

## **Description of the conference topics**

### **Theme 1: Stock assessment and freshwater fish management (and fish stocking)**

Stock assessment is a crucial component of freshwater fish management, involving the evaluation of fish population sizes, structures, and dynamics. Stock assessment is needed to inform management and advance sustainable fishing practices. EIFAAC would like to highlight developments in quantitative approaches to the assessment and management of inland fisheries and fish stocks, with a focus on:

1. Data collection and monitoring requirements for stock assessment,
2. Data-limited assessment methods relevant to inland commercial and/or recreational fisheries,
3. Assessment of the impacts of predation on freshwater fish stocks (e.g. by cormorants and otters) and
4. Model-based approaches to inland fisheries management, e.g., MSE, harvest control rules etc.

New research findings on fish stocking practices, stocking programmes, and their successes and failures will be discussed under this theme, and information will be shared on the development of the EIFAAC/CACFish Fish Stocking Guidelines.

### **Theme 2: Migratory fishes – problems and conservation**

Migratory fishes face numerous challenges in inland fisheries and aquaculture, primarily due to habitat fragmentation from dams, weirs, and other barriers that obstruct their natural migratory routes. These disruptions can lead to declines in fish populations, as they hinder access to spawning and feeding grounds. Additionally, pollution, overfishing, and climate change exacerbate these problems, further threatening migratory species. There are significant gaps in understanding the specific habitat requirements, breeding behaviours, and life cycle stages of migratory species, which complicate efforts to replicate these conditions in captivity. Additionally, there is limited information on the impacts of farming and related water use practices on the health and genetic diversity of migratory fish populations. Effective management practices and technologies that support the unique needs of migratory fish are still underdeveloped.

Conserving migratory fishes requires a multifaceted approach that addresses habitat restoration, pollution control, sustainable fishing practices, aquaculture advancement, and public engagement. These goals are among those that EIFAAC wishes to highlight. The outcomes of (research) projects on fish habitat restoration and improvement, fish migration, water pollution effects on fish behaviour, reproduction, health and genetic diversity, lessons learnt and solutions available will be discussed under this theme.

### **Theme 3: Exploring the use of artificial intelligence in inland fisheries and aquaculture**

Artificial intelligence (AI) technologies offer a great opportunity to improve efficiency, sustainability, automate analyses and inform aquatic biodiversity conservation and management. AI has the potential

to revolutionize inland fishery and aquaculture by enhancing monitoring, optimizing feeding and breeding, improving resource management, and promoting sustainable practices. EIFAAC desires to showcase examples of AI technologies integration in inland fisheries and aquaculture management, which may facilitate more efficient operations, cost savings, and a reduced environmental footprint, ultimately contributing to the long-term viability of the industry.

#### **Theme 4: Freshwater invasives networking for strategy (FINS III)**

This theme will be discussed in a workshop format with presentations and group discussions, and the results are planned to be prepared for publication in a journal (see publications from FINS I: [https://www.reabic.net/journals/mbi/2014/1/MBI\\_2014\\_Caffrey\\_etal.pdf](https://www.reabic.net/journals/mbi/2014/1/MBI_2014_Caffrey_etal.pdf) and FINS II: [https://www.reabic.net/journals/mbi/2017/3/MBI\\_2017\\_Piria\\_etal.pdf](https://www.reabic.net/journals/mbi/2017/3/MBI_2017_Piria_etal.pdf) ). The problem of invasive aquatic species (IAS) is global, and therefore international cooperation is of paramount importance to the effective management of IAS. The FINS III aims to provide a forum where international scientists, policy makers and stakeholders will address designated subjects with a view to informing management and policy development. Workshop sessions will facilitate involvement of all delegates. Synthesis sessions will aim to draw firm conclusions from the discussions and put forward concrete recommendations that will inform both national and international policy makers, including the 32nd session of EIFAAC.

The subjects of the FINS III workshop will contribute to the objectives of the on the European Code of Conduct on Recreational Fishing and Invasive Alien Species, Regulation (EU) no 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species, and the EU Biodiversity Strategy for 2030, related to invasive aquatic species (IAS). Subjects that will be discussed include:

- Development models of prioritizing species (inland eaters, aquaculture)
- Early warning systems
- Prevention, management and eradication
- Public awareness, literacy and engagement
- Pressure on species on the Red List threatened by IAS

The workshop on this topic will follow after presentations, with the involvement of all interested conference delegates.

#### **Theme 5: Climate change and impacts on inland waters, fisheries and aquaculture**

Climate change significantly impacts inland waters, fisheries, and aquaculture by altering water temperatures, precipitation patterns, and hydrological cycles. These changes can disrupt aquatic ecosystems, affecting fish habitats, breeding cycles, and food availability. Increased water temperatures and altered flow regimes can lead to the loss of biodiversity, the proliferation of invasive species, and higher incidences of diseases. Additionally, extreme weather events, such as floods and droughts, can damage aquaculture infrastructure and reduce fish production. These impacts threaten the livelihoods and food security of communities dependent on fisheries and aquaculture, necessitating adaptive management strategies to enhance resilience and sustainability. EIFAAC wishes to highlight existing research and share experiences related to assessing the impacts of climate change on inland waters, fisheries and aquaculture, and adaptive and mitigating measures that can be taken to ensure resilience and sustainability.

## **Theme 6: Developments and challenges in freshwater aquaculture (technology, environment, economic and circular economy aspects)**

While freshwater aquaculture benefits from technological advancements and opportunities for economic growth and circular economy practices, it faces significant environmental and economic challenges that must be addressed for its sustainable development. In order to realize its full potential, secure affordable and healthy aquatic foods for the future, and respect the socio-economic and environmental conditions, the sector needs to innovate and overcome current challenges.

Sustainable aquaculture is a dynamic concept, and the sustainability of an aquaculture system will vary with species, location, societal norms and the state of awareness, knowledge and technology. For aquaculture to be truly sustainable, it must include environmental, economic, technological, social and community sustainability. Fish farming should not create significant disruptions to the ecosystem, cause the loss of biodiversity or result in substantial pollution. It must be socially responsible and contribute to community well-being, but at the same time, it must present a viable business with long-term prospects. Aquaculture systems that have effective waste management practices, such as integrated multitrophic aquaculture (IMTA), recirculating aquaculture systems (RAS) or aquaponic systems, are getting more advanced. Circular economy practices, like waste utilization, integrated systems, and resource recycling, promote sustainability in aquaculture. Integrating these developments while addressing also environmental and economic challenges is crucial for the sustainable growth of freshwater aquaculture.

One of the most prominent challenges to aquaculture development nowadays is climate change. Depending on the aquaculture system, the most important consequences of climate change on freshwater aquaculture are poor water quality and/or general water shortage. The presentations under this theme will discuss research outcomes and innovations in freshwater aquaculture, challenges to aquaculture development and how to overcome these, covering technological, environmental, economic and circular economy aspects.

## **Theme 7: Advances in recreational fisheries research and management**

Advances in recreational fisheries research and management focus on improving fish population health, angler satisfaction, and the contributions of recreational fishers and their organizations to increasing ecosystem sustainability and value, will be discussed under this theme. Key developments in recreational fisheries research management include using technology for fish monitoring, data collection, and habitat mapping. Enhanced stock assessment techniques and genetic studies support better species management in recreational fisheries. Angler behaviour and catch data analysis increasingly inform policy and regulatory developments that offer practical arrangements where recreational use is balanced with conservation objectives.

EIFAAC wishes to promote the implementation of its 2008 Code of Practice for Recreational Fisheries, and to highlight under this theme the collaborative efforts of scientists, anglers and their organizations, and policymakers in the development and implementation of adaptive management strategies that ensure the long-term viability of recreational fisheries.

## **Theme 8: Innovative management for conservation of freshwater areas and aquatic biodiversity**

Innovative management for the conservation of freshwater areas and aquatic biodiversity involves integrating advanced technologies and sustainable practices. There is a need for comprehensive data on the current status and trends of freshwater ecosystems and species, as many regions lack detailed monitoring. The socio-economic drivers of habitat degradation, illegal, unreported and unregulated (IUU) fishing and overexploitation are not fully understood, hindering the development of effective management and conservation strategies. There is also limited knowledge on the effectiveness of various conservation interventions and how successful approaches can be scaled up or adapted to different contexts. Integrating traditional ecological knowledge with modern conservation science is underexplored, potentially missing valuable insights for sustainable management. EIFAAC wishes to showcase within this theme the outcomes of interdisciplinary research on the management and conservation of freshwater areas and securing aquatic biodiversity, to address knowledge gaps and contribute to collaboration between scientists, policymakers, and local communities.

## **Theme 9: Citizen science and socio-economic aspects of freshwater fishery and aquaculture**

Citizen science in freshwater fishery and aquaculture involves public participation in data collection and research, contributing valuable insights on fish populations, water quality, and ecosystem health to management and conservation. This collaborative approach enhances scientific understanding and resource management, fostering community engagement and education. Socio-economically, freshwater fisheries (commercial and recreational) and aquaculture provide critical livelihoods, food security, and economic benefits. Effective management, bolstered by citizen science, can ensure sustainable practices, improve resilience against environmental changes, and support the socio-economic well-being of fisheries and aquaculture dependent communities.

EIFAAC would like to build on the outcomes of its recent (February 2024) Workshop on Citizen Science in Fisheries, highlight existing citizen science initiatives and explore its use as a complementary tool to traditional fishery management methods in inland waters and in aquaculture.

## **Description of the workshops and panel discussion**

### ***Workshop on management advice for reducing the impact of cormorant predation on fish and fisheries (Tuesday 8 October, 8.30 to 13.00)***

Since the adoption of the Birds Directive (79/409/EEC) in 1979, the very small population of cormorants has grown to over one million birds in Northwest Europe. This conservation success has led to increasing conflicts between fishing and aquaculture interests and cormorant protection advocates. The conflicts are EU-wide and are rooted in the cormorant predation effects on fish in rivers, aquaculture ponds, lakes and coastal areas. The number of conflicts increased over the last 30 years and very few have been successfully resolved. In the past the European Union has supported conflict mitigating projects (Redcafe, Intercafe, FRAP, CorMan), but despite these efforts there are no

indications that the tools developed have led to coherent solutions. Since 2013 no new regional management initiatives have been initiated.

Scientific findings confirm the observations by commercial fishers, recreational anglers and aquaculturists that too many cormorants have a significant negative impact on fish and fisheries. Scientific evidence indicates that the current level of cormorant predation of fish is negatively impacting aquatic biodiversity. Cormorant predation in rivers is of such high magnitude that it threatens vulnerable fish populations like the grayling (*Thymallus thymallus*). The conflict has now moved into the conservation/biodiversity area.

There is a growing demand for action at the European level regarding cormorant management/regulations, as the migratory nature of cormorants does not make it possible to solve the problems at national level. The EU DG Mare therefore agreed to support EIFAAC with a project on 'Developing Europe-wide management advice to protect vulnerable and endangered fish species from unsustainable predation by cormorants' (GCP/RER/069/EC). In addition, the EU Horizon programme finances the ProtectFish project, which contributes research to inform better management of cormorants to reduce their impact on fish stocks.

This workshop benefits from initial research findings by both projects and aims to:

- 1) report on the use of Article 9 derogations (Birds Directive), regulations and management measures to reduce the impact of cormorants on fish population, fisheries and aquaculture that are in place in the EIFAAC member countries,
- 2) provide a compilation of management advice for reducing the impact of cormorant predation on fish, fisheries and aquaculture, and
- 3) discuss potential regional management measures.

The outcomes of recent EIFAAC surveys on cormorants will be presented as well.

To register for this workshop, please write to [EIFAAC-Secretariat@fao.org](mailto:EIFAAC-Secretariat@fao.org)

### ***Panel discussions on the „Future of European Freshwater Aquaculture“***

A set of panel discussions is foreseen on the „Future of European Freshwater Aquaculture“. The panels will discuss about freshwater aquaculture issues, challenges and solutions. Participants will be representatives of FAO, EC Mission "Restore Our Ocean and Waters", various European aquaculture associations, scientists, professionals and producers. The conclusions and recommendations from the panels will be delivered to the 32nd EIFAAC Session and the EC Commission.