



Home Office

## NON-TECHNICAL SUMMARY

# Migrations and behaviour of fish

### Project duration

Years 5

Months 0

### Project purpose

- (d) Protection of the natural environment in the interests of the health or welfare of man or animals.

### Key words

Fish, migration, behaviour, tracking, survival

## Retrospective assessment

The Secretary of State has determined that a retrospective assessment of this licence is not required.

## Objectives and benefits

**Description of the project's objectives, for example the scientific unknowns or clinical or scientific needs it's addressing.**

### What is the aim of this project?

To increase knowledge and understanding of the migrations, behaviour and discard survival of marine fish so as to provide evidence and advice to UK and international government, stakeholders and NGOs in support of fisheries management and conservation efforts

**Potential benefits likely to derive from the project, for example how science might be advanced or how humans, animals or the environment might benefit - these could be short-term benefits**

**within the duration of the project or long-term benefits that accrue after the project has finished.**

**What are the potential benefits that will derive from this project?**

Basic information on e.g. fish movements, behaviour, distribution and population mixing is lacking for many commercially exploited or species of conservation concern. This hampers the development of more effective management of fishing activity, which potentially leads to unnecessary fisheries mortality (directly targeted, or as accidental bycatch) or unnecessary handling stress (in the case of recreational fisheries). By using tags to collect information on fish movements and the environments they use, and by taking biological samples that can be used to assess population genetics or life-history, better advice can be given to UK or international marine managers to avoid unnecessary mortality or stress caused by fishing or other human activities. In addition, the integration of fish behaviour with environmental data will contribute to improving the 'ecosystem approach to fisheries management', including the impacts of environmental change. Data collected on discard survival can be used to support key principles of the UK's policy in respect of practices of discarding fish at sea, and the UK Shark, Skate and Ray Conservation Plan, which aims to manage stocks sustainably. Data will support stock assessments, and other management measures designed to enable effective management.

**Species and numbers of animals expected to be used**

**What types and approximate numbers of animals will you use over the course of this project?**

Adult, maturing (sub-adult) and juvenile fish. Up to 1600 animals would be used over the 5-year period of the work.

## **Predicted harms**

**Typical procedures done to animals, for example injections or surgical procedures, including duration of the experiment and number of procedures.**

**In the context of what you propose to do to the animals, what are the expected adverse effects and the likely/expected level of severity? What will happen to the animals at the end?**

The tagging procedures we propose to undertake are assessed as 'Mild' or 'Moderate' severity, while the biological sampling protocols are assessed as 'Mild'. Where appropriate, analgesia will be applied to the tagging site to reduce likely pain. The most likely adverse effect in the medium-term is deterioration of tagging wounds, which may lead to scarring and/ or infection. The risk of deterioration will be minimised by using established and researched tag attachment or implantation techniques. The risk of infection will be minimised by using aseptic techniques during the procedures. Most fish will be used in migration studies and will be discharged from the Act and returned to the sea once procedures have been undertaken.

## **Application of the three Rs**

## 1. Replacement

**State why you need to use animals and why you cannot use non-animal alternatives.**

The purpose of the project is to increase knowledge and understanding of the migrations and behaviour of marine fish in their natural environment. The knowledge being pursued does not exist and is typically species-specific. It is therefore not possible to find a non-protected animal alternative.

## 2. Reduction

**Explain how you will assure the use of minimum numbers of animals.**

The experimental methods and numbers of animals used are based on previous experience and research. As part of the institute's Animal Welfare and Ethical Review Process, each programme of study is considered by staff from our in-house statistical team and their sign-off is required before any study is undertaken. Where possible, the use of methods that enable remote transmission of data will be used so that the recovery of data is not dependent upon recapture of the fish (typically ~30% chance) and the data recovery: animal use ratio is maximised. Opportunities to reduce the number of animals used will be assessed throughout the project

## 3. Refinement

**Explain the choice of species and why the animal model(s) you will use are the most refined, having regard to the objectives. Explain the general measures you will take to minimise welfare costs (harms) to the animals.**

The aim of the work is to improve knowledge of the movements and behaviour of marine fish of commercial or conservation concern in relation to their environment. A range of species including skates, sharks, tunas and other teleosts needs to be studied. The methods we have proposed are based both on direct experience and development of fish tagging techniques developed over 20 years, as well as on peer-review research that has been shown to provide robust evidence on fish migration, behaviour, population structure and life-history. The identified procedures have therefore been refined over many years of practice within a culture of continuous improvement. When fish undergo a procedure with recovery, appropriate anaesthesia and analgesia will be used to minimise welfare costs. Individuals will be monitored for a suitable time following procedure(s) to assess any adverse effects. All fish that are caught for the purposes of the proposed project will be assessed for their fitness for subsequent release to the wild, and those not fit will be treated in accordance with Home Office guidelines. Advice on refinement of techniques will be sought and taken from the Named Veterinary Surgeon and the Named Animal Care and Welfare Officer throughout the project as appropriate.