Invasive Shrimp, *Dikerogammarus villosus.*
Briefing Note 4, September 2011

Introduction

The invasive non native shrimp, *Dikerogammarus villosus,* was first reported in the UK on 3rd September 2010 in Grafham Water SSSI in Cambridgeshire, and was subsequently detected on 25th November in Cardiff Bay, and on 26th November in Eglwys Nunydd reservoir (Port Talbot), in Wales. Previous briefing notes are available on the Non-native Species Secretariat website[1].

The potential impact of *D.villosus*

D. villosus is considered 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[2] and it is amongst the 'Top 100' invasive alien species in Europe[3]. A rapid risk assessment, (also available on the Non-native Species Secretariat website), undertaken on behalf of the GB Non-native Species Programme Board scored this species 'very high risk' for impact and 'high' risk overall. It has the potential to significantly affect the ecology of our major rivers, canals and lakes as well as some brackish habitats. More information on its impacts can be found on the Non-native Species Secretariat website[1].

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

Managing the response to *D.villosus*

The response to this species in England and Wales is being led by a Task Group comprising staff from Defra, Welsh Government (WG) and expert advisers from the Environment Agency, Natural England and the Countryside Council for Wales. The Task Group will coordinate the national response plan and delivery of the key high level actions which include:

- containment of known populations;
- promoting bio-security measures;

[1] www.nonnativespecies.org/alerts/killershrimp
[2] http://www.wfduk.org/tag_guidance/Article_05/Folder.2004-02-16.5332/alien_tag_table
[3] www.europe-aliens.org

- surveillance and monitoring;
- managing the risks at high value nature conservation sites; and,
- commissioning/supporting key research to improve our understanding of the shrimp and how best to manage its impact.

The Task Group reports to the GB Non Native Species Programme Board and to ministers via Defra and the Welsh Government.

One year on:

Status update:
To date there are still only the three known populations. This is very encouraging and suggests that the superb joint effort of everyone involved to raise awareness, contain these populations and implement bio-security practices is helping to protect our waterways from significant harm. However, there is absolutely no room for complacency as preventing its spread remains a serious challenge.

Containment action:
Site owners, operators and user groups at the affected sites have developed risk assessments for their activities and are implementing bio-security measures (e.g. jet washing) and other appropriate containment actions (e.g. installing barriers at Grafham Water and Eglwys Nunydd reservoirs). These groups continue to work very closely together on their bio-security measures and are being supported by advice from STAG & local Environment Agency, Natural England and Countryside Council for Wales officers as appropriate. Clear signage about the shrimp has been erected at all key access points around the affected sites alongside active promotion amongst the users and operators.

Bio-security guidance can be found on the Non Native Species Secretariat's website[1], including:
- Bio-security advice for the general public, anglers and water users
- Bio-security posters to download and post at your local water body
- Supporting information about identification, risk assessment and updates

Surveillance and monitoring:

The Environment Agency has developed a monitoring programme which includes over 4,300 sites across England and Wales to provide extensive coverage of English and Welsh water bodies, (see map at annex 1). This programme includes site specific monitoring around known *D.villosus* locations along with surveillance at vulnerable sites and additional checks made at routine monitoring locations. The programme includes different monitoring techniques including using specially designed traps at vulnerable sites as well as kick sampling at all other ecology monitoring sites. The accompanying map, which is also available on the Environment Agency website[4], shows the coverage of these sites. The Agency working with Natural England and the Countryside Council for Wales, has agreed criteria to identify 'vulnerable' sites. These criteria relate to presence of suitable

[4] http://www.environment-agency.gov.uk/homeandleisure/wildlife/123281.aspx

habitat for *D.villosus*, nature conservation importance, presence of other risk factors and recreational use for fishing or boating. Seventy percent of these 262 sites (49 of which are in Wales) have now been monitored and no further occurrences of *D.villosus* have been confirmed. To date, reports of suspected outbreaks have been native Gammarus species.

Focus on nature conservation sites:

Natural England and the Countryside Council for Wales are promoting bio-security awareness amongst owners and recreational users of those 'vulnerable' sites which are designated sites of nature conservation importance. Local staff are engaging directly with site owners, clubs and other users to provide advice, guidance and signage. The objective is to work with local stakeholders to improve bio-security at these locations and reduce the risk of introducing the killer shrimp and other invasive non native species.

Research and evidence:

The Scientific and Technical Advice Group (STAG) provides expert advice and is maintaining an overview of current research activity. No significant control of the species has been achieved on the continent therefore we are at the forefront in terms of implementing an effective response.

Key research activity is underway including:

- a study funded by the Esmee Fairbairn Foundation and Natural England investigating the implications for biodiversity of invasion by *D.villosus*, including whether the predatory impact and prey range as observed in Europe would be similar in the UK; whether the shrimp may carry parasites or be affected by parasites in the UK; and the factors affecting its potential spread. This is being led by Cambridge University, supported by the University of Leeds and Queen's University, Belfast;
- Defra has commissioned CEFAS to investigate suitable disinfectant substances that might be usable to enhance the effectiveness of bio-security measures whilst also being safe and practical for use in the field.

Against the background of current surveillance results and the support for implementation of bio-security measures, proposals for a preliminary investigation into whether there are viable means to achieve significant control of *D.villosus* populations are under development. This will involve a scoping study to investigate what means there may be to enable large scale control or eradication of the species in water bodies of various sizes. A study using Defra Water Framework Directive funding to better understand the introduction pathway for highly invasive Ponto-Caspian species like the shrimp and the zebra mussel is also under development.

As knowledge and understanding improves, information is also being made available in various ways, including via published papers such as those listed below:

- Drew Constable and Nina J Fielding (2011), Dikerogammarus villosus: An Anglian Perspective, *In Practice: Bulletin of the Institute of Ecology and Environmental Management,* ***72****,* pp. 9-11.

- Fielding, N., Constable, D. and Hall, N. (2011). Dikerogammarus villosus: preliminary trials on resistance to control measures, *FBA News, **54**,* pp. 16-17.
- MacNeil, C., Plavoet, D., Dick J.T.A., Fielding, N., Constable, A., Hall, N., Aldridge, D., Renals, T. and Diamond, M. (2010). The Ponto-Caspian 'killer shrimp', Dikerogammarus villosus (Sowinsky, 1894), invades the British Isles, *Aquatic Invasions*, **5 (4),** pp.441-445;
- Madgwick, G & Aldridge, D. C. (2011). Killer Shrimps in Britain: hype or horror? The facts about our latest invasive animal. British Wildlife. Vol. 22. Number 6. 408-412.

Communications activity:

The shrimp has been a trigger for both species-specific and more generic awareness activity via the "Stop the Spread – Check, Clean Dry" campaign supported by a wide range of bodies. In addition to site-specific activity, partners, which include recreational bodies, NGOs and other relevant/interested organisations, have been raising awareness of this issue amongst their memberships and this is greatly welcomed. In August, the Environment Agency issued a Top 10 list of most wanted alien invaders which had the shrimp at the top of the list[5]. With the benefit of WFD funding from Defra, the communications group is planning its next phase of activity including:

- ***promoting the campaign at the Southampton Boat Show in September;***
- ***developing the Check-Clean-Dry online presence and increasing its profile; and,***
- ***working with partners to identify further opportunities to spread the message of the campaign.***

Further work on the campaign planned for 2012 and 2013 is expected to include identifying other key events, developing more collateral material to enhance awareness raising activity, and developing contacts with relevant publications and other media opportunities.

In Wales, EAW has been pro-actively working with the media (e.g. BBC & HTV) and others to promote key messages on bio-security measures and monitoring work to help maintain awareness and ensure these messages reach the widest possible audience.

Partners and the public:
The Check-Clean-Dry message is also being spread by partners involved in the many local/county/catchment based action groups around the country with the campaign brand being displayed on their websites and their members being urged to remain vigilant and report any suspected detections via the GB Non-native Species Secretariat website[1]. Encouragingly, there have been several public reports of suspected detections which were immediately investigated. Thankfully these have been false alarms, but the support of the public is greatly welcomed.

Northern Ireland and Scotland:
In Northern Ireland efforts to date have focussed on raising awareness of the threat of the killer shrimp following its detection in GB. Awareness efforts have included an

[5] http://www.environment-agency.gov.uk/news/132163.aspx?page=6&month=8&year=2011

alert poster being posted on the Invasive Species Ireland website, articles have been placed in several widely distributed local angling newsletters and a press release was issued by the Northern Ireland Environment Agency in September 2010 warning of the threat of the killer shrimp (see http://www.northernireland.gov.uk/index/media-centre/news-departments/news-doe/news-doe-september-2010/news-doe-200910-water-users-warned.htm). In addition a targeted e-mail alert and identification key was issued to relevant staff from various Departments and organisations who are involved in fieldwork. To date there have been no detections in Northern Ireland or the Republic of Ireland.

In Scotland, the "Stop the Spread – Check, Clean Dry" will be formally launched by the minister on 27 September and key officials have attended meetings of the joint England/Wales Task Group to maintain latest awareness. Scottish Environment Protection Agency ecologists have been on high alert, looking out for *D.villosus* at all their monitoring sites but with no reports to date. All field staff have been reminded of their responsibly to implement suitable bio-security measures during fieldwork, in accordance with the SEARS bio-security guidance: http://www.scotland.gov.uk/Publications/2009/06/e2412655/link

What can your organisation do?

Key information and advice about the response to the shrimp is available from the central information point for the invasive shrimp at the GB Non Native Species Secretariat website: www.nonnativespecies.org/alerts/killershrimp This website will be periodically updated as new information and guidance becomes available.

Anyone undertaking activities in our freshwaters, and especially at water bodies with stony or artificial substrate and those known to contain zebra mussels, should implement bio-security measures. They should also remain vigilant and report any suspected sightings of the invasive shrimp, and encourage others to become more aware of the threats and to generally adopt good bio-security practice.

It is always good practice to inspect, clean thoroughly and dry any equipment which has been in contact with the freshwater environment to minimise the risk of spreading non-native species. For bio-security advice, please refer to the link above.

ACKNOWLEDGMENT:

The GB Non-native Species Programme Board and the Task Group would like to express their gratitude to all those involved in responding to the shrimp at the affected sites, all those experts who have given freely of their advice and knowledge and all those colleagues and partners who are helping to raise awareness and promote bio-security practice. Whilst there is still much to do and key questions that still need answers, together we have achieved a great deal through voluntary commitment and partnership in the last year to protect our waters from a species that has been un-stoppable in continental water bodies.

Further information

If you have any queries or would like further information about the shrimp and the actions taken to control its spread, or if you feel your organisation can help, please visit:

www.nonnativespecies.org/alerts/killershrimp

You can contact the GB Secretariat at the above address or by email at:
nnss@fera.gsi.gov.uk

ANNEX 1 – Map showing the coverage of Environment Agency monitoring sites:

our monitoring programme

Monitoring for killer shrimp in England and Wales

The Environment Agency carries out extensive monitoring to identify animal species in water bodies across England and Wales. In addition to this programme, our staff have identified 262 additional locations which are suitable habitats for killer shrimp or have links with Grafham Water and Cardiff Bay where the killer shrimp has been identified.
Monitoring at all of these locations would pick up the presence of the killer shrimp.