



Control and Management of Marine Non-Native Species



There are currently four experimental projects being undertaken under the marine pathways project which have gathered information aiding the control of NNS following their introduction or spread. These are:

- 'The Dee Chinese Mitten Crab Project'
- 'The control and eradication of *Didemnum vexillum* off the West coast of Ireland'
- 'The extent of *Grateloupia turuturu* in Milford Haven'
- 'Survey of feral Pacific oyster in Scotland'



River Dee Chinese Mitten Crab Project

Ben Wray

Overview



- Mitten crab life history & potential impacts
- Project outline & objectives
- What we did & results/observations
- Key messages





European Distribution



First documented in Germany – 1912

1940s – Established populations in Denmark, Sweden, Finland, Poland, Holland, Belgium & France

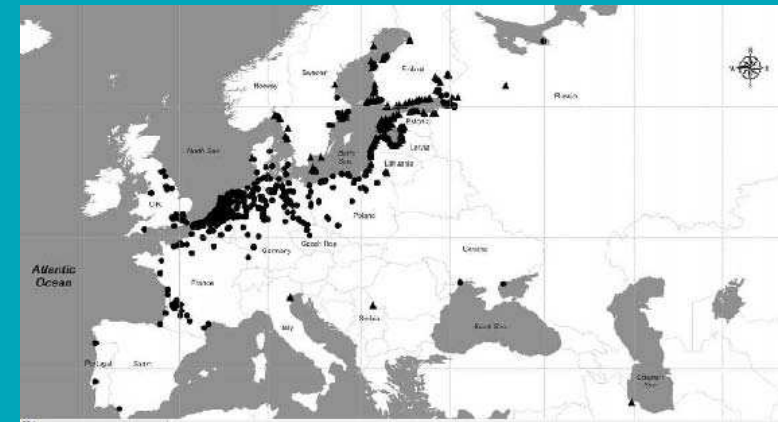
UK – Only 2 isolated reports River Thames 1935
Humber 1949

Long ‘lag-phase’ - Post 1996 – rapid expansion in Thames

Other sightings – Chelmer, Tees, Tyne, Mersey and Duddon

River Dee – 2006

Shipping - Ballast water – most likely vector for introduction



- Established locations
- △ Sightings where establishment not confirmed



- Existing records
- Verified records entered through the mitten crab recording project

Potential Impacts

Economic

Burrowing

- Large abundances = high burrowing density (Elbe 1930s 30 holes per m²)
- Increased erosion - concerns regarding river bank integrity

Fisheries conflicts

- Damage to nets
- Damage to target species
- Bait removal - anglers

Water abstractions

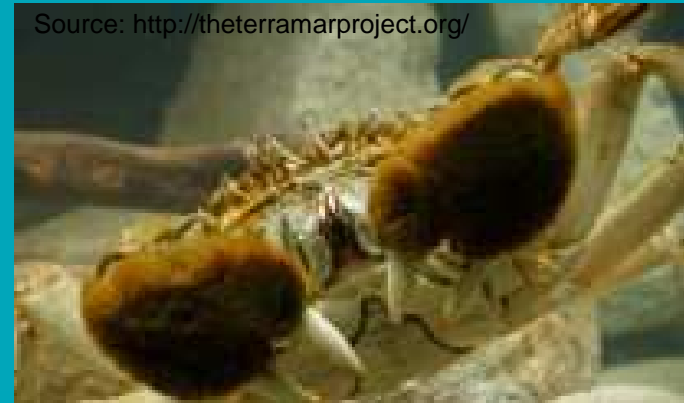
- Clogging intake screens
- Water treatment works, power stations etc



Potential Impacts

Ecological

- Generally poorly understood
- Mitten crab known to consume variety of invertebrate prey
- Competition for food & space with native species e.g. native white clawed crayfish
- Mitten crab – known to consume fish eggs

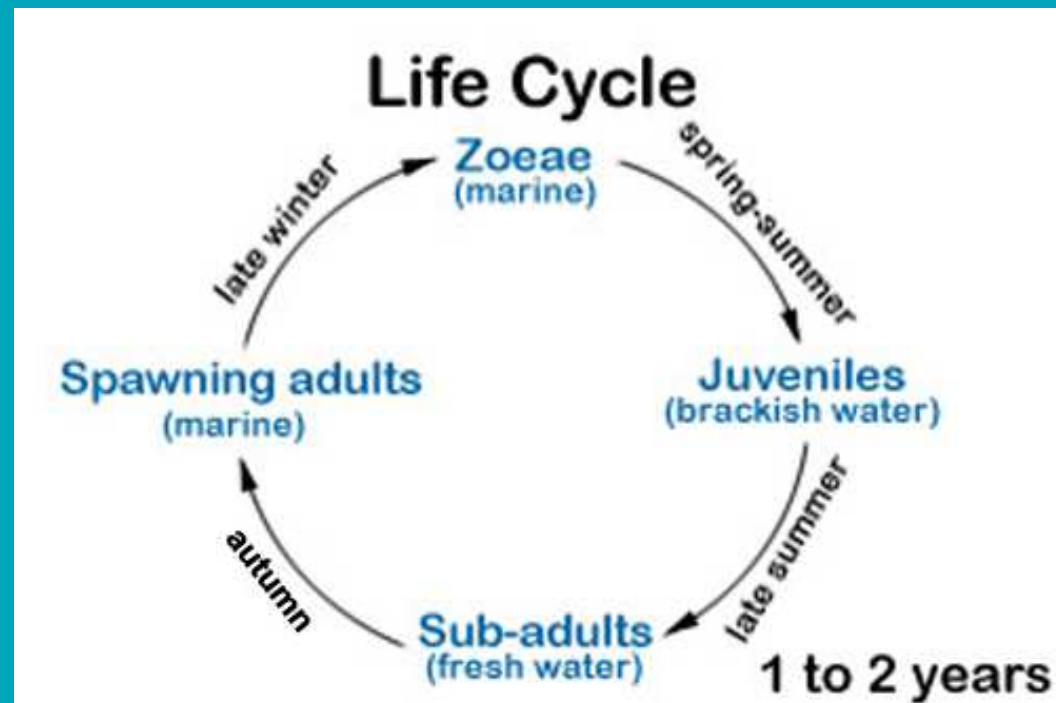


General Biology



Life History – Chinese Mitten Crab

- **Catadromous**
- Majority of adult life freshwater
- Migrate downstream saline estuarine conditions to **mate** and **spawn** (>20ppt)
- Mating – late summer/autumn depending on geographic location
- Sexual maturity – Europe 3-5 years



Adapted from: <http://www.dfg.ca.gov/>



Dee Project

Main objectives



- Stakeholder engagement and awareness raising
- Establish if population is expanding
- Trial various monitoring & management methodologies



Stakeholder engagement and awareness raising



- Meetings and talks at stakeholder groups
 - Power stations, waterworks etc
 - River users – fishermen, anglers, boat users, kayak clubs etc..
- Poster and calling cards
- Volunteer days – events ‘Big Dee Day’ - Juvenile search methodology

Alien Invaders - We Need Your Help!
Please Report Any Chinese Mitten Crab Sightings



Potential Threats:

- Chinese mitten crabs *Eriocheir sinensis* are one of the worlds 100 worst invasive species
- They are invading the River Dee!
- They can damage river banks
- They may feed on invertebrates, fish eggs and eat bait from anglers tackle.

Long walking legs and squarish body up to 86mm across.

Don't report native common shore crabs *Carcinus maenas* (these have triangular bodies)



Dense brown fur on claws



Juveniles may lack fur on claws

Was it male or female?



Male



Female

Report your sightings in Wales to 0845 1306 229 or <http://mittencrabs.org.uk/>
Please note it is illegal to return live Chinese mitten crabs to the water





Monitoring Chester Weir Fish Trap

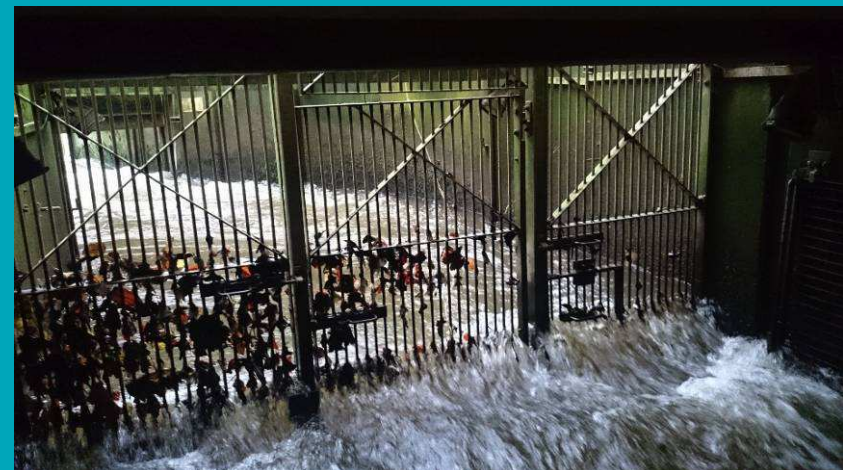


2007 – 2012 NRW Fish trap
Chester Weir

- ca. 70 adults
- 76% - September & October

2013 - 2015 Systematic approach

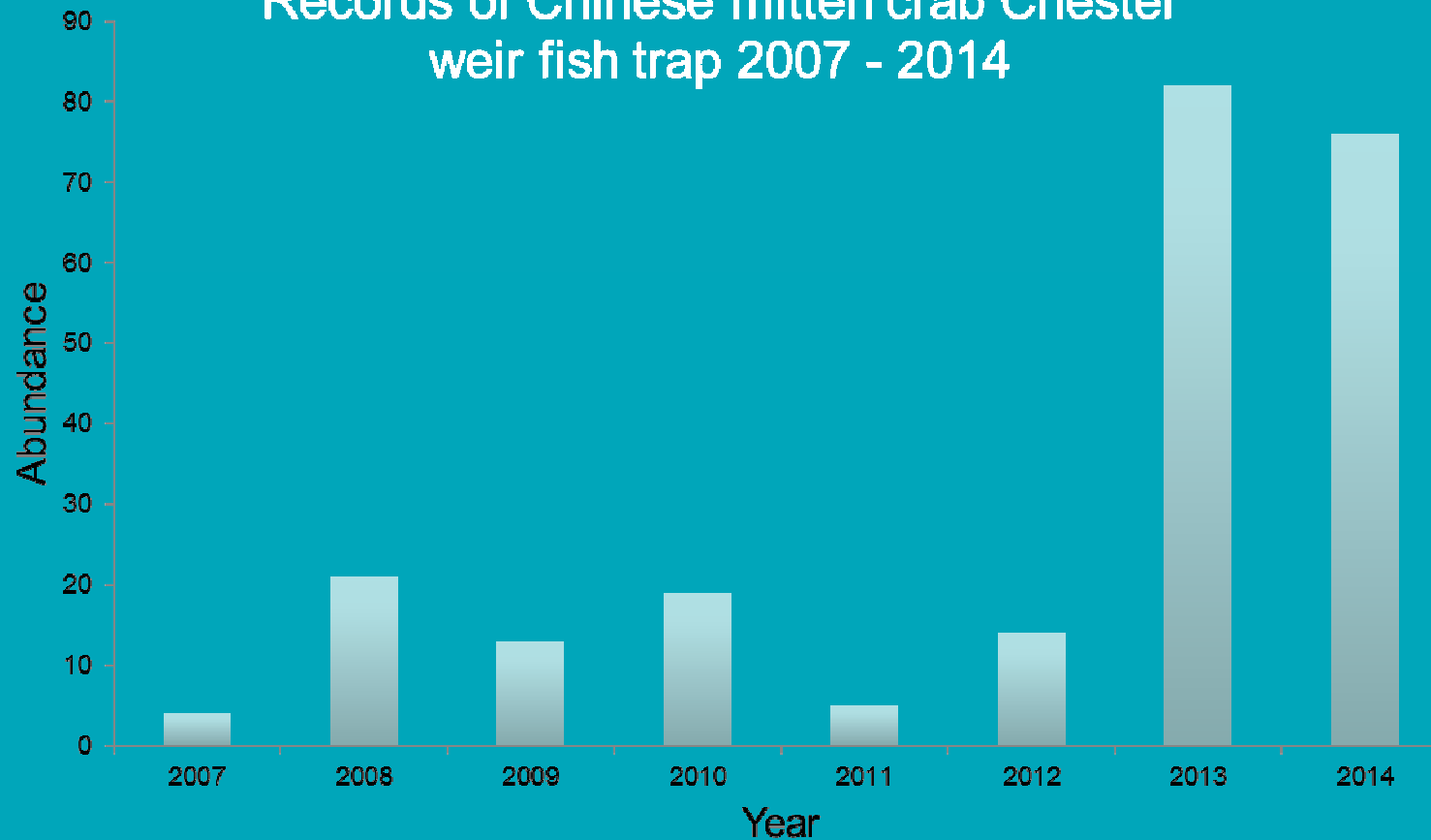
- Morphometric data – size, weight = age
- DNA samples – Natural History Museum
- MSc student – gonad development, tissue analysis



Increasing Population Size



Records of Chinese mitten crab Chester weir fish trap 2007 - 2014



Trapping trials Over 2 seasons

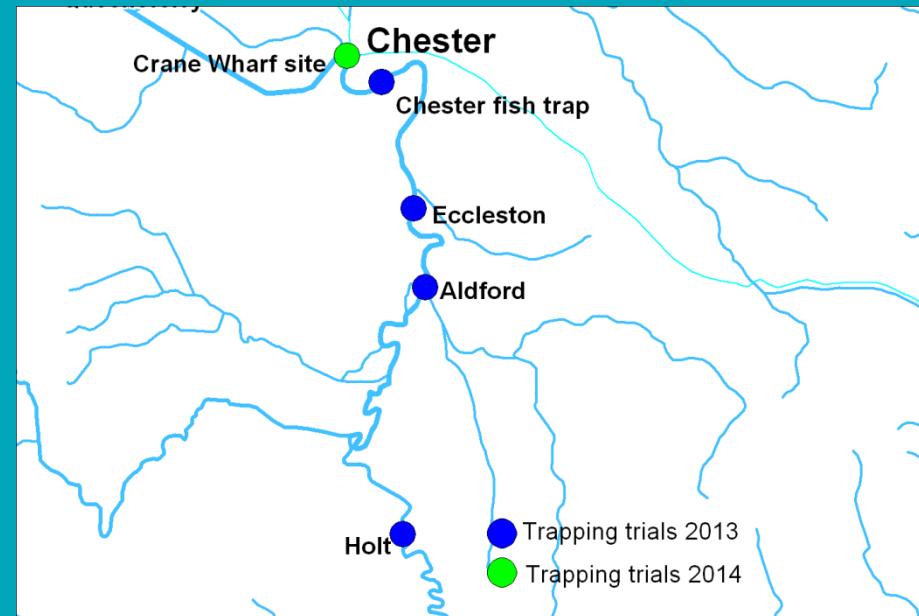
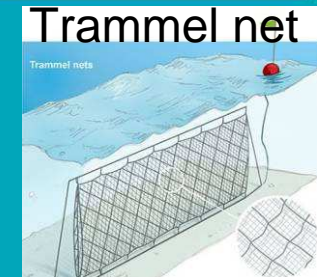
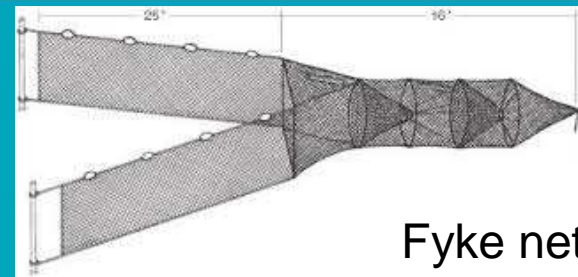
Methods derived from Thames project
- modified fyke nets

- Minimise bi-catch – large mesh, otter guards, variable soak times, without & with wings attached
- Upstream & downstream weir
- Shore & boat
- **Results** – 0 mitten crabs captured

Trammel netting – limited success,
and costly

Conclusions

- Restricted by SAC features, resources/budget, environment,
- Small population size



Other components of project

Collection of salinity and temperature data

- Identify environmental parameters at different sections of river suitable for MC development

Megalopae collection - MSc project

- Detection of MC megalopae > Confirm life cycle
- Proxy for population size
- 100s native species each collector 0 mitten crab megalopae
- Low population size



Key Messages



Dee mitten crab population appears to be expanding

Despite detailed knowledge of successful monitoring elsewhere in the UK, management needs to be site specific

Management of this species on Dee is challenging due to the environment and potential impacts on species of conservation importance.

Important to monitor the potential impacts of a population of this size and understand what the implications may be if population is left unchecked

Challenge is to decide how best to proceed and how to fund future work

Questions?

