

## The FishPopTrace Consortium Members

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— The Centre of Molecular Genetic Identification (VNIRO); RU



— National Oceanic and Atmospheric Administration  
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## Improved Fisheries Management & Conservation Based on Integration of Advanced Technologies

FishPopTrace aims to build a framework for Sustainable Fisheries Management and Conservation by:

- Developing traceability tools fully supporting a “from fish to fork” approach.
- Integration of new and established technologies based on molecular genetics, otolith microchemistry and morphometrics.
- Applying forensic standards to technology development for fisheries control, enforcement and conservation.
- Focusing on four fish species that differ in life style and distribution: cod, hake, common sole and herring.
- Tailoring newly-developed tools to the needs of end-users and stakeholders.
- Engaging with priorities of the European Common Fisheries Policy.
- Enhancing awareness of IUU issues within the industry, academics, policy, makers and consumers.



## The Structure of Fish Populations and Traceability of Fish and Fish Products



Towards a Framework for sustainable Fisheries Management & Conservation based on Genetics, Chemistry & Forensics

<https://fishpoptrace.jrc.ec.europa.eu>



## From curiosity driven research to applications in the world of fisheries

FishPopTrace is funded under the European Union (EU) Seventh Framework Programme and aims at developing a forensic framework for the enforcement of regulations and laws to reduce the amount of Illegal, Unreported and Unregulated fishing (IUU).

Starting out as a fundamental and explorative research project, results emerging from FishPopTrace will be translated into end-user tools for fish population structure analysis and fish (product) traceability. These tools will be scrutinized applying forensic standards and developed for monitoring, control, surveillance (MCS) and enforcement in the fisheries sector.

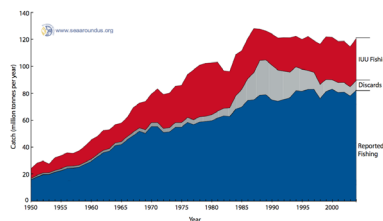
The strategy of FishPopTrace is to take advantage of the rapid progress in life science technologies. Currently, our research focuses on four commercially important fish species, cod (*Gadus morhua*), hake (*Merluccius merluccius*), herring (*Clupea harengus*) and common sole (*Solea solea*), by using state of the art DNA-based analytical methods (SNPs) for population identification. In parallel, the consortium explores the potential of otolith microchemistry and shape, fatty acid analysis, proteomics, gene expression, and microarrays.

The FishPopTrace consortium consists of 15 partners with expertise in fish biology, population and conservation genetics, molecular biology and biochemistry, wildlife forensics, with representatives of the food industry and with strong links to European fisheries policy makers. Moreover a scientific advisor from the US National Oceanic and Atmospheric Administration (NOAA) is participating.



## Support to Fisheries Management and Conservation Measures

The FAO and independent scientists estimates that 80% of marine fish stocks are fully or over-exploited worldwide. In this context the fight against IUU fishing is a high priority, due to the severe threat it poses to global marine ecosystems and sustainability of world fisheries. The annual losses attributed to IUU fishing have been valued at €10-20 billion worldwide, which is at least twice the value of legal landings by the EU fleet.



Estimated proportion of Illegal, Unreported and Unreported (IUU) fishing of the world marine fisheries catch. The figure for "reported fishing" includes invertebrates, groundfish, pelagic fish and Peruvian anchoveta and is based on landing statistics from the Food and Agriculture Organization of the United Nation. With kind permission and updated from Pauly et al. (2002).

To fight illegal fishing activities, ensure sustainability, fairness and transparency in the fisheries sector, and protect consumers, a traceability system is required. Traceability must be effective throughout the food supply chain ("from fish to fork") and verify the species and origin of the fish. It is also crucial to develop efficient methods for control and enforcement bodies, which can then be used as evidence in court trials. **Development and application of advanced technologies within a forensic framework are the fundamental elements at the core of FishPopTrace.**

Conservation of living aquatic resources is a key feature of the EU Common Fisheries Policy as well as of many other fisheries management schemes worldwide. Ecosystem-Based Fisheries Management will be progressively introduced, and as part of these management programmes, data generated by FishPopTrace can be used to analyze the state and putative boundaries of fish populations and to monitor changes which are known to impact stock recovery and resilience. Such aspects can be envisioned as accompanying measures to long term approaches in fisheries management. The strategy pursued by FishPopTrace aims to develop approaches which are fully compatible with such conservation measures and management schemes.

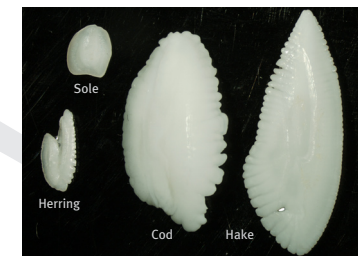
## Future Challenges and Potential

New technologies based on molecular biology, genetics, microchemistry and forensics have great potential in a variety of applications related to fisheries management and conservation. However a consistent approach to transfer new technologies to these applications is still lacking. Many challenges faced by fisheries can be addressed by methodologies emanating from FishPopTrace, addressing the assessment, modelling and monitoring of:

- Biodiversity
- Marine Protected Areas
- Aquaculture
- Stock assessment
- Marine Stock Enhancement
- Detection of Genetically Modified Fish

### Otoliths - "Fish Ear Bones"

The picture shows otoliths from cod, herring, hake and common sole illustrating the species specificity of the otolith forms. FishPopTrace uses otolith-microchemistry to reveal population structures. (Courtesy of A.J. Geffen; University of Bergen; Norway)



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Daniel Pauly et al (2002; www.seaaroundus.org) for IUU fishing graph.



For further information and contact details visit our website:  
<https://fishpoptrace.jrc.ec.eu.int>