

Freshwater Pearl Mussel Survey Report

River Deel & River Moy,
Crossmolina, Co. Mayo



Planning & Environmental Consultants

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1 INTRODUCTION

1.1 Survey Background

McCarthy Keville O'Sullivan Ltd. has been appointed to conduct a Stage 2 Survey for Freshwater Pearl Mussel (*Margaritifera margaritifera*) in advance of proposed flood defence works at Crossmolina, Co. Mayo.

The current survey has been commissioned to assess the Freshwater Pearl Mussel population near where works associated with flood defence works are proposed at Crossmolina, Co. Mayo. The works area included a 330 section of the River Deel upstream of Crossmolina and a section of the Mullenmore Stream. The location of these surveys is shown in Figure 2.1.

The survey work was conducted by suitably qualified ecologists, Pat Roberts (BSc. Env., MCIEEM) with John Hynes (MSc. Env., GradCIEEM) working as banksman.

1.2 Ecology of Freshwater Pearl Mussel

Freshwater Pearl Mussel (*Margaritifera margaritifera*) is a scheduled species under the Wildlife Act and is also listed on Appendix II of the EU Habitats and Species Directive [92/43/EEC]. The range and extent of the species is under threat across Europe and the aforementioned legislation affords protection of the species and its habitat. Any action that is likely to have an adverse impact on the species, including surveys, requires a license. The current survey work was carried under license number C142/2014. The survey work was carried out in accordance with the protocol set out in *Margaritifera margaritifera* Stage 1 and Stage 2 Survey Guidelines produced by the NPWS (Irish Wildlife Manual No. 12).

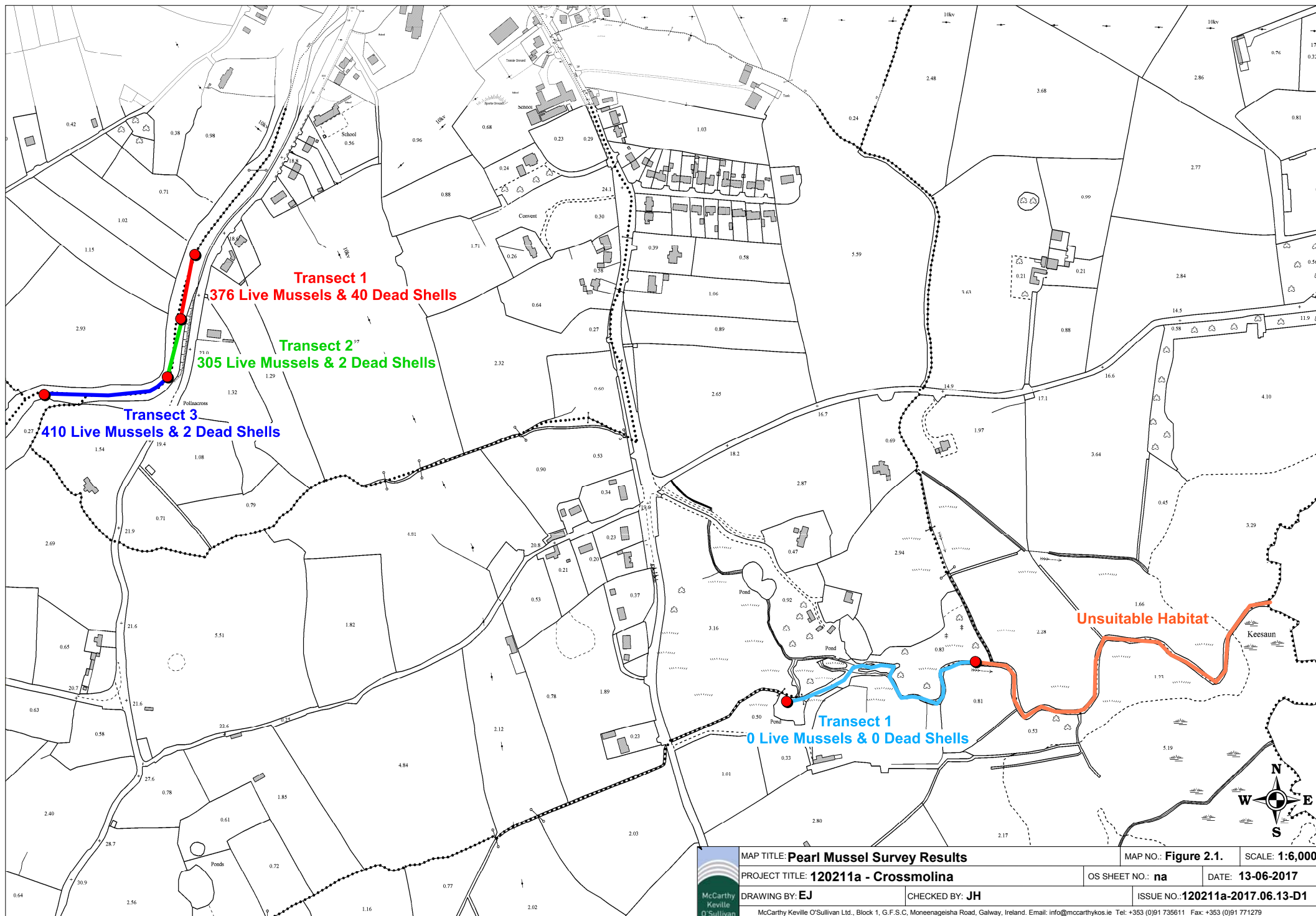
Margaritifera margaritifera is large bivalve mollusc (up to 140mm), with an oval shaped heavy black shell often eroded at the umbone (apex). The species is native to Ireland. Pearl Mussel are positively correlated to salmonids and are partially parasitic on juvenile salmonids during their early life cycle (Glochidia stage). Pearl Mussels are long-lived filter feeders and consequently are sensitive to pollution and may be affected by impacts occurring at considerable distances upstream from their populations. In a pearl mussel river, the effects of such an incident can range from loss of the salmonid fish which are essential to the mussel's life cycle, to long term stress and death of adult and young mussels from oxygen deprivation, to immediate death of the entire mussel population from toxic poisoning (E.A. Moorkens, 1999)¹.

1.3 Methodology

The survey was conducted, in accordance with the *Margaritifera margaritifera* Stage 1 and Stage 2 Survey Guidelines produced by the NPWS (Irish Wildlife Manual No. 12), by ecologists from McCarthy Keville O'Sullivan Ltd. under license number C157/2016 from the NPWS. A copy of the license is provided as Appendix 1 to this report.

In order to determine suitable survey days a variety of meteorological websites were analysed (i.e. www.met.ie). Ideally survey should be undertaken on sunny days which aids and increases underwater visibility. Survey works should not be conducted

¹ E. A. Moorkens (1999) Conservation Management of the Freshwater Pearl Mussel *Margaritifera margaritifera*. Part 1: Biology of the species and its present situation in Ireland. Irish Wildlife Manuals, No. 8.



during overcast days i.e. (more than 60% cloud cover) or at dawn or dusk (*Margaritifera margaritifera* Stage 1 and Stage 2 Survey Guidelines produced by the NPWS, Irish Wildlife Manual No. 12). The water levels within the Deel River (Station number 34007) (Grid Ref: IG 112054, 316084) were assessed using www.waterlevels.ie, which provides live updates from the Office of Public Works river gauges every 15 minutes. Surveys should not be carried out after periods of heavy rain when there may be a high sediment loading in the river which may impair visibility.

The survey was carried out on the 11th May 2017. The River Deel was largely dry with only occasional pools of stagnant water present. The survey was carried out by eye with the bathyscope only used in the pools where necessary. The Mullenmore Stream contained water of between 0.25 and one metre in depth with good visibility. The survey was undertaken using a bathyscope.

Weather conditions including cloud cover and sun hours were recorded. Weather conditions on the survey date were bright and sunny with little breeze and no precipitation. Cloud cover varied between 10-60%.

The methodology followed is described below:

- The survey area was divided into five stretches
- Each section was surveyed by Pat Roberts, with John Hynes acting as banksman.
- Pearl Mussel were recorded and notes were made on the substrate, vegetation and other any other faunal species present.

2 RESULTS

The following sections outline the findings of the field surveys for each of the transects. The locations of each of the transects and the numbers of live freshwater pearl mussels and dead shells per transect are presented in Figure 2.1. A summary table of each of the transects and the results is in Table 2.1.

2.1 Survey Results Per Transect: River Deel

Survey Transect 1

Survey Section 1 commenced approximately 600m upstream (Grid ref: E13524 N17009) of the N59 bridge through the town of Crossmolina, and concluded 85 metres downstream from this point. The survey was conducted on the 11th May 2017. The time of entry was 9:40am.

The river was approximately 18m wide in this section. The river was largely dry at the time of surveying, with only small pools of water remaining. Most the pearl mussels were located within the pools. The pools were in the deepest sections of the river but it is likely that the mussels had moved into these areas as water levels receded in the river. Many of the mussels were upside down with their siphons close to the substrate. In addition, many of the mussels were in the process of moving with their foot extended. The substrate consisted of a mixture of gravels and cobbles with little silt. A total of 376 live mussels and 40 dead shells were observed within this 85 metre stretch of river.

Survey Transect 2

Section 2 covered approximately 73m of the river starting at the end point of transect 1 (Grid ref: E13506 N16927). It had similar morphology and conditions to transect 1 and a substrate consisting of cobble, gravel. The transect was completely dry with pearl mussels located under stones in areas where water would previously have been pooled. A total of 305 live pearl mussels and two dead shells were found in this transect. The live mussels in this section were located primarily in the deepest sections of the river and had their valves tightly shut.

Survey Transect 3

Transect 3 covered 166m of the river, starting at the end point of transect 2 (Grid ref: E13489 N16853), and had a similar substrate to the above transects. Water levels were again very low with just one pool located at the down-stream end of the transect. A total of 410 live mussels and two dead shells were found in this section with the majority recorded within the pool.

2.2 Survey Results Per Transect: Mullenmore Stream

Transect 1

Transect 1 covered approximately 335m in total (Start grid ref: E14278 N16439, end grid ref: (E14519 N16490). No live mussels or dead shells were recorded within this transect despite the presence of suitable habitat. The substrate was described as containing some gravels and cobbles but with abundant silt and algae.

Unsuitable Habitat

The remaining 590m of the river were walked and deemed not to have suitable habitat for pearl mussel due to a slow depositing flow and deeply silty substrate.

2.3 Summary of Results Per Transect

Table 2.1 Summary of Survey Results

Transect	River	No. of live mussels	No. of dead shells
1	Deel	376	40
2	Deel	305	2
3	Deel	410	2
1	Mullenmore Stream	0	0
Total		1091 live mussels & 44 dead shells	

2.4 Other Faunal Species

During the course of the survey, numerous dead white clawed crayfish (*Austropotamobius pallipes*) were recorded in the dry river bed. Live specimens were also recorded within the pools and in the Mullenmore Stream.

Otter Spraint was recorded at numerous locations along the River Deel study area. Many of the spraints contained crayfish remains.

Spawning brook lamprey (*Lampetra planeri*) were recorded in the Mullenmore Stream.

3 CONCLUSIONS

Approximately 324 metres of channel within the river Deel and 928 metres of channel within the Mullenmore Stream. Pearl mussels were recorded within the river Deel but not in the Mullenmore Stream. The survey was conducted in accordance with the methodology set out by the NPWS in its Stage 1 and Stage 2 survey guidelines (Anon, 2004).

The pearl mussel that were recorded were likely to be under extreme stress due to the lack of water and appeared to have been mobile within the river to reach the last remaining pools. Those mussels that were outside the water but still alive, clamped tightly shut and many were inverted so that the siphons were as close to the substrate as possible.

This section of the river is subject to regular drought and dries out completely for short periods in most years (local knowledge) and yet supports a population of pearl mussel.

It is likely that the distribution of mussels within the channel will expand in high water levels and contract to the deeper areas as the water subsides.

The area surveyed corresponded to sections 33 and 34 in the 'Mapping of the Distribution of *Margaritifera Margaritifera* in the River Deel (Moy Catchment), Co. Mayo' (Moorkens & Killeen, 2009). Mussels were recorded as 'occasional' in this area during that survey (1- 40 in every linear 100m) in 2009. The current survey recorded over 300 mussels per 100 metre section. This would have corresponded to a rating of 'Common' according to the parameters set in the 2009 report. The reasons for this are unknown but it is likely that the population of mussels is mobile within the river depending on conditions.

References

Anon. (2004) *Margaritifera margaritifera* Stage 1 and Stage 2 survey guidelines. *Irish Wildlife Manuals*, No. 12. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

E. A. Moorkens (1999) Conservation Management of the Freshwater Pearl Mussel *Margaritifera margaritifera*. Part 1: Biology of the species and its present situation in Ireland. *Irish Wildlife Manuals*, No. 8.

E. A. Moorkens *et al* (2009) Mapping of the Distribution of *Magaritifera margaritifera* in the River Deel (Moy Catchment), Co. Mayo, National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Appendix 1

Licence C157/2016



An Roinn Ealalon, Oidhreacht,
Gnóthaí Réigiúnacha, Tuaithe agus Gaeltachta

Department of Arts, Heritage,
Regional, Rural and Gaeltacht Affairs

Licence No. C157/2016

NATIONAL PARKS & WILDLIFE SERVICE

Wildlife Acts 1976 to 2012 – Sections 23 and 34

**LICENCE TO CAPTURE PROTECTED WILD ANIMALS FOR EDUCATIONAL, SCIENTIFIC
OR OTHER PURPOSES**

The Minister for Arts, Heritage, Regional, Rural and Gaeltacht Affairs in exercise of the powers conferred on her by Sections 9, 23 and 34 of the Wildlife Acts 1976 to 2012 authorises:

**Dr. Chris Peppiatt, Pat Roberts & Dervla O'Dowd,
C/O McCarthy Keville O'Sullivan, Block 1, GFSC, Moneenageisha Road, Galway.**

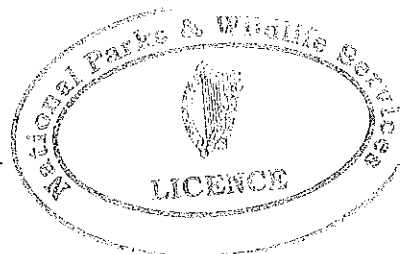
To disturb specimens of the species specified in Column 1 of the Schedule hereunder in the area specified in Column 2 by the means specified in column 3 for scientific educational or other purposes during the period beginning **8 November 2016** and ending **30 October 2017**, subject to the conditions listed overleaf.

SCHEDULE

1	2	3
Species	Area	Means of capture
Freshwater Pearl Mussel (<i>Margaritifera margaritifera</i>) & White-clawed Crayfish (<i>Austropotamobius pallipes</i>)	River Deel Crossmolina Town Co. Mayo & small stream discharging to Lough Conn (Mullenmore Td.)	No specimens will be captured or killed. Stage 2 survey for Freshwater Pearl Mussel by bathyscope or snorkelling. Hand search for Crayfish To provide detailed baseline information for inclusion in EIS for proposed development.

Dated 8 November 2016

For the Minister for Arts, Heritage, Regional, Rural and Gaeltacht Affairs



Conditions

1. This licence shall be produced for inspection on a request being made on that behalf by a member of An Garda Síochána or any person appointed by the Minister for Arts, Heritage, Regional, Rural and Gaeltacht Affairs under Section 72 of the Wildlife Acts 1976 to 2012, to be an authorised person for the purposes of the Acts.
2. The local NPWS District Conservation Officer or Conservation Ranger must be contacted during business hours prior to the commencement of each survey under the terms of this licence.
3. On completion of the stage 1/2 survey, returns must be made to the NPWS using the standard forms in IWM 12 and using the attached MS Excel template. Returns should also include any reports on the stage 1/2 survey, including distribution maps and assessments of habitat condition.
4. The returns must be made on or before expiry of this licence to Dr Áine O'Connor, National Parks and Wildlife Service, 7 Ely Place, Dublin 2, D02 TW98. Email: Áine O'Connor - Aine.OConnor@ahg.gov.ie. If the licence is not used, a 'nil' return must be made, clearly stating that no survey was undertaken. Any subsequent applications for a Section 23 & 34 licence in relation to the Freshwater Pearl Mussel will be judged against the full, proper and timely submission of returns under the licence.
5. This licence covers Stage 1 and Stage 2 Survey of the Freshwater Pearl Mussel, only. It does not cover in-stream, riparian or other works. It does not cover handling mussels, juvenile searches, or removal, movements or translocation of adult or juvenile mussels.
6. The licence holder must use the established methods described in the following manual, or any future modification of that manual: Anon (2004) *Margaritifera margaritifera*. Stage 1 and Stage 2 survey guidelines. Irish Wildlife Manuals, No. 12. National Parks and Wildlife Service, Dublin, Ireland. <http://www.npws.ie/publications/archive/IWM12.pdf>

Conditions for standard licence for crayfish surveys

7. Licence holders should use the established procedures described in following manuals as closely as possible:
 - Reynolds, J.D., O'Connor, W., O'Keeffe, C. & Lynn, D. (2010) A technical manual for monitoring white-clawed crayfish *Austropotamobius pallipes* in Irish lakes. Irish Wildlife Manuals, No 45. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.
 - O'Connor, W., Hayes G., O'Keeffe, C. & Lynn, D. (2009) Monitoring of white-clawed crayfish *Austropotamobius pallipes* in Irish lakes in 2007. Irish Wildlife Manuals, No 37. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.
 - Peay S (2003). Monitoring the White-clawed Crayfish *Austropotamobius pallipes*. Conserving Natura 2000 Rivers Monitoring Series No. 1, English Nature, Peterborough.
8. STRICT biosecurity measures should be applied following the Inland Fisheries Ireland protocol (<http://www.fisheriesireland.ie/Biosecurity/biosecurity-protocol-for-field-survey-work.html>) for the purposes of preventing the introduction and spread of disease and alien species. All equipment should be appropriately treated before and after work and before moving to a new site.
9. Surveyors must familiarise themselves with crayfish identification. All crayfish should be positively identified as native White-clawed Crayfish *Austropotamobius pallipes* before release back into water. In the case of doubt, advice must be sought immediately from NPWS or a recognised expert on the group. Under no circumstances must any crayfish which are suspected of being a non-native species be returned to the wild.



10. Crayfish Plague. Surveyors should familiar with the symptoms and signs of Crayfish Plague and MUST report any suspicions of the disease to NPWS IMMEDIATELY. These signs include abnormal escape or other behaviour and presence of dead or dying individuals.
11. This licence also permits trapping, temporary confinement and translocation of crayfish from areas that are to be affected by any proposed works. Translocation sites should be evaluated beforehand and should be the nearest available area of unaffected habitat upstream of the works. All White-clawed crayfish are to be returned to the trapping location or chosen relocation site as soon as possible after capture.
12. A report on the work conducted under this licence should be provided to NPWS. This should be returned promptly (within 3 months of the expiry of the licence) to Dr Brian Nelson at the address below. All reports should contain full information on the work undertaken, a list of all the sites surveyed for crayfish and all the records (giving full date, 6 figure grid reference, site location, numbers of crayfish seen). Photographs of a sample (at least one per main sampling location e.g. individual stream, or lake) of the crayfish recorded should be included with each report as verification of the identification. These photographs should show the appropriate identification features.
 - Dr Brian Nelson, Invertebrate Ecologist, National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural & Gaeltacht Affairs, 7 Ely Place, Dublin 2, D02 TW98.
13. Any query in relation to this licence should be addressed to National Parks and Wildlife Service, 7 Ely Place, Dublin 2, D02 TW98. Telephone: (01) 888 3232.

Note: This licence does not confer right of entry onto any lands.



