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INDICATOR FACTSHEET

WELFARE INDICATORS FOR EUROPEAN SEABASS

INTRODUCTION AND SCOPE OF THE TEXT

This fact sheet introduces Operational Welfare Indicators (OWIs) for European seabass ***(Dicentrarchus labrax)***, targeting the transportation and harvesting stages. These indicators are essential tools for **inspectors** and farm operators to assess fish welfare conditions through measurable environmental and animal-based criteria. OWIs enable consistent evaluations across sites and ensure that fish are reared, transported, and harvested in ways that meet EU welfare expectations. Their practical design supports application by both regulatory authorities and aquaculture staff with limited technical training.

LEGAL REQUIREMENTS

As with other farmed fish, European seabass welfare is currently covered under general EU legislation:

- **Council Directive 98/58/EC on the protection of animals kept for farming purposes.**

  This directive provides a foundation for farm animal care. For fish farming, it implies that **fish must be maintained in conditions that avoid unnecessary suffering,** at all production stages.

- **Council Regulation (EC) 1/2005 on the protection of animals during transport.**

  This regulation mandates conditions to **minimize transport-related stress,** including space, water parameters, and duration. For seabass, it means that pre-loading fasting, stocking density, oxygen supply and water temperature must be carefully controlled to avoid mortality and injury.

- **Council Regulation (EC) 1099/2009 on the protection of animals at the time of killing.**

  While fish-specific stunning methods are not detailed, the law requires that **killing must not cause avoidable pain or distress.**

WELFARE INDICATORS PROPOSED BY WELFARE RISK AND FARMING STAGE

WELFARE RISKS ACKNOWLEDGED

In aquaculture, fish are raised in **controlled environments** that diverge from their natural habitats. While this allows for efficient production, it can also introduce welfare challenges that must be acknowledged and managed. To safeguard fish well-being and promote sustainability, **potential welfare risks must be identified, along with acceptable thresholds for risk exposure.**

A structured evaluation of the seabass farming process–especially the **harvest phase**–reveals points where environmental or handling factors can adversely affect welfare. Monitoring these stages using appropriate indicators allows for proactive responses to welfare threats.

The key welfare risks identified in seabass harvest include:

- **Death** (from temperature shock, crowding, or poor stunning)
- **Pain** (linked to inadequate or delayed stunning methods)
- **Injury** (from nets, pumps, or high-density crowding)
- **Disease** (exacerbated by stress during handling or transport)
- **Hunger** (pre-harvest fasting impacts welfare status)
- **Stress** (induced by handling, poor water quality, or long transport durations)

Measures in place expected by the farmers to mitigate the impacts on the identified welfare risks.

WELFARE INDICATORS PROPOSED BY WELFARE RISK AND FARMING STAGE

Key Definitions

- **Welfare State:** Describes a fish's **overall condition,** including health, comfort, and emotional well-being at a given moment. Good welfare state is achieved when animals are free from distress and capable of expressing natural behaviors.
- **Affective State:** Refers to the fish's **longer-term emotional state** or mood, shaped by repeated experiences. Monitoring this helps determine whether a fish experiences its life positively or negatively.
- **Operational Welfare Indicators (OWIs): These are practical, scientifically grounded indicators** designed for use by inspectors to evaluate welfare. OWIs are divided into:
  - **OWI_A** – Indicators that reflect the **internal welfare experience (affective state).**
  - **OWI_C** – Indicators that measure the **impact of production conditions** on welfare outcomes.

OWIs IN EUROPEAN SEABASS FARMING

Live Transport of European Seabass

- **OWI_A (Affective state):**
  - pH of seawater
  - Oxygen saturation (%)
- **OWI_C (Process assessment):**
  - Overall mortality (%)
  - Incident mortality (%)
  - Injuries/fin bites (%)

Harvesting of European Seabass

- **OWI_A:**
  - Not specifically identified, but environmental conditions like oxygen levels remain relevant
- **OWI_C:**
  - Incident mortality (%)
  - Injuries (%)
  - Hematomas (%)

*These indicators give a complete view of seabass welfare, capturing both the **environmental influences** and the **observable outcomes** during crucial production phases.*

EUROPEAN SEABASS TRANSPORTATION

In European seabass farming, live fish transport typically occurs at the end of the weaning period when fish weighing 2 to 20 g are moved from land-based facilities (hatcheries or pre-fattening units) to open sea cages for on-growing. **Figure 2** bellow outlines the steps involved in live fish transportation. Preparations begin with ***grading*** the fish to ensure uniform size, minimizing the risk of cannibalism between individuals of significantly different sizes. ***Fasting*** is necessary to lower fish metabolism, reducing the impact on water quality in the small transport containers. ***Weighing*** the fish is the practice used for counting them, determining the number of transport loads, and selecting appropriate containers. It also serves commercial purposes. Fish are transferred to mobile containers fitted onto road trucks, either using ***nets or pumps***. The duration of ***transportation*** is critical and can range from a few hours to several days. To minimize fish metabolism during transit, water in the containers is often cooled. ***Acclimatization*** is necessary when transporting fish to distant locations where the receiving water temperature differs significantly (> 4°C) from the dispatching water. Post-transport ***monitoring*** of fish behavior for 1-3 days after arrival at the farm is crucial to confirm the success of the transportation process.

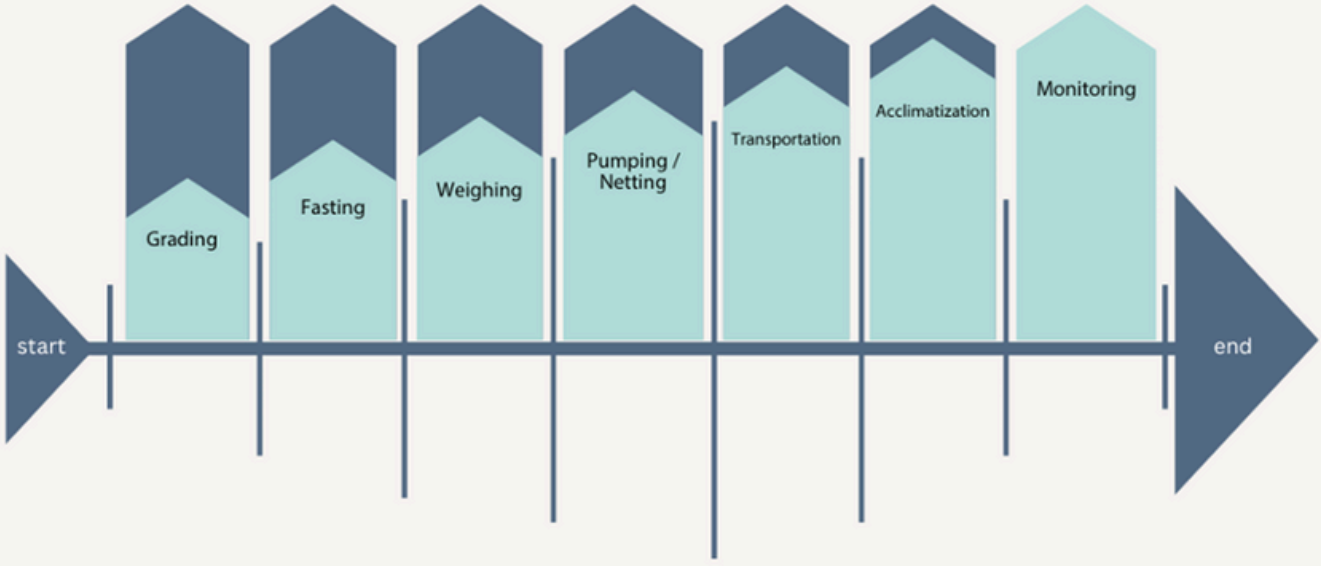

Figure 2. European seabass live fish transportation standard operational procedure steps.

EUROPEAN SEABASS HARVEST

The harvest of European seabass takes place at the end of the on-growing phase when the fish reach the desired market size. For European seabass and other marine fish species, harvesting involves killing the fish, which is typically carried out at sea near the floating rearing cages. The preparation for harvesting begins with fasting the fish to clear their intestines of feed residues and metabolic waste. This fasting period can last several days, depending on the farmer's sales plan.

The harvesting process starts by lifting the nets and placing a harvest net inside the cage to isolate a portion of the biomass for harvesting. Using gentle movements, workers separate the targeted fish and gradually reduce the available swimming space, causing the fish to crowd together.

This crowding allows the fish to be captured either with a net or through pumping. The next step involves transferring the fish into tanks filled with slurry ice, where they are killed by a rapid drop in water temperature. Recently, the use of electric stunners has become more common in European seabass farms. In this method, fish are either guided directly into an electric field for stunning, dewatered, and then submerged in slurry ice to be killed (wet electric stunning), or dewatered first, then stunned in an electric field, and finally submerged in slurry ice. **Figure 3** illustrates the various steps involved in the European seabass harvesting process.

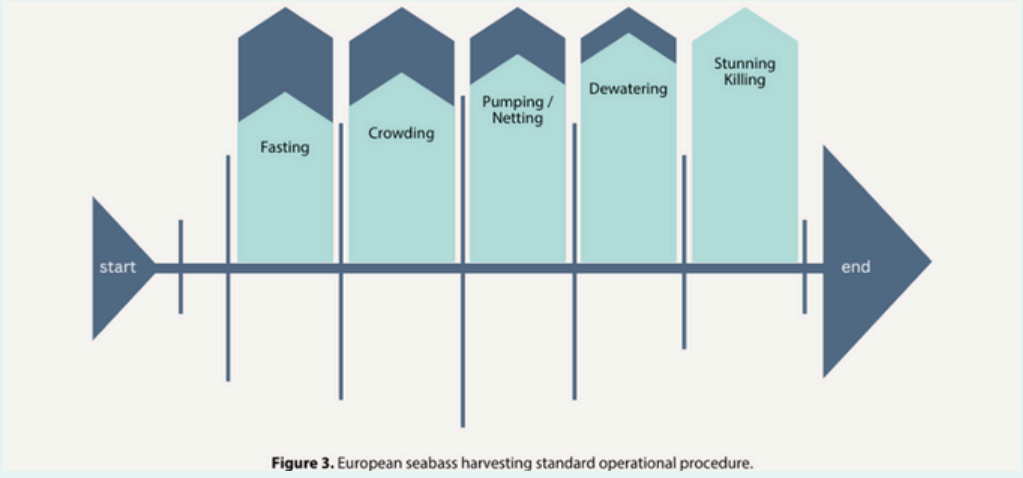

Figure 3. European seabass harvesting standard operational procedure.

Conclusion

The proposed welfare indicators for **European seabass** are designed to help **NCAs** standardize welfare evaluations across farms, particularly during **transportation and harvest.** For both stages, the **OWI_C**—Overall mortality, Incident mortality, and Injuries/fin bites—provide a **quantifiable measure of risk impact.**

The **OWI_A—pH** and oxygen saturation—serve as proxies for the fish's affective state, influenced by factors like **water change, trip duration, and stocking density.** These indicators help farmers and inspectors detect early signs of stress or suboptimal conditions.

As the welfare monitoring framework becomes embedded in practice, it will be **continuously updated** to integrate new research, technology, and practical experience, ensuring it remains robust and relevant to the evolving needs of the sector.

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