Catchment Biosecurity

Threats and safety measures

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THE wildlife TRUSTS STAFFORDSHIRE

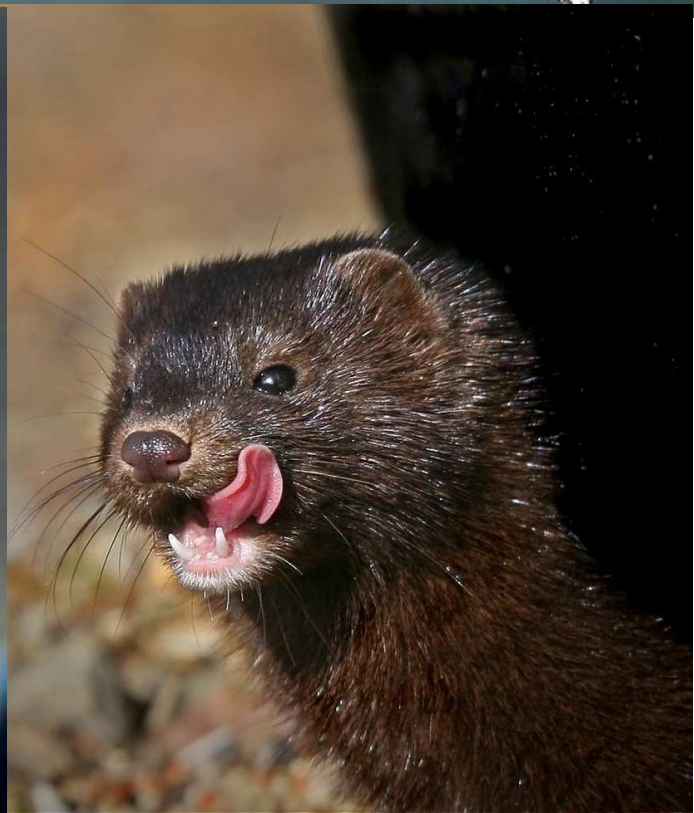
Environment Agency

Threats - Invasive Non-Native Species (INNS)?

- There are 2,721 non-native species living in England of which the majority (1,798 or 66%) are plants.

- Most non-native species do not cause problems. Only a minority have become invasive and have negative impacts on agriculture, forestry or biodiversity interests.

- Invasive non-native species are the second biggest threat to biological diversity worldwide. Globally, invasive species cost an estimated £914 billion pa and are the cause of half of all **extinctions**. Considered even more damaging than pollution or climate change.



What are INNS?

- Invasive non-native species come from all over the world, some from continental Europe (e.g. Zebra Mussels) some from Asia (e.g. Chinese Mitten Crab, Asian Clam), some from America (Grey Squirrel, Mink, Skunk Cabbage, Red-eared terrapin, Ludwigia, Signal Crayfish), some from Africa (Hottentot Fig) and some from Australia (Australian flatworm) and New Zealand (NZ Pigmyweed, NZ flatworm).

- intentional (e.g. deliberate release of non-native species like Signal crayfish) and some
- unintentional (e.g. by 'hitch-hiking' on food or other goods imported into Britain or by escaping from captivity (e.g. American mink)).
- Some freshwater and marine species are transported large distances on ships or in ships' ballast water (e.g. Demon/Killer shrimps and Chinese mitten crabs).
- Many plant species are brought in intentionally as part of the horticulture trade but some then become established in the wild after that are disposed of irresponsibly or 'escape'.

Are they increasing and spreading in UK?

- Yes, the number of non native species becoming established in the UK is likely to increase due to the growth in world trade and global tourism.
- Climate change may also allow species that are currently benign in Britain to become invasive.
- The risks associated with invasive non-native species are therefore likely to remain a feature of our lives.

What are the biggest current aquatic invasive threats to Derwent Catchment rivers?

Demon shrimp

Signal crayfish

American Signal Crayfish

- Native to North America, signals carry a disease, crayfish plague, that is deadly to our threatened native white-claw crayfish. Introduced for food in the late 1970s and 1980s but spread quickly across much of the UK.

- Distinguishing nonnative species from the threatened native white-clawed crayfish is essential. Compared to the native species, the signal crayfish is much larger and its claws are red underneath with a small turquoise / white blotch on the surface.

- Spreads up and downstream and may cross land to colonise adjacent water bodies. Human transfer, although illegal, still continues.

- Negative impacts include the almost complete loss of the native crayfish through the spread of disease and direct competition. Also undermines riverbanks through burrowing and predates on native fish eggs and aquatic invertebrates.

- License required form EA to trap

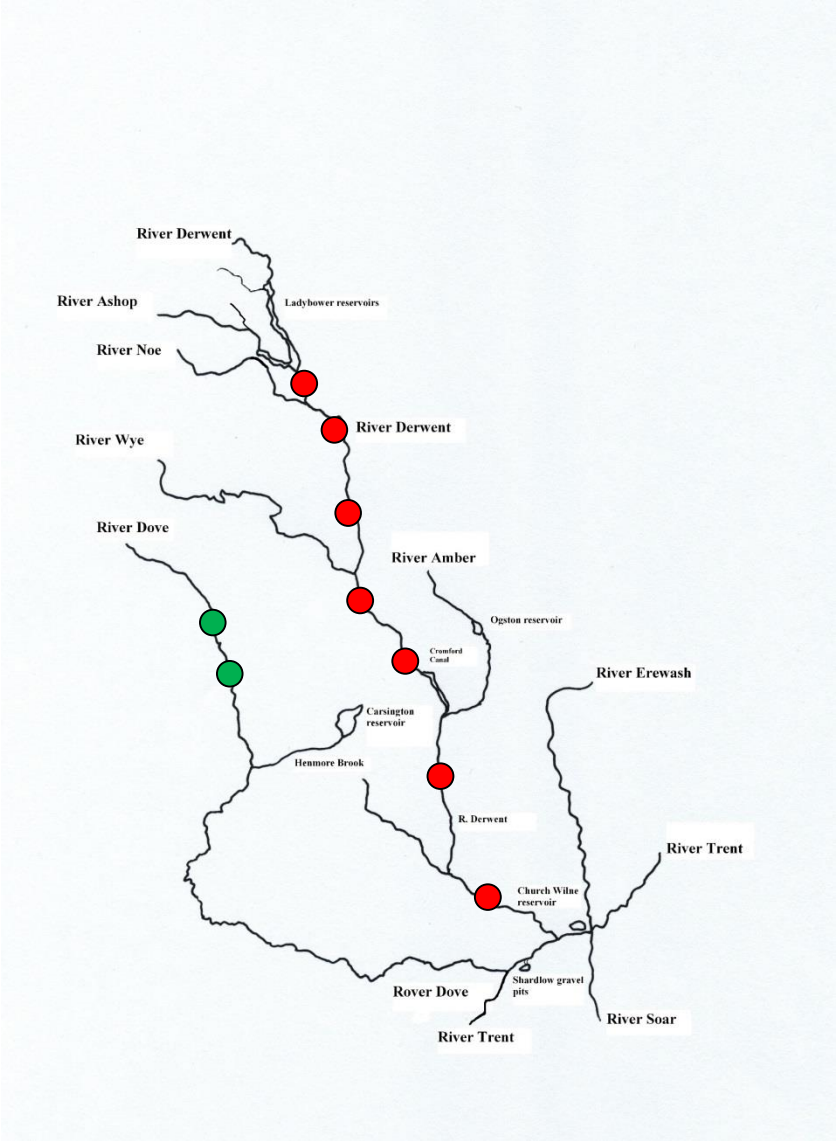
Impacts of Signal crayfish on riverfly life

- Signal crayfish invasion resulted in persistent changes to macroinvertebrate communities.
- Signal crayfish invasions are irreversible events that alter community structure and ecosystem function.
- The observed shifts in community composition following invasion were associated with reductions in the occurrence of Mayfly (Anglers Curse .. *Caenis* spp.) but not e.g. The Mayfly (*Ephemera danica*), and Caseless caddis fly (Grey Sedge .. *Hydropsyche* spp.), Leech species (*Glossiphonia complanata and Erpobdella octoculata*), Snails (*Radix* spp.)
- However, these were mainly lowland rivers and not that salient to many of the Trent tributary rivers

Mathers, K *et. al.* (2016). The long-term effects of invasive signal crayfish (*Pacifastacus leniusculus*)

on instream macroinvertebrate communities.

Derwent distribution map of Signals (Natives ?)



Demon Shrimp

- Native to Black Sea area, unlike signals less is known about their disease carrying capabilities. Introduced accidentally via boat traffic from Europe in Thames region in 2012 spreading quickly across the UK and much faster than the better understood Killer Shrimp .

- Distinguishing species from native shrimp is essential but not, dependent upon life stage, that easy. Compared to the native species, the Demon Shrimp is much larger when mature, stripey in appearance (but not always diagnostic) and has spiny ‘volcano’s or humps on the upper surface of the last 2 segments of the abdomen (need a microscope). Oh yes and it bites if you handle it long enough without gloves!

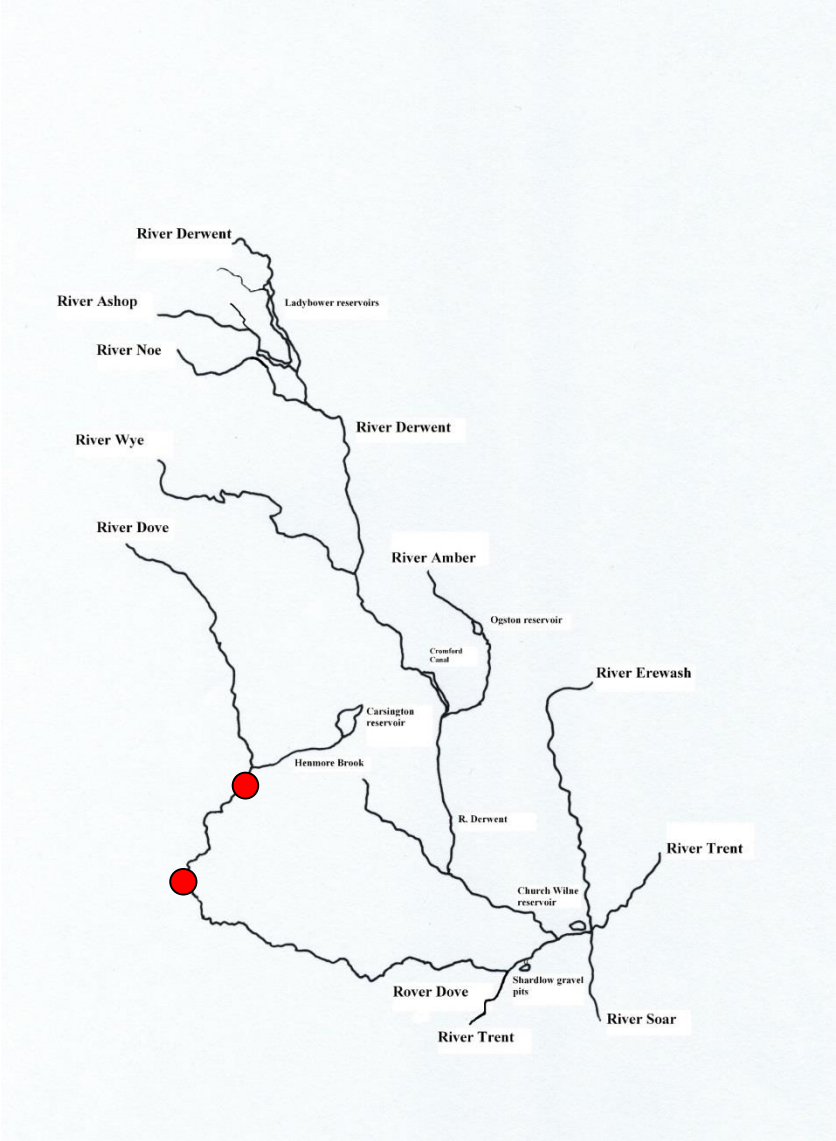
- Spreads up and downstream to colonise adjacent water bodies.

- Negative impacts looking like marked loss of aquatic invertebrate species richness and abundance with change in ecosystem functional stability. Not sure yet, if like cousin Killer Shrimp, it predates on fish eggs. May not be same in all waters.

Rehabilitation

None!

Dove distribution map of Demon Shrimps ?



Reporting them (citizen science)

Invasive Non-Native Species

Environment Agency

Report invasive non-native species to the Analysis and Reporting team:

[insert contact name, number & email]

Provide a grid reference and either a sample or a photograph for verification.

Share information more widely and update online non-native species records by using the appropriate tracking App.

Download the free Apps to your mobile or tablet today and be ready for the next time you spot a potential invasive non-native species whether you are at work or at play.

Invasive Non-Native Species, spread the word and stop the spread.

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Aqua Invaders *Use for:* Freshwater aquatic species
Use the built in photographic ID guides and 'confusion species' galleries to identify and record 26 invasive freshwater aquatic species, including 12 fish species.
http://naturelocator.org/aquainvaders.html

Plant Tracker *Use for:* Plants
Use the built in photographic ID guides and 'confusion species' galleries to identify and record 14 invasive plant species.
http://planttracker.naturelocator.org/

Sealife Tracker *Use for:* Marine species
Use the built in photographic ID guides and 'confusion species' galleries to identify and record 25 marine species; 11 invasive species and 14 climate change indicators.
http://naturelocator.org/sealife.html

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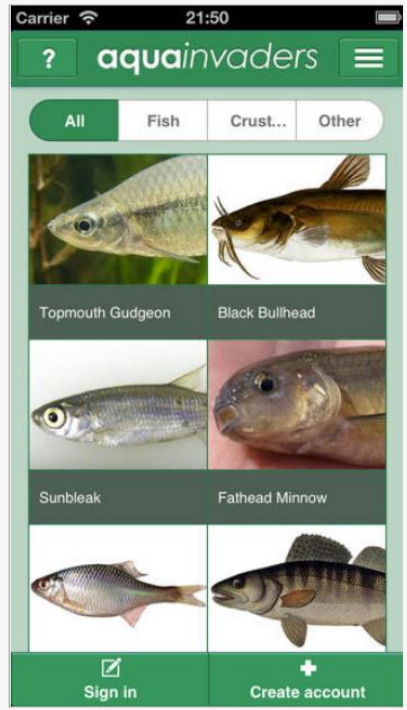

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Invasive Non-Native Species, spread the word and stop the spread.

Further reporting role for ‘citizen science’

- Reporting and identification through national Angler’s Riverfly Monitoring Initiative (ARMI-EA/RP), River Invertebrate Identification Monitoring Scheme (S & TC) and other community based river watch schemes
- Education. The community e.g. schools, Farmers meetings, Wildlife Trusts ….

Stop the spread

- Signal crayfish

- Until (if ever) a cure is found for fungal plague and natural signal crayfish population control then catchment co-ordinated trapping and BIOSECURITY measures may be the only counter measures available to us.

- Rest assured if we don't act, the problem of invasive non-native species will continue to escalate at an ever increasing rate, causing us to feel more of the impacts and incur more cost every year.

Stop the spread

- Demon shrimp

Biosecurity is the only known ‘control’ measure to date

- We need more impact studies of this newly, last 4 years (known), invasive species to the UK to gauge it’s impact across all our UK river types.

- Local results for parts of the River Churnet suggest we should do all we can to slow upstream migration in currently invaded rivers (systems) and prevent spread to hydrologically separated watercourses in our area.

- For fly fisher folk, the signs from the River Churnet at Dimmings Dale are that unless you only fish at ‘Duffers Fortnight’ with *Ephemera danica* (The Mayfly) imitations then the art of dry fly fishing and ‘matching the hatch’ is going to become increasingly limited on rivers where The Demon prevails and so is the associated revenue.

Aspects of both Signal crayfish (plague) and the Demon Shrimp bring us nicely on to BIOSECURITY .. although many of these good precautionary (mandatory) practices apply to many other INNS beasties

Signal crayfish (plague) & Demons

Check your equipment and clothing for live plants and animals - particularly in areas that are damp or hard to inspect.

Clean and wash all equipment, footwear and clothing thoroughly.

If you do come across any plants or animals, leave them at the water body where you found them.

Dry all equipment and clothing - some species can live for many days in moist conditions.

Make sure you don't transfer water elsewhere.

…&/or AVOID e.g. no wade fishing!

Record / Report any non native invasive species – note location accurately and get a sample/specimen/photo www.nonnativespecies.org

NNSS
GB non-native species secretariat

Signal crayfish (plague)

Fungal plague - Virkon aquatic

(not Demons .. only makes them angry!)

Demon shrimp and crayfish plague

Other water users like

Remember to check and clean these places

British Canoing will presumably have biosecurity measures in place?

Other boat users: Boats should be pressure steam cleaned (away from watercourse) and left to dry for 1 week. If no steam cleaning then left to dry for 10 days.

Demon shrimp - belt and braces biosecurity

- If you cannot leave your gear (waders, boots, nets ..) long enough to be completely assured your next watercourse visit will be ‘dry’ then:

- Fully immerse all river gear (waders, boots, nets …) in hot (70^{o} C) tap water in a tub or other container for 30 minutes. Ensure water remains red hot for 30 minutes but hot tap water will suffice. Wash down with clean cold tap water and leave to fully dry before next river visit. Dispose of wash water (when cooled) to e.g. garden .. provided long way from watercourse

- If you have the luxury of a spare chest freezer then place all river gear (waders, boots, nets …) in it for 2 days and good to go.

Information and advice

Handouts today!

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The Riverfly Partnership

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