

## Fish Ageing - what can it tell you?

Fish ageing is an important tool which can be used to help understand how well a fishery is performing. It is the quickest and easiest way to assess fish growth, mortality rates, when fish mature, and how well species are recruiting within a population. This is key information to underpin fishery management practices like stocking or cropping. It is an effective way to show the success of habitat improvements or mitigation measures. The National Fisheries Laboratory provide a bespoke and flexible fish ageing service to help you and our customers improve the way fisheries are managed.

### Habitat enhancement - get some data before you start!

Fish ageing can be used to demonstrate the benefits of habitat enhancement projects. Because the scales from a fish hold growth information about their entire life, we can accurately estimate the length of each fish at each age. This allows us to measure the growth performance of a fish population prior to any habitat improvement project. Obtaining a quick and simple base-line survey before and after any work is done will allow a comparison of growth performance after the project has been completed. We can also calculate year class strength, which is a measure of how successful juvenile recruitment has been before and after the improvement. This provides a simple and easy way to demonstrate the benefits of our work to colleagues, anglers and stakeholders.

### Stillwater ageing packs



It is estimated that over 69% of anglers fish stillwaters in England. Fishery management is key to health of stillwater populations and how these fisheries perform. However, how many of these fisheries use fish ageing to inform management measures like stocking or cropping?

The National Fisheries Laboratory provide stillwater fish ageing kits for angling clubs or fishery owners to gain a better understanding of how the fish are performing within their waters. These kits contain everything needed to take a scale sample, including a measuring board, tweezers, scale packets, instructions on sampling and even a pre-paid envelope to return the scales to us. We

then age the scale samples and provide a report, based on our findings. This free service is there to help identify any problems before they escalate and inform best practice for fisheries based on sound information.

## Migratory fish ageing

Obtaining age and growth data of migratory fish species, such as Atlantic salmon, is particularly important given the various pressures they face and the declines observed in wild salmon stocks. Ageing validates the stock composition of fish caught in the Index River trapping monitoring programmes. Data from these surveys are reported to national teams, NASCO and ICES to help inform management of the fishery at national and international levels. Analysis of migratory fish scales can answer important questions, for instance, how long a fish lived in freshwater or how long it spent at sea and even whether the fish had previously spawned. Fish ageing can also improve understanding of less well known species too - recent studies of smelt scales have provided a valuable insight into the biology, recruitment and stability of smelt populations in rivers across England.

## Unknown species and stock identification

We can identify a fish species from just its scales or other bony structures. This can be particularly useful when reconstructing predatory species' diets, such as the otter. Not only can we see what fish they have been eating, but we can also provide estimates of the size of the fish. Sometimes, identifying if a trout is a brown trout or sea trout can be difficult based on appearance alone. But if you were to take a scale sample, we can tell you whether a trout has undertaken a migration and gone into the marine environment or is a resident individual. We can also identify fish that have been introduced, from enhancement stocking programmes for example. This can help you evaluate the success of a stocking programme, or see if farmed fish have escaped into the wild environment.

## Managing non-native species

Fish ageing is one of many tools used to look for negative impacts on native fish communities as a result of non-native species introductions. Increased competition for resources by non-native species can negatively influence growth rates of native fish, and increased predation can affect successful recruitment. We can use fish ageing to examine how big these impacts are, but also examine how well non-native fish are performing in our waters, by comparing their growth rates to those from their native range. The growth rate of native fish are also examined before and after the removal of invasive species, to provide information on the success of these operations and the benefits of invasive species management.

## Fish ageing to inform fish health investigations

The fish ageing and fish health team work closely together to gain as much information from the samples we see. By measuring the growth of a fish each year, we can identify any periods where slow growth has occurred. This can be particularly useful when a fish health problem or mortality incident occurs. We routinely examine scales from all of our disease investigations to identify whether a fishery has encountered a recent stressor or if there has been a long standing issue. Fish ageing can provide valuable information, assisting in the interpretation of our fish health investigations and the subsequent advice we provide, to help minimise the likelihood of issues in the future.

## What about scale-less fish?

There are a number of techniques and structures which we can use to age fish. We prefer to use their scales as it's non-destructive and they do not require any special preparation prior to ageing. However, for some species, other approaches are required.

Examples include fish without

scales (e.g. Wels catfish), or those with microscales like the European eel. In these cases we can use other bony structures, such as their otoliths (ear bones) or fin rays to determine their age. These structures have to be prepared by cutting very thin sections with specialised grinding tools. We can also use these structures for other purposes, for example, eel otoliths can be analysed for micro-chemistry, stable isotope composition or other molecular analyses, opening up huge amounts of information about their life history, diet, migration and behaviour.



## Partnerships and projects

We work closely with a wide range of partner organisations to benefit our fisheries. This includes use of existing scale archives, as well as new projects to address key questions or pressures. We have recently completed projects with the Barbel Society, Institute of Fisheries Management (IFM) and specialist angling groups to improve understanding of our fisheries. We also work closely with academic partners to support projects on a wide range of subjects, involving scale micro-chemistry, molecular studies and modelling.

If you're planning a project and think ageing could help, please get in touch.

## Contact us

This fact sheet has been produced by:

**National Fisheries Laboratory, Monitoring: Laboratories, Environment Agency, Bromholme Lane, Brampton, Huntingdon, PE28 4NE.**

For more information on fish ageing, or to obtain a stillwater fish ageing kit, please contact the National Fisheries Laboratory at:

**Tel: 02084 745244; Email: [fish.ageing@environment-agency.gov.uk](mailto:fish.ageing@environment-agency.gov.uk)**