Crayfish Conservation in Hampshire’s Chalk Streams

7th November 2014

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Ecologist
Southern Chalkstreams Project

- Partnership project
- Protect, promote and preserve
- Focus on three key species
- Four main mechanisms

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Outline

- Ecology
- Decline of native crayfish and spread of non-natives
- Status of crayfish in Hampshire
- Our work
- Why and what you can do?
White-clawed Crayfish
*Austropotamobius pallipes*

- Only species of crayfish native to Britain
Characteristics
White-clawed crayfish

- Decapod crustacean
- Brown / olive
- 12 cm length
- Chelae
  - Colour
  - Tubercules
- Spines
- Rostrum
- Post-orbital ridges

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* Holdich, Rogers & Fox
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© Holdich et al.*

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Distribution (Historic)

European

UK


Taken from the National Biodiversity Network Gateway:
http://www.searchnbn.net/gridMap/gridMapLarge.jsp#topOfMap
Factors Influencing Distribution in the UK

- Variety of water body types
  - Lentic and lotic
- Geology and water chemistry
  - Clean, base rich and calcium input
  - Water quality (Low BOD)
    - Susceptible to organic pollution
  - Water quantity
  - Keystone species
- Low turbidity and silt / mud
- Temperature
Habitat Selection and Utilisation

• Habitat selection
  • Coarse substrate
  • Cryptic micro-habitats
  • Natural refugia
• Abundance
Decline of White-clawed Crayfish

- Once widespread in Britain where conditions suitable
- From mid 20th century but massive acceleration 1980’s+
- Most dramatic in the south
Rare and Protected Species

- Nationally and Internationally endangered
- Protected by UK and European legislation

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Protecting wildlife, inspiring people
Causes of Decline

• Physical loss of habitat
  • Dredging during WWII
  • River-engineering

• Pollution
  • Organic
  • Chemical
  • Pesticides

• Abstraction

• Non-native crayfish

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Non-native Crayfish

- Native (ICS) and Non-native (NICS)
  - Only one ICS
  - 6 NICS established in the wild
  - 2 NICS in aquarium trade
    - Only one legally

* Photos courtesy of Chris Lakhaup: taken from Holich & Silbey, 2009
Signal Crayfish
*Pacifastacus leniusculus*

- Most abundant and widespread non-native crayfish in UK
- Introduced in 1970’s
- Lower productivity than promoted
- Readily migrated and rapidly expanded range

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Effects of Signal Crayfish

• Major cause of decline in white-clawed crayfish

• Competition
  • More fecund
  • Earlier breeder
  • Faster growth
  • Aggressive and larger

• Predation

• ‘Crayfish plague’
  • *Aphanomyces astaci*
‘Crayfish Plague’

- Oomycete pathogen *Aphanomyces astaci*
- Mass mortality – up to 100%
- ‘Spores’ – viable without host for up to 16 days
- Wet equipment / animals
- **Check, clean, disinfect and dry!**
- Consider native crayfish

Find out how you can help stop the spread of invasive aquatic species

www.direct.gov.uk/checkcleandry
Crayfish Distribution in Hampshire

- 95% reduction in populations since mid 1970’s
- Progressively expanding and probably under-recorded
  - Itchen population
Current Status in Hampshire

- **White-clawed crayfish**
  - Widespread / locally abundant
  - Mass mortalities - 80’s / 90’s
  - Tributaries of upper Itchen
    - Highly isolated
    - Locally abundant

- **Signal crayfish**
  - Rapid expansion
  - Most if not all catchments
    - Widespread
    - Variable abundance

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Headwaters of the River Itchen

- Candover Stream
  - Extensive and abundant
  - Highest densities
  - Well studied

- River Alre
  - Downstream of Alresford
  - Localised high abundance

- Cheriton Stream
  - Recent discovery

- **Isolated and threatened**
  - Partnership working
Current Threats in Hampshire

- Signal crayfish
- Crayfish plague
  - Number of vectors
- Habitat loss
  - Abstraction
    - Aquaculture
    - Augmentation
  - Management practices
- Climate change
- Pollution
Work of the SCS Project
Conservation of Crayfish

- Four key objectives
  - Raise awareness
  - Improve knowledge / distribution and provide technical guidance
  - Landowners and habitat enhancement
  - Captive projects and ‘Ark’ sites
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Raising Awareness

- Inform and advise
- Bio-security
  - Transmission of NICS and crayfish plague
    - Practitioners / anglers
    - Landowners
    - Aquaculture / food retail
- No benefit in trapping for consumption
- Events / booklet / articles
- Presentations
- Training
Monitoring and Behavioural Research

- Targeted surveys and monitoring
  - Licences and consents
  - Current knowledge essential
    - Proactive and responsive
  - Collated and disseminated
    - Focus conservation efforts / inform decision makers

- Anomalous diurnal behaviour
  - Previously unobserved
  - Localised sub-set
  - Number of explanations examined
  - Status already precarious
    - Undetermined stressor is significant concern
Technical Guidance

• Upper Itchen Augmentation Scheme
  • Tested in 2011
  • Ecological Monitoring
  • Results not clear-cut
    ▪ Potential impacts
  • Informed decision making process
    ▪ Continued discussion and assessment

• Water quality issues
  • Elevated phosphates in Upper Itchen
    ▪ Effect on crayfish?
  • HIWWT working closely with partners on Upper Itchen Initiative
Habitat Management / Enhancement

- Aquaculture, landowners and fishery managers
- Management
  - Stock density
  - Weed management
  - Favourable habitat features
  - Operational procedures
- Habitat enhancement
  - Environment Agency
  - Technical advice and supervision of delivery
- Wider benefits
  - Range of flora and fauna

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Captive-rearing with BZS

- Captive rearing and breeding
  - Three years
  - Hampshire population
- Phase 1
  - ‘Berried’ females early 2013
  - Juveniles by end July 2013
  - Translocation
  - Walk over / abiotic data collection
  - Juvenile release and monitoring
- Phase 2
  - Ark site
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Captive-breeding and ‘Ark’ sites

- Captive-breeding success
- Male collection – October 2013
  - Introduced to females
- Over-winter fully in captivity
- Temperature issues
- Phase 2
  - Male collected during 2014 release
- Release in summer 2015
- Suitable ‘Ark’ site
Why Should You Care?

- Why invest in native crayfish conservation
  - National populations focused in north and central
- Duty
- Regional importance
  - Nationally rare species
- Wider impacts of NICS
  - Techniques developing
- Pro-active
- Education
- Investment and Persistence
What Can You Do to Protect Crayfish?

- Already are!
  - Engagement and support
- Introduction of signals
  - Educate
- Provide records
  - New sites
  - Each year
- Dispel the myths on trapping
- Locate potential Ark-sites
BIO-SECURITY

- Bio-security protocol
  - Protect against accidental introduction of NICS
  - Minimise the risk of transmission of crayfish plague
  - Protect fisheries / sites from fish diseases and INNS
Summary

- Ecology
- Decline of native crayfish and spread of non-natives
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- Our work
- Why and what you can do?
Thank you for your support!

Landowners, river keepers and fishing clubs