ENNISCORTHY FLOOD DEFENCE SCHEME, ENNISCORTHY, CO. WEXFORD

Fish Translocation/Salvage Outline Methodology

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INTRODUCTION

All instream construction activities have the potential to kill fish and it is standard practise to translocate these fish out of the way of works or rescue them from areas enclosed or dewatered. In the current project temporary isolation structures (piling) will be erected in the river and fish may become trapped inside if they are not moved out of the way they will die when the enclosure is pumped dry. Fish are collected using various means, including electrofishing and netting, and are immediately moved to an unaffected area – in this case an area upstream of the works.

The current document provides an outline method statement addressing how fish can be collected and transplanted from the affected site.

The key approach taken in any operation such as this is to minimise the number of fish which will be in the area to be enclosed in the first place. This will involve avoiding undertaking piling during the times when fish are migrating. River lampreys in particular will be vulnerable to getting trapped behind the piling – so this will be avoided by not undertaking any piling during the times when they will be migrating or spawning. Salmonids are very mobile and can be encouraged not to enter an area, or to leave an area prior to instream works commencing using disturbance methods. This is a preferable approach to handling fish – especially adult salmon and this should be avoided if at all possible.

Because juvenile lampreys live in burrows it is more difficult to encourage them to move away from an affected area on their own accord. It is proposed to capture juvenile lampreys present in the affected areas using electrical fishing in advance of any works taking place. Lampreys captured will be translocated to suitable nursery habitats located upstream of the proposed works. Translocating juvenile lampreys is a difficult, labour-intensive and time-consuming procedure. All areas of silt/fine substrate will need to be fished using a varied “pulse and draw” method for up to one minute per m^2. It will not be feasible to remove small larvae; however, it should be possible to remove a significant proportion of all other age groups present. The fishing effort will focus on areas where the most lamprey ammocoetes occur. During dredging works a best effort will also be required to examine spoil removed from the river and salvage juvenile lampreys.

Other fish likely to be in the study area will include Juvenile salmon, Brown trout, Minnows, Gudgeon, European eel, and possibly Twaite Shad. Adult salmon will be migrating throughout the period when works are being completed and could potentially end up behind the piling. These fish will all be removed using standard electrical fishing undertaken from a boat with a crew of 4 ecologists/technicians. The enclosed areas will be fished at least 3 times to ensure that most of the fish present are captured. Areas behind the piling will be divided up into manageable sections using fine meshed stop nets.

OUTLINE METHODS

Fish salvage / translocation operations can only be conducted by qualified ecologists/technicians. A licence issued under Section 14 of the Fisheries (Consolidation) Act, 1959 as substituted by Section 4 of the Fisheries (Amendment) Act, 1962. is required for this work. Licences can take up to 6 weeks (or more) to obtain so this contractor will need to be appointed well in advance of works.

General guidelines for electrical fishing include ‘*Guidelines for Electric Fishing Best Practice’* by Beaumont et al., (2002). Also relevant is the ‘Electrofishing team leader training manual’ by SFCC (2007). Guidance for wadable stretches is given in CFB (2008). Lamprey ammocoete survey methodology is given in Harvey J & Cowx I (2003).

There is no guidance manual for fish rescue / translocation / salvage operations, but the approach would be broadly the same methodology as used for a survey (e.g. Delanty et al., 2017).

The electrofishing work will be expected to require the use of both back packs and also generator gear mounted in a flat-bottomed boat. A 'boom-boat' electrical fishing system may also be required. These systems are particularly suited to large river channels (Cowx et al., 1988).

The fish translocation work needs to be undertaken in tandem with the piling works. The detailed method statement (MS) for fish rescue works needs to be drawn up at the same time as the MS for the piling and dewatering works. Piling should only take place outside of the times when adult River Lampreys are migrating. River Lampreys are very vulnerable to be trapped behind piling – their migration period generally extends from October to April so will be protected with the standard salmonid close-season.

In shallow areas fish should be translocated before the piling work is done. This can be achieved by enclosing areas behind silt curtains prior to piling. Piling itself will kill fish, particularly juvenile lampreys in sediments. Therefore, where possible the fish/lampreys should be removed in advance. This will need to be planned out in detail at the pre-construction stage between the appointed contractors. The detailed method statement will be required for the Section 14 licence application.

Fish translocation – especially moving lampreys – is a very slow and tedious process. The current phases of the piling / dredging works will need to be divided into smaller units for this to be successful. In lamprey nursery habitats (which occur throughout the area upstream of the railway bridge) active electrofishing will take up to 1 min per m^2.

Fishing will be quicker downstream of Seamus Rafter Bridge, where the river is freshwater tidal. Only very low densities of juvenile lampreys were indicated to occur in this area during the baseline surveys. However, other fish will be present in this area, including the critically endangered European eel *Anguilla anguilla*, salmonids, and possible Shad species. Other fish such as Flounder *Platichthys flesus*, Minnow *Phoxinus phoxinus* and Gudgeon *Gobio gobio* will be abundant.

The key effort will be try to ensure that fish are not trapped behind the piling in the first place. This will not be possible for juvenile lampreys but with careful planning and implementation of the piling under the supervision of the fish rescue team leader, many fish can be encouraged to leave the area on their own accord.

Upstream of Seamus Rafter Bridge both juvenile lamprey translocation and standard multiple pass electrical fishing will have to be completed in the enclosed areas. Downstream of this bridge only multiple pass electrical fishing will be required. However, if patches of juvenile lampreys are detected then efforts will have to be made to move the lampreys also.

Prior to works taking place in any particular area the affected section of river will be cordoned off using a 'stop net'. The areas will generally be workable sections/units of around 250m^2. Within these areas there will be patches of lamprey microhabitats. These will need to be fished using the lamprey removal methods. The entire section will need to be fished using standard multi-pass electrical fishing.

The stop nets should extend to the river bed and ideally should be weighted with lead rope, chain or equivalent. A frame can also be required to support the net. The top of the net can be floated on the surface of the river with floats or can be suspended by alternative means. The stop net will prevent fish returning to the section once the removal exercise has been completed. The net will remain in place until piling has been completed to ensure that fish populations do not re-colonise the fished area. The net mesh size should be a maximum of 2mm in diameter.

There will be practical difficulties in doing this in many areas due to the strong flows. The exact approach taken in each area will have to be decided on-site by the site ecologist / fish salvage team. The large piling areas / sections will have to be broken down into small areas of around 250m^2.

For lamprey ammocoetes, the selected area of habitat will then be electrically fished using a pulsed DC electrical fishing. The affected area will be fished in a zigzag pulse and draw manner with a minimum effort of 1 minutes fishing per m^2. A fishing operation will be started with the gear constantly 'on' followed by a regular on/off sequence. While the gear is 'on' the anode will be slowly pulled backwards in the water to cause lampreys to emerge from burrows as a result of electro-taxis. This procedure will be repeated throughout the operation, working though consecutive adjoining $1m^2$ areas. By keeping the anode 1-15cm above the sediment and pulling the anode backwards, the number of lampreys stunned within the substrate will be reduced. Captured lampreys (and other fish) will be removed quickly using the anode net or dip net and placed into a container of river water. The operation will be continued until the lamprey removal exercise in the cordoned off section has been completed.

Many of the affected areas are unsuitable for burrowing ammocoetes (e.g. gravel areas, and almost the entire sections downstream of Seamus Rafter Bridge). These can be spot checked and moved over at a faster rate. However, it must be noted that some juvenile lampreys can also be present in cobble/gravel areas, particularly where a high level of siltation occurs. A best-effort by the electrofishing team will be required.

By working in cordoned-off areas/units all other fish can be removed also in this way. Depletion fishing will be undertaken until it can be shown that <90% of the fish have been captured.

Captured fish will be removed using a dip net (not an anode net) and placed in a bucket of river water. Every 5 minutes (or sooner if large numbers are captured) the catch will be placed into a larger tank with an aeration system. Fish should not be kept in the aeration tank for more than 2 hours. Following this the tank will be transported upstream of the works and fish will be released into suitable habitats. Lampreys will be spread out in suitable habitats at a density of <10 m^2. All other fish (especially juvenile salmonids) need to be placed quickly into the aerated tank. Any adult salmon should be released immediately outside the cordoned off area. It is likely that very few salmon and trout would remain inside the cordoned off area, but some may be encountered. It is recommended that eels be recorded and moved out of the study area with the lampreys. In the event that fish from outside the cordoned off area are drawn into the electric field, the operator should suspend fishing for a few seconds to allow such fish to escape.

During hot weather conditions work may have to be suspended. The electrofishing team will monitor dissolved oxygen levels in the buckets and tanks and if 90% levels are difficult to maintain, or if there are mortalities, then the operation will have to be suspended.

Records of all captured fish (and especially any mortalities) must be kept.

Captured lampreys will be identified on the basis of their external pigmentation and trunk myomere counts as described by Potter & Osborne (1975) and Gardiner (2003). It is considered important to document what is being translocated, and especially record any Sea Lamprey ammocoetes.

During dredging works in areas which are too deep, inaccessible, or with insufficient visibility for using the electrofishing approach spoil dredged from the watercourse will be checked for the presence / absence of lampreys and these will be collected from the spoil. Juvenile lampreys will be in the top 20cm of substrate in the river, so it is recommended to first remove the top 200cm of silt using the machine bucket and spread this out on the barge for examination. This approach will be also be set out in the detailed method statement.

If the piled / dewatered area is flooded, then the above fish removal works will have to be repeated.

PLATES

Plate 1 Fish translocation works from behind piling on the Ennis Flood Scheme. This is an example of the approach that will be taken at Enniscorthy using a boat crew and generator electrical fishing units (Ecofact).

Plate 2 Fish translocation works on the Ennis Flood Scheme. In this case translocation was undertaken in advance of piling with a silt curtain suspended on a frame (Ecofact).

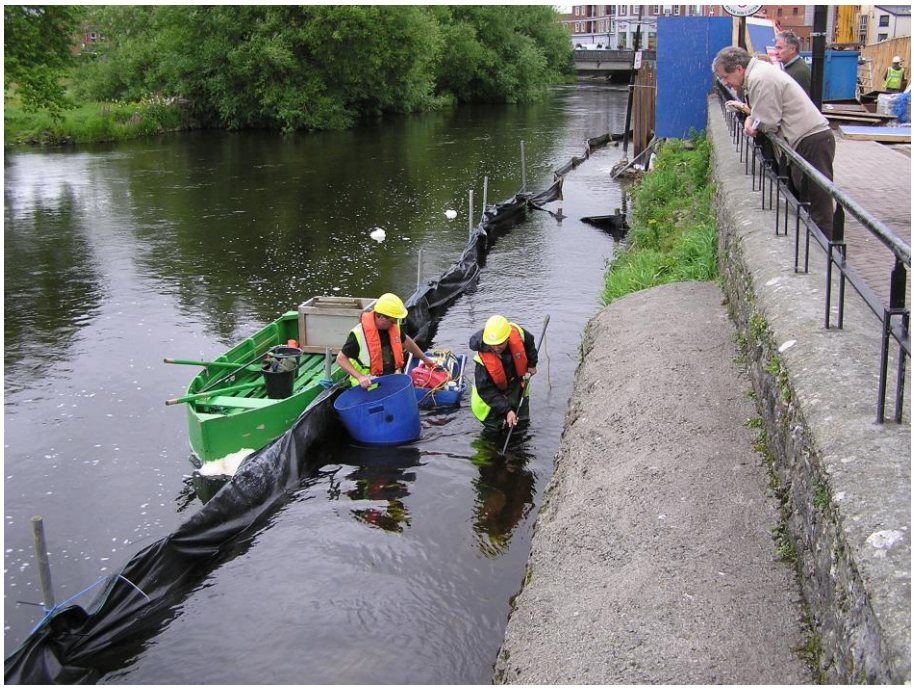

Plate 3 Fish translocation works on the Ennis Flood Scheme (Ecofact).

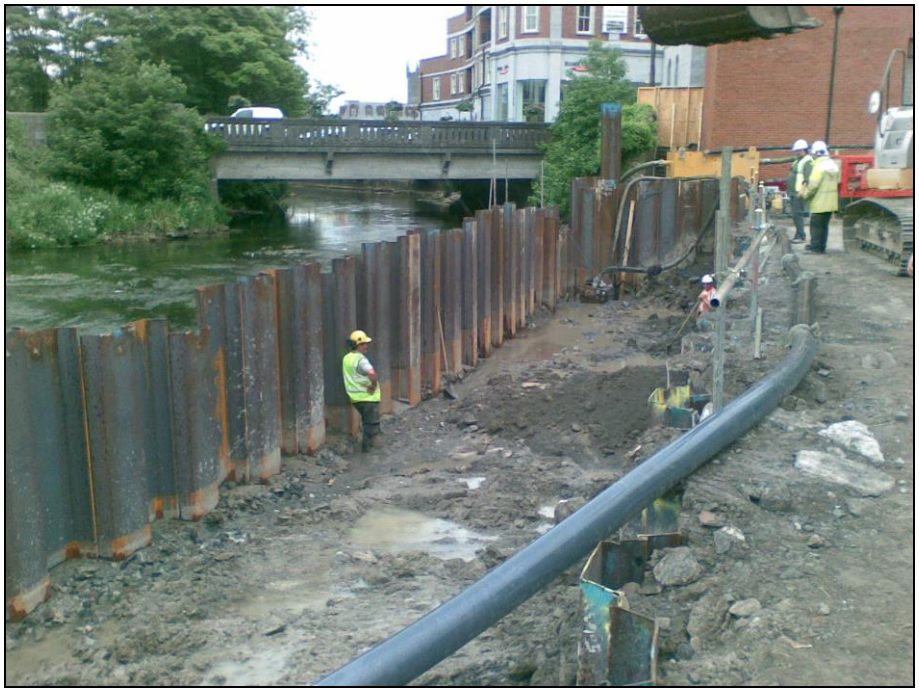

Plate 4 Dry works area maintained behind piling on the Ennis Flood Scheme (Ecofact).

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