant effect on the condition of the qualifying interests?
- Is the impact of mute swan grazing a natural impact (the increase in populations a natural change)?
- What factors attract mute swans to the areas they occupy on the rivers Avon and Wylfe?
- Can non-breeding flock sizes and/or impacts be reduced by active deterrence or by habitat modifications to the river channel and/or the wider river valley? If a change in land use (more tussocky grassland, swamp and fen habitats, etc.) would reduce swan damage, this would be in line with the aims of the Environmentally Sensitive Area Scheme, Countryside Stewardship and English Nature management objectives.
- Is there any justification for control of breeding success? Could it contribute to a reduction in swan damage as part of a co-ordinated strategy that addressed other factors bringing mute swans into the area? If so, is the driver the protection of conservation interests or of economic interests?

The determination of the ecological effect of swan grazing has implications as to whether the driver to address swan grazing is the protection of conservation or economic interests. This in turn has consequences for the obligations of English Nature and DEFRA to take action, and the nature of that action.

Action required	Delivery		
	By whom	Mechanism	Date
Determine the ecological impact of mute swan grazing on the cSAC. Depending on the outcome, identify practical options for reducing the impact of swan grazing on the cSAC.	EN, DEFRA, WFA, A&SRA	?	2003/4

7.2.1.2. Monitoring

Fishing clubs in the upper Avon often observe numbers of mute swans, but this information is not formally recorded or collated. Provision should be made within the invasive non-native plant species recording system to record information on mute swans, as the same group of recorders are likely to observe mute swans. In certain sections of the lower Avon information is already recorded by anglers and is passed to the Horticultural Research Institute in Staffordshire.

7.3 Avian Predation

Cormorant numbers have risen rapidly throughout Europe in the last 20–30 years (RDS 2001) including on the Avon. Under the Wildlife and Countryside Act there is provision to prevent birds from doing serious damage to a fishery. Licences to control cormorants to prevent serious losses from fisheries may be issued by DEFRA. Licences are only issued to control limited numbers of cormorants as part of an auditory and visual scaring, proofing (where appropriate) and stocking regime strategy. Numbers of cormorants on the Avon are of increasing concern to fisheries and there has been a rise in successful applications to undertake control measures.

Cormorants are opportunistic feeders and particularly predate on stocked trout and coarse fish, as these are easiest to catch. As long as alternative food sources are available, salmon are not likely to be the preferred catch on the Avon, with the possible exception of smolts at certain points where they accumulate on their migration. Predation on bullhead and lamprey is not likely to be at significant levels.

Goosander are also present and breeding in the Avon catchment and will predate upon salmon, bullhead and lamprey.

The inter-relationship between predator and prey is part of the overall balance between species and it is not currently thought that the control of cormorants or other avian predators on the Avon is required on conservation grounds. However, if numbers continue to rise and a significant effect on conservation interests is shown, the situation may be reconsidered.

During their downstream migration, salmon smolts collect in Christchurch Harbour, where they may be particularly vulnerable to avian predation, providing a relatively concentrated source of food. There could be an opportunity to protect salmon from avian predation in Christchurch Harbour, providing the movements of salmon within the harbour are known. There have been several studies of salmonid movements in the harbour and an assessment of the results is required to determine if they provide enough information.

Action required	Delivery		
	By whom	Mechanism	Date
Keep a watching brief on the number of cormorants and other avian predators and any trends affecting the cSAC.	*DEFRA, EA, EN, fisheries interests, RSPB	DEFRA, EA research	2003+
Carry out an investigation to assess whether there is a likely significant effect on salmon juvenile numbers (particularly smolts) at certain times and places, and formulate appropriate action.			?

7.4 Signal Crayfish

The signal crayfish (*Pacifastacus leniusculus*) is of most concern because of its impact on native crayfish, but it is also negatively correlated with bullhead, suggesting competitive and/or predator-prey interactions. The further spread of signal crayfish could lead to localised extinction of bullhead (Guan & Wiles 1997). The potential effects of signal crayfish on the cSAC features are as follows:

- They can consume large quantities of plant material under certain conditions in their native habitat and may have an impact on *Ranunculus* communities if present in large numbers.
- At high densities they can contribute to increased bankside erosion as a result of burrowing.
- Signal crayfish have a negative correlation with bullhead as well as native crayfish.

The first signal crayfish farm was established at Pewsey in 1984 and within weeks an outbreak of crayfish plague was confirmed. Mortalities of native crayfish along 65 km of the main river were observed within two months of the initial infection (Hutching 1999). The upper Avon was surveyed in 1998 to determine the location and number of signal and native crayfish. Healthy signal crayfish populations were found in the upper Avon (eastern arm) and the upper reaches of the Nadder. The rivers Wylfe and Ebble also contain signal crayfish in apparently small numbers.

The surveys suggest that signal crayfish are not present in large numbers except at the top of the Nadder and Avon, and it is not known if signal crayfish are having a significant effect on the Avon cSAC. The Native Crayfish Species Action Plan is aimed at conserving native crayfish species in the South Wessex area. This includes actions to minimise the introduction and spread of signal crayfish. Unless it is thought that signal crayfish are having a significant effect on the cSAC, no further actions over and above those within the action plan are recommended. However, if the numbers of signal crayfish rise then this situation should be reviewed.

Action underway	Delivery		
	By whom	Mechanism	Date
Support the implementation of the Native Crayfish Species Action Plan and ensure that it is progressed.	EA, EN, WTs	BAP delivery	?
Action required			
Investigate current population densities of signal crayfish in the Nadder and eastern Avon and determine if there has been an impact on bullhead and <i>Ranunculus</i> habitat.	EA, EN, WTs	BAP	?

7.5 Mink

Mink are present throughout the catchment, and pose a particular threat to water vole populations. Provided alternative food sources are available, salmon are not likely to be the preferred catch on the Avon and predation on bullhead and lamprey is not likely to be at significantly high levels. It is not currently thought that mink have a significant effect on the status of the Avon cSAC. However, it is vital that populations are controlled in order to protect water vole populations.