Crayfish Conservation in the South West

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White-clawed crayfish
*Austropotamobius pallipes*

- Crustacean, decapod
- Astacidae family
- One of UK’s largest freshwater invertebrates
- Only endemic crayfish species in U.K.
- Grows up to 12cm in length
- Can live up to 10 - 12 years
- Breeds once per year in Autumn
- Gestation 8 months 40 – 150 young
- Breeds at 2 – 4 years of age
- Can live in rivers or ponds
- Omnivorous not predatory
- Ecological importance, keystone species
A. pallipes status and protection

A pallies present in 18 countries

Legal protection:

- Wildlife & Countryside Act 1981 (as amended) - Schedule 5
- Prohibition of Keeping of Live Fish (Crayfish) Order 1996
  - EC Habitats Directive 1992 annex II & V(a) Designated SAC’s
  - Bern Convention 1979 - appendix III
- **IUCN red data list**: Globally Endangered
White – clawed crayfish decline

- Change of land use
- Reduced water ways and man made barriers
- Water pollution – agricultural / industrial
- Main threat introduced invasive crayfish species
- Europe has 5 indigenous crayfish species
- 13 crayfish species introduced into Europe
- 120 crayfish species available to purchase via the internet
- 9 introduced species of crayfish in the UK....
American signal crayfish
*Pacifastacus leniusculus*

- Main threat to white-clawed crayfish
- Introduced into UK (1970’s) for food
- Escaped and bred in water ways
- Spreads crayfish plague
- Out competes for space and food
- Eats white-clawed crayfish
- Preys upon fish species
- Damages river morphology:
  - Degrades river banks
  - Increases sedimentation
  - Reduction of fish spawning sites
- Increased flood risk
- Financial implications
Invasive crayfish in Britain

**Noble Crayfish**
*Astacus astacus*

- European found in Somerset, susceptible to plague

**Red Claw Crayfish**
*Cherax quadricarinatus*

- Australian – aquarium trade, susceptible to plague

**Narrow-clawed Crayfish**
*Astacus leptodactylus*

- Eastern European – found in SE & Midlands susceptible to plague

**Marbled Crayfish**
*Procambarus fallax*

- Aquarium trade, susceptible to plague – Parthenogenic!
**Virile**

*Orconectes virilis*

- **American** – found in SE & Midlands, carries plague.

**Spiny-cheek**

*Orconectes limosus*

- Found in USA & Mexico, found in London, carries plague.

**Red swamp**

*Procambarus clarkii*

- USA & Mexico, found in London, carries plague.

**White-river**

*Procambarus acutus*

- USA. One isolated population London, carries plague.

**Virile crayfish** (*Orconectes virilis*) © D.M. Holdich

**Spiny-cheek crayfish** (*Orconectes limosus*) © D.M. Holdich

**Red swamp crayfish** (*Procambarus clarkii*) © S. Peay
S.W. white-clawed crayfish decline

- SW England has experienced a rapid decline in *A. pallipes* (up to 70% lost)
- 18 known *A. pallipes* populations remained in SW at project start in 2008
South West Crayfish Partnership

- South West Crayfish Partnership established in 2008
- Steering committee: Bristol Zoological Society, Buglife, Cefas, Environment Agency and Wildlife Trusts
- **SWCP - 3 main strands at inception:**
  1. Ark sites (safe refuge) establishment in England
  2. UK wide communication strategy delivered
  3. *A. pallipes* hatchery established at Bristol Zoo
An ark site for white-clawed crayfish is a discrete waterbody, comprising running and/or still water, which supports a healthy, recruiting population of white-clawed crayfish and which can be reasonably expected to sustain a population in favourable condition for the foreseeable future, without significant management intervention (Bradley 2008)
Ark site establishment

**Stage 1:**

**Coarse Filter:**
1. Is *A. pallipes* absent from the site/watercourse?
2. Is the site/watercourse free of non-indigenous crayfish species [NICS]?
3. Is the site/watercourse physically isolated from the threat of colonisation by NICS?
4. Does the site have permanent water?
5. Is the *water quality likely to be suitable for A. pallipes?*
   
   [*i.e. equivalent to GQA1 chemistry A-C]*

**Next Stages:**
1. Site graded - identifies the risks to *A. pallipes* at ark site / catchment /region
2. Detailed site investigation
3. Donor population identified
4. Habitat enhancements
5. Licences and permission obtained and resources secured

**Further information:**
Peay S (2009). Selection criteria for ark sites for white clawed crayfish.

Crayfish website: [https://www.buglife.org.uk/sites/default/files/Selecting Crayfish Ark Sites.pdf](https://www.buglife.org.uk/sites/default/files/Selecting Crayfish Ark Sites.pdf)
Ark site establishment

16 ark sites established across SW England:

13 - translocations, 5000+ crayfish moved from 8 highly threatened populations
2   - captive born ark sites
1   - captive born river supplementation

70% of monitored ark sites already show presence of *A. pallipes*
Communication Strategy

Bristol Zoo Crayfish display - 3,000,000+ visitors

Anglers - 1,000,000+ anglers

Outreach events - 250,000+ attendees [80+ events]

Divers - 50,000+ targeted

Students / school children – 7,000+ students [BZG education sessions]

Crayfish roadshow - 1,600+ children

Restaurants - 1,500 targeted

Conferences – 150+ delegates

Media events - 80+ [T.V. radio, publications]
DO YOU KNOW IF YOUR STOCKIST IS LEGAL?
KNOW YOUR STOCKIST

With increased popularity for foraging for food, it is important to know where your crayfish is coming from and if it is legal. Follow the simple steps below to protect yourself and endangered British crayfish.

CHECK YOUR UK STOCKIST HAS:
- Written authorization to keep crayfish (from the Environment Agency).
- Written authorization from Defra and fish farm registration with The Fish Health Inspectorate.

OR

- Serve great tasting, local crayfish and stay legal -

RESTAURATEURS
STOCKING & KEEPING CRAYFISH - THE LAW

RESTAURATEURS KEEPING CRAYFISH NEED TO ENSURE:
- A legal, sustainable & ethical UK or international supplier.
- Crayfish are kept secure, (in escape-proof containers).
- Crayfish are kept for consumption.
- Unwanted crayfish are returned to stockist or killed humanely, (never give live crayfish to other restaurants, family or friends & never release into the wild).

For more information on crayfish, visit: www.bristolzoo.org.uk or www.crayfish.org.uk

THE SOUTH WEST CRAYFISH PROJECT

Save British crayfish
Stop the spread of crayfish plague:
CHECK & CLEAN your boots when leaving rivers, lakes or ponds.
DRY everything well, when you get home!
Crayfish Roadshow

We promise to protect British white-clawed crayfish and our rivers, lakes and ponds by taking the time to CHECK, CLEAN and DRY our boots, nets and fishing gear after a visit to a river, lake or pond.
Outreach
Bristol Zoo INNS display

WE'RE TAKING OVER YOUR RIVERS

JUST TRY AND STOP US!

INVASIVE SPECIES COST THE UK ECONOMY £1.7 BILLION EVERY YEAR.
New biosecurity recommendations

Remove all visible dirt

Soak in 45°C water for 15 minutes

Dry equipment for 24 hours

Dry in sunlight – U.V. is best
Crayfish captive breeding

Bristol Zoo hatchery established in 2009:

• Functions as a fully bio-secure ark site
• 4 x closed-circuit, outdoor & indoor systems
• No natural water supply or top up
• Treated, mains supply city water
Bristol Zoo crayfish hatchery
A. *pallipes* captive rearing / breeding

**Captive rearing:**
- Wild caught ovigerous females
- Brought into hatchery in spring
- Eggs hatch, juveniles reared
- Adults health screened & released

**Captive breeding:**
- Wild caught & captive born
- Mated within hatchery
- Juveniles reared
- Adults health screened & released
Where do the juveniles go?

- **Released** - wild /ark sites
  Health screened / sampled

- **Moved** - BIAZA / EAZA institutions, colleges & hatcheries

- **Kept** - unrelated brood stock groups maintained for captive breeding
Current hatchery focus

- River Itchen, Hampshire
- Two remaining populations in county
- *A. pallipes* captive breeding
- River supplementations - 2014 /15
- Third release planned for 2016
- Juveniles held at Sparsholt College
- Hampshire ark sites search in progress
- Devon *A. pallipes* programme planned for 2016
Bristol Zoo Hatchery

- 6 years hatching and rearing *A. pallipes* crayfish
- 3000+ crayfish born [estimated 80% average survival rate]
- Complete cycle captive breeding since 2012
- Second filial generation at BZG
- Records held at BZG using Zoological Information Management System (ZIMS)
Research

Optimal rearing densities

Refuge fidelity / preference

Behaviour / aggression

Optimal feeding regimes

Isotopic analysis

Breeding techniques

Paternity assessment

Ark site survival

PIT tagging

Genetic data base
Signal crayfish control

- Trapping efficacy – Angling Trust fishery trials for 3 years
- Attract & kill feeding stations - laboratory trials for 4 years
- Male sterilisation – laboratory trials for 3 years
- First *in-situ* male sterilisation trial in progress - PhD
- Population modelling – effective prediction tool
SWCP current programme

• *A. pallipes* captive breeding, rearing & release

• *A. pallipes* production for institutions & colleges

• Husbandry training & general practitioner support

• Ark site establishment & annual monitoring

• Signal crayfish control

• Research
SW crayfish conservation

- Ark sites have increased SW A. *pallipes* populations by > 50%
- Captive breeding of A. *pallipes* can halt population decline
- Captive bred crayfish are surviving in the wild
- Signal crayfish mitigation trials, *in-situ*, are beginning
- South West model can be used by other regions
- SWCP links to ISAP group
- SWCP is a strategic landscape approach to species conservation
- Ark sites are nature reserves for many species
- A. *pallipes* is a flagship species for freshwater habitat preservation
Thank you for listening & Happy Christmas!