



Code of good practices on fish welfare and fish welfare indicators

List of “General Good Practices On Fish Welfare”

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Introduction

- The '**Code of good practices on fish welfare and fish welfare indicators**' will supplement the existing '*Good Husbandry Practices for Aquaculture*' and **focuses on general, non-species-specific fish welfare issues, rather than fish health issues.**
- The good practices included in '*The Code*' are intended to provide **guidance based on the best available information** at the time of writing.
- They should **not be considered mandatory.**
- **Users are encouraged to consult the original sources.**
- Although a review of European legislation on fish welfare is beyond the scope of this document, **European regulations on the protection of vertebrate animals on farms, during transport, and at slaughter have been introduced.**

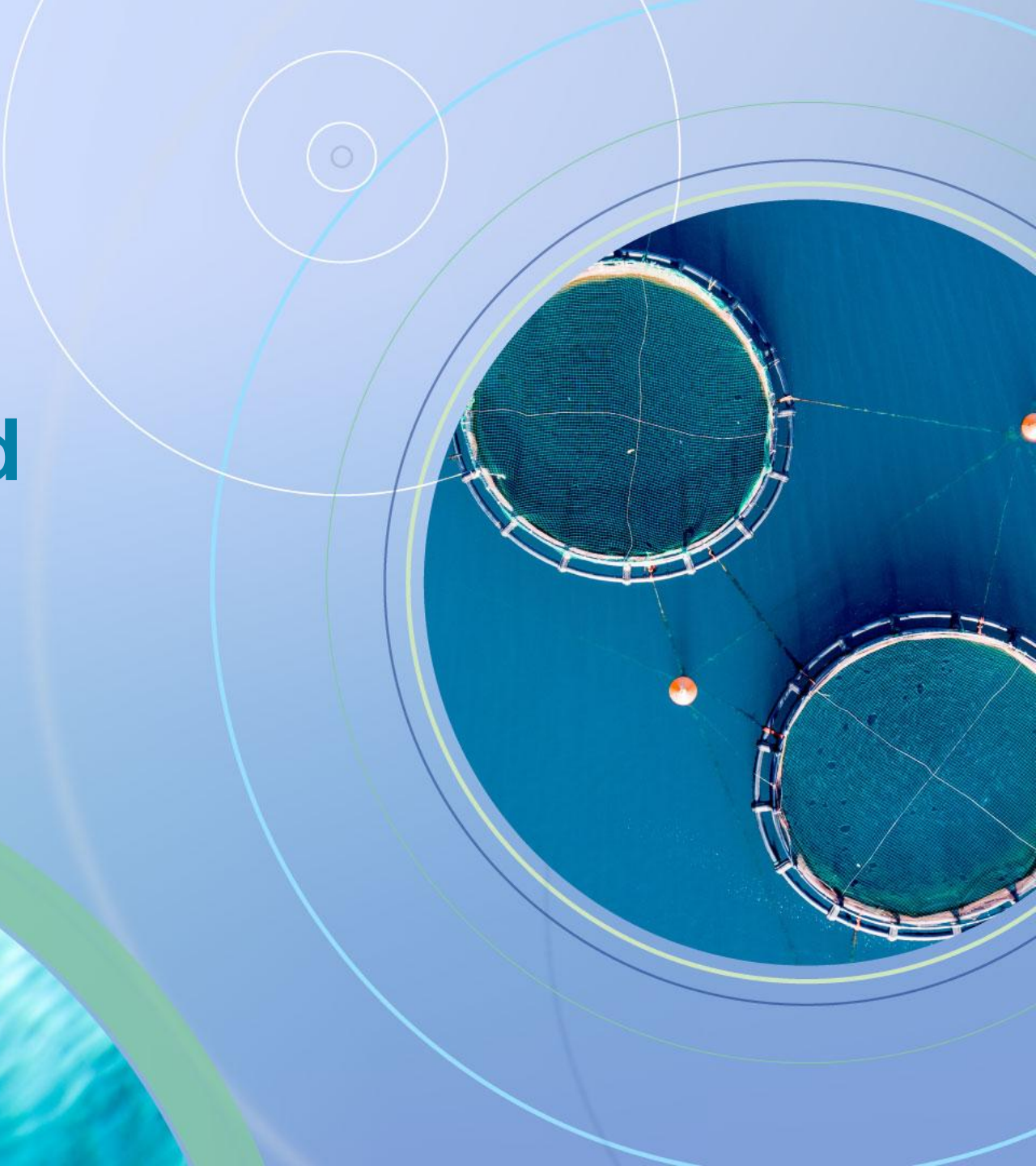
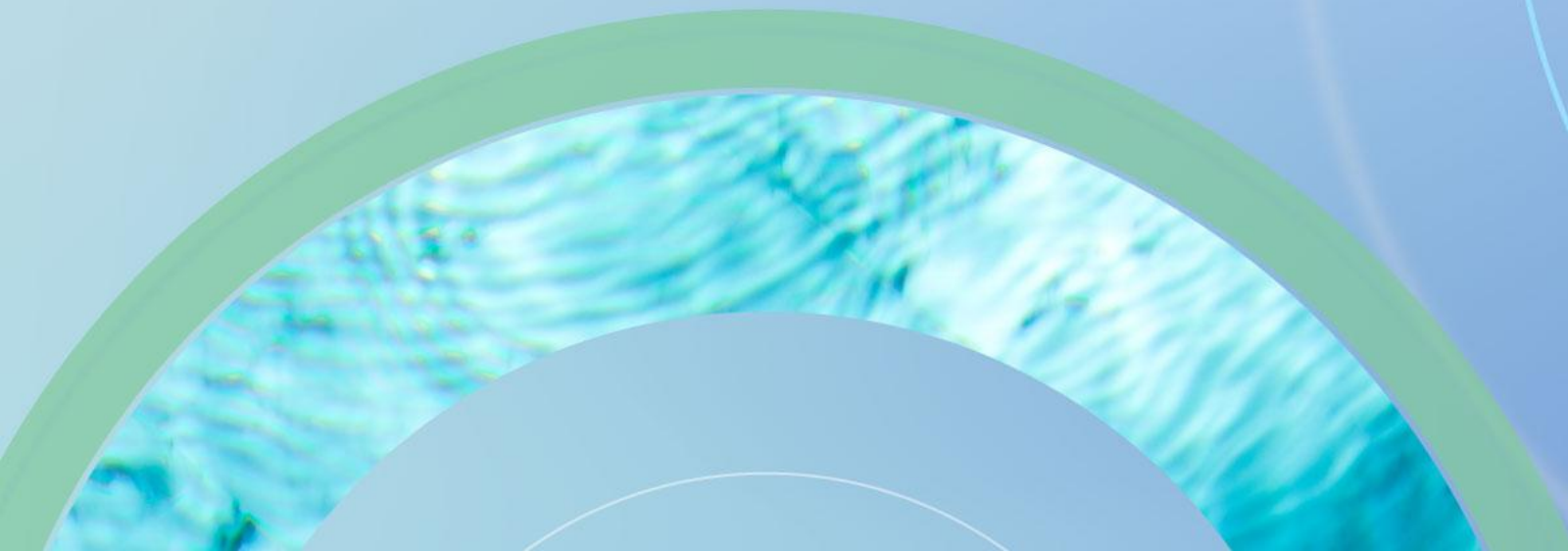
Scope and Objectives of the presentation

- It focus on the list of ‘*Good Practices on Fish Welfare*’ that are included in the ‘*Code of good practices on fish welfare and fish welfare indicators*’ and it is not a consultation exercise on ‘The Code’.
- It is meant to:
 - Explaining the **Methodology**, providing an exhaustive explanation of the work done by the AAM in terms of composition of the document, for extracting best practices from consultations activities and sound sources of information.
 - Presenting a **synopsis of the Good Practices by topic**,
 - Giving the **AAC members the opportunity to discuss/share their views** about how the industry would / could / should apply ‘The Code’.

Methodology for Developing the Good Practice List

- As a starting point, the list of general good practices was developed by drawing from the previous document, "*Good Husbandry Practices for EU Aquaculture*".
- Additional information was gathered from sources in countries such as the UK and Norway, EU Member States, NGOs, and international organisations like FAO or WOAHA, among others.
- The recommendations from the AAC, such as '*Code of good practices on fish welfare among aquaculture producers*' and others were also considered.
- Input was also gathered from an **online survey** launched between October 22nd and December 6th 2024, addressed to EU Member States, Norway, UK, AAC members, the West MED Mechanism and the fish expert group from the EUPAHW.
- Conclusions drawn from a **Cluster meeting** held on November 8th 2024 with experts from relevant EU-funded projects and the AAM BoA.
- This document has been reviewed by the DG SANTE and a group of experts from the EURCAW-Aqua prior to its final publication.

Synopsis of the Good Practices by TOPIC



Feeding and Handling

➤ For feeding

- 4 GPs were identified. For example:
 - Providing food to all fish,
 - Adapting feeding practices to the type of production system, life cycle stage and species.
- Some of the sources consulted were IFA Aquaculture, AAC, Council of Europe and EFSA, different scientific articles.

➤ For handling

- 13 general indications, such as:
 - Having qualified and properly equipped personnel, minimizing operations as much as possible.
- 6 for **grading**. For example:
 - Is important to make uniform sizes of the batch, avoiding cannibalism in certain species.
- Sources include RSPCA, CIWF, FAO, EFFAB, EU Platform on Animal Welfare, APROMAR, Ireland's Seafood Development Agency (BIM).

Water Quality and Stocking Density

➤ For Water quality

- 9 general recommendations were identified.
- 5 general recommendations regarding the most important physicochemical parameters (O₂, ammonia, CO₂, pH, salinity, and temperature).
- 3 concerning microbiological parameters.
- Sources include Scottish Salmon Producers Organisation, Council of Europe, EU Platform on Animal Welfare.

➤ For stocking density

- 6 general indications were identified, such as:
 - Adjusting to the biological needs related to environmental conditions and the production system to maintain water quality.
- Sources include EFSA, AAC, Council of Europe, Eurogroup for Animals and scientific articles.

Mortality Removal and Transport

➤ For mortality removal

- 5 GPs were identified. For example:
 - Any dead or near-death fish should be removed as soon as possible,
 - The cause of death should be recorded.
- Sources include EU Platform on Animal Welfare, Council of Europe, EFSA.

➤ For transport

- It is divided into 4 phases: **pre-transport** (10), **loading and unloading** (1), **transport** (15) and **post-transport** (1). Some examples are:
 - Pre-transport: Vehicles should be equipped to reduce vibration transfer; fasting before transport.
 - Loading and unloading: Minimizing time out of water; reducing pre-transport crowding time.
- A total of 27 recommendations have been identified.
- Sources include Bavarian State Research Centre for Aquaculture (Germany), European Parliament, WOAAH, Italian Ministry of Health, ITA, GSA, GLOBALG.A.P, etc.

Slaughter

➤ For slaughter

- 8 general recommendations were identified, such as:
 - Ensuring that the selected procedure guarantees minimal pain and suffering.
- And is also divided into 4 phases: **pre-slaughter handling** (3), **harvesting** (5), **stunning** (19) and **killing** (4). Some examples are:
 - Stunning: Farmed fish should be stunned before killing, ensuring immediate and irreversible unconsciousness.
 - Killing: A thorough protocol is needed to ensure effective fish slaughter systems.
- A total of 39 recommendations have been identified.
- Sources include WOAHP, European Commission, Humane Slaughter Association, UNE 173300:2016 (Spain), FAWC, AAC, EFSA, and CIWF.

Environmental Enrichment

➤ For environmental enrichment

- 11 general indications were identified
- In addition, this topic includes a section dedicated to **lighting**, with 6 general recommendations, as it is a crucial regulator of fish biological processes, including diurnal and circannual rhythms, developmental transitions and behaviour.
- Sources include some of the most recent specialized scientific articles.



**Thank you for your attention.
We wish you a fruitful discussion, and we
will be happy to answer questions!**



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Examples of consulted SOURCES

See the complete list of sources in the published document at:

<https://aquaculture.ec.europa.eu/key-documents/code-good-practices-fish-welfare-and-fish-welfare-indicators>

Examples of sources used for GPs on fish welfare (I)

Source / Authors	Title
European Commission	Welfare of farmed fish: Common practices during transport and at slaughter (2017)
	Report from the Commission to the European Parliament and The Council on the possibility of introducing certain requirements regarding the protection of fish at the time of killing (COM, 2018)
European Parliament research services	Research for ANIT Committee: Particular welfare needs in animal transport: aquatic animals (2021)
	Pavlidis, M. et al., 2023. Animal welfare of farmed fish (June 2023)
Council of Europe	Recommendation concerning farmed fish adopted by the Standing Committee of the European Convention for the Protection of Animals kept for Farming Purposes (T-AP) on 5 December 2005 (in accordance with Article 9, paragraph 3 of the Convention, this Recommendation entered into force on 5 June 2006)
Aquaculture Advisory Council (AAC)	Recommendation on Fish Welfare in Live Fish Transport (March 2022)
	Recommendation on Fish Welfare at Slaughter (July 2019)
	Farmed fish welfare during slaughter. Report (2017)
	Code of Good Practices on Fish Welfare among Aquaculture Producers (2024)
World Organisation for Animal Health (WOAH, founded as OIE)	Aquatic Animal Health Code (2022). Chapters 7.2. and 7.3
Food and Agriculture Organization of the United Nations (FAO)	Welfare of fishes in aquaculture (2019)
	Better management practices for carp production in Central and Eastern Europe, The Caucasus and Central Asia (2011)
Hellenic Aquaculture Producers Association (HAPO)	Mediterranean Fish Welfare : Guide to Good Practices and Assessment Indicators (2020)
European Food Safety Authority (EFSA)	Opinion of the Scientific Panel on Animal Health and Welfare on a request from the Commission related to welfare aspects of the main systems of stunning and killing the main commercial species of animals (2004)
	Animal Welfare Aspects of Husbandry Systems for farmed fish: Carp (2008)
	Animal welfare aspects of husbandry systems for farmed trout. Scientific Opinion of the Panel on Animal Health and Welfare (2008)
	Animal welfare aspects of husbandry systems for farmed European sea bass and gilthead sea bream. Scientific Opinion of the Panel (2008)
	Animal welfare aspects of husbandry systems for farmed Atlantic salmon. Scientific Opinion of the Panel on Animal Health and Welfare (2008)

Examples of sources used for GPs on fish welfare (II)

Source /Authors	Title
Ministry of Health (Italy)	Fish Health and Welfare During Transport (in Italian) (2004) / MANUALE PER LA GESTIONE DEL CONTROLLO DEL BENESSERE DEI PESCI DURANTE IL TRASPORTO SU STRADA (in Italian)
Bavarian State Research Centre for Agriculture (LfL)	Fish Welfare During Transport (in German) (2018)
Spanish Aquaculture Business Association (APROMAR)	A guide on fish welfare in Spanish aquaculture – Volume 1: Concepts and generalities (2022)
Spanish Standardisation (UNE)	UNE 173300:2016 Fish Slaughter Best Practice Guidelines (in Spanish)
Norwegian Regulation	Regulation on the operation of aquaculture facilities (the aquaculture operation regulation) (in Norwegian). (art. 16th)
Marine Institute (Ireland) / IFA Aquaculture	The Farmed Salmonid Health Handbook . Chapter IV (2017)
Ireland's Seafood Development Agency (BIM)	Certified Quality Aquaculture Standards (2022)
Scottish Salmon Producers Organisation	Scottish Salmon Farming. Code of Good Practice (2015)
European Forum of Farm Animal Breeders (EFFAB)	The code of good practices for Responsible and Balanced Farm Animal and Aquaculture Breeding (Code EFABAR, 2023)
EU Platform on Animal Welfare Own Initiative Group on Fish	Guidelines on water quality and handling for the welfare of farmed vertebrate fish (2020)
Eurogroup for Animals	On-farm Welfare Standards in Aquaculture: Annex to White Paper – No animal left behind: The need for a new Kept Animals Regulation (July 2022)
	Transport Regulation: Due time to change the rules. White Paper on the revision of Council Regulation (EC) 1/2005 (February 2024)
Farm Animal Welfare Committee (FAWC)	Opinion on the Welfare of Farmed Fish at the Time of Killing (2014)

Examples of sources used for GPs on fish welfare (III)

Source /Authors	Title
Humane Slaughter Association	Humane harvesting of fish (2014)
Global Seafood Alliance (GSA). Best Aquaculture Practices (BAP)	BAP Farm Standards (February 2023)
Compassion in World Farming (CIWF)	Environmental enrichment for fish in aquaculture
	The Welfare of Farmed Fish during slaughter in the European Union (November 2018)
	Improving the welfare of farmed rainbow trout at rearing (2023)
GLOBALG.A.P.	Integrated Farm Assurance Smart/GFS. Principles and Criteria for Aquaculture – Finfish, Crustaceans, Molluscs, Seaweed (August 2024)
Aquaculture Welfare Standard Initiative (ITA)	Recommendations on animal welfare in aquaculture
Aquatic Life Institute	Stunning and Slaughter: Best Practices for Animal Welfare in Aquaculture (May 2023)
Royal Society for the Prevention of Cruelty to Animals (RSPCA)	RSPCA welfare standards for farmed rainbow trout (March 2020)
	RSPCA welfare standards for farmed Atlantic salmon (May 2024)
Van de Vis, J.W., Poelman, M., Lambooij, E., Bégout, M.-L. and Pilarczyk, M., 2012	Fish welfare assurance system: initial steps to set up an effective tool to safeguard and monitor farmed fish welfare at a company level. <i>Fish Physiol. Biochem.</i> 38: 243-257.
Van de Vis, H., Kiessling, A. Flik, G. and Mackenzie, S. (Editors), 2012	Welfare of farmed fish in present and future production systems. Springer, Heidelberg, Germany, 312 pp.
Kristiansen, T., et al., 2020	Theoretical basis and principles for welfare assessment of farmed fish
Dara, M., et al., 2023	Fish Welfare in Aquaculture: Physiological and Immunological Activities for Diets, Social and Spatial Stress on Mediterranean Aqua Cultured Species
de la Rosa, I., Castro, P.L., Gines, R. 2021.	Twenty Years of Research in Seabass and Seabream Welfare during Slaughter
Browning, H. 2023.	Improving welfare assessment in aquaculture

Examples of sources used for GPs on fish welfare (IV)

Source /Authors	Title
Baarset, H., Johansen, J., 2019	Innovative processes for mortality disposal in aquaculture. Deliverable 2.2 GAIN - Green Aquaculture Intensification in Europe. EU Horizon 2020 project grant nº.773330. 15pp.
García-Ortega, A., & Calvario-Martínez, O., 2003	Manual de Buenas Prácticas de Producción Acuícola de Trucha para la Inocuidad Alimentaria. SENASICA/SAGARPA (in Spanish).
Zhang, Z. et al., 2022	Social enrichment affects fish growth and aggression depending on fish species: Applications for aquaculture
Zhang, Z. et al., 2023	Physical enrichment for improving welfare in fish aquaculture and fitness of stocking fish: A review of fundamentals, mechanisms and applications
Hyvärinen, P., & Rodewald, P., 2013	Enriched rearing improves survival of hatchery-reared Atlantic salmon smolts during migration in the River Tornionjoki. Canadian Journal of Fisheries and Aquatic Sciences
Jones, N. A., Webster, M. M., & Salvanes, A. G. V., 2021.	Physical enrichment research for captive fish: Time to focus on the DETAILS. Journal of Fish Biology, 99 (3), 704-725
Näslund, J., & Johnsson, J. I., 2016.	Environmental enrichment for fish in captive environments: effects of physical structures and substrates. Fish and Fisheries, 17(1), 1-30