



# **Impacts of predators on fish: FRS's role**

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# A major issue



## Main fish predators

- **seals (common and grey)/otters/mink/dolphins**
- **goosanders/mergansers/cormorants/herons/  
ospreys**

# Seal and bird licenses

- **A license is required to kill seals-**
  - a) for grey seals during the moult (Sept.-Dec.)**
  - b) for common seals during the moult (June-Aug)**
  - c) when a conservation order is in place**
- **A license can be granted to kill birds to prevent serious damage to fisheries**

## Assessment of damage

- **Does the predator eat the species of fish of interest?**
- **How many of each life stage does the predator consume?**
- **How does this consumption compare with stock sizes and other sources of mortality?**
- **How would changes in the level of predation affect the prey populations and fisheries that harvest them?**

# Investigating predator impact

- **Ideal world analysis**

**Conduct large scale experiments in which predators are present at some sites but not others and compare fish stocks and fisheries**

- **Real world analysis**

**Use a combination of modelling and small scale experiments to determine the likelihood of effects of predation**

**The key requirements are understandings of population dynamics of fish, diets of birds and dynamics of the fishery**

# Impacts of predators on Atlantic salmon

- **Losses of returning migrating adults are likely to have a direct impact on fisheries and spawning stocks- seals in rivers, dolphins in coastal zone**
- **Losses of smolts are likely to have a direct impact because mortality at sea is largely independent of density.**
- **Losses of over-wintering pre-smolts are likely to have a direct impact- predation is thought to be a main limiting factor at this time**
- **Losses of fry and parr may have no impact, negative impact or even positive impact on production, depending on how local densities and sizes of fish relate to the carrying capacity**

# Salmon are (a little) like lettuces

- **Picture a small plot that produces six large lettuces (= smolts)**
- **Whether there were six or six hundred seedlings, only six large lettuces can be produced**
- **If there were six seedlings, then they would grow quickly and any losses to birds would reduce final production**
- **If there were (say) sixty seedlings, then birds might remove 54 of them without any reduction in final production**
- **If there were six hundred seedlings then they might be sufficiently stunted that none reached a size large enough to harvest unless some were removed by birds**

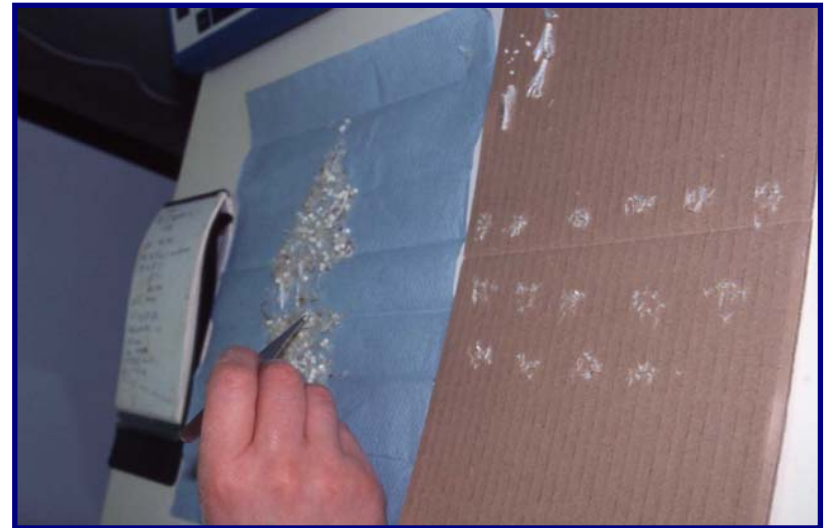
## Role of FRS as advisor to SEERAD on applications to shoot piscivorous birds and seals

- **Provide comment and advice on “fish” and “fisheries” aspects of applications to shoot piscivorous birds in Scotland.**
- **For each application a specific report is prepared**
- **For new bird applications – advisors attend a site visit for background information and discuss problem and possible solutions with applicant**

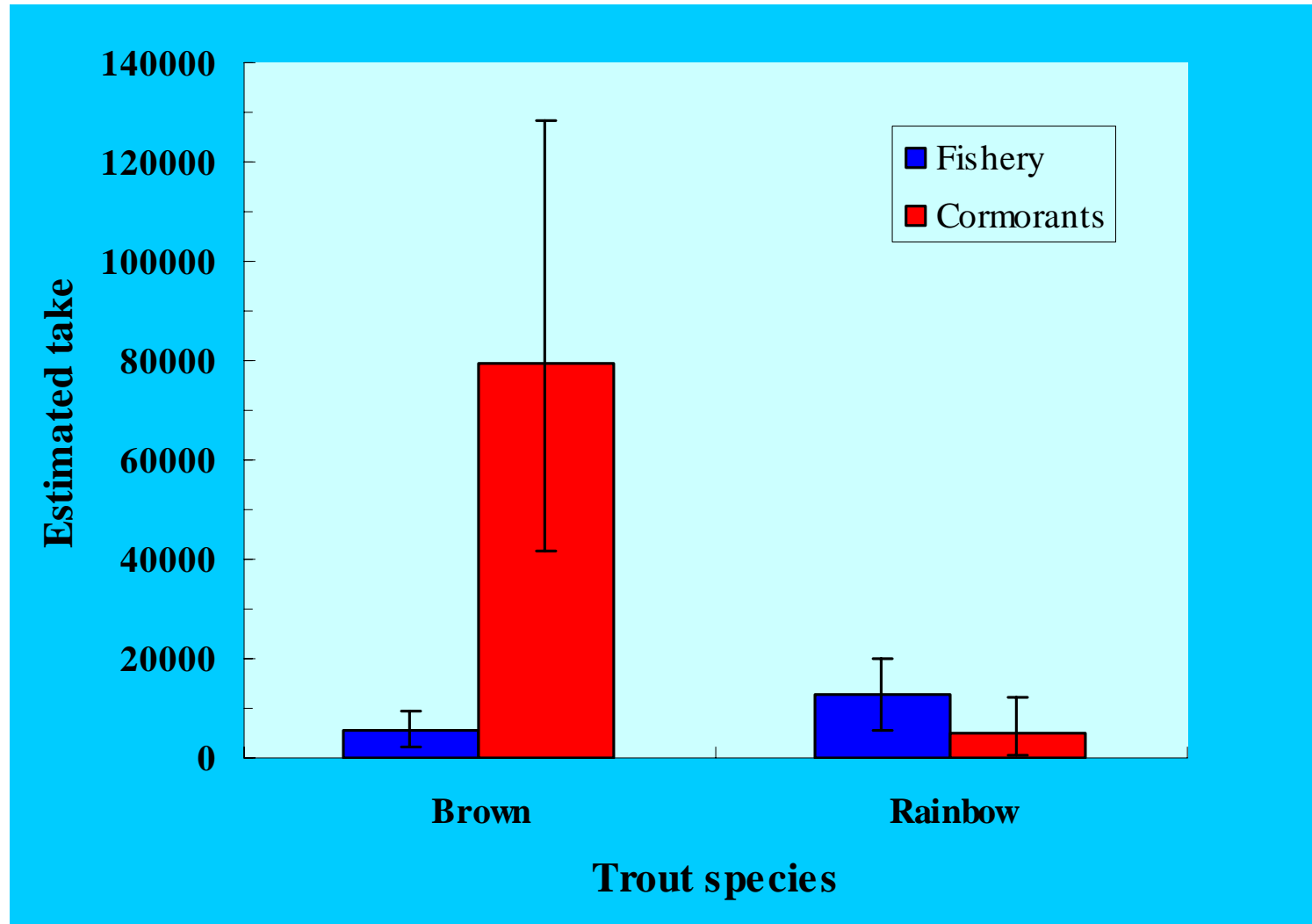
## **Specialised advice includes:**

- **Review of information on the status of fish populations (survey data)**
- **Review of recent performance of fishery (catch data)**
- **Consider present fishery management practices (e.g. stocking, conservation measures)**
- **Advise on alternative measures (if applicable) that might help to reduce predation**
- **Undertake diet analyses in certain instances**
- **Reconstruct diets of birds to determine proportion and size range of prey species taken.**

# Gut-content sampling



# Estimated number of trout removed by cormorants relative to the fishery catch



## Volume of advice in 2005/2006

- **17 application to shoot birds**
- **8 applications to shoot seals**