Smolt counting with confidence (limits)

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A long-term dataset with certainty

The Game and Wildlife Conservation Trust, together with Cefas, have been estimating smolt numbers on the river Frome, Dorset, UK, using a consistent and scientifically robust method since 2002; as of May 2014, we have just completed our 12th year!

We are aware of the importance of showing the confidence limits of our population estimates, in order that we can determine real changes. For that reason we are continuing to refine and improve our methods.

The work also has funding from the EU via the MORFISH project.

One of 10,000 young-of-year salmon parr that are PIT tagged every September since 2002.

Rotary Screw Trap: recaptures and proportions

We use a Rotary Screw Trap (RST) to recapture salmon smolts and to measure the proportion of PIT tagged fish to unmarked fish that are migrating to sea.

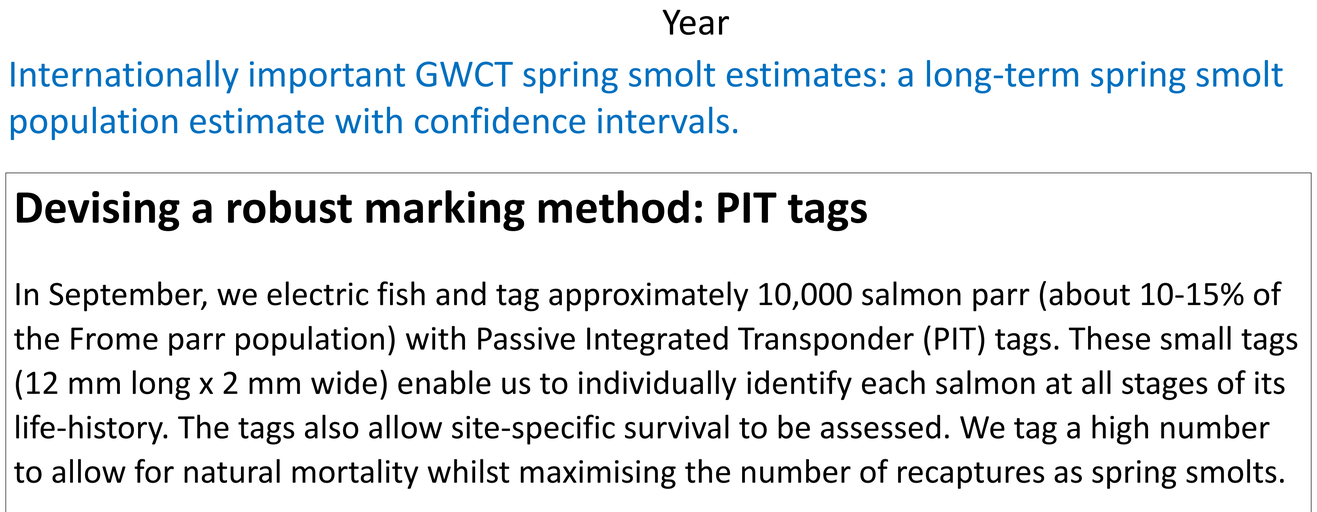
We use this proportion to extrapolate our PIT tagged population size (determined from a multiple array of readers at East stoke) to the unmarked salmon smolts and thus estimate the size of the entire spring smolt population.

We check the trap every 30 minutes (24/7) to minimise any effects on delaying the fish's migration.

We also use the number of tagged fish to estimate the population size at the time of tagging (September). We do this using a Lincoln-Petersen capture-mark-recapture estimator, corrected for small sample size.

Our confidence intervals are calculated by normal-approximation.

All our population size estimates are for the entire river catchment upstream of our monitoring station at East Stoke.



Internationally important GWCT spring smolt estimates: a long-term spring smolt population estimate with confidence intervals.

Devising a robust marking method: PIT tags

In September, we electric fish and tag approximately 10,000 salmon parr (about 10-15% of the Frome parr population) with Passive Integrated Transponder (PIT) tags. These small tags (12 mm long x 2 mm wide) enable us to individually identify each salmon at all stages of its life-history. The tags also allow site-specific survival to be assessed. We tag a high number to allow for natural mortality whilst maximising the number of recaptures as spring smolts.

We tag parr because they are less sensitive to the stress of handling / manipulating than smolts, which are already undergoing a stressful transition called smoltification.

The PIT tags are also monitored on the adults when they return from the sea.

The future: automation!

We are developing a 'Hands-off' electronic smolt counting system.

We have a working prototype but it has taken twelve year's development time!

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