Manual for monitoring Irish lake stocks of white-clawed crayfish, *Austropotamobius pallipes* (Lereboullet)

Julian D. Reynolds, December 2006

Summary: The white-clawed crayfish *Austropotamobius pallipes* (Lereboullet) is still widespread in lakes and rivers over much of Ireland, but it is becoming increasingly restricted to headwater streams elsewhere in Europe. It is a protected species in Ireland under the Wildlife Act and, under the Habitats Directive, Ireland is required to designate SACs for the species and furthermore, to monitor the status of crayfish populations on a regular basis.

In Ireland, crayfish occur in many lakes. This document is a manual for sampling and monitoring crayfish in lake habitats, commissioned by the National Parks and Wildlife Service.

1. INTRODUCTION

1.1 Distribution and current extent: The white-clawed crayfish *Austropotamobius pallipes* is distributed in 18 countries of western Europe, extending from Portugal to the Balkans, and from Ireland to Italy (Souty-Grosset et al. 2006). Since the advent of crayfish plague caused by the oomycete *Aphanomyces astaci*, which arrived in Europe before 1900 carried by non-indigenous crayfish species (NICS) from North America, white-clawed crayfish populations have diminished and are now patchy. In many areas, e.g. France, they are now limited to headwater streams to which American species have not yet penetrated (Reynolds & Demers 2006). White-clawed crayfish are now very threatened in Spain and Portugal. No NICS have so far been reported from the wild in Ireland, where the sole indigenous species remains widespread and relatively abundant in rivers and lakes (Reynolds 1997, Demers et al. 2005; see Figure 1). However, a crayfish plague outbreak in the mid-1980s decimated populations in the Boyne and Inny catchments (Matthews & Reynolds 1992) and there have been other sporadic reports of crayfish losses (e.g. Lyons & Kelly-Quinn 2003). Crayfish were reintroduced to L. Lene about 1989 (Reynolds & Matthews 1997), but disappeared again some time after 2000 (L. O'Flanagan, pers. comm.). They were also reintroduced to White Lake in 1999 (Reynolds et al. 2000) and confirmed breeding in 2003 (C. O'Keeffe, pers. comm.).

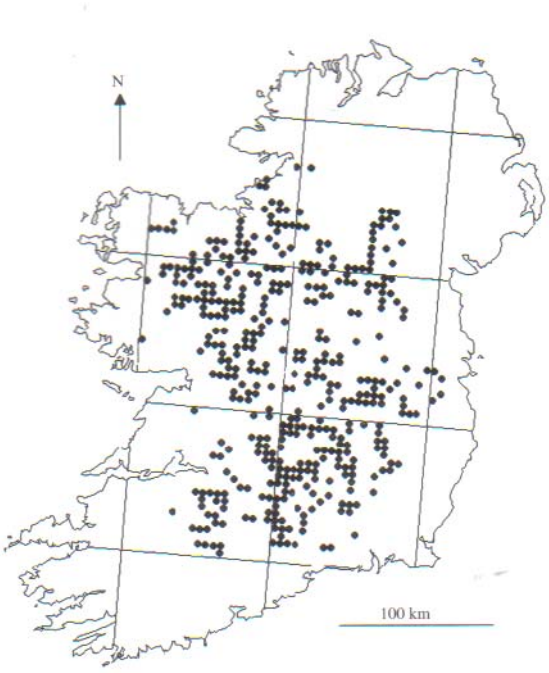


Figure 1. Distribution of *A. pallipes* in Ireland (from Demers et al. 2006)

1.2 Taxonomy: In Ireland, Britain and most of France, a single taxon, *Austropotamobius pallipes pallipes*, is present. It is now thought likely that the populations in Britain and Ireland were introduced separately from France, and those in the Iberian peninsula were introduced from Italy (Gouin et al. 2003).

1.3 Biology: The species in Ireland reaches a final total length of 11-12 cm, and an age of at least 10 years, although determination of age is difficult in crustaceans, which cast their skeleton on a regular basis. White-clawed crayfish mature at about 3 years old and 50 mm total length (25 mm carapace length). They mate and spawn in October, the female usually carrying 50 to 120 eggs each about 3 mm in diameter. Some females may lose most or all of their eggs, while others may carry the majority to full term until about June, when the juveniles hatch at an initial length of 6-8 mm. These hatchlings shelter in vegetation, gravel and among fine tree-roots, feeding chiefly on animal matter (Demers et al. 2003, Reynolds & O'Keeffe 2005). Juveniles moult many times in their first year and several times in their second and third,

growing perhaps 10% in length on each occasion. Once adult, males generally moult twice a year, females only once if carrying eggs.

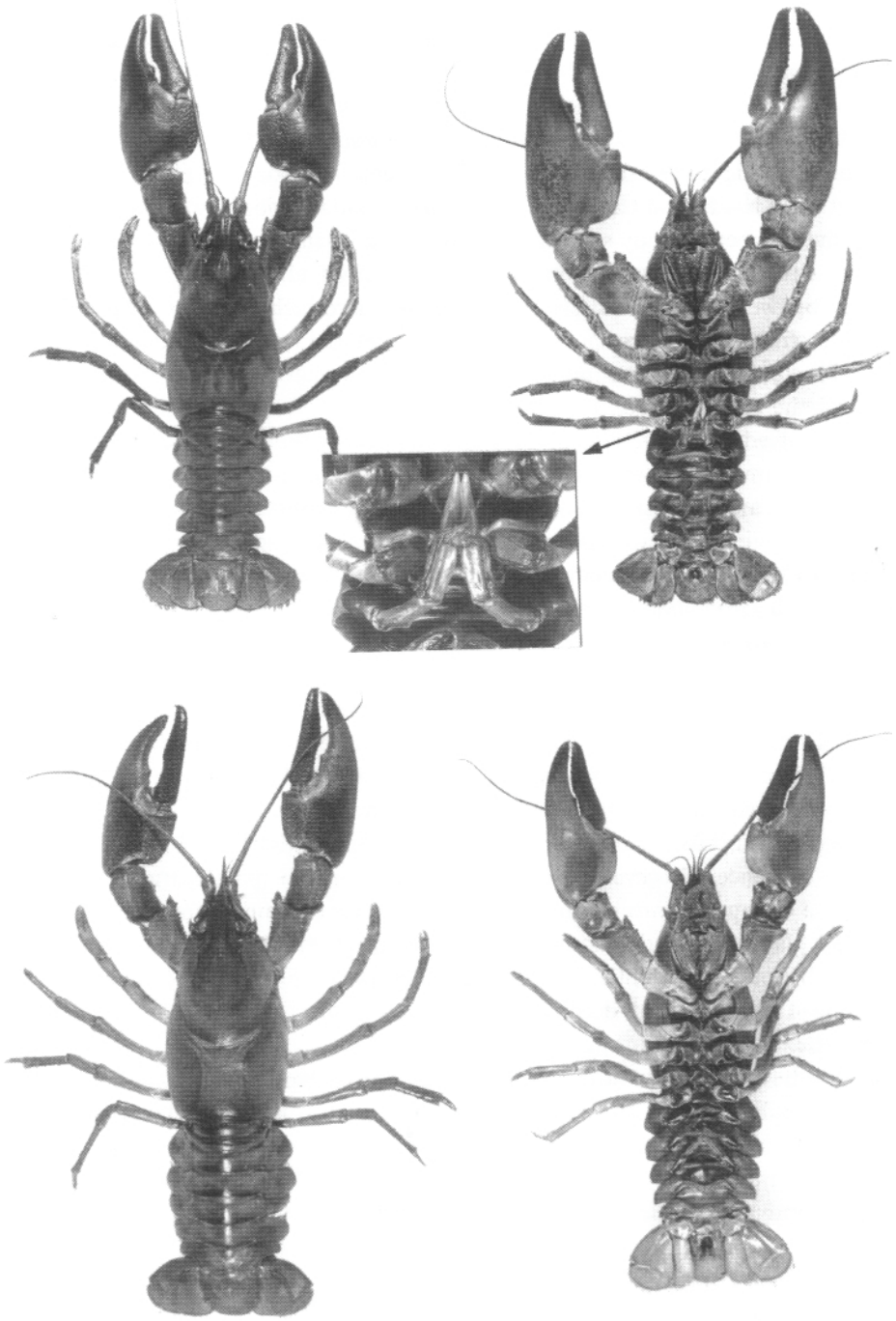


Figure 2. Adult male (above) and female (below) crayfish. Insert shows male stylets.

Males develop markedly larger claws than females, and have a narrower abdomen, on the first two segments of which are carried a pair of forward-pointing stylets (see insert, Figure 2). Ripe females may show whitening at the under-edges of the

abdominal segments, marking the glair glands which produce a sticky substance which cements the eggs.

1.4 Habitats: While most populations of white-clawed crayfish occur in streams, in parts of their range (Spain, Britain, Ireland) this crayfish is also known from ponds and small lakes with suitable habitat (Reynolds et al. 2002). Larger crayfish prefer stony stretches of shore (Figure 3), but may also occur in *Chara* or other aquatic weed or at the base of emergent plants (Figure 4), as well as in burrows in the bank or among tree roots. Juveniles are typically found among weed and debris in shallow water.

Figure 3: Stony lakeshore at Lough Talt, with some *Chara* offshore.

Figure 4. Vegetated soft lake margin at Kilroosky Lough.

1.5 Irish lake stocks: Lake populations remain widespread in Ireland, and there is thus a need for an agreed methodology to survey and monitor these populations. A desk study was carried out to gather information on Irish lakes known to have held crayfish populations in the past, and Regional Conservation Staff and a number of other researchers were circulated between May and August 2006 to ask for recent lake and other crayfish records.

Of over forty crayfish lakes identified (Appendix 1), half are in the Erne catchment, which doubtless has many more. Elsewhere in the country crayfish lakes are limited to a handful of catchments, chiefly the Boyne, Shannon, Corrib, Moy and Bonet, with the Blessington Reservoir on the Liffey. Crayfish are generally limited to smaller lakes (up to 100 ha), although in medium-sized lakes (Upper Erne, Ramor, Owel and Ennell they may occur in suitable shallows, and in large lakes (Derg, Ree, Lower Erne, Corrib, Mask) adjacent to inflowing streams.

1.6. Comparison of survey methods for lake crayfish: Trapping has traditionally been the method used to assess lake crayfish stocks, particularly with the noble crayfish *Astacus astacus* and the signal crayfish *Pacifastacus leniusculus* in Scandinavia. A large string of standard traps will yield repeatable catch levels, when standardized by season, weather and phase of the moon. Such trap data exist for some Irish lake stocks of white-clawed crayfish, e.g. for Blessington Reservoir (mean catch per unit of effort (CPUE) 0.44 crayfish per trap; Matthews & Reynolds 1995) and Lough Lene (mean CPUE 2 crayfish per trap; Reynolds & Matthews 1993). However, the process is time-consuming, requiring separate visits to set and lift traps, and there are safety considerations and risks of interference by the public.

For this reason, alternative methods were assessed in a pilot study of six lakes (Reynolds 2006). These methods include hand search, modified from the JNCC selective manual survey protocol for streams (Peay 2003), sweep-netting and night search. No single alternative method proved to be suited to all situations, and comparison of methods between lakes is only valid for like habitats, e.g. stony shores.

It was also not possible to find exact equivalents of effort. On average, one sweep caught 1.6 crayfish, broadly equivalent to hand-search of one patch of 10 refuges (1.4) or night search of 3 metres of shoreline (1.4), while a string of 10 traps caught 1.1 crayfish. However, individual pilot study results were widely variable, and the trap results, for a densely stocked lake, appear too low, indicating that these figures should be used with great caution. Based on the variability noted, numbers of replicates likely to give a reliable catch per unit of effort (CPUE) are recommended, and it is also recommended that two or more methods are attempted, to provide some relative measures. For lake monitoring at regular intervals, the most suitable method should be selected and used at the same sites and under the same conditions to get comparable results. Trapping should be considered where other methods are unsatisfactory.

2. METHODOLOGY FOR LAKE SURVEYS

This section contains three parts: advance preparation for sampling, biological sampling, and survey methods.

2.1 Advance preparation; determination of site characteristics: Crayfish are most active between June and November, and are best surveyed in summer or autumn. Avoid periods of high water, winds and heavy rain. Distribution of crayfish may not be homogeneous within a lake. Larger crayfish prefer stony shores, but access may determine which sites are available to survey. Monitoring is easiest on gently sloping stony shores facing prevailing winds, as these are relatively free from mud and provide ample refuges for crayfish. It is important to select the best possible sites.

Before departing,

- Check databases and maps; potentially suitable sites can be deduced from aspect and topography, and possible access determined.
- Contact local NPWS Conservation Ranger and Fisheries Officer to inform them of work plan.

On arrival at the lake,

- Check access and examine the available substrate.
- Estimate the extent of most suitable habitat.
- Look for 'surrogate' information – cast shells, remains in otter spraints, burrows etc. Where vertical banks are visible, look for burrows with flattened oval entrances about 5-10 cm across.
- Take digital photos and GPS readings for sites where crayfish are particularly abundant, or where patches are widely spaced along the shore, to facilitate repeatability.
- Make biological observations on the crayfish catch from each defined sample (patch, sweep or trap) separately.

The following habitat definitions apply:

Stretch: a lake margin with apparently suitable substrate. There may be several stretches of different extent at any one lake.

Patch: within a stretch, an area containing a concentration of refuges, or an otherwise defined area, e.g. that covered by a standard sweep, or an area of shoreline illuminated by torchlight for night search.

Refuge: a stone, crevice or clump of weed which may shelter crayfish.

2.2 Biological Sampling: As each patch, sweep or trap is surveyed, place any captured crayfish in a bucket with lake water.

- Record total length (TL) (excluding claws) and hard carapace length (CL) (Figure 5; marked as LT and LC), also whether hatchling (6-15 mm TL), juvenile (16-50 mm TL) or adult (greater than 50 mm TL), and whether male or female.
- You may see evidence of breeding status outside the normal summer sampling period; in autumn, ripe females have whitish patches at the underside edges of abdominal segments; in October or November mated females will have white cement-like spermatophores at base of legs; while from November to June berried females carry eggs attached to the abdomen.
- Note also any signs of damage or disease, then return specimen to place of capture before moving on to sample the next patch.
- If a crayfish is seen but not caught, estimate its size and stage as hatchling, juvenile or adult.
- Record all data in a notebook. At the end of sampling, upload the data onto the attached Recording Form, including notes on breeding and disease status etc. under ‘Other comments’.

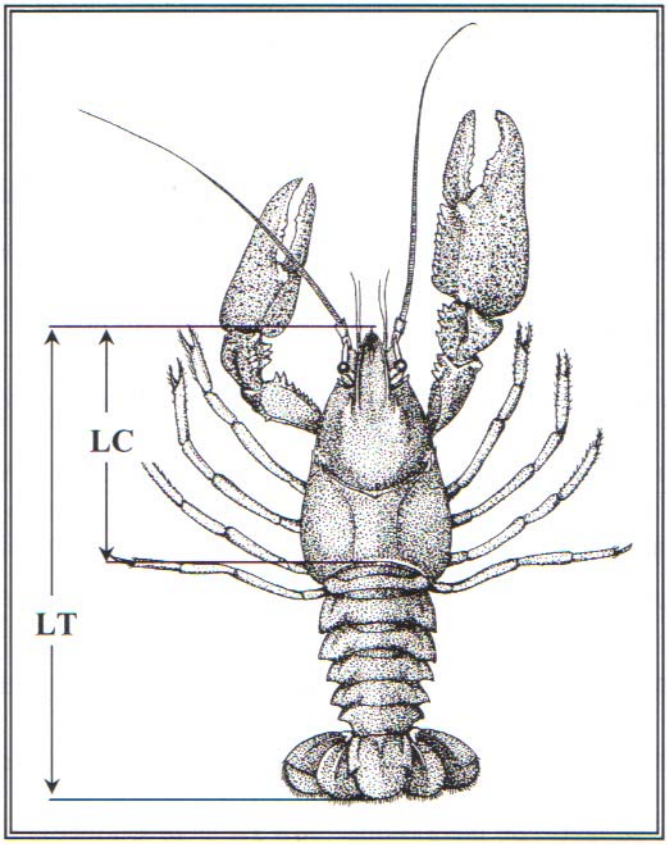


Figure 5. Crayfish total length (LT) and carapace length (LC) measurements.

2.3 Survey methods: For logistical reasons, work in pairs. Follow at least one of the approaches described below: hand search, sweep-netting, night search, trapping. Two or more methods will give some relative measures. Note that night search and trapping will chiefly locate larger crayfish, while hand search and sweep-netting methods may find both juveniles and adults.

For all methods you will need a digital camera, GPS hand-set, notebook, white buckets or containers for crayfish caught, and measuring callipers. Check each method for any additional equipment needed. Remember to make biological and other observations after sampling each patch!

2.3.1 HAND SEARCH: This method is most suitable for lakes with abundant stony cobble in the shallows. Aim to examine at least 100 m of shoreline, depending on lake size. Estimate how many stretches of this habitat are available in the lake, and accessible to surveyors. Centre the stretches on known crayfish hotspots where possible. Select 10 patches of stones in each stretch and ideally investigate 10 refuges per patch. If stony stretches are continuous, treat the whole lake shore as a stretch and define patches at a suitable distance apart. If crayfish are found in abundance, concentrate on just one stretch per lake.

Equipment and methods: In addition to the equipment already listed, you will need a viewing basin with a clear bottom, or a clear plastic aquarium. A hand-net may be useful in capturing crayfish.

- Working preferably in 5-40 cm depth, view substrate through transparent bottomed basin to cut out surface glare.
- Select 10 patches of stones in each stretch and investigate 10 refuge stones per patch.
- Stones should be flattish, and at least 10 cm long; smaller or rounded stones rarely harbour crayfish.
- Lift and turn over each stone carefully and catch any crayfish underneath by hand or using a hand-net where water is deep or conditions difficult.
- Replace each stone carefully.
- Place all crayfish caught in this patch into the container, and make biological observations on them, then return them to where they were caught before moving on to the next patch.
- If no crayfish are seen after 5 patches or 50 refuge stones are investigated, move to a clearly different stretch.

Effort (CPUE) is number of crayfish per patch.

2.3.2 SWEEP-NETTING: If there are no or few stones, or the bottom is obscured by weed, algae or debris, use a hand-held pond net, treating one standard sweep of the net as a sampling unit. Select an apparently favourable area as the patch to be sampled. Note, however, that hand-searching and sweep-netting are not directly comparable; a standard sweep may often yield no crayfish, or may sometimes turn up large numbers of juvenile crayfish, particularly amongst weed. As sweeps are less predictable than hand search, therefore, aim to do a minimum of 20 sweeps per lake.

Equipment and methods: In addition to the equipment listed above, you will need a white tray and a sturdy square-framed pond net (FBA or equivalent), 25 cm x 25 cm mouth with strong mesh bag. A mesh size of 1-2 mm will retain all juveniles.

- Carry out a **standard sweep** by drawing the net along one metre of bottom, forward and back once along the same track, taking one second per movement.

- Empty contents of net into a white tray for examination, and remove all crayfish to a white container.
- If no crayfish are encountered in the first 10 sweeps, repeat the process at a different location, to a maximum of 20 sweeps.
- Remember to make separate biological observations for each sweep.

CPUE is number of crayfish per standard sweep.

2.3.3 NIGHT SEARCH: If the edge shelves abruptly, or the bottom is soft marl or mud which may swirl up if disturbed and obscure vision, consider night viewing as an alternative. An estimate of margin length and width viewed in each area and a count of animals seen will give a semi-quantitative abundance of crayfish moving around in the area. Weed and algal growth may limit usefulness of this method. Note also that it has safety considerations, especially where access is limited or difficult. Not all the margin may be viewable safely, even from the bank.

Equipment and methods: Bring a torch with a narrow beam, and oily fish as bait (sardines in sunflower oil are recommended).

- **By daylight**, survey the stretch to be viewed, identifying access and noting hazards. Aim to cover at least 30 metres of margin; this may be discontinuous because of access or for other reasons. Ground-baiting with oily fish by day may later attract crayfish into the open.
- **When dark**, use a torch with a narrow beam to scan a strip of shore up to one metre wide. Keep the light off the water until you are ready to view, then only illuminate an area of about one square metre at a time.
- Remember to record numbers of crayfish seen after every 3 metres viewed.

CPUE is number of crayfish seen per 3 metres of bank.

2.3.4 TRAPPING: Trapping should be considered where the terrain is unsuitable for hand search, sweep-netting or night search. Baited traps may attract crayfish from an unknown area, probably several square metres. Set the baited traps before dusk, and retrieve them early the following day.

Equipment and methods: You will need 20 traps, set in two strings of 10 traps at different locations, and baited with liver or fish. 'Trapy' August plastic mesh traps are recommended.

- In each string, attach the traps at 3-5 m intervals to a head rope by 2-3 m leaders. Secure one end of the head rope to the bank (for ease of retrieval), tie a weight to the other end, and throw in the traps so that the head rope lies parallel to the bank and ideally within 5 m of it, in about 0.5-3 m water.
- Haul the traps onto the shore, watching for any smaller crayfish that may escape through the meshes as traps are hauled.
- Remember to record biological observations on any crayfish caught after examining each trap.

CPUE is number of crayfish per trap.

3. REFERENCES AND SELECT BIBLIOGRAPHY

Demers, A. & Reynolds, J.D. 2002. A survey of the white-clawed crayfish, *Austropotamobius pallipes* (Lereboullet) and of water quality in two catchments of Eastern Ireland. Bull. Franc. Pêche Piscic. 367: 729-740.

Demers, A. & Reynolds, J.D. 2003. The distribution of the white-clawed crayfish, *Austropotamobius pallipes*, in eight catchments in relation to water-quality. Pp/ 94-103 in: Holdich, D.M. & Sibley, P.J. (eds) Management and conservation of crayfish. Proceedings of a conference held on 7th November, 2002. Environment Agency, Bristol.

Demers, A. Reynolds, J.D. & Cioni, A. 2003. Habitat preferences of different size classes of *Austropotamobius pallipes* in an Irish river. Bull. Franc. Pêche Piscic. 370-371: 127-137.

Demers, A., Lucey, J., McGarrigle, M.L. & Reynolds, J.D. 2005. The distribution of the white-clawed crayfish, *Austropotamobius pallipes*, in Ireland. Biology & Environment: Proc. RIA 105B: 65-69.

Füreder, L. & Reynolds, J.D. 2003. Is *Austropotamobius pallipes* a good bioindicator? Bull. Franc. Pêche Piscic. 370-371 : 157-163.

Gouin, N., Grandjean, F., Pain, S., Souty-Grosset, C. & Reynolds, J. 2003. Origin and colonization history of the white-clawed crayfish, *Austropotamobius pallipes*, in Ireland. Heredity 91: 70-77.

Lucey, J. & McGarrigle, M.L. 1987. The distribution of the freshwater crayfish in Ireland. Irish Fisheries Invest. 29A: 1-13.

Lyons, R. & Kelly-Quinn, M. 2003. An investigation into the disappearance of *Austropotamobius pallipes* (Lereboullet) populations in the headwaters of the Nore River, Ireland, and the correlation to water quality. Bull. Franc. Pêche Piscic. 370-371: 139-150.

Matthews, M. & Reynolds, J.D. 1992. Ecological impact of crayfish plague in Ireland. Hydrobiologia 234: 1-6.

Matthews, M.A. & Reynolds, J.D. 1995. A population study of the white-clawed crayfish *Austropotamobius pallipes* (Lereboullet) in an Irish reservoir. Biology & Environment: Proc. RIA 95B: 99-109.

Matthews, M.A., Reynolds, J.D. & Keatinge, M.J. 1993. Macrophyte reduction and benthic community alteration by the crayfish, *Austropotamobius* pallipes (Lereboullet). Freshwater Crayfish 9: 289-299.

Moriarty, C. 1971. The crayfish *Astacus pallipes* of an Irish lake. Irish Fisheries Investigations A6: 12-20.

Moriarty, C. 1973. A study of *Austropotamobius pallipes* in Ireland. Freshwater Crayfish 1:57-67.

O'Keeffe, C. 1986. The ecology of two populations of the freshwater crayfish *Austropotamobius pallipes* (Lereboullet) in Ireland. PhD Thesis, Trinity College Dublin University.

Peay, S. 2003. A cost-led evaluation of survey methods and monitoring for white-clawed crayfish. Bull. Franc. Pêche Piscic. 372-373: 335-352.

Reynolds, J.D. 1982. Notes on the distribution of the freshwater crayfish in Ireland. Bulletin of the Irish Biogeographical Society 6:18-24.

Reynolds, J.D. 1997. The present status of freshwater crayfish in Ireland. Bull. Franc. Pêche Piscic. 347: 693-700.

Reynolds, J.D. 1998. Conservation management of the white-clawed crayfish *Austropotamobius pallipes*. Part 1. Irish Wildlife Manuals 1. Duchas, The Heritage Service. Dublin.

Reynolds, J.D. 2001. Growth and reproduction. Pp. 152-191 in: D.M. Holdich (ed.) Biology of Freshwater Crayfish. Blackwell Science, Oxford.

Reynolds, J.D. 2006. Pilot lake survey for white-clawed crayfish *Austropotamobius pallipes* (Lereboullet), Summer 2006. Unpublished report to the NPWS.

Reynolds, J.D. & Demers, A. 2006. Comparison of white-clawed crayfish populations in Irish and French streams, with comments on its future survival in Europe. Bull. Franc. Pêche Piscic. 380-381: 1115-1120.

Reynolds, J., Gouin, N., Pain, S., Grandjean, F., Demers, A. & Souty-Grosset, C. 2002. Irish crayfish populations: ecological survey and preliminary genetic findings. Freshwater Crayfish 13: 584-594.

Reynolds, J.D. & Matthews, M.A. 1993. Experimental fishing of *Austropotamobius pallipes* (Lereboullet) in an Irish midlands lake. Freshwater Crayfish 9: 147-153.

Reynolds, J.D. & Matthews, M. 1997. Successful reintroduction of crayfish to Irish lake. Crayfish News: IAA Newsletter 19 (2): 4-5.

Reynolds, J.D. & O'Keeffe, C. 2005. Dietary patterns in stream- and lake-dwelling populations of *Austropotamobius pallipes*. Bull. Franc. Pêche Piscic. 376-377: 715-730.

Reynolds, J.D., Souty-Grosset, C., Gouin, N., Devaney, S. & Grandjean, F. 2000. Experimental restocking of native crayfish in White Lake, Co. Westmeath, Ireland. Pp. 123-130 in: Rogers, D., Brickland, J. (eds) Crayfish Conference Leeds, April 26-27 2000. Environmental Agency.

Souty-Grosset, C., Holdich, D.M., Noel, P.Y., Reynolds, J.D. and Haffner, P. 2006. Atlas of crayfish in Europe. Patrimoines Naturels 64, 180 pp., Museum national d'Histoire naturelle, Paris.

Thompson, W. 1843. On the Crustacea of Ireland – *Astacus fluviatilis.* Ann. & Mag. Nat. Hist. 11:106-108.

Watson, P.S. 1974. Studies on the distribution of the freshwater crayfish *Astacus (Potamobius) pallipes* Lereboullet in Co. Fermanagh, N. Ireland, and particularly within Lough Lea. Unpubl. Report to Ministry of Fisheries & Food, N.I.

Appendix 1. SOME IRISH LAKES HISTORICALLY KNOWN TO HOLD CRAYFISH STOCKS

CATCHMENT	LAKE NAME	COUNTY	COMMENTS
BONET	Doon		
	Gill	Sligo / Leitrim	
	Glenade	Leitrim	
	Na Leibe (G7312)	Sligo	seen 2006
BOYNE	Ballyboy	Monaghan	
	Bane	Westmeath	disappeared 1982
	Kill	Cavan	
	Lene	Westmeath	reintroduced stock gone c.2003
	Ramor	Cavan	around influents
	Sheehan	Cavan	
	Tullaghan	Monaghan	
	White	Westmeath	reintrod. 1999-2001, seen 2003
	Whitewood	Cavan	
CORRIB	Carra	Mayo	
	Carraroe (L9475)	Galway	
	Claureen	Roscommon	
	Corrib	Galway	mouth of Clare R.
	Mask	Mayo	
ERNE	Achork (Navor)	Fermanagh	
	Carrigaport		
	Coolyermer	Fermanagh	
	Erne Lower	Fermanagh	
	Erne Upper	Cavan / Fermanagh	
	Eyes (Tempo)	Fermanagh	
	Glaslough	Monaghan	
	Gowna	Cavan / Longford	
	Kilrooskey & Dummy's	Monaghan	seen 2006
	Lea (Hollybrook)	Fermanagh	
	Meenaiveen (Navor)	Fermanagh	
	Mill	Fermanagh	
	Moorlough	Fermanagh	
	Nageage (Termon)	Donegal	
	Naure	Fermanagh	
	Navor	Fermanagh	
	Oughter	Cavan	
	Tallycan	Fermanagh	
	Venagreane (Termon)	Donegal	
LIFFEY	Blessington Res.	Wicklow	
	Brittas Ponds	Dublin	not recently seen
MOY	Talt	Sligo	seen 2006
SHANNON	Carrickacladdy (H0331)	Leitrim	
	Derg	Tipperary/ Clare	
	Ennell (Brosna)	Westmeath	around influents
	Glore (Inny)	Westmeath	disappeared 1980s
	Owel (Inny)	Westmeath	periodic kills
	Pallas (Clodiagh)	Westmeath	disappeared 1854
	Ree	Westmeath	
	Sheelin (Inny)	Cavan / Westmeath	disappeared 1980s

LAKE CRAYFISH MONITORING REPORT FORM

Lake name	**Catchment**

Date	**Recorders**

Weather
General comments

HAND SEARCH

(10 refuges per patch) Size of crayfish found

	Grid ref.	Hatchling	Juvenile	Adult male	Adult female	Total No.
Patch 1						
Patch 2						
Patch 3						
Patch 4						
Patch 5						
Patch 6						
Patch 7						
Patch 8						
Patch 9						
Patch 10						
Total by life stage						
Average by life stage						
					total CPUE	

Substrate:
Other comments:

Sketch Map

LAKE CRAYFISH MONITORING REPORT FORM

Lake name	**Catchment**

Date	**Recorders**

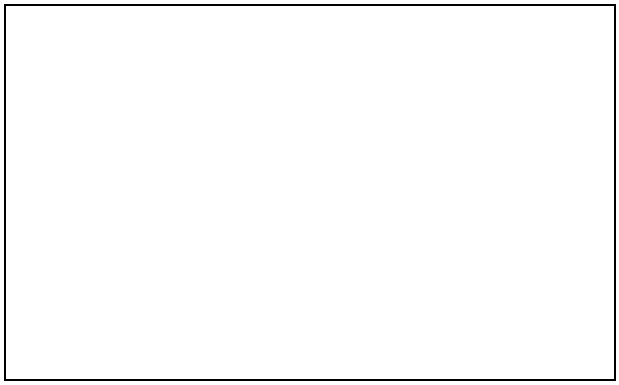
Weather
General comments

SWEEPS

20 standard sweeps in 2 areas		Size of crayfish found				
AREA 1	Grid ref.	Hatchling	Juvenile	Adult male	Adult female	Total No.
Sweep 1						
Sweep 2						
Sweep 3						
Sweep 4						
Sweep 5						
Sweep 6						
Sweep 7						
Sweep 8						
Sweep 9						
Sweep10						
AREA 2						
Sweep 11						
Sweep 12						
Sweep 13						
Sweep 14						
Sweep 15						
Sweep 16						
Sweep 17						
Sweep 18						
Sweep 19						
Sweep 20						
Total by life stage						
Average by life stage						
					total CPUE	

Substrate:
Other comments:

Sketch Map



LAKE CRAYFISH MONITORING REPORT FORM

Lake name	**Catchment**

Date	**Recorders**

Weather
General comments

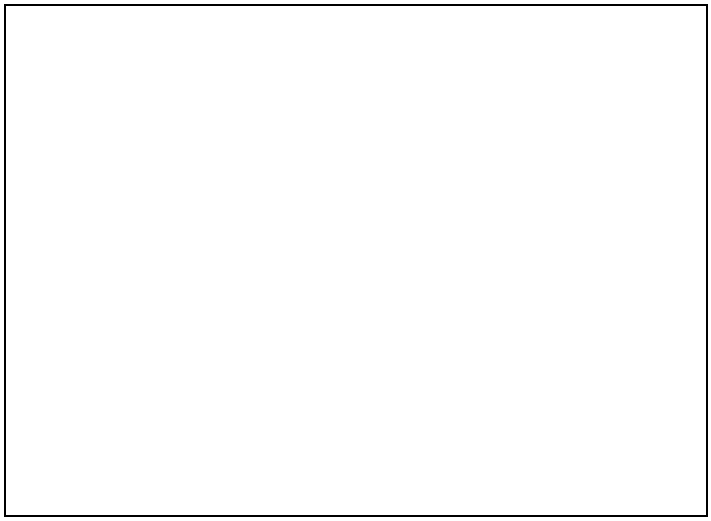
TRAPS — **Type of bait**

20 traps in 2 strings — Size of crayfish found

STRING 1	Grid ref.	Hatchling	Juvenile	Adult male	Adult female	Total No.
Trap 1						
Trap 2						
Trap 3						
Trap 4						
Trap 5						
Trap 6						
Trap 7						
Trap 8						
Trap 9						
Trap10						
STRING 2						
Trap 11						
Trap 12						
Trap 13						
Trap 14						
Trap 15						
Trap 16						
Trap 17						
Trap 18						
Trap 19						
Trap 20						
Total by life stage						
Average by life stage						
					total CPUE	

Substrate:
Other comments:

Sketch Map



LAKE CRAYFISH MONITORING REPORT FORM

Lake name	**Catchment**

Date	**Recorders**

Weather
General comments

NIGHT SEARCH **Type of bait**
(3 metres per patch) Size of crayfish found

	Grid ref.	Hatchling	Juvenile	Adult male	Adult female	Total No.
Patch 1						
Patch 2						
Patch 3						
Patch 4						
Patch 5						
Patch 6						
Patch 7						
Patch 8						
Patch 9						
Patch 10						
Total by life stage						
Average by life stage						
					total CPUE	

Substrate:
Other comments:

Sketch Map