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Water Supply Project

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Volume 6 of 6: Appendices

(Appendix 8.19) Aquatic Invasive Species Survey Report 2021

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WATER SUPPLY PROJECT
EASTERN AND MIDLANDS REGION

Report on
Aquatic Invasive Species Survey at Lough Derg and Parteen Basin Abstraction Site

August 2021

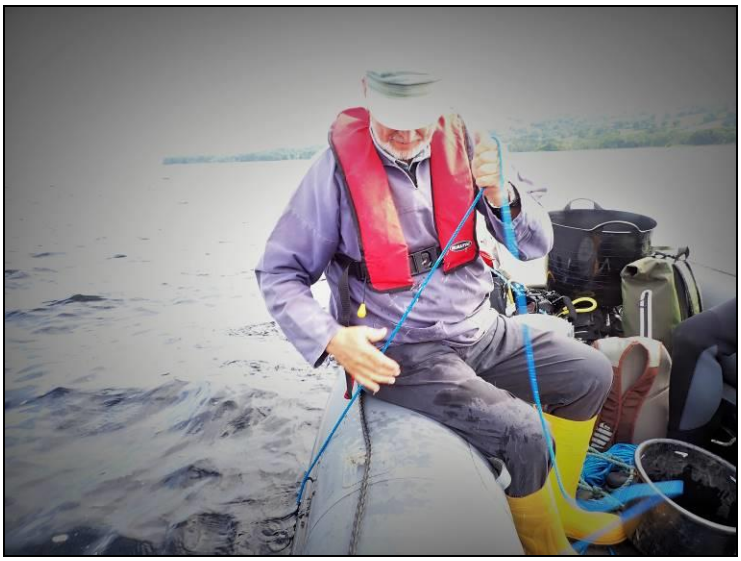

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Table of Contents

1. Introduction

This report present the results of a survey to determine whether the Asian clam (*Corbicula fluminea*) has spread from its previously recorded range (LDSG, 2016) within Lough Derg and has established within the Parteen Basin or in the vicinity of the proposed intake for the Water Supply Project (WSP).

The Asian Clam is a non-native invasive species as listed under the Third Schedule (Part 1) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No 477 of 2011). The species was first recorded in the River Shannon at Carrick-on-Shannon in 2010 and in Lough Derg in January 2011(LDSG, 2016). Since then, the clams have continued to extend their range into bays on the west side of Lough Derg and have also generally increased in their density occurring in depths of >20m in the Dromaan Deep.

2. Methodology

The survey entailed a two tier approach as follows:

1. Basket dredge survey in lower Lough Derg to determine presence of clams.

2. Basket dredge and Scuba survey in Parteen Basin at the intake site, with further dredges at intervals in the basin between the intake site and the narrows at Ballina - Killaloe.

The first tier survey was focussed on the lower section of Lough Derg from south of Rinnaman Point to within c200m of the Ballina Killaloe Bridge. A number of dredges were carried out at series of locations and depths along a transect from the open lake to the narrows. A 4.5m RIB was used as the survey vessel. Samples were sifted in the water before hauling aboard to remove fine sediments. Samples were then sorted though in small amounts to check for presence of Asian Clam, the juveniles of which can be as small as 2mm in length. The basket dredge was made using a Sunnex® stainless steel wire meshed basket of 260 mm open diameter, 300mm height and 180mm bottom diameter, all basket surfaces, and the base, had a diagonal mesh of 5mm. One side was weighted with a tied-in lead sheet. A bridle with a net float was attached to the upper half of the basket rim to ensure a correct sampling position.

The second tier survey involved sampling using the dredge in the vicinity of the WSP intake location, and at intervals between the intake and the narrows downstream of the Ballina Killaloe Bridge. The locations of dredge surveys is shown in Figure 1. In addition, a SCUBA survey was undertaken at the intake location which allowed for a visual assessment of the substrates and associated biota, and allowed for the collection of further sediments for sieving within the support vessel to determine presence of juvenile clams.

The SCUBA survey was undertaken by a suitably qualified and experienced team comprising Paul Murphy (HSE Part IV, PADI Dive Master) as lead diver, Brian Murphy (HSE Part IV, II & I, PADI Dive Instructor) as standby diver and John Kinsella (HSE Part IV, PADI Dive Instructor) as dive supervisor and boat coxswain. Dr Dan Minchin provided technical knowledge on suitable locations to undertake the dredge in the channel between Lough Derg and Parteen Basin, and provided confirmation on species identification.

GPS positions of dredge locations were recorded along with a photographic record of habitats and key features along transects.

The weather at the time of survey was dry, bright (cloud cover 3/8) with temperatures of approximately 25^{o}C and light variable winds (F1-2).

A Biosecurity protocol was rigidly followed to avoid the potential for transfer of invasive alien species to or from the site in accordance with guidance produced by Invasive Species Ireland and Inland Fisheries Ireland (*Decontamination and Disinfection procedures for equipment and personnel*). A specific Biosecurity Method Statement was produced for the survey operation.

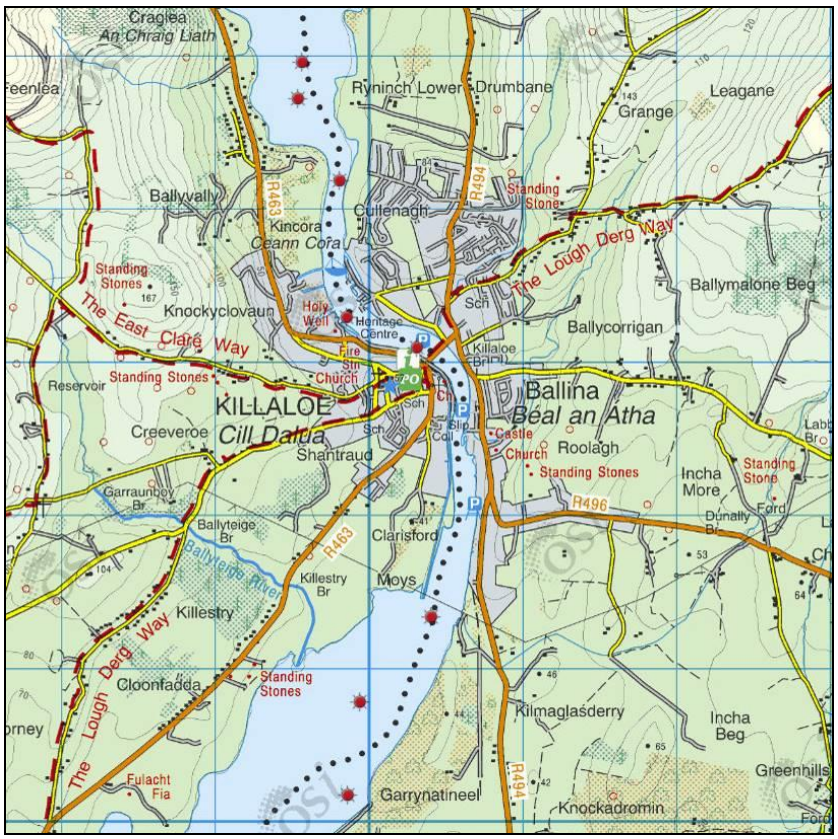

Figure 1. Dredge survey locations for Asian Clam in Lough Derg and Parteen Basin (red dots). (*Source: NPWS Mapviewer*)

3. Results

3.1 Overview of Dredge Results

The dredge surveys for Asian Clam found no evidence of live or dead shells at any of the station surveyed. All samples collected were dominated by the Zebra mussel (*Dreissena polymorpha*) in addition to a small number of the non-native invasive species Quagga mussel (*Dreissena rostriformis bugensis*) from dredges No. 1 and 2 in the lower end of the Lough Derg basin (see Figure 2 and 3). A summary of the results of the dredges is presented in Table 1.

Table 1. Results of dredge surveys in Lough Derg and Parteen Basin June 2021.

Dredge no.	Position	Depth	No. of hauls	Contents
1	52º 49' 25" N 08º 27' 07" W	5-8m	2	Extensive mud. *Nitellopsis obtusa* with extensive attachment of small *D. polymorpha* and abundant larger free individuals.
2	52º 49' 50" N 08º 27' 13" W	~20m	2	Some mud, *N. obtusa* (drift) with no apparent *D. polymorpha* attached. Some free individual along with dead *Anodonta anatina* shell.
3	52º 49' 09" N 08º 26' 54" W	~16m	1	Extensive settlement of *D. polymorpha* on small pebbles.
4	52º 48' 40" N 08º 26' 53" W	~7m	2	Extensive settlement of *D. polymorpha* on small pebbles.
5	52º 48' 32" N 08º 26' 44" W	~7m	1	Large stone with attached *D. polymorpha*.
6	52º 48' 31" N 08º 26' 29" W	~6m	1	*D. polymorpha* possibly scraped of larger stones.
7	52º 46' 56" N 08º 26' 48" W	~6m	1	Extensive mud. Some *D. polymorpha* attached to dead *A. anatina* shell and large pebbles. Abundant chironomids and singe *Aphelocheirus aestivalis*.
8	52º 47' 22" N 08º 26' 34" W	~5m	1	*Sparganium angustifolium* occasional. *D. polymorpha* frequent on small stones.

The Quagga mussel has been found previously in the Lough Ree where it is currently abundant in Lough Ree over a wide range of depths (Minchin pers. comm.). They had not been recorded in Lough Derg before though are reported to occur in the Shannon river between the two lakes.

The quagga mussel is native to Ukraine and during the last few decades has spread through Western Europe and to North America and Mexico. It was first recorded in Britain in 2014. The species looks very like the zebra mussel and leads to a similar suite of impacts including pipe blockages, hull fouling and reduction in aquatic biodiversity by forming high densities on the bottom of lakes and rivers.
The quagga mussel, like the zebra mussel, is also a filter feeder removing planktonic organisms from the water column. It has a high filtration rate likely to result in further changes to water quality and nutrient dynamics of, in particular, lakes. The quagga mussel is also likely to compete with the zebra mussel and native species as it has a wide ecological tolerance and appears to have a preference for cooler water in addition to being able to settle on finer sediments than the zebra mussel.

In addition to the Zebra mussel and Quagga mussel, the dredges yielded a small number of the dead shells of the Duck Mussel (*Anodonta anatina*), which was used as an attachment substrate by large numbers of Zebra mussel. No live Duck mussel were recorded and the distribution of the species within Lough Derg and the Parteen Basin is likely to be significantly impacted by the settlement of Zebra mussel. A single individual specimen of the native Hemipteran bug *Aphelocheirus aestivalis* was recorded from a dredge in the Parteen Basin.

The non-native Charophyte Starry Stonewort (*Nitellopsis obtusa*) was recorded from several dredges in Lower Lough Derg, where this invasive species was found to support settlement of juvenile Zebra mussel. Starry Stonewort was first recorded in Lough Derg and the Parteen Basin in 2016 (Minchin et. al, 2016), though it is suspected to have been present for many years prior to discovery due to the extent of the beds it formed. It occurs to a greater depth than other submerged macrophytes within the lake system, including other non-native species.

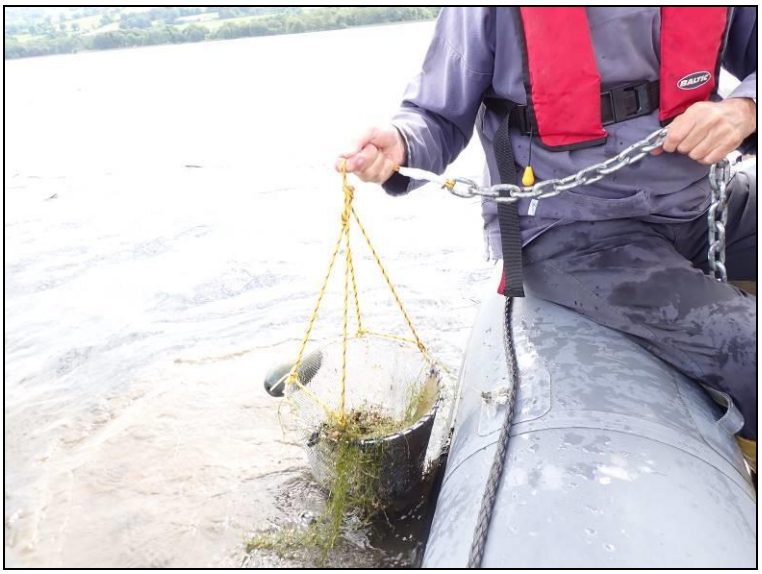

Figure 2. Dredge sample (5-8m) being retrieved with *Nitellopsis obtusa* and *D. polymorpha*.

Figure 3. Dredge sample (~20m) with dead shells of *Anatina Anodonta* and *D. polymorpha*.

3.2 Overview of SCUBA Survey

As previously described from earlier reports on the aquatic ecology at the proposed WSP intake location (EirEco, 2017 & 2019), the shoreline in the vicinity of the proposed abstraction is gently shelving with the upper shore comprised of cobble and gravel. At a distance of approximately 5m offshore with a depth of 1m depth of water, the substrate changes from cobble and gravel to a silty, sandy gravel with scattered coble and small boulder. This continues to a depth of approximately 2.5m where it becomes a silty sand, while from 3m and deeper it is comprised of a fine silt.

The shallow upper shore zone (to approximately 0.5m) has cobbles covered with krustenstein, a blue-green algal crust associated with oligotrophic alkaline waters. The substrate has a dense covering of horned pondweed (*Zannichellia palustris*) with small amounts of stonewort (*Chara virgata*) (Figure 4). A moderate amount of algal cover, was noted which was not evident during the survey in 2017. Willow moss (*Fontinalis antipyretica*) is present though primarily confined to the roots of fringing trees that are exposed on the lake shore. Zebra mussel was recorded as occasional in small quantities on cobbles.

In water from 1.0 to 1.5m in depth, small amounts of stonewort are present, though much of it appears to be unrooted drift material. Yellow water lily (*Nuphar lutea*) and the submerged form of bulrush (*Schoenoplectus lacustris*) are occasional to frequent, and the submerged form of arrowhead (*Saggitaria sagittifolia*) forms isolated dense stands. Both shining pondweed (*Potamogeton lucens*) and perfoliate pondweed (*P. perfoliatus*) occur in small amounts along with Nuttall's pondweed (*Elodea nuttallii*). Cobbles still retain some krustenstein cover along with small amounts of zebra mussel. Areas devoid of vegetation have a thin mat of coalescing algae cover, while there are pockets of cloud algae in slightly deeper water.

In water from 1.5m to 2.5m in depth, both bulrush and arrowhead form dense stands with occasional clumps of yellow waterlily. The bulrush forms emergent reed beds while the arrowhead remains in submerged form. Both dominant species thin out towards 3.0m depth and small amounts of ivy-leaved duckweed (*Lemna trisulca*) occur on the lake bed. No macrophytes were recorded below 3.5m (euphotic depth) though zebra mussels were recorded in small amounts to 5m in depth, forming dense aggregations on any hard substrate.

No evidence of Asian Clam was recorded during the dive survey, and there was no significant change observed on the aquatic ecology from the previous surveys undertaken at the site in 2017 and 2019 (EirEco 2017 & 2019).

4. Conclusion

No evidence of Asian Clam was recorded during the dredge surveys undertaken in lower Lough Derg and in the Parteen Basin. Small numbers of Quagga mussel were however recorded at some of the dredges in the lower Lough Derg samples. This species of mussel has only recently been recorded from Lough Ree (in 2016), but as with the more widespread Zebra mussel, is likely to spread rapidly as a result of larval settlement on the hulls of please craft moving along the Shannon system which is now connected for navigation with the Erne system to the north. In view of its higher environmental tolerances, Quagga mussel is likely to out-compete the Zebra mussel and present an even greater ecological impact on indigenous aquatic biota as well on aquatic infrastructure.

The results from the dive survey at the proposed WSP intake location found there was no significant change observed on the aquatic ecology from the previous surveys undertaken at the site in 2017 and 2019 (EirEco 2017 & 2019). Zebra mussel were widespread in the vicinity of the abstraction location and occurred in large numbers on suitable surfaces.

5. References

EirEco Environmental Consultants (Sept. 2017). *Water Supply Project Eastern and midlands region; Report on Aquatic Ecological Survey at the Proposed Parteen Basin Abstraction Site 2017.*

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