

# Fish welfare legislation

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The Norwegian Food Safety Authority

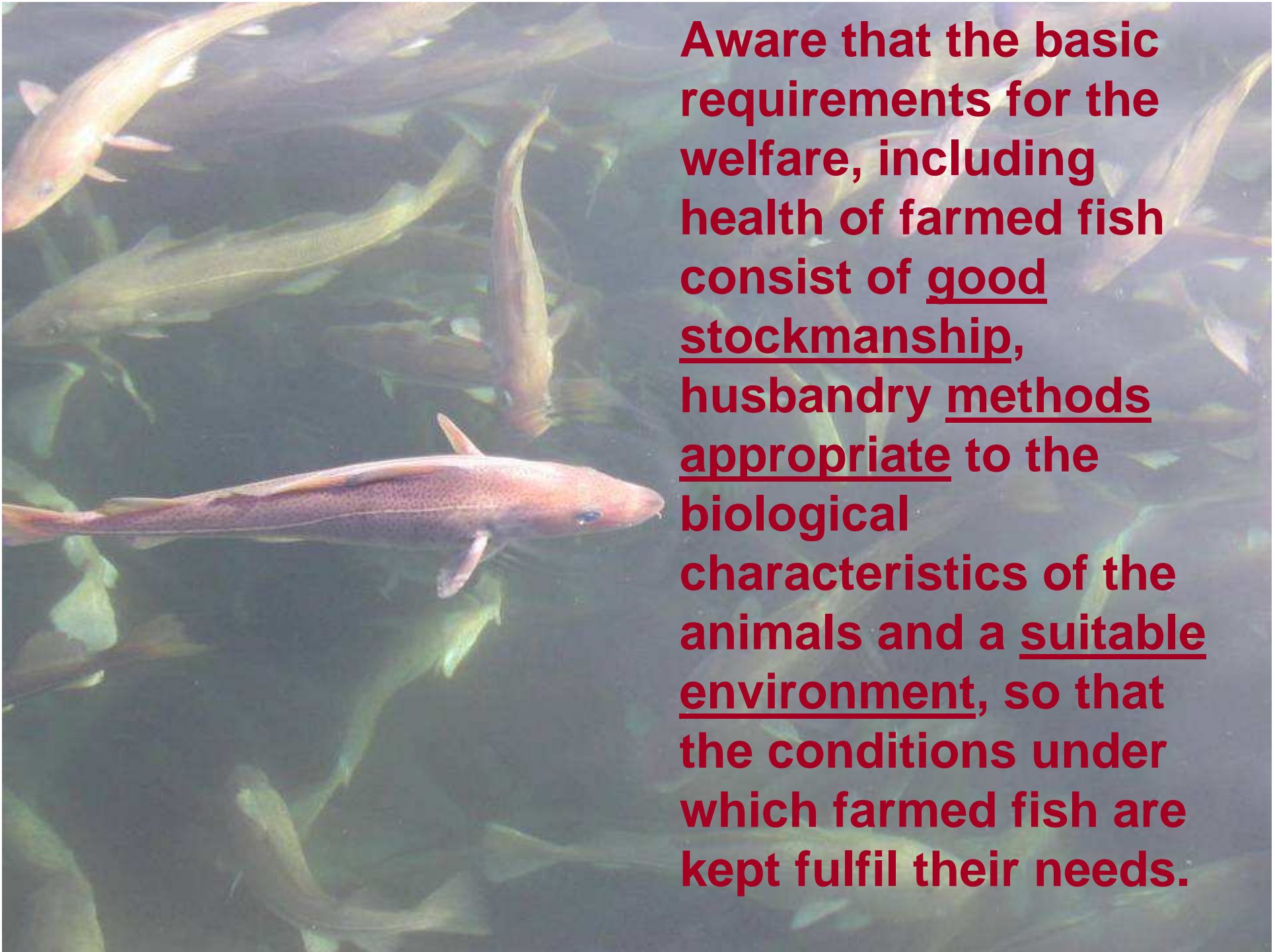
March 27<sup>th</sup> 2009

A close-up photograph of two large farmed fish, likely salmon, in a tank. The fish are dark brown with lighter, mottled patterns on their heads and bodies. They have large, prominent eyes and are looking towards the camera. The water is clear, and the background shows the structure of the tank.

**European Convention for the protection of  
animals kept for farming purposes**

**Recommendation concerning farmed fish  
June 5<sup>th</sup> 2006**





**Aware that the basic requirements for the welfare, including health of farmed fish consist of good stockmanship, husbandry methods appropriate to the biological characteristics of the animals and a suitable environment, so that the conditions under which farmed fish are kept fulfil their needs.**

# Competence

- Training appropriate to responsibilities
- Practical and theoretical
- Continued training
- Certificate of competence?



# Stockmanship

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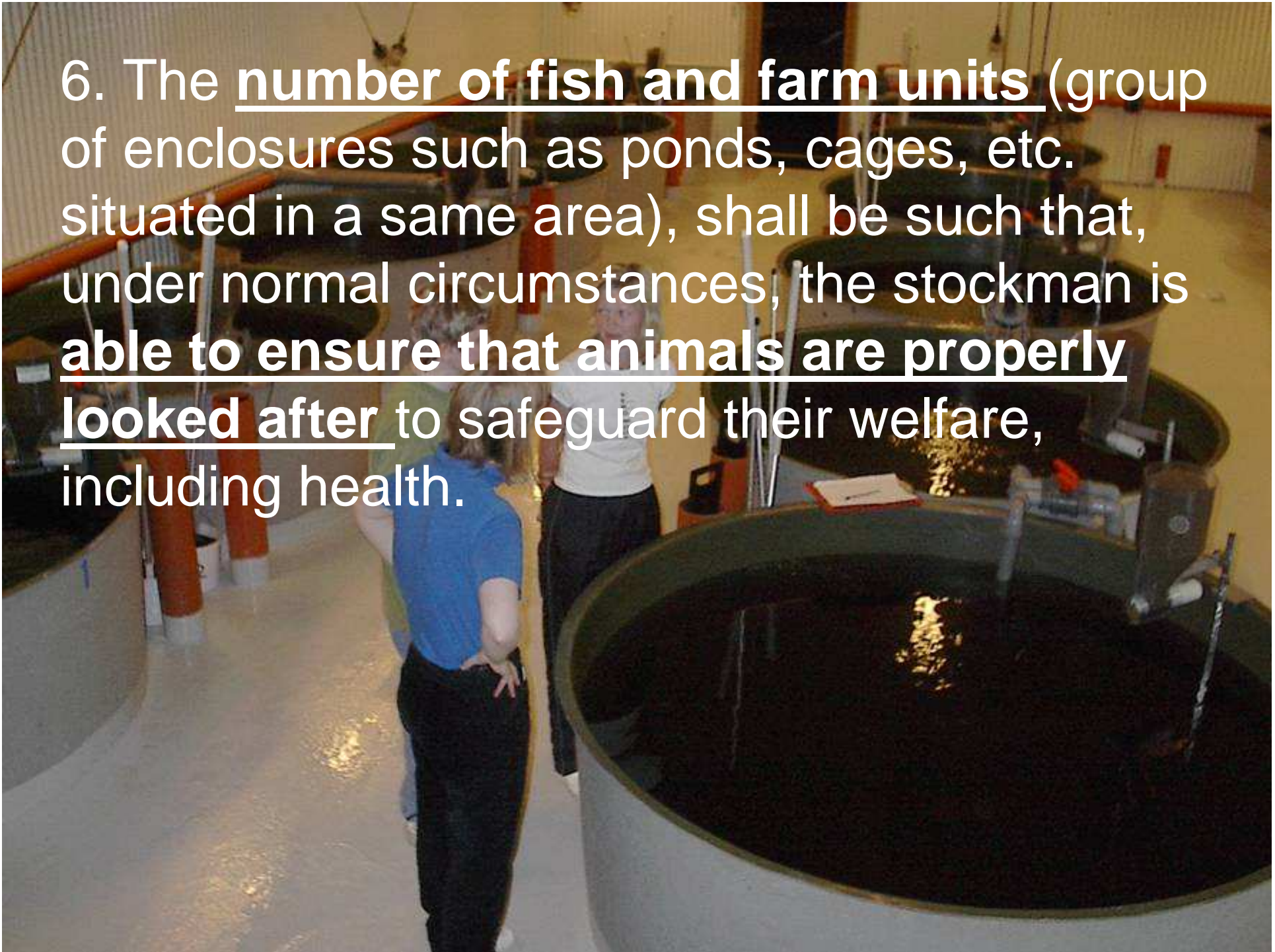
Owners, persons responsible for and every person engaged in the keeping of farmed fish shall:

according to their responsibilities, ensure that every reasonable step is taken to safeguard the welfare, including health of such fish.



4. Farmed fish shall be **cared for by a sufficient number of personnel** with adequate training and experience of the fish and of the husbandry system used to be able to:
- (a) recognise whether or not the fish are in good **health**;
  - (b) understand the significance of **behavioural changes**; and
  - (c) appreciate the suitability of the total **environment** for the fishes' welfare, including health.

6. The number of fish and farm units (group of enclosures such as ponds, cages, etc. situated in a same area), shall be such that, under normal circumstances, the stockman is able to ensure that animals are properly looked after to safeguard their welfare, including health.





# Inspection

1. Enclosures ... shall be inspected at least once a day, preferably more frequently, ... Inspection should be made with minimal disturbance to the fish.

2. ...should focus on factors affecting adversely the welfare of the fish, and signs of abnormal behaviour, injury, poor health or increased mortality.





# Inspection

3. If fish are behaving abnormally, are injured or in poor health or if increased mortality is registered,

the person responsible for their care **shall act promptly** to establish the cause and **take remedial action, ...**



# Disease/injury



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# Statistics

## Loss of fish in Norway 2007:

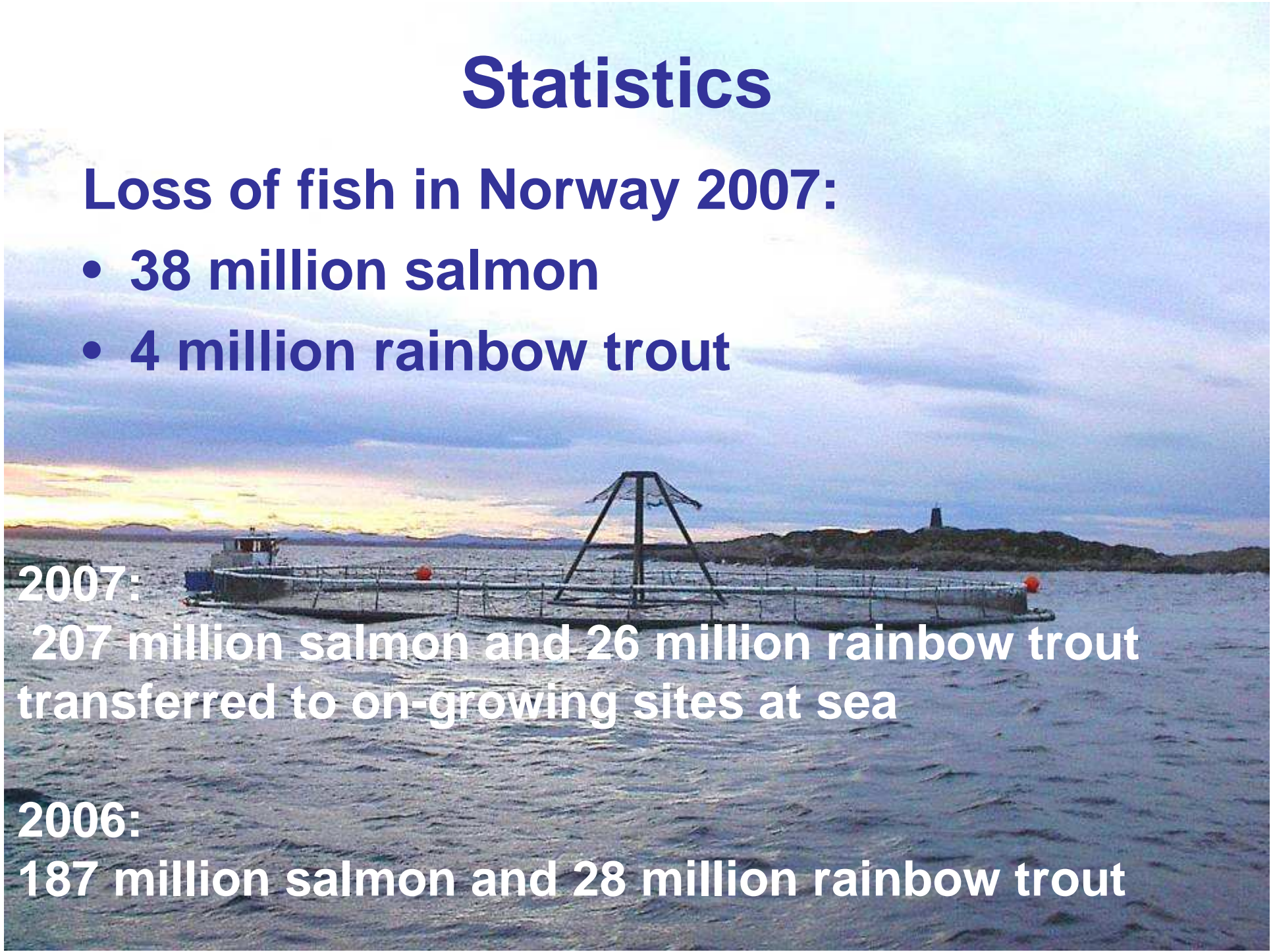
- 38 million salmon
- 4 million rainbow trout

2007:

207 million salmon and 26 million rainbow trout transferred to on-growing sites at sea

2006:

187 million salmon and 28 million rainbow trout





**Any dead or dying fish shall be removed as soon as possible ...**

**If fish are ill or injured to such an extent that treatment is no longer feasible**

**they must be killed ... without delay**





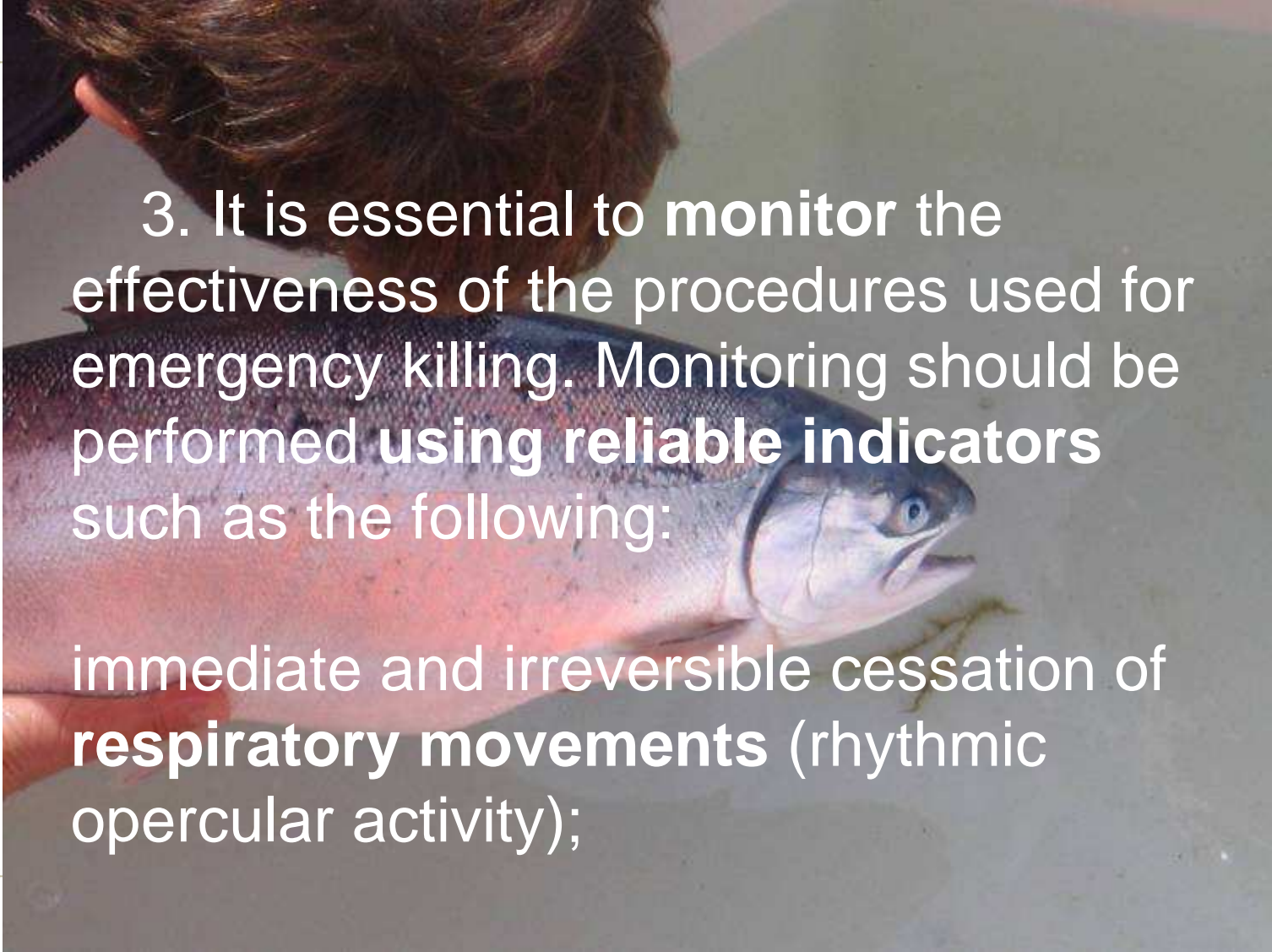
## Article 19:

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2. The methods used shall either:
  - a. cause immediate death, or
  - b. rapidly render the fish insensitive until death supervenes, or
  - c. cause the death of a fish which is anaesthetised or effectively stunned.

## Article 19 (continued):

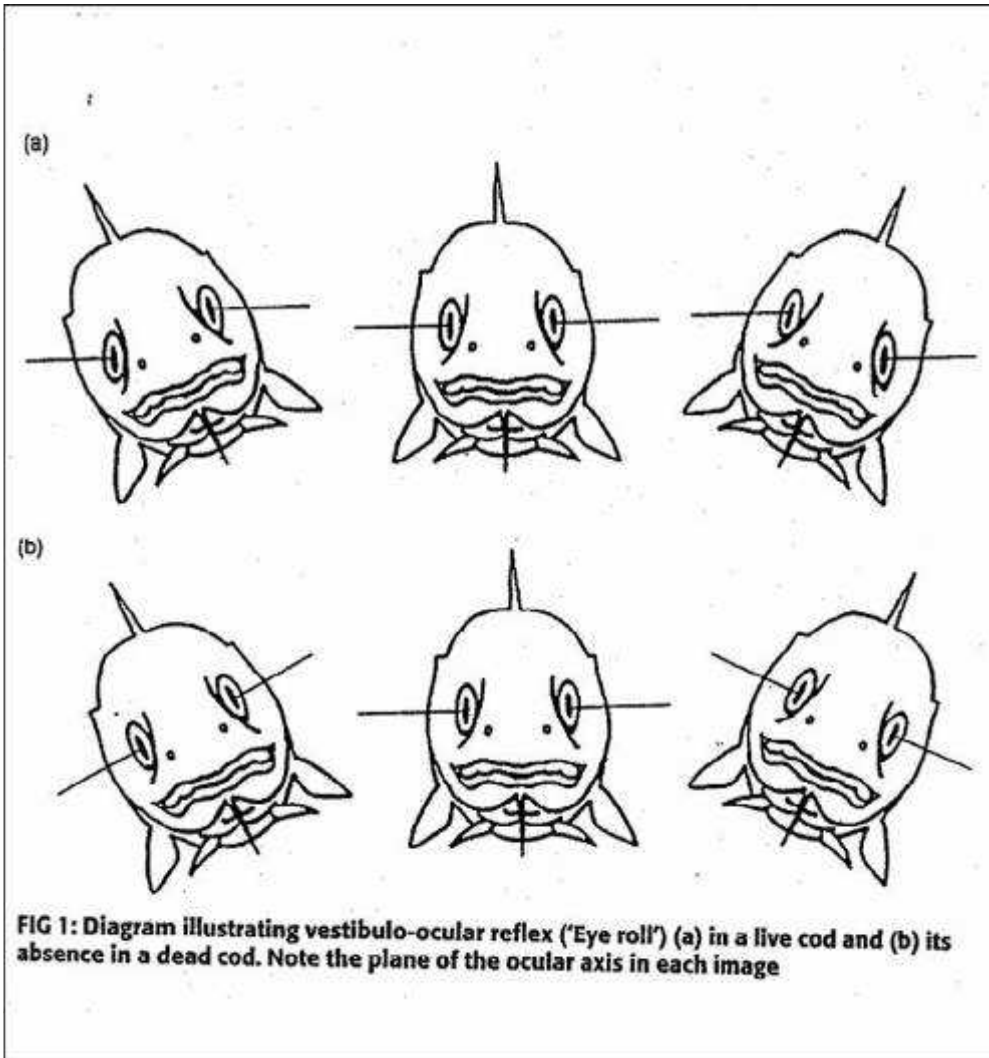
A photograph showing a person's hands holding a large fish, likely a salmon, against a plain background. The fish is held horizontally, and the person's hands are visible at the top and bottom. The fish's scales are a mix of silver and reddish-pink. The person's hair is dark and visible at the top left.

3. It is essential to monitor the effectiveness of the procedures used for emergency killing. Monitoring should be performed **using reliable indicators** such as the following:

immediate and irreversible cessation of **respiratory movements** (rhythmic opercular activity);

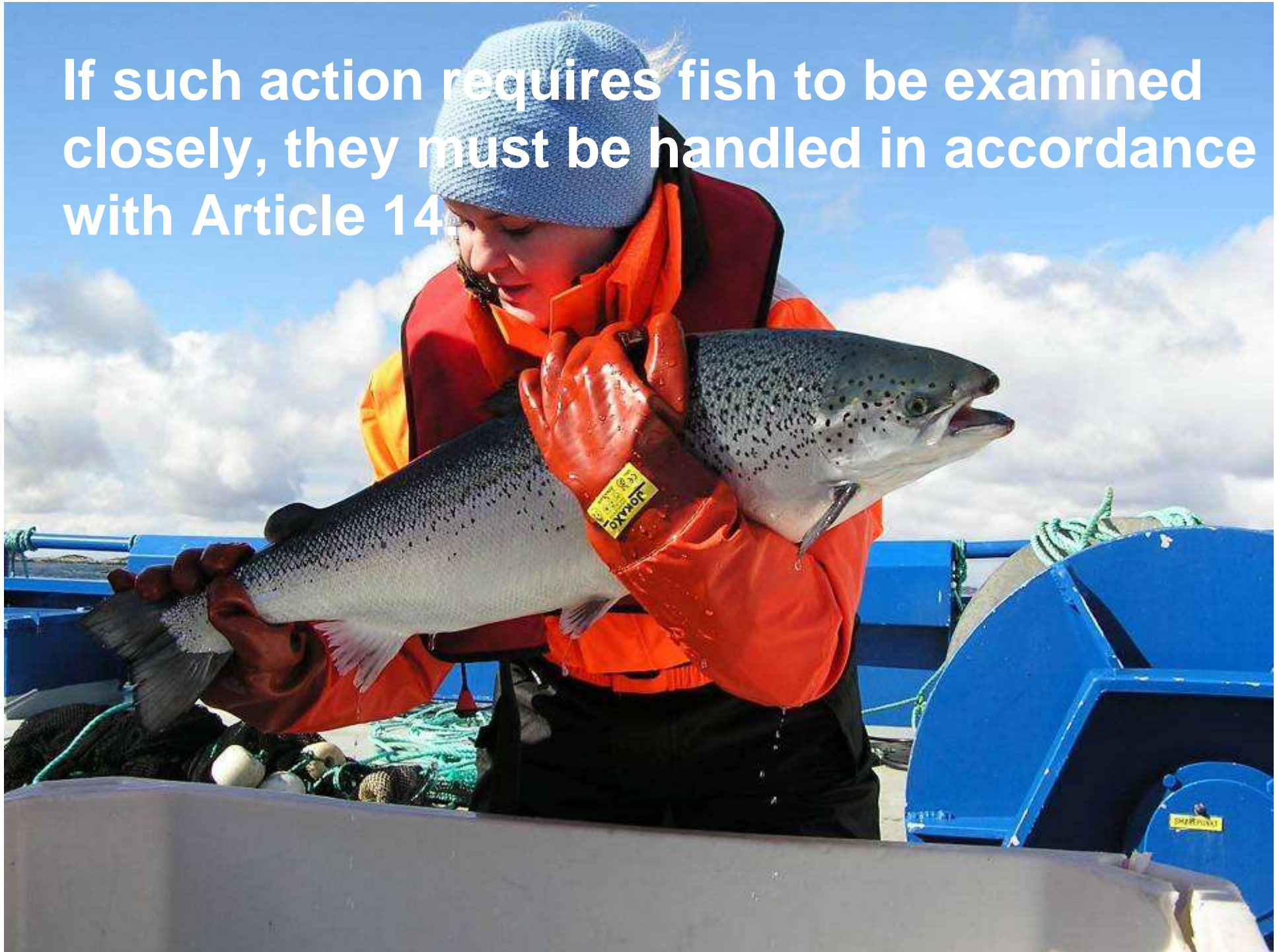


# Article 19 (continued):



immediate and irreversible loss of **eyeroll** (vestibulo-ocular reflex - VOR), that is, the movement of the eye when the fish is rocked from side to side. In a dead fish the eye does not move.

If such action requires fish to be examined closely, they must be handled in accordance with Article 14.



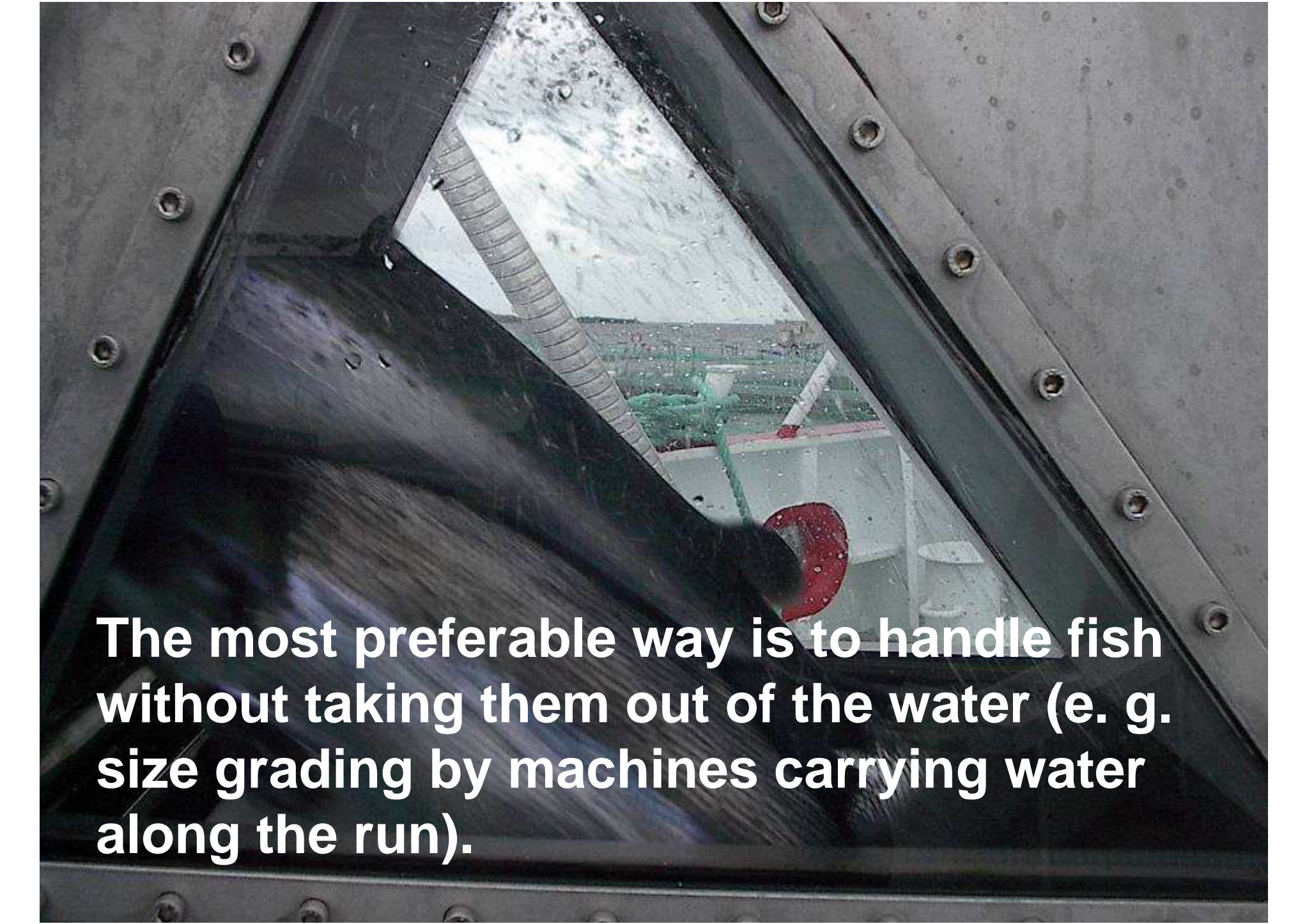


# Article 14 - Handling

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1. ...shall be carried out with a minimum of stress and disturbance ...for the shortest time possible.





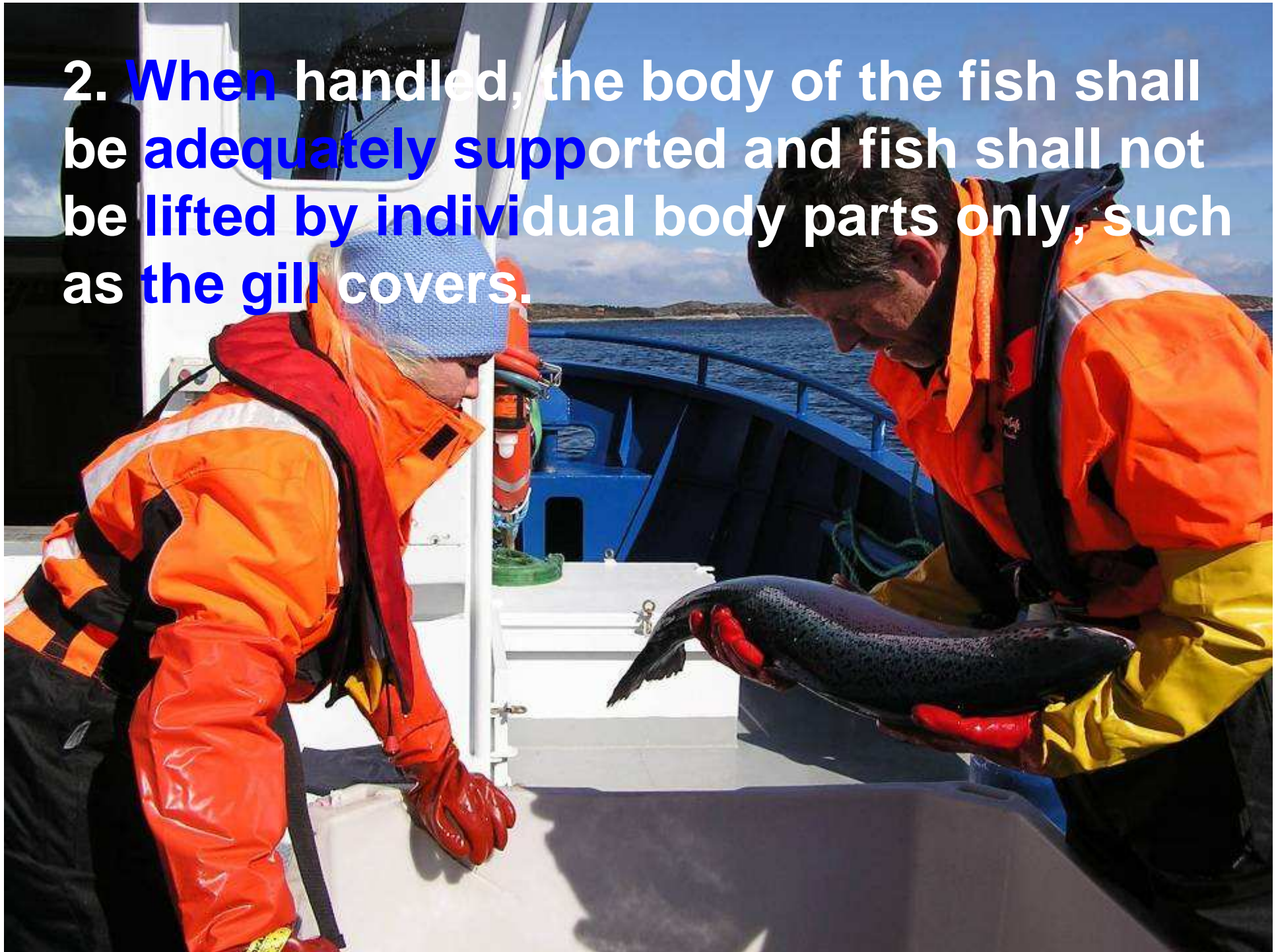
**The most preferable way is to handle fish without taking them out of the water (e. g. size grading by machines carrying water along the run).**



**Sedation or anaesthesia may be appropriate.**

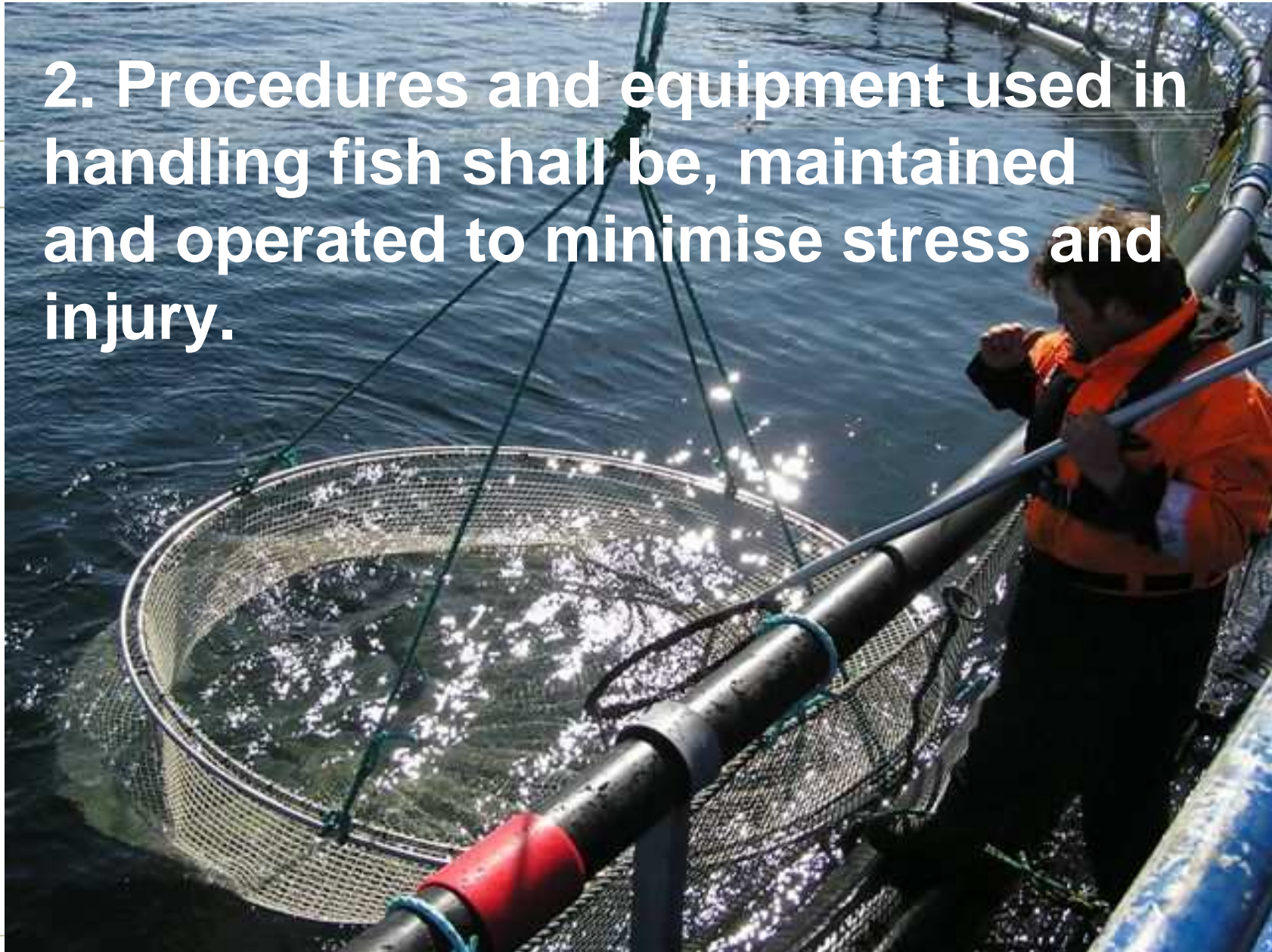


2. **When** handled, the body of the fish shall be **adequately supported** and fish shall not be **lifted by individual body parts only**, such as **the gill covers**.





**2. Procedures and equipment used in handling fish shall be, maintained and operated to minimise stress and injury.**



# Pumping

3. Procedures involving pumping should minimise the risk of injury. In particular, it should be ensured that **pumping height, pressure and speed**, and the **height from which fish fall** when they emerge from the pump, are adjusted to this aim.





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All equipment must be free of rough surfaces liable to cause injury.

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**Assembling equipment**



**Fin damage**



**4 Where fish are crowded to aid handling, the water quality and especially levels of oxygen should be monitored and kept within acceptable limits.**

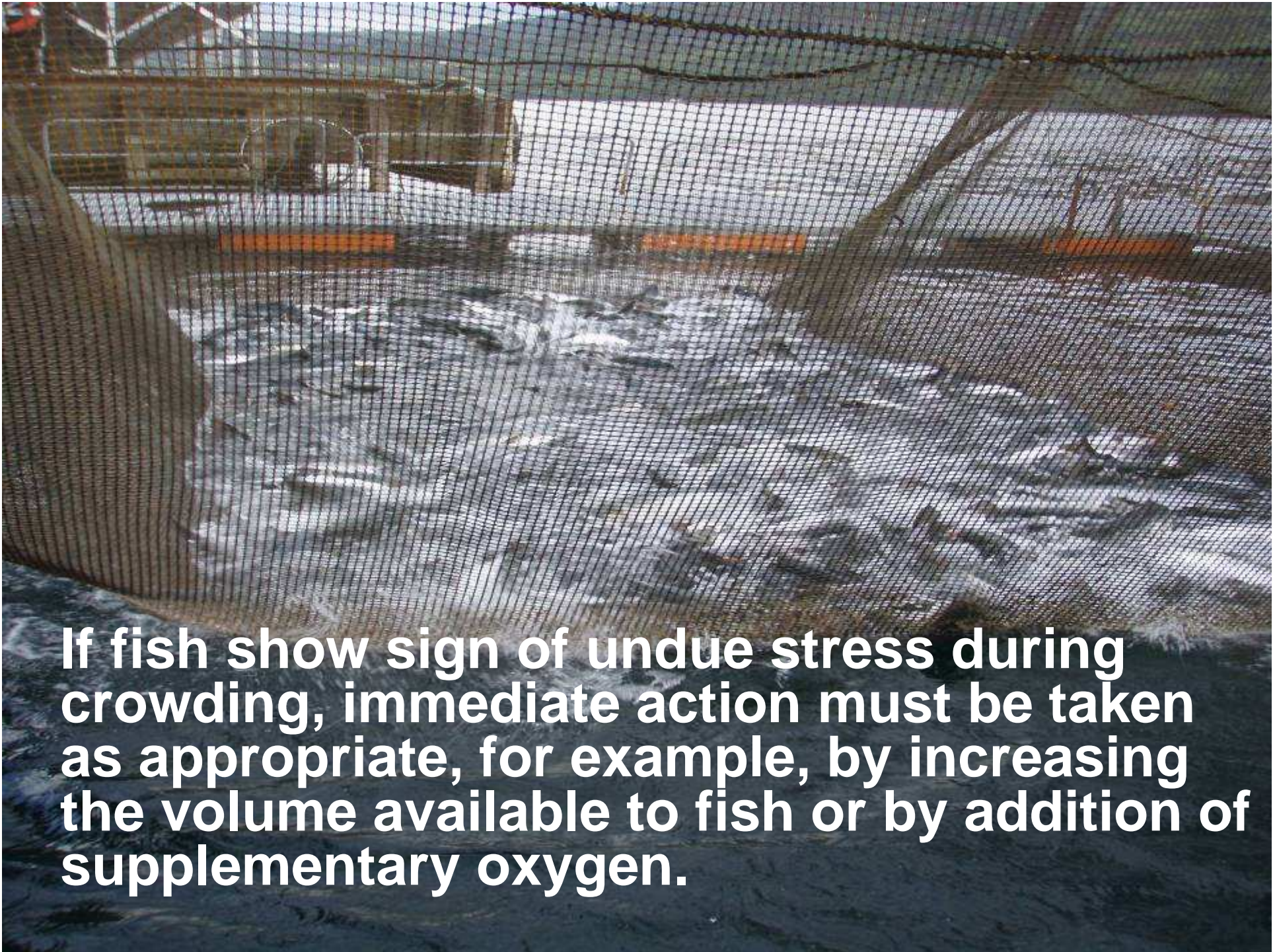




**The period in which fish are kept crowded should be as short as possible.**







**If fish show sign of undue stress during crowding, immediate action must be taken as appropriate, for example, by increasing the volume available to fish or by addition of supplementary oxygen.**



# Article 6

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2. New methods of husbandry, and new design of equipment and enclosures for fish should be **comprehensively and objectively tested** from the point of view of fish welfare, including health and when tests are undertaken, **shall not be put into commercial use unless found to be satisfactory**, in accordance with a procedure laid down by the competent authority.



**Percussive stunning machine**



**Sea cage**



**Electrical stunning**



**Water treatment**

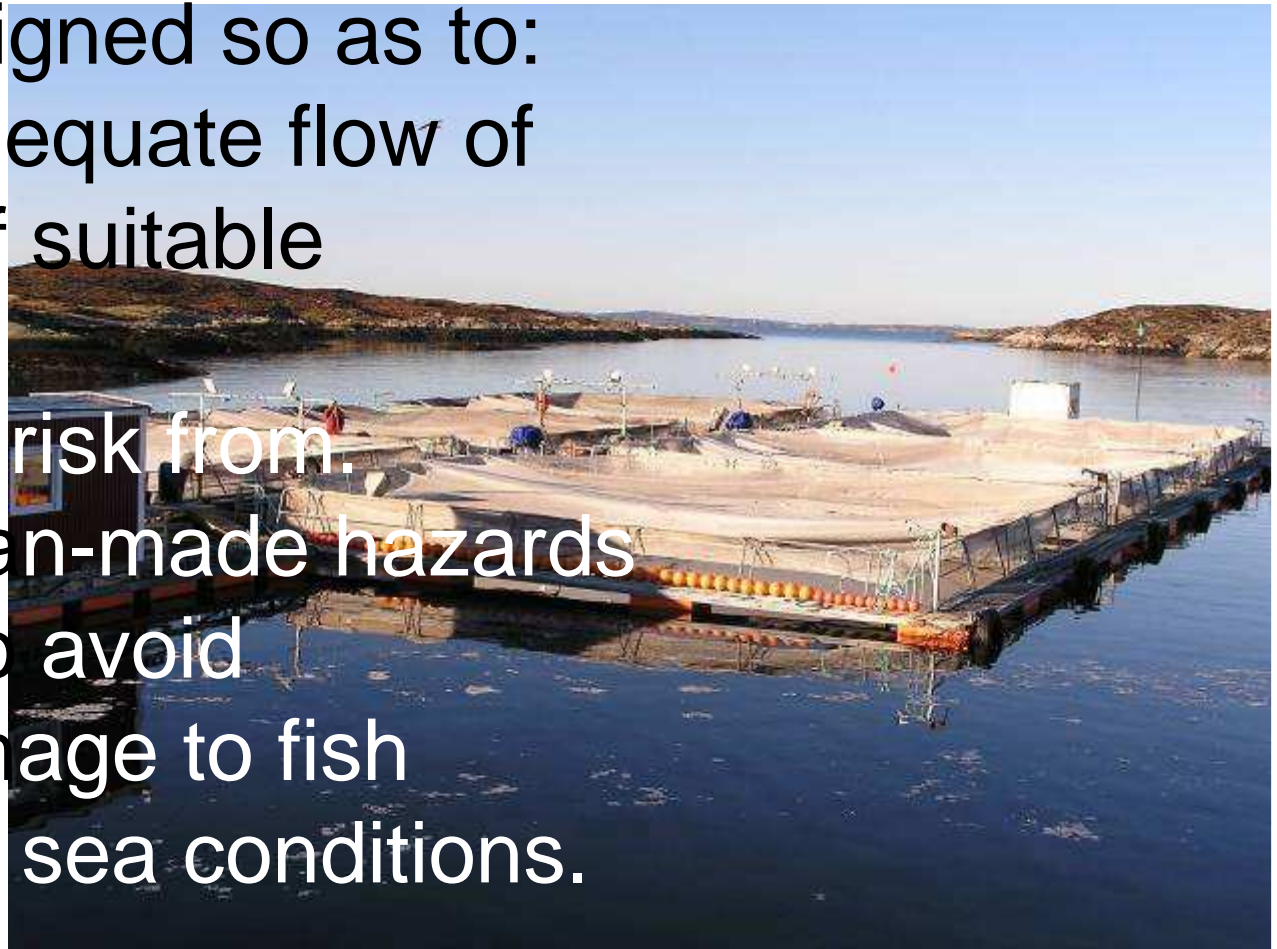


a suitable environment



# Article 7

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2. sites shall be carefully chosen or designed so as to:
- ensure an adequate flow of clean water, of suitable quality,....;
  - minimise the risk from natural and man-made hazards
3. ... also ... to avoid excessive damage to fish under adverse sea conditions.





# Water quality

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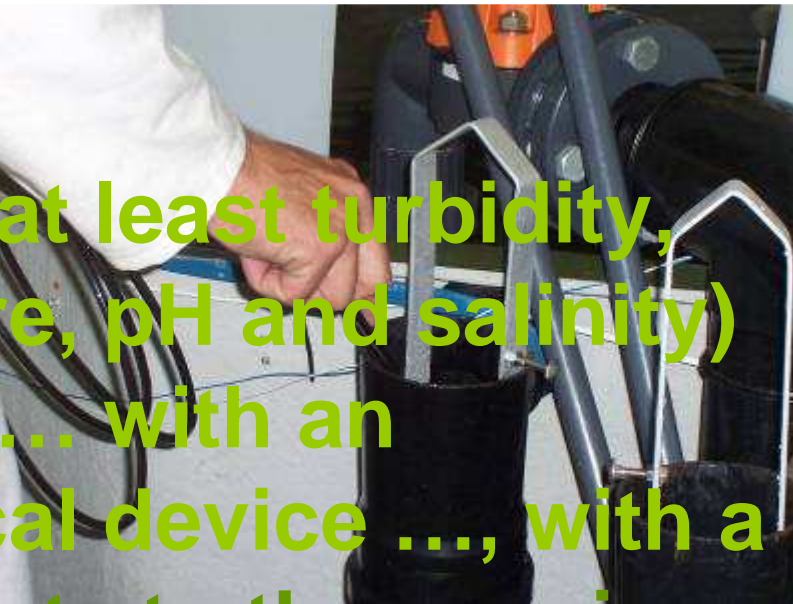
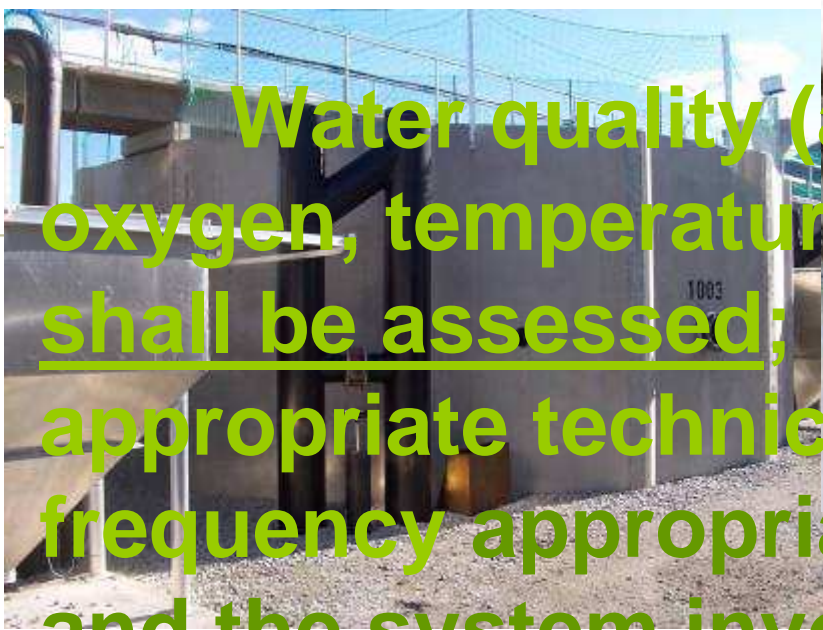
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## Article 12

1. The parameters affecting water quality, such as oxygen, ammonia, CO<sub>2</sub>, pH, temperature, salinity and water flow, are interrelated. ... affect the welfare of fish.

Water quality parameters **shall at all times be within the acceptable range** that sustains normal activity and physiology for a given species ...

Water quality (at least turbidity, oxygen, temperature, pH and salinity) shall be assessed; ... with an appropriate technical device ..., with a frequency appropriate to the species and the system involved in order to avoid poor welfare, including health in fish.





# Water quality (continued)

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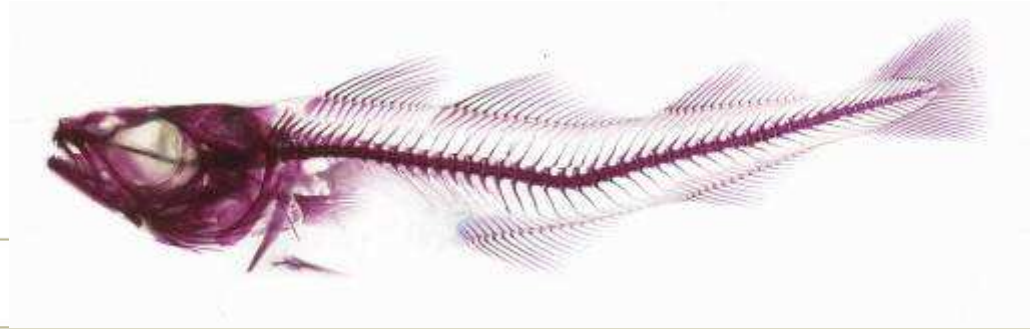
Water quality parameters shall also take into account the fact that the **requirements** of individual species may **vary between different life-stages** e.g. larvae, juveniles, adults or according to physiological status e.g. metamorphosis or spawning.

Species-specific water quality parameters are provided in the Appendices.

<b>Parameter</b>	<b>Value</b>
pH inlet water	6.2 – 6.8
Oxygen saturation in tank	Maximum 100%
Oxygen saturation (exit water)	> 80%
Carbon dioxide	< 15 mg/l
Total organic material	< 10 mg/l
Aluminium (labile)	< 5 microgram/litre
Aluminium (gills)	< 20 microgram per gram gill
Nitrite (freshwater)	< 0,1 mg/l
Nitrite (saltwater)	< 0,5 mg/l
Total ammonia	< 2 mg/l



# Water quality – deformities



- oxygen super saturation, too low a water flow, high production intensity: All these factors are of importance in the development of spinal deformities
- water temperature was increased during hatching and early development



Photo: Grete Bæverfjord



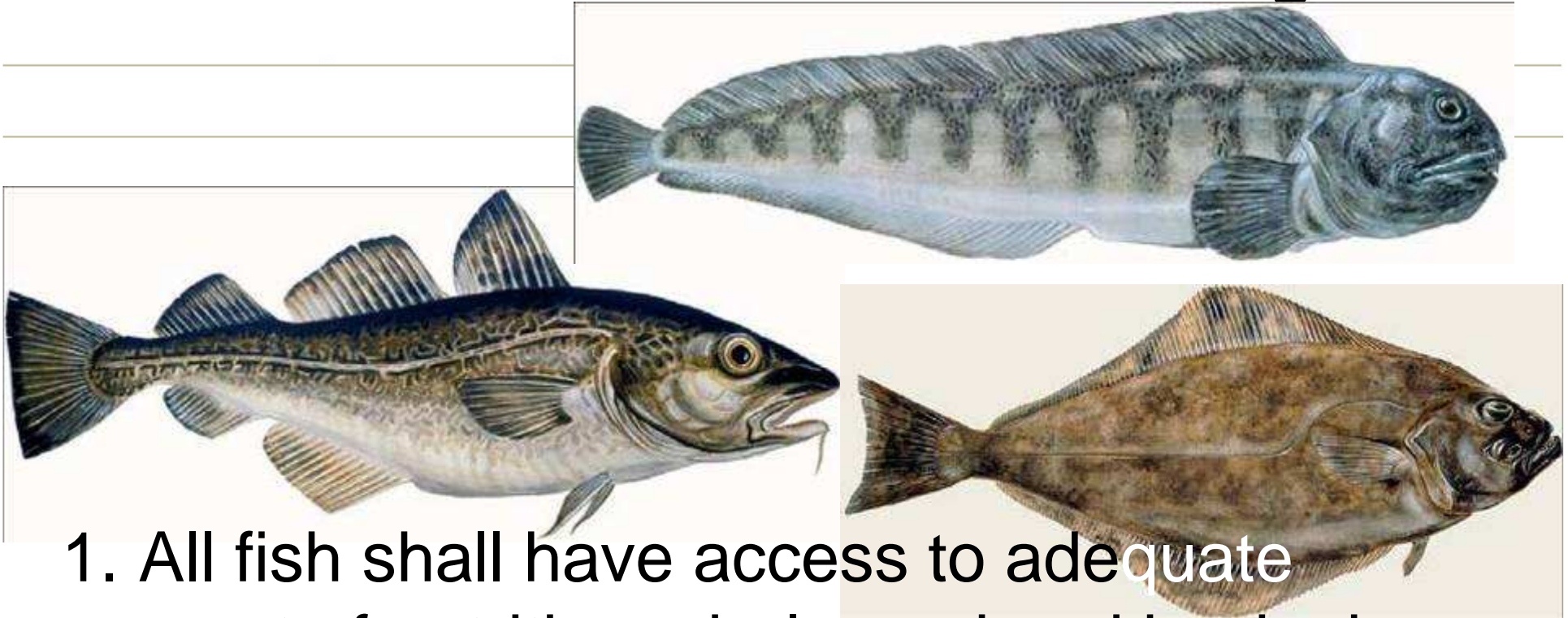
# Water quality - disease

- oxygen super saturation, too little water, high production intensity  $\Rightarrow$  greater risk for disease outbreak e.g. Infectious Pancreatic Necrosis (IPN)





a **diet** to maintain full health and vigour



1. All fish shall have access to adequate amount of nutritious, balanced and hygienic feed according to their physiological needs. Feed should be distributed in a way which precludes excessive competition between fish.



## Cataract:

Ban on use of blood from other animals in feed

⇒ deficiency of the amino acid histidine

⇒ impairment of vision or blindness

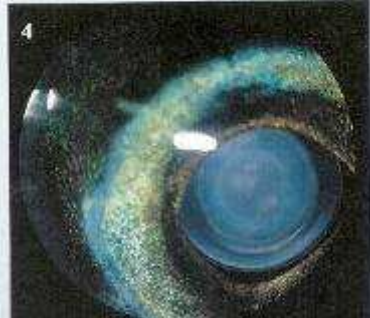
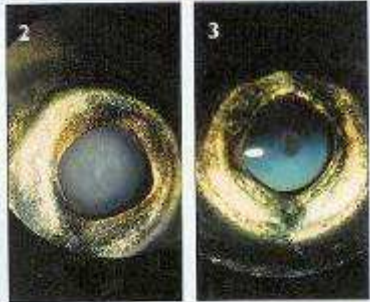


Photo:  
Ellen Bjerås

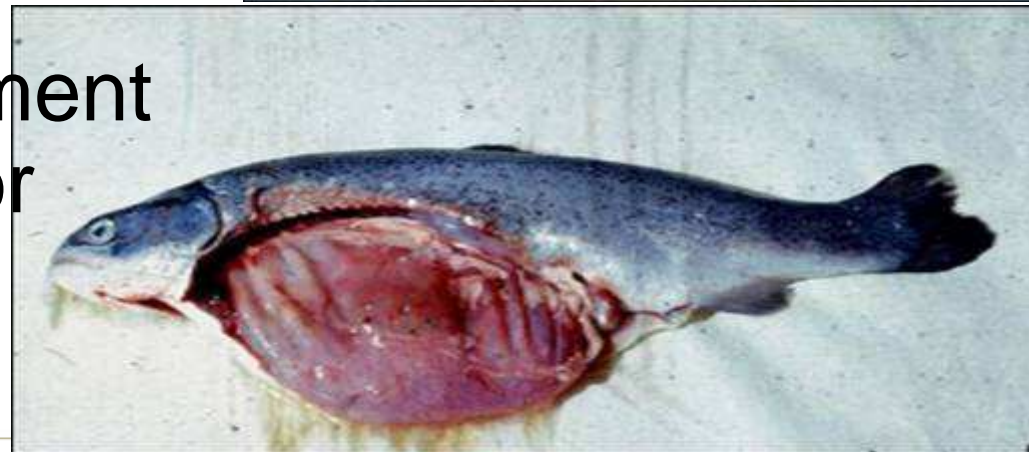
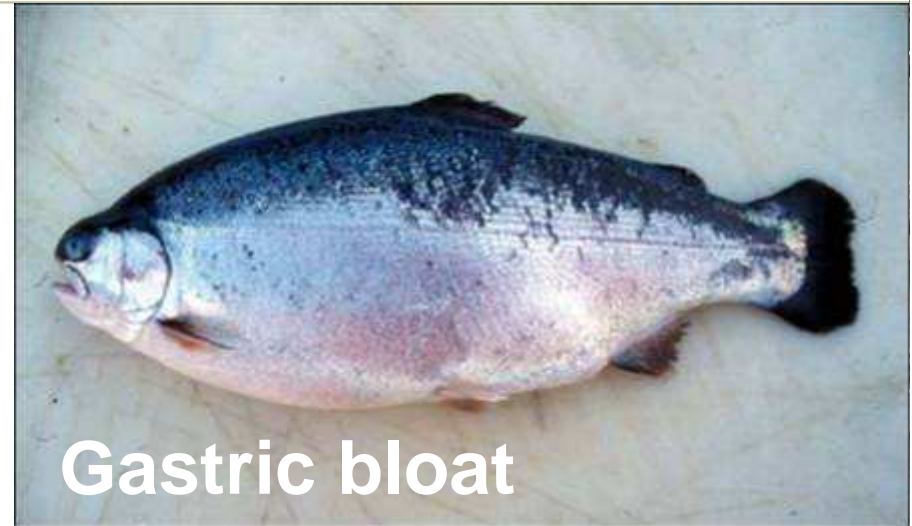


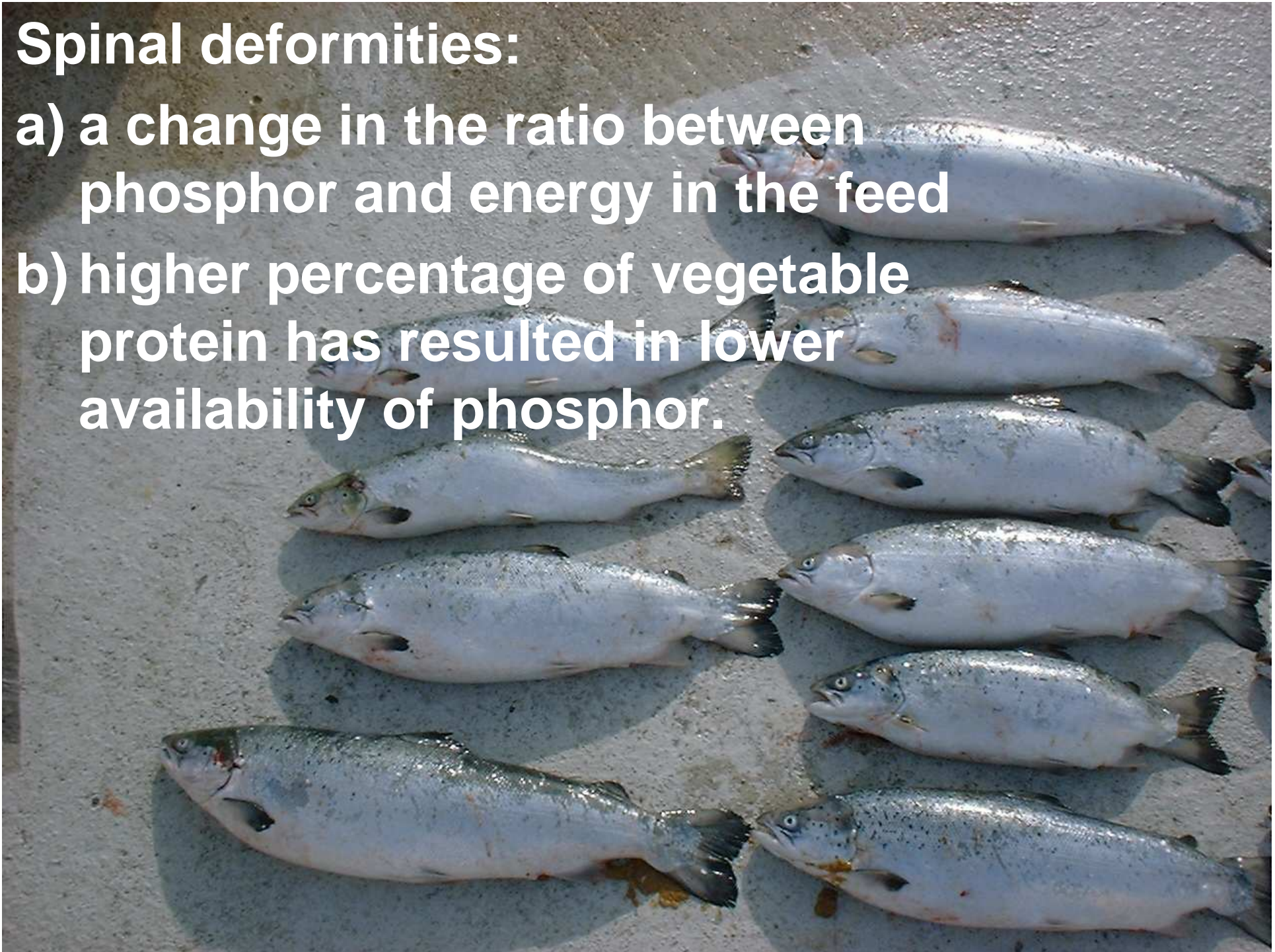
Photo: Anne Marie Bakke

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## **Spinal deformities:**

- a) a change in the ratio between phosphor and energy in the feed**
- b) higher percentage of vegetable protein has resulted in lower availability of phosphor.**







**b. Long lasting stressful events, poor water and feed quality, and behavioural problems, may result in immunosuppression and disturbance of reproduction and growth.**





**Thank you**