AAC Recommendation on Industrial Contaminant Levels in Aquaculture and Climate Change

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I. Background

Since aquatic organisms live in open areas, they are highly sensitive to environmental conditions and therefore vulnerable to contamination by industrial pollutants. It is important to emphasize that these **contaminants are not generated by aquaculture practices themselves** but rather **originate from external sources**. Depending on the location of aquaculture farms, contamination may result from upstream activities within the watershed or from marine pollution sources external to aquaculture operations. Industrial contaminants pose risks to animal health, welfare, and safety, as well as to the environment and human health. In addition, the resulting **closures of farming areas, destruction of stocks, and sales bans** on affected aquatic products significantly increase the vulnerability of aquaculture enterprises.

Analytical methods have become increasingly accurate, allowing laboratories to detect ever smaller amounts of contaminants. While this development is positive for consumer and environmental protection, it can also lead regulators to gradually reduce maximum residue limits, even in the absence of effective measures by Member States to curb water pollution at its source. At the same time, without more robust and harmonized methodologies, there is a risk of over-implementing contaminant regulations in aquaculture products.

Contaminants, depending on their nature, fall under different specific regulatory frameworks (as illustrated in the non-exhaustive Annex below). This fragmentation is central to understanding the complexity of the issue. For instance, persistent organic pollutants are regulated under feed and food law, heavy metals and industrial chemicals fall under environmental legislation, and natural toxins are addressed by food safety provisions.

With the increasing frequency and intensity of extreme weather events (i.e. droughts and heavy rainfall) and given the limited capacity of existing water treatment systems, **the risk of contamination from external sources is rising**. As a result, there is growing potential for the presence of contaminants in aquaculture products and aquafeed.

While the impacts of climate change on fisheries and aquaculture systems are widely discussed in scientific literature, their economic repercussions on the aquaculture sector are becoming increasingly evident. However, these impacts remain complex and highly context-dependent, varying across production systems and local environmental conditions.[1] **Extreme weather events,** such as **floods, droughts, and storms**, can trigger contamination issues by compromising both water quality and quantity. For example, heavy rainfall can wash contaminants from soils into rivers and coastal areas; storms can resuspend contaminated sediments from the seabed; and droughts can reduce river flows, leading to higher pollutant concentrations. Beyond aquaculture producers, contaminated water can also **affect feed manufacturers**, creating cascading impacts throughout the value chain.

[1] Impacts of climate change on fisheries and aquaculture. Synthesis of current knowledge, adaptation and mitigation options | EU Aquaculture Assistance Mechanism

Finally, this issue concerns not only the current industrial contaminants listed in the Annex but also emerging industrial contaminants – such as phytopharmaceutical residues and other persistent pollutants – that may be incorporated into legislation in the coming years. The concern extends beyond molluscs or finfish to include algae[2] and other newly farmed aquatic species, even though regulatory frameworks for these sectors are not yet fully established. The contamination of aquaculture feed at the manufacturing level will be addressed in a separate recommendation.

II. Justification

A. Water Quality and Quantity Issues in the Context of Climate Change

The Aquaculture Advisory Council (AAC) has issued several recommendations highlighting the close link between water quality and the vulnerability of aquaculture producers to external sources of contamination, as well as a specific recommendation on the impacts of climate change on aquaculture. While these recommendations have underlined critical points and contributed to raising awareness, the AAC notes with concern that they have not yet led to significant improvements in water quality or in addressing the persistent challenges related to water treatment and contamination management and their impacts on the sector.

In the AAC Recommendation on Climate Change Impact, the AAC presented specific recommendations to the European Commission and the Member States. One recommendation to the European Commission was 'to provide specific guidance through the Open Method of Coordination for aquaculture or develop other mechanisms (e.g. the EU's new Aquaculture Assistance Mechanism) for collecting the experience of aquaculture farmers already impacted by climate change and through research studies that can fill information gaps or support climate change adaptation and mitigation'.

More specifically, the AAC Recommendation on MSFD explains in detail that marine aquaculture is practised within coastal and marine ecosystems, which makes it dependent on the quality of marine and ocean waters and the difficulties in meeting the GES because of the under-consideration of the aquaculture sector.

The AAC Recommendation on the Specific Protection of Shellfish Water Quality highlighted the inconsistency and confusion in certain Member States between two zoning systems resulting from two different regulatory provisions: the shellfish protection zones under the Water Framework Directive and the sanitary classification zones under the Hygiene Package.

B. Improve Consistency Between Aquaculture Policy Objectives and EU Aquaculture, Environmental, and the Animal and Public Health Directives

The AAC has consistently advocated for improved alignment between EU aquaculture policy objectives and relevant environmental and health directives. While progress has been made at the strategic level, inconsistencies in implementation persist, leading to regulatory

[2] Regulation No. 915/2023

overlaps or gaps that can hinder the sustainable development of the sector. The AAC regrets that, despite previous recommendations, these misalignments continue to pose significant challenges for operators and competent authorities alike.

As expressed in the AAC Recommendation for an Aquaculture Policy Reform, to date, applicable EU environmental legislation consists of directives that Member State authorities must transpose into national law.

The AAC recommendation on Anticipating Noroviral Contamination emphasized the necessity of adopting a cross-cutting approach to contamination, involving collaboration between DG MARE, DG SANTE, and DG ENVI.

More recently, the AAC reaffirmed the need for enhanced protection of aquaculture waters and outlined specific actions in its contribution to the Water Resilience Strategy submitted to DG ENVI. It was specifically noted that this work should be articulated with the Oceans Pact to ensure the good health of ocean and marine ecosystems.

III. Recommendations

AAC Recommendations:

To the European Commission

1. Ensure effective implementation of existing AAC recommendations mentioned above, in particular by requiring Member States to fulfil their obligations to maintain EU waters at the highest possible quality levels.

2. Officially recognize that aquaculture farmers, particularly those working in open-water environments, are victims of external pollution sources (agricultural, industrial, and urban), which directly affect their production despite their lack of responsibility for the contamination.

3. Reinforce and update regulations governing industrial emissions and water quality management, with the objective of reducing pollution at its source and upstream of aquaculture production areas.

4. Establish dedicated funding mechanisms to enable aquaculture professionals to develop and implement self-monitoring plans for chemical contaminants in aquaculture products.

5. Strengthen data interconnection and management in a holistic marine observation framework, building on initiatives such as the Ocean Observation Initiative, the Ocean Pact, and the CleanSeaNet Service (EMSA), to enhance monitoring and knowledge of both coastal and offshore water.

6. Promote the effective implementation of the 'polluter pays' principle, in conjunction

with DG MARE, DG ENV, DG SANTE, enabling:

- Systemic identification of polluters
- Clear allocation of responsibilities
- Provision of management guidelines to Member States to prevent disproportionate economic losses (sales ban, destruction of products, etc.) for aquaculture farmers
- Financial compensation for losses suffered by affected producers from external and temporal contaminations based on the polluters pays principle

7. Evaluate the need to complement the European legislative framework with a specific standard for aquaculture farming, potentially through the development of a daughter directive under the Water Framework Directive dedicated to the protection of water quality in open marine aquaculture systems.

8. Strengthen inter-institutional dialogue between DG MARE, DG ENV, and DG AGRI, ensuring integrated catchment area management and the prioritization of aquaculture as a key sector in EU water quality protection policies.

To the EU Member States

1. Ensure the full implementation of all AAC Recommendations outlined in this document.
2. Integrate climate change and water protection strategies within Multi-Annual Strategic National Plans and EMFAF Operational Programmes, ensuring coherence between related measures and actions. At the strategic level, this integration should include national aquaculture assessments to identify opportunities for enhancing sectoral resilience to climate change. Such efforts could involve strengthening the protection of aquaculture waters within allocated zones for aquaculture (AZA) against external industrial contaminants.

IV. Annex: List of industrial (chemical) contaminants (non-exhaustive)

Finfish:

Contaminants	**Threshold**	**Targeted species/groups of species**	**European/national regulation references**
Cadmium	**Muscle meat of fish (most** aquaculture species): 0.050 mg/kg **Cephalopods:** 1.0 mg/kg	Species reared in open or semi-open systems Tuna (*Thunnus* species) Octopus	COMMISSION REGULATION (EU) 2023/915

Mineral oil hydrocarbons – for discussion			
Dioxins and PCBs			
Sum of dioxins (pg WHO-PCDD/F-TEQ/g)	**Fishery products:** 3.5 pg/g wet weight	Species reared in open or semi-open systems	COMMISSION REGULATION (EU) 2023/915
Sum of dioxins and dioxin-like PCBs (pg WHO-PCDD/ F-PCB-TEQ/g)	**Fishery products:** 6.5 pg/g wet weight		
Sum of non-dioxin-like PCBs (ng/g)	**Fishery products:** 75 ng/g wet weight		
Lead	**Muscle meat of fish:** 0.30 mg/kg **Cephalopods:** 0.30 mg/kg	Species reared in open or semi-open systems Tuna (*Thunnus* species) Octopus	COMMISSION REGULATION (EU) 2023/915
Malachite green	Prohibited (not allowed) in food of animal origin Reference point for action (RPA) 0.5 µg/kg	RPA – 0.5 µg/kg for the sum of malachite green and leucomalachite green	Regulation (EC) N. 470/2009 COMMISSION REGULATION (EU) 2019/1871
Mercury	**Muscle meat of fish:** 0.50 mg/kg **Exception for Tuna:** 1.0 mg/kg **Cephalopods, *Cyprinidae*, *salmon*, *and trouts:*** 0.30 mg/kg	Species reared in open or semi-open systems Tuna (*Thunnus* species) Octopus Carp (Cyprinidae family)	COMMISSION REGULATION (EU) 2023/915
Inorganic arsenic	**Muscle meat of the following fish:** 0.5 mg/kg 0.1 mg/kg	Anglerfish, monkfish and giant stargazers, flatfishes, haddock, herring, rays, and shark Species other than those listed above	EC proposal amending Regulation (EU) 2023/915 as regards maximum levels for inorganic arsenic in fish and other seafood
Perfluoroalkyl substances			
PFOS	**Muscle meat of fish:**		

	2.0 µg/kg **Exception for seabass:** 7.0 µg/kg **Exception for bream, in case it is not intended for the production of food for infants and young children:** 35 µg/kg	Species reared in open or semi-open systems Seabass Seabream	COMMISSION REGULATION (EU) 2023/915
PFOA	**Muscle meat of fish:** 0.20 µg/kg **Exception for seabass:** 1.0 µg/kg **Exception for bream, in case it is not intended for the production of food for infants and young children:** 8.0 µg/kg		
PFNA	**Muscle meat of fish:** 0.50 µg/kg **Exception for seabass:** 2.5 µg/kg **Exception for bream, in case it is not intended for the production of food for infants and young children:** 8.0 µg/kg		
PFHxS	**Muscle meat of fish:** 0.20 µg/kg **Exception for seabass:** 0.20 µg/kg **Exception for bream, in case it is not intended for the production of food for infants and young children:** 1.5 µg/kg		

Sum of PFOS, PFOA, PFNA, and PFHxS	**Muscle meat of fish:** 2.0 µg/kg **Exception for seabass:** 8.0 µg/kg **Exception for bream, in case it is not intended for the production of food for infants and young children:** 4.5 µg/kg		
PAH	Benzo(a)pyrène: 2.0 µg/kg wet weight Sum of PAHs: 12.0 µg/kg wet weight	Smoked fisheries products (fresh, chilled, or frozen)	COMMISSION REGULATION (EU) 2023/915

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