



Invasive Shrimp, *Dikerogammarus villosus*.

Briefing Note 2, 22nd December 2010

Introduction

The invasive non native shrimp, *Dikerogammarus villosus*, was first reported in the UK on 3rd September in Grafham Water SSSI in Cambridgeshire. Briefing note 1 (dated 11th October 2010) outlined the local and national response to the discovery at Grafham Water. It has subsequently been detected on 25th November in Cardiff Bay, and on 26th November in Eglwys Nunydd reservoir (Port Talbot), in Wales*. This note is aimed at providing an update on the emerging situation.

D. villosus is an aggressive predator with a high rate of reproduction. It is 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 wider functioning of freshwater ecosystems 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.

What is being done?

The response to this species in England and Wales is being led by a Task Group chaired by the Environment Agency and involving Defra, Welsh Assembly Government, Natural England and Countryside Council for Wales. Sub-groups with wider membership will be established as necessary. The Task Group will coordinate delivery of the response plan and the key high level actions necessary to contain *D. villosus*, to prevent further spread and protect vulnerable sites from invasion. This group will oversee a series of projects aimed at addressing these issues and will report to the GB Non Native Species Programme Board.

The Environment Agency has led extensive investigations of waters around Grafham and thus far the shrimp has not been found beyond the reservoir and its immediate outflow. Anglian Water has surveyed all its other water bodies and has likewise not detected the species elsewhere.

Environment Agency Wales is surveying high risk and ecologically important sites across Wales. Although sampling to date has not detected the shrimp at other locations, this work is ongoing and has been delayed by adverse weather conditions.

Biosecurity measures at Grafham continue to be in place and include washdown and inspection of fishing and sailing equipment which has come into contact with the reservoir. The flow of water from the reservoir into the local brook has been shut off, and mesh screens and a dam installed to prevent the shrimp spreading further. Initial local survey results suggest that containment efforts

* corrigendum note: a previous version of this document referred to the Wales discoveries as having been on 28th November which is the date they were confirmed, rather than discovered.

at Grafham have so far been successful. Monitoring of local waters and testing of biosecurity measures is continuing to improve confidence in the effectiveness of containment measures.

Cardiff Harbour Authority is implementing biosecurity measures which include requiring all water users to check, clean and air-dry their equipment. This is reinforcing biosecurity controls already in place because of the presence of another non native; zebra mussels, *Dreissena polymorpha*, in the Bay. Tata Steel UK, the owner of Eglwys Nunydd, is working with anglers and boaters using the site to implement biosecurity measures including cleaning and drying tackle, boats and other equipment.

The possibility of additional containment measures is being reviewed with Tata Steel and Cardiff Harbour Authority including assessments of potentially connected waterways associated with the sites.

How did it get there?

It is not known how *D. villosus* arrived in the UK. Given its wide tolerance of salinities and its high abundance in parts of Europe there are several possible transmission routes. Genetic studies are being undertaken to characterise the UK populations to see which populations in Europe they most resemble.

What can your organisation do?

The central information point for the invasive shrimp is the GB Non Native Species Secretariat website <https://secure.fera.defra.gov.uk/nonnativespecies/alerts/index.cfm?id=3>.

This includes information on how to identify the shrimp and interim guidance on biosecurity measures for anglers and boaters.

Keep up to date with this website as it will be periodically updated as new information and guidance becomes available.

It is important that anyone monitoring or surveying freshwaters be vigilant and report sightings of the invasive shrimp via the NNSS website. Where *D. villosus* is detected equipment should be disinfected and dried in the same way as for anglers and boat users. In particular you should be vigilant at water bodies with stony or artificial substrate, and those containing zebra mussels.

It is always good practice to clean thoroughly and, if possible, dry 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. For *D. villosus* specific biosecurity advice, please refer to the link above.

The potential impact of the invasive shrimp

D. 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 as well as some brackish habitats.

D. villosus 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 the Netherlands, Belgium, Germany and France.

Many water bodies in the UK will be suitable for *D. villosus*. In particular the species appears to favour still or slow flowing waters with stony or artificial substrate. It has also been regularly observed to co-exist with zebra mussels, another invasive non native from the same geographic area, which create a habitat complexity suitable for *D. villosus*. If it spreads from its current locations, 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 likely to rely on human vectors.

The shrimp is likely to have a significant impact on the ecology of affected water bodies, through direct predation, competition and indirect affects at other trophic levels. It is an aggressive predator which predated a number of invertebrates including other amphipods, mayflies, damselfies, leeches, chironomids, cladocera, isopods and snails. It has also been observed to replace our native shrimp (*Gammarus pulex*) in field and lab experiments. 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 deterioration in the biological and conservation status of affected water bodies in England and Wales. There are also likely to be impacts at higher trophic levels, on other food web interactions and on wider ecosystem functioning, but at present we do not understand the extent or precise nature of these impacts. In Europe *D. villosus* 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 for Great Britain, 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:

www.nonnativespecies.org

Further information

If you have any queries or would like further information about the shrimp and the actions taken to control its spread, please see

<https://secure.fera.defra.gov.uk/nonnativespecies/alerts/index.cfm?id=3>

or contact Mark Diamond of the Environment Agency at: mark.diamond@environment-agency.gov.uk