

## FINFISH ECOSYSTEM SERVICES

### Background

Healthy ecosystems provide fundamental resources of both natural and economic wealth for human life. Global warming and climate change, closely related to environmental degradation and the loss of biodiversity due to some human activities, are the major existential threats both for Europe and the world. These challenges must be faced to guarantee a safe future<sup>1,2,3</sup>. The European Green Deal reaffirms the EU's commitment to respond to the climate and environmental challenges that risk the future. In line with the EU Green Deal the European Commission published its Biodiversity Strategy for 2030<sup>4</sup>, which proposes actions and commitments to correct the loss of biodiversity in Europe; and the Farm to Fork Strategy<sup>5</sup>, to facilitate the transition to a sustainable and equitable food system. Both strategies are interconnected under the certainty that a sustainable food system must preserve biodiversity.

1 Rockström, J.; W. Steffen, et al. (2009) A safe operating space for humanity. *Nature* 461: 472-475 DOI 10.1038/461472a

2 Steffen, W.; J. Rockström, R. Costanza (2011) How Defining Planetary Boundaries Can Transform Our Approach to Growth. *Solutions* 2 (3): 59-65

3 Steffen, W.; et al. (2015) Planetary boundaries: Guiding human development on a changing planet. *Science* 347 (6223). DOI: 10.1126/science.1259855

4 Biodiversity strategy for 2030 [https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030\\_en](https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en)

5 Farm to fork strategy [https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy\\_en](https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en)

In this context European aquaculture must also contribute to the protection of biodiversity, and preservation of habitats and landscapes while constituting a central part of the sustainable food system.

The objective of this factsheet is to restore and protect ecosystem services by recognising and supporting those European aquaculture systems which are significantly providing these services. This will also contribute to the right to food security of European citizens. This document focuses on the ecosystem services provided by extensive<sup>1</sup> (including semi-intensive) finfish aquaculture in Europe taking place in freshwater ponds and in marine lagoons. It also addresses socio-economic aspects but not all sustainability issues.



1 <https://aac-europe.org/en/recommendations/position-papers/322-aac-recommendation-on-ecosystem-services>

### The Ecosystem Services

The term ecosystem services<sup>1</sup> was coined to emphasize the close relationship and dependence that exists between human well-being and the well-being of natural ecosystems. Over the years, this concept has evolved and has been enriched by different disciplines of knowledge. Today, ecosystem services can be defined as the contributions of ecosystems to benefits obtained in economic, social, cultural and other human activities<sup>2</sup>. In the EU, the adoption of this conceptual framework has been reinforced and integrated into a growing number of Union's policies. In 2011, with the adoption of the Biodiversity Strategy, the European Commission highlighted - for the first time - the value of ecosystem services and the urgent need to maintain and restore them for the benefit of both nature and humankind. The classification of ecosystem services is based on human interests, offering a structure that allows for the analysis of the consequences of ecosystem management on the well-being of humanity:

- Supply Services. Related to the capacity of ecosystems to provide society with nutrients, materials and energy.
- Regulation and Maintenance Services. Remediation of waste, toxic substances and others, regulation of flows, and those that have to do with the maintenance of physical, chemical and biological conditions.
- Cultural Services. Physical and intellectual interactions with the environment, as well as spiritual and symbolic interactions.

1 Based on TEEB, 2010 & SEEA-EEA, 2012. (Ref??)

2 Bouwma et al (2018) Adoption of the ecosystem services concept in EU policies. *Ecosystem Services* 29, Part B: 213-222.

# FINFISH ECOSYSTEM SERVICES

## Socio-ecosystems and their ecosystem services

Not only natural ecosystems provide ecosystem services. Man-made and semi-natural ecosystems can also provide them. These types of ecosystems in which human beings have a marked participation is complementary to the ecosystem services provided by nature. The study and analysis of the ecosystem services of these socio-ecosystems make it possible to define correct practices that maximize their environmental benefits. However, the recognition of the ecosystem services of fish farming has still not reached that of ecosystem services derived from extensive agricultural practices. Although forty-one aquaculture related ecosystem services have been identified in a recent scientific publication<sup>1</sup>.

## Natural values and ecosystem services of freshwater pond aquaculture

Wetlands developed in direct connection with pond fish farming have a long history<sup>2</sup>. Perhaps for this reason there is a wrong public perception that they are not man-made but natural wetlands. From an ecological point of view, fish ponds rely on the natural conditions of wetland habitats. Their management aims to artificially strengthen these processes to increase production. Fish pond farming in Europe is mainly based on Common carp production. Fish ponds operate as open ecological systems where natural.

1 Willot, P.A., Aubin, J., Salles, J.-M., Wilfart, A. (2019) Ecosystem service framework and typology for an ecosystem approach to aquaculture. *Aquaculture*, Elsevier, 2019, 512, pp.734260. [ff10.1016/j.aquaculture.2019.734260](https://doi.org/10.1016/j.aquaculture.2019.734260) [ff.fhahshs-02172389f](https://doi.org/10.1016/j.aquaculture.2019.734260).

2 Nash, C. E. (2011) *The history of aquaculture*. Ames: Wiley-Blackwell Publishing Ltd.

and technological processes are in synergy and cannot be separated. This also means that fish pond production is a good example of circular economy, relying on the reuse of natural resources through nutrient cycling in identical ways as in natural wetlands. Fish pond ecosystems are comparable to natural aquatic ecological systems in complexity. Furthermore, fish farming ponds have been highlighted multiple times as regional biodiversity hotspots, providing habitats and refuge for some of the most endangered animals related to wetlands<sup>1</sup>. Both natural and semi-natural wetlands are particularly important for carbon sequestration.<sup>2</sup> They also provide a wide range of other services such as water provisioning, management and purification, and flood defense besides offering recreational and tourism opportunities<sup>3</sup>. A significant number of birds and mammals depend on these freshwater wetlands for breeding or feeding<sup>4</sup>. In the case of cultural ecosystem services, they can provide opportunities for environmental education, and recreation.<sup>5</sup>

1 Hill, M.J.; Hassall, C.; Oertli, B.; Fahrig, L.; Robson, B.; Biggs, J.; Samways, M.; Usio, N.; Takamura, N.; Krishnaswamy, J.; et al. (2018) New policy directions for global pond conservation. *Conserv. Lett.*, 11, e12447. [doi:10.1111/conl.12447](https://doi.org/10.1111/conl.12447).

2 USGCRP. (2018) *Second State of the Carbon Cycle Report (SOC-CR2): A Sustained Assessment Report*. Washington: Cavallaro, N., G. Shrestha, R. Birdsey, M. A. Mayes, R. G. Najjar, S. C. Reed, P. Romero-Lankao, and Z. Zhu (eds.). [doi: 10.7930/SOCCR2.2018](https://doi.org/10.7930/SOCCR2.2018).

3 Villa, J., & Bernal, B. (2018, April 15) Carbon sequestration in wetlands, from science to practice: An overview of the bio-geochemical process, measurement methods, and policy framework. (Ü. M. William J. Mitsch, Ed.) *Ecological Engineering*(114), pp. 115-128. [doi:https://doi.org/10.1016/j.ecoleng.2017.06.037](https://doi.org/10.1016/j.ecoleng.2017.06.037).

4 BirdLife International. (2018) *State of the world's birds: taking the pulse of the planet*. Cambridge: BirdLife International.

5 Palásti, P., Kiss, M., Gulyás, Á., Kerepeczki, É. (2020) Expert Knowledge and Perceptions about the Ecosystem Services and Natural Values of Hungarian Fishpond Systems. *Water*, 12. 2144.



# FINFISH ECOSYSTEM SERVICES

## Estuarine and marine lagoon fish farming ecosystem services

Coastal lagoons are under constant pressure from human activities and are one of the most threatened ecosystems in the world. The majority of impacts are related to urban sewage, industrial pollution and agricultural fertilizers leading to an alteration of the bio-geochemical balances that allow the ecosystems to be functional. Some types of fish farming have been taking place in coastal lagoons for hundreds of years. Their environmental impact has been successfully addressed by researchers and the farmers themselves and today the environmental negative footprint is negligible. Moreover, the beneficial effects of fish farming in these environments are proven to be beneficial and should qualify for better and more supportive policies. Furthermore, in many cases, coastal lagoon systems would not have survived without continuous management by local communities of fish farmers and fishers. The ecosystem services provided by coastal lagoons are very similar to those of pond freshwater fish farming.



## Recommendations

FEAP emphasises the need to undertake the following actions:

1. Recognise and support the complex ecological services of ponds, lagoons and estuaries provided by fish farming, in line with EU Biodiversity strategy, acknowledging them as special traditional farming areas with high ecological values.
2. Put in place coordinated spatial planning for freshwater pond and marine lagoon habitats.
3. Secure adequate allocation of space for aquaculture that provides ecosystem services, while simplifying the bureaucratic procedures for access to space, licensing and operating to ensure long-term existence of this kind of aquaculture.
4. Highlight that although the value of the Ecosystem services provided by pond, lagoon and estuarine fish farming is significantly greater than that of any agricultural sector, support for these complex natural value services is significantly lower. This support should be increased in line with the objectives of the EU Green Deal.
5. Make more public aid available for research on the Ecosystem services provided by pond, estuarine and lagoon fish farming to enhance the science-based knowledge available on their natural values.
6. Consider the positive aspects of these fish farming systems to the EU climate change objectives.
7. Develop and support educational programmes to raise awareness, knowledge and understanding of these traditional aquaculture systems, focusing on their complex ecological and socio-economic values, their Ecosystem services and their role in the maintenance of wetland habitats.
8. Implement effective fish predator management plans and work out compensation mechanisms for damages caused by wildlife on fish farming ponds so as to maintain their natural values.
9. Offer the possibility for farmed fish products obtained through traditional extensive and semi-intensive aquaculture systems to be placed on the market labelled as organic-like or organic-equivalent.