

Invasive Shrimp, *Dikerogammarus villosus*

Briefing Note 1, 11th October 2010

Introduction

The discovery of *Dikerogammarus villosus* at Grafham Water SSSI in Cambridgeshire is a major concern for the Environment Agency and Natural England. This species is an aggressive predator with a high rate of reproduction making it an extremely successful invasive with the potential to spread quickly, and to cause harm to many freshwater ecosystems. We predict that if it becomes widespread it will threaten a number of native species through predation and competition and will have knock on effects for biodiversity and the functioning of freshwater ecosystems widely in the UK.

The shrimp has already colonised parts of Western Europe, killing and outcompeting a range of aquatic species such as freshwater invertebrates, particularly native freshwater shrimps and even very young fish, thereby altering the ecology of the habitats it invades. *Dikerogammarus villosus* was first reported in the UK on 3rd September in Grafham Water reservoir where it occurs in very high numbers, suggesting it may have been there for some time.

What is being done?

The Environment Agency has led extensive investigations of waters around Grafham and thus far these have not found evidence that the shrimp has spread beyond the reservoir and Diddington Brook, its outflow stream, either naturally or through transportation by human activity. Surveys by Anglian Water of all its other water bodies have also found no sign of the species so far. This situation remains under review and surveys of other waters across the country may change this picture over the coming weeks and months.

As soon as we were alerted to the presence of the invasive shrimp we worked together to develop a joint assessment of the risk of further spread. We have set up a cross-agency technical advisory group, including external specialists, which is advising on the risks posed and actions required at the reservoir to minimise the risk of spread. The Environment Agency has assumed the role of coordinating measures locally and nationally and with Natural England is advising Defra which has the overall policy role for non-native species. Operational decision-making lies with Anglian Region of the Environment Agency, which is working closely with Anglian Water (the owners of Grafham Water) and with the users.

The measures in place currently include wash-down and clean-off facilities and biosecurity measures to be followed by boaters and anglers using the lake. Anglian Water has also stopped the flow into the local brook and installed mesh screens to act as a barrier to shrimp entering the brook. Together, we are keeping this action plan under review in the light of the technical group advice, feedback from operators and users, results of further survey work, and lessons from abroad. Any further measures will be discussed with the owners, and the interests of users will continue to be taken into account.

Whilst the immediate focus has been on containment, the cross-agency technical group has also been evaluating the feasibility and costs of eradication and longer-term control options. We will work with Defra to establish what further action is needed in the longer-term.

How did it get there?

It is not known how *Dikerogammarus villosus* arrived at Grafham Water, but given its wide tolerance of salinities and its high abundance in parts of Europe, a number of routes are possible. Each of the potential pathways is being evaluated to understand mechanisms of spread so that we can minimise risk of movement out of Grafham. The discovery has highlighted the need for vigilance and effective biosecurity measures to deal with other non-native species entering UK freshwaters given their potential ecological and economic impact.

What can your organisation do?

It is important that anyone carrying out any monitoring or surveillance work on freshwaters should be vigilant and report any sightings of *Dikerogammarus villosus* to alert_nonnative@ceh.ac.uk. An identification guide is available at <https://secure.fera.defra.gov.uk/nonnativespecies/alerts/index.cfm?id=3>. We are also urging all water users who have recently used Grafham Water to ensure they follow measures in place to make sure equipment is thoroughly cleaned to prevent the species spreading to other waters. More generally it is always good practice to wash off any equipment which has been in contact with the freshwater environment in order to minimise the risk of spreading a host of non-native species.

The potential impact of *Dikerogammarus villosus*

Dikerogammarus villosus is thought to be one of the most damaging invasive species in Europe. The UK Technical Advisory Group for the Water Framework Directive (UKTAG) has included it on their list of high impact species and it is in the 'Top 100' of invasive species in Europe (www.europe-aliens.org). It has the potential to significantly affect the ecology of our major rivers, canals and lakes.

It has spread rapidly across Europe following the opening of the Rhine-Main-Danube canal in 1992. This links the crustacean's home waters (the region of the Caspian and Black Seas) to Western Europe, so the shrimp is now found in many countries including Holland, Belgium, Germany and France.

Many water bodies in the UK will be suitable for *Dikerogammarus villosus*. If it spreads from its current location, experience in Europe suggests that it will spread rapidly (up to 125 km a year) throughout connected water bodies. The rate of spread to isolated lakes and reservoirs is less certain, but it is likely to be aided by human vectors. In time, it could also potentially colonise faster-flowing waters, so the problem may not be confined to sluggish rivers, canals and lakes.

The shrimp is likely to have a significant impact on the ecology of water bodies. Its occurrence in Europe has been associated with a decrease in the diversity and abundance of invertebrates, so we can assume that it will cause some deterioration in the biological and conservation status of some water bodies in England and Wales. It has also been observed to replace our native shrimp (*Gammarus pulex*) in field and lab experiments. At present we do not know how much of an impact there will be. In Europe it is known to eat the eggs and fry of fish that spawn on the stony margins of lakes. The potential effect on other fish is not yet known.

Context to the response

The Non-native Species Secretariat has responsibility for helping to coordinate the overall approach to invasive non-native species issues in Great Britain. They are responsible to the GB Non-native Species Programme Board which represents the relevant governments and agencies of England, Scotland and Wales. Their approach to non-native species is summarised in the Invasive Non-native Species Framework Strategy, which is intended to provide a strategic framework within which the actions of government departments, their related bodies and key stakeholders can be better co-ordinated.

More information on the Non-native Species Secretariat can be found at:
<https://secure.fera.defra.gov.uk/nonnativespecies>

If you have any queries or would like further information about the shrimp and the actions taken to control its spread, please contact Mark Diamond of the Environment Agency at:
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