

# INCREASING THREATS TO LAST WIDESPREAD POPULATIONS OF *Austropotamobius pallipes*

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International Crayfish Symposium,  
Olot, Spain  
23 September 2015



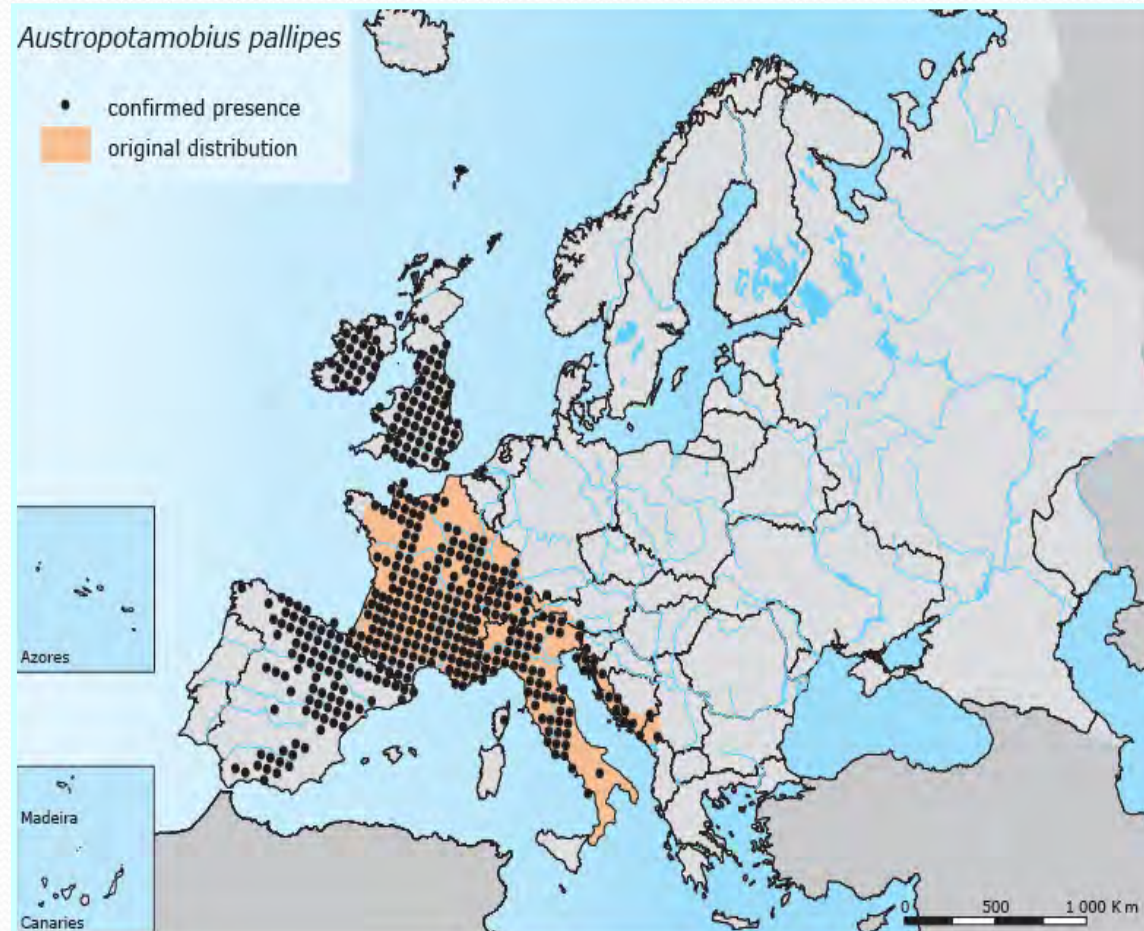
# White-clawed crayfish – present extent in Europe

White-clawed Crayfish:  
Northern and Southern  
Subspecies

Protected under Europe's  
Habitat Directive and  
national legislation

All are in sharp decline  
[NICS present] –

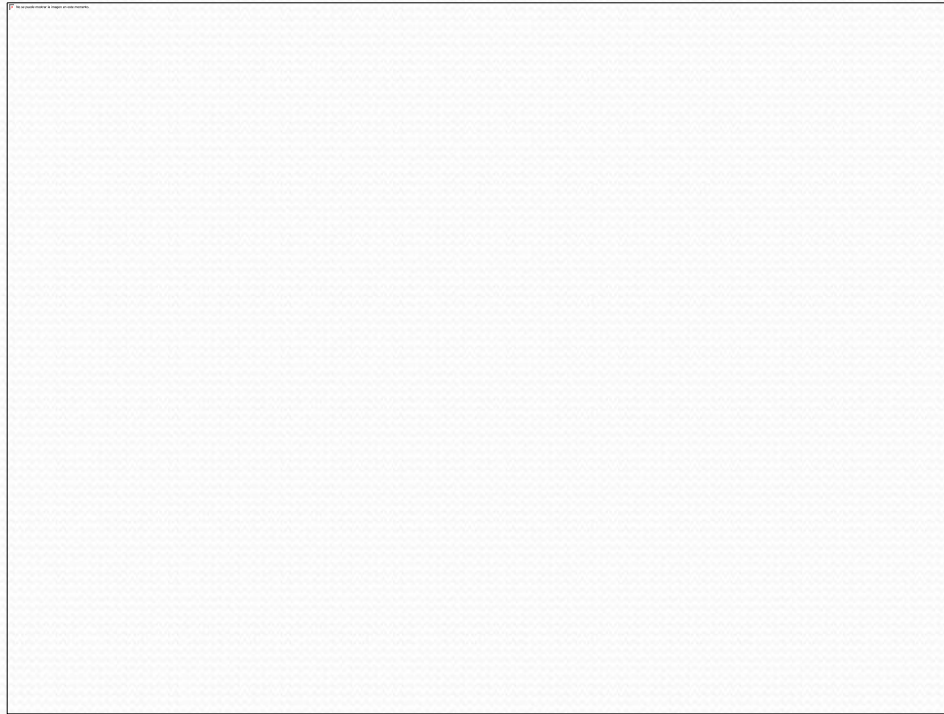
...except in Ireland



# NORTHERN WHITE-CLAWED

## CRAYFISH (*Austropotamobius pallipes*)

- Irish, British and northern French stocks are quite homogeneous, with little genetic difference

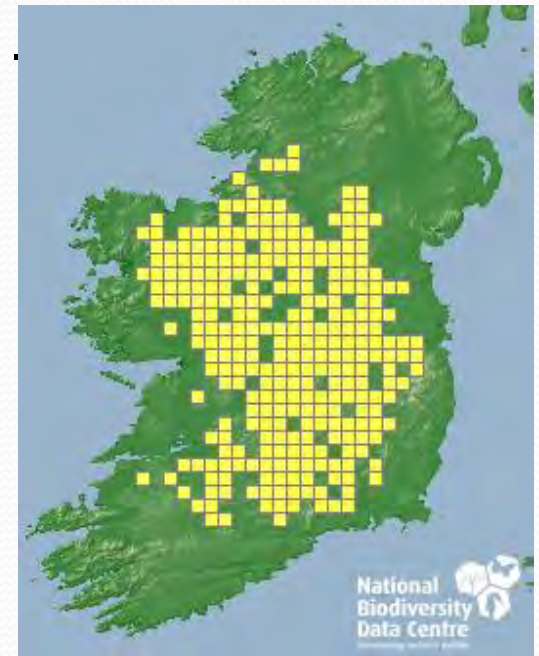


# The spread of European crayfish

- After the last glaciation, White-clawed crayfish spread out from circum-alpine refugia
- But islands were cut off by the sea rising, Ireland 12000 years ago, Britain later, 8500 years ago
- Some Irish fish established naturally –
  - ◆ *Salmo, Salvelinus, Coregonus* (breed in fresh water)
  - ◆ Eels *Anguilla* (breed in the sea)
- Most others probably introduced.
- What about crayfish?

# IRISH CRAYFISH

- Distributed widely across the midlands
- Probably by human introduction
  - From Britain?
  - From the continent?



# A LITTLE IRISH HISTORY –



## The Normans invaded Ireland in 1169...

- But Ireland already had some continental monasteries, answering at first to France
- What were they like?
  - ◆ High status (friends of kings)
  - ◆ Big communes
  - ◆ New methods of agriculture
  - ◆ New food habits



# So where did Irish crayfish come from?

- Native?
- Introduced from England?
- I think that French Cistercians brought them in – then handed them from abbey to abbey, until they had spread across Ireland.
- Genetically very similar to crayfish in western France!  
Heterozygosity is less, going north.

# ***White-clawed crayfish – country status***

**Ireland – Stable or slowly declining**



**England – 50% decline in last 10 years,  
[95% for Thames region, Hampshire]**



**France – 52% decline in last 10 years**



**Italy – 74% decline in last 10 years**

**Spain – rapid decline**



**Portugal – extinct**

#



# Irish white-clawed crayfish are now of European importance - 'Ark Europe for *Aup*'

Republic of Ireland

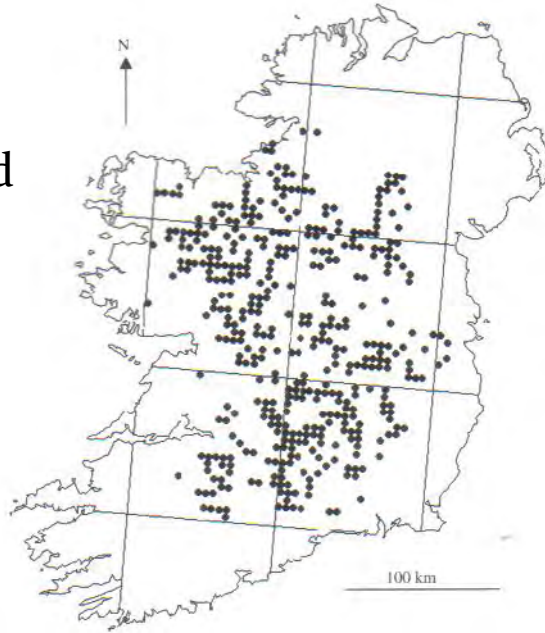
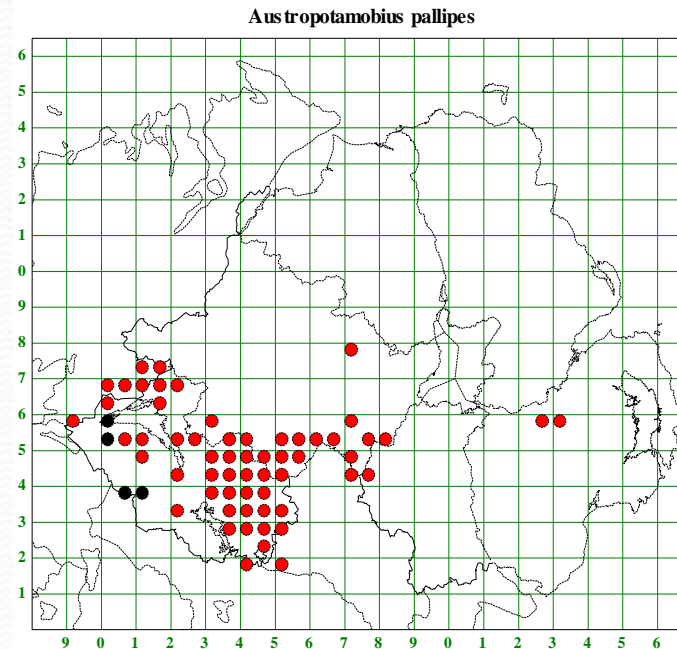


Fig. 1—Distribution of *Austropotamobius pallipes* in the Republic of Ireland from records collected between 1990 and 2003, based on presence in 5km<sup>2</sup> grid.



Northern  
Ireland:  
Erne and  
Bann



Post-1990

Pre-1990



## IRISH RIVER STOCKS –

Irish rivers with enough lime hold large stocks of crayfish, even in mildly polluted waters.

- Trapping crayfish in King's River [Nore catchment], CRAYNET Kilkenny meeting 2003

## IRISH LAKE STOCKS:

Crayfish are known in about 40 small Irish lakes.

Half of known lake stocks are now extinct

Above, Lough Talt SAC

Right, Kilrooskey  
(cross-border SAC)

# Reasons for decline? –

## 1. DIRECT HUMAN USE – [Unlikely]

- **No commercial fishery in Ireland**
- **Poaching not a major problem**
- **Predators not excessive**



# Reasons for decline? – 2. BIOLOGY

- **Slow growing, long-lived (10 to 20 years)**
- **Low reproductive effort (50-100 eggs, 8 months incubation)**
- **Prefer cool temperatures, high oxygen (climate change)**
- **Disease-susceptible (porcelain disease, plague)**



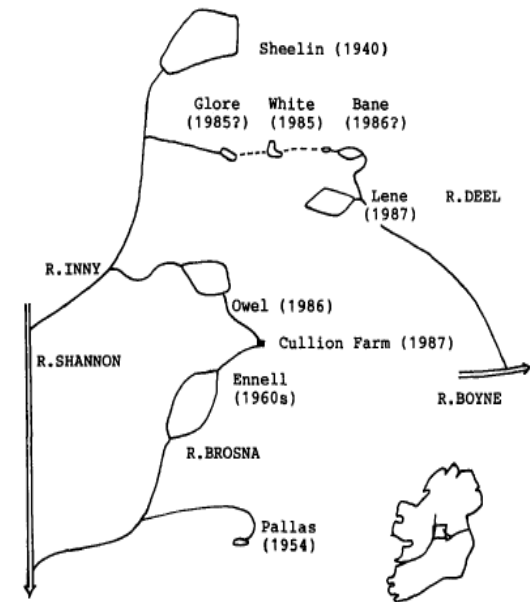
# One crayfish plague outbreak - in 1980s

**Probably brought in by anglers**

Boyne and Shannon catchments are connected and both were affected (from Reynolds 1988, with actual or suspected dates).

**Plague slowly burnt itself out**

**Crayfish re-established themselves in both catchments.**



# Reasons for decline? -

## 3. ENVIRONMENTAL IMPACTS

- **Drainage, agriculture and habitat degradation (chiefly rivers)**
- **Pollution stresses (lakes and rivers)**



# NO INVASIVE CRAYFISH IN IRISH FRESH WATERS

In Europe there are at least 10 non-indigenous crayfish species (NICS)  
All brought in by people,  
without considering consequences



Internet is now a major route of supply

Where NICS are present (Britain, rest of Europe), native crayfish are restricted to isolated headwaters

Where NICS are absent (only Ireland), native crayfish can be found in a wide range of water types, including large rivers and lakes



# Irish crayfish – a different pattern to Britain or France

Irish crayfish still widespread,  
Tolerant of mild pollution,  
But some lake populations in difficulty

Historic differences from GB:

- Irish Laws prohibits release of all alien crayfish
- No encouragement from Government to import signals
- Crayfish rarely eaten
  
- Laws differ in England, Wales, Scotland and N. Ireland – often not understood by media

# HOWEVER – Increasing reports that alien crayfish have reached Ireland ...



## SOURCE:

## CORRECT?

NI: R. Blackwater - Anglers' reports of Signals NO

NI: L. Neagh - Signals allegedly caught here for TV Chef NO

RoI: R. Barrow - claw found, believed alien NO

RoI: Dublin Chinese market: Turkish crayfish for sale YES

RoI: Cork, Cavan - NICS species offered on Internet YES

?

# Plague again confirmed in 2015!

**July 2015 – Crayfish plague again found in RoI**

- **In cross-frontier Erne catchment**
- **No NICS yet seen [as in 1980s plague]**
- **BUT If NICS become established, it will mean the rapid decline of most Irish *A. pallipes* stocks**

# WHAT CAN WE DO?

**Rapid survey** of extent of problem - use eDNA

**Rescue** endangered stocks - use a crayfish farm  
in for conservation in rearing for future

**Restocking** into wild.

# Moneycarragh crayfish farm, Dundrum, County Down, NI



Moneycarragh Fish farm  
Crayfish Hatchery, RAS  
project.

o+ Hatchery reared  
crayfish (March  
2014)

# Moneycarragh Farm – stock history

Stocked in 2006 from Erne Catchment [now plague affected]  
Uses advanced RAS recirculation technology  
Many generations grown on with temperature manipulations

**POTENTIAL FOR RESTOCKING IRELAND AND BEYOND**

[Owner **John Smyth**, Researcher **Joerg Arnscheidt** and  
Advisor **Martin Flanigan** are present here]

# Rearing troughs



# BREEDING TANKS AT MONEYCARRAGH





# HATCHERY BOTTLE RACKS



# INTERNATIONAL ACTION NEEDED

North (UK) and South (RoI) against threat from crayfish plague and NICS

- **STRENGTHEN** legislation
- **MONITOR** and manage plague in Erne catchment
- **CONTROL** internet aquarium trade
- **PROMOTE** 'Ark Europe' potential and use rearing facilities to conserve stocks
- **EDUCATE** officials, professionals and public
- **ALERT AND INVOLVE ALL WATER USERS!**

# PROTECT IRISH CRAYFISH



## Alien invader:

- Over 150 years ago, the first American crayfish were imported to Europe. The Spiny-cheek crayfish, *Orconectes limosus*, is now widespread across Europe. It has ousted the white-clawed crayfish from large French lakes and rivers, and also the larger European "Noble" crayfish *Astacus astacus* from many rivers and smaller lakes further north.
- Less than 50 years ago the Swedish Government introduced Signal crayfish *Pacifastacus leniusculus* from California, in

the belief that they would spread through lakes now empty of Noble crayfish. They have done so, but caused the continuing decline of Noble crayfish across Scandinavia.

- 20 years ago the Red Swamp crayfish *Procambarus clarkii* from Louisiana was introduced into Mediterranean deltas in France, Spain and Italy; it has drastically altered the ecology of the deltas and marshes such as the Camargue, and has since spread as far afield as UK.



Irish crayfish are under real threat from the risk that someone may accidentally or even deliberately introduce a different species, which carry a lethal disease, into Ireland or bring in crayfish plague on boats, damp fishing gear or equipment.

## Contacts

National Parks & Wildlife Service (NPWS)  
Department of the Environment, Heritage & Local Government  
7 Ely Place  
Dublin 2  
Tel: 1800 405 000

natureconservation@environ.ie  
www.npws.ie

Useful websites:  
www.npws.ie  
www.noticenature.ie

Text: C. O'Keefe, NPWS  
Design: www.slickfish.ie



Comhaltas, Oidhreacht agus Rialtas Áitiúil  
Environment, Heritage and Local Government

## Heading here?

Freshwater crayfish look like small brownish lobsters. There are about 650 different crayfish species worldwide, but only six species in Europe and only one species in Ireland.

The six European crayfish species are or were widely caught for food, but all are now threatened, chiefly by a fatal disease, the 'crayfish plague' carried by crayfish introduced from North America. There are now at least 7 species of American crayfish across Europe. There are many of these alien crayfish now living wild in the UK.

However, Ireland is in the fortunate situation of being the last European country having no alien crayfish and we have one widespread native species, the White-clawed Crayfish, *Austropotamobius pallipes*. It can be found in Ireland, Britain, France, Spain, Italy and Croatia.

Crayfish are a valuable food item for many freshwater species. Otters, herons, trout and pike all feed on crayfish where they are available.

We have good stocks of native crayfish in Ireland, but the future is under a cloud because of the risk of release of alien species into Ireland.



## HERE IS WHAT YOU CAN DO:

**Do not take foreign crayfish into Ireland, or purchase or release foreign species of crayfish in Ireland for any reason.**

**If you are involved in angling, be on the lookout for anyone who might use imported crayfish as bait.**

**Always dry fishing gear fully between use on different water bodies. If you can't dry it, disinfect it with a dilute bleach solution.**

**If you own a pet shop, do not buy in or sell crayfish.**

**If you suspect foreign crayfish are in a lake or river, contact the National Parks and Wildlife Service immediately – see the State Services page in the phone book or email natureconservation@environ.ie**