Friend of the Sea Standard

FOS-Aqua – *Acipenser transmontanus* – Fish Welfare Standard for the certification of White sturgeon in aquaculture

www.friendofthesea.org

REV	DATE	REASON	APPROVED	RATIFIED
1	05/11/2021	New standard	Friend of the Sea Technical Committee	Friend of the Sea Board of Directors

Foreword

Friend of the Sea is a non-governmental organisation established in 2008. Its objective is to safeguard the marine environment and its resources, encouraging a market and implementing specific conservation projects.

The Friend of the Sea certification program allows for the assessment of fisheries and aquaculture products according to criteria and requirements. The certification, granted following an audit by independent certification bodies, ensures that a product complies with the requirements.

Requirements are classified as Essential, Important, or Recommendations, according to their level of importance.

Essential Requirements: The unit of certification shall be 100% compliant with essential requirements to be recommended for certification by the Certification Body (CB). Failure to comply with essential requirements is a major non-conformity. To achieve certification, corrective actions shall be implemented within three months from the date of assessment of non-conformities. The unit of certification shall provide the CB with satisfactory evidence of correction of all major non-conformities, if necessary, with additional audits.

Important Requirements: Failure to comply with important requirements is a minor non-conformity. To achieve certification, the unit of certification shall first propose a corrective action plan within a maximum of three weeks from the date of assessment of the non-conformities, to the satisfaction of the CB. In the proposal, the unit of certification shall include the timeframe for implementation of each corrective action, considering that all minor non-conformities must be closed before the surveillance audit. The proposal shall be analysed by the CB for consistency and feasibility. If accepted, the certificate can be granted. During the surveillance audit, the unit of certification shall be able to demonstrate that all minor non-conformities reported in the approved proposal have been resolved. If the approved proposal has not been fully implemented, the certificate is suspended until any remaining minor non-conformities are resolved.

Recommendations: The unit of certification does not need to comply with recommendations to achieve certification. Nonetheless, compliance with recommendations shall be verified during the audit, and any non-conformities shall be highlighted in the audit report as a “recommendation”. During the following audit, the unit of certification shall inform the CB of any corrective measures implemented.

Requirements that are not applicable to the audited unit of certification will be marked with “N.A.”

Description of the unit of certification

This document shall only be completed by personnel of the CB in charge of the audit. It shall be completed in English, where possible.

a) NAME OF THE UNIT OF CERTIFICATION TO BE AUDITED:
b) NAME OF THE UNIT OF CERTIFICATION THAT REQUESTED THE AUDIT:
c) IS THE UNIT OF CERTIFICATION TO BE AUDITED PART OF A GROUP?
d) ADDRESS OF THE UNIT OF CERTIFICATION TO BE AUDITED:
e) NAME AND CONTACTS OF THE PERSON RESPONSIBLE FOR THE UNIT OF CERTIFICATION TO BE AUDITED:
f) SITES TO BE AUDITED: *(Please list site names and locations)*

g) SITES VISITED BY THE AUDITOR:
h) DESCRIPTION OF THE AQUACULTURE SYSTEM: *(E.g.: land, bay, offshore, extensive, intensive, basin, tank, cage, nets, etc. Geographical extension, other. If available, include a map)*
i) DESCRIPTION OF BREEDING TECHNIQUES: *(Summary of breeding techniques from broodstock, to hatching, to the finished product)*

j) ACTIVITY OF THE UNIT OF CERTIFICATION TO BE AUDITED:

□ **breeding**

□ **pre-transformation**

□ **final transformation**

□ **import**

□ **export**

□ **distribution**

□ **other (description):**

k) DESCRIPTION OF THE FINAL PRODUCT:

(e.g.: fresh, frozen, canned, other)

l) BRANDS OF FINISHED PRODUCT:

(List of brands under which the product is sold. If available, include images of the brands)

m) DESCRIPTION AND LOCATION OF FREEZERS AND WAREHOUSES, IF ANY: *(For product traceability purposes)*
n) TOTAL NUMBER OF EMPLOYEES: *optional*
o) ENVIRONMENTAL CERTIFICATIONS AND AWARDS:
p) ADDITIONAL INFORMATION:

The Friend of the Sea project was introduced. If not, the Auditor shall provide a short description.

The unit of certification was informed of the opportunity, in case of approval, to use the Friend of the Sea logo on certified products.

The unit of certification has a document confirming the qualifications and roles of the staff carrying out the audit.

The duration of the audit was agreed upon.

The information included in the Preliminary Information Form (PIF) has been confirmed. In case of changes to the PIF, an updated version must be promptly provided.

<table>
<tr><td>CERTIFICATION BODY:</td><td>AUDIT TEAM:</td><td>AUDIT START AND END DATE:</td></tr>
<tr><td rowspan="2">SIGNATURE OF AUDITOR:</td><td rowspan="2">NAME OF THE PERSON IN CHARGE OF THE UNIT OF CERTIFICATION AND ACCOMPANYING THE AUDITOR DURING THE AUDIT:</td><td>AUDIT CODE:</td></tr>
<tr><td>TYPE OF AUDIT:</td></tr>
</table>

NOTES TO THE AUDITOR

1) The Auditor shall fill out all fields in the checklist.
2) The Auditor shall provide an explanation when requirements are not applicable.
3) The Auditor shall write YES when the unit of certification complies with a requirement and NO when it does not.
4) The Auditor shall comment and explain the positive or negative answers. Simple "YES," "NO," or "N.A." are insufficient.
5) Each relevant document shall be added to the final Audit Report in a separate and numbered attachment.
6) Photographic explanations added to the checklist or attached are appreciated.
7) This checklist is divided into two main sections: Hatchery and On-growing. If the checklist must be applied to only one of the two sections, the auditor must specify this in section p), ADDITIONAL INFORMATION.

HATCHERY REQUIREMENTS

1 – CAPTIVE ENVIRONMENT

No.	Requirement	Level	Parameters and information	Y/N	Comments
1.1	Production units should provide horizontal and vertical withdrawal space, optimizing fish welfare conditions regarding spatial constraints.	Important	There must always be horizontal and vertical empty space.		
1.2	Production units must not have sharp protrusions which may be injurious to the larvae and young.	Important	Absence of dangerous protrusions.		
1.3	Back-up power generators must exist, must be functional, and must be ready to support essential equipment in case of a power failure. Generators should be tested and maintained weekly.	Important	Records and documents relating to generator tests.		
1.4	Production units and equipment must be checked for holes, faults, and fouling. All equipment must be maintained regularly.	Important	Good overall condition of tanks and equipment. e.g., hand nets.		
1.5	Optimal photoperiod for fish welfare must be determined on a site-by-site basis using practical experience, research, and welfare specialist advice. Maximum range: 6:18 to 18:6 L:D.	Important	Facility allocated within the natural photoperiod and geographical range of the species.		
1.6	Additional lighting, either fixed or portable, must be available, but should only be switched on to allow examination of the animals and equipment.	Important	Stock inspection at all times.		

1.7	Any pest control substances or equipment must be enclosed in a secure location, so there is no risk of water contamination or accidental access by non-target species.	Important	There must be a system of regular documented monitoring of these bait points and recording results.		
1.8	Structural enrichment should be provided (*e.g.* gravel substrate 1.2-1.9 cm ø), but sand must be avoided. If deemed impossible or harmful, another type of enrichment should be implemented (occupational, dietary, social, sensorial).	Recommended	Presence of enrichment – refer to Section 1.2 Captive Environment.		
1.9	The tanks should be located in a site protected from human-induced noise. No loud noises are permitted in the vicinity of the tanks or raceways: air compressors, loading docks, air guns, machinery, etc.	Recommended	Absence of noise, recorded with a hydrophone and analysed with appropriate software.		

2 – WATER

No.	**Requirement**	**Level**	**Parameters and information**	**Y/N**	**Comments**
2.1	A contingency plan must exist to correct water quality parameters when they deviate from reference values.	Important	Water transparency, absence of foam, food, or other items on the surface or in suspension, and overall good water quality.		
2.2	Temperature should be verifiable at all times and must be below 20°C, preferably 14-17 °C.	Important	Regular records of temperature.		

3 – ANIMAL HEALTH AND ANIMAL WELFARE

No.	Requirement	Level	Parameters and information	Y/N	Comments
3.1	Each site must either employ a qualified fish veterinarian or have access to one.	Important	Records, documents, contracts.		
3.2	Each site must either employ a qualified fish welfare specialist or have access to one regularly.	Important	Records, documents.		
3.3	All sites must have a documented fish health and welfare plan.	Important	Records, documents.		
3.4	The documented fish health and welfare plan must be reviewed on at least an annual basis by an experienced fish veterinary and welfare specialist.	Important	Records, documents.		

4 – FEEDING

No.	Requirement	Level	Parameters and information	Y/N	Comments
4.1	The farm must implement a system that ensures appropriate feed logistics (storage, transport, distribution, traceability), records, and a contingency plan.	Important	Records, documents.		

4.2	The farm must ensure that feeding regimes are in accordance with the manufacturer's guidelines, the farmer's experience, and fish feeding behaviour. Adjustments to feeding regimes should be based on fish behaviour, appetite, expected biomass, and minimisation of feed waste.	Important	Records, documents.		
4.3	Feed must be dispensed and spread throughout the rearing space to minimise the risk of over- and under-feeding and to reduce feeding competition.	Important	Records, feeding technique, and protocol.		
4.4	Fish must be observed at least once per day during feeding, and feeding behaviour should be registered. Records must be available for inspection.	Important	Records, documents.		

5 – HANDLING AND MANIPULATION PROCEDURES

No.	Requirement	Level	Parameters and information	Y/N	Comments
5.1	Fish must be protected at all times from avoidable injuries, pain, and stress. Farm operators must be able to demonstrate awareness at inspection.	Important	Records, documents, Standard Operational Procedures (SOPs), on-site observation, and training.		
5.2	Cleaning and maintenance operations must be carried out with minimal impact on fish welfare and health.	Important	Records, documents, on-site observation, and training.		

5.3	Live fish must only be removed from water and handled when absolutely necessary. The maximum emersion time without anesthesia is 15 seconds.	Important	Records, documents, on-site observation, and training.		
5.4	When fish are handled, adequate support must be given to the body: live fish should never be held by the gills, tail only, and/or thrown.	Important	Records, documents, videos, or on-site observation.		
5.5	Handling nets must be of a suitable size and ideally knotless. They must be kept clean, disinfected after each use, and replaced when damaged. Their design must not risk injuring the fish. In case equipment other than nets is used, it must be in good condition and without protrusions.	Important	Net design, size, and condition.		

6 – VACCINATION

No.	Requirement	Level	Parameters and information	Y/N	Comments
6.1	The use of vaccines is encouraged for the prevention of disease, rather than relying on treatment.	Important	Records, documents, Standard Operational Procedures (SOPs), and on-site observation.		
6.2	All vaccination procedures must be conducted with care and with the minimum possible distress caused to the fish.	Important	Records, documents, Standard Operational Procedures (SOPs), and on-site observation.		

6.3	All fish must be sedated before being injected, unless there are clear health and welfare reasons not to.	Important	Records, documents, on-site observation.		
6.4	Vaccines and anesthetics must be used according to the manufacturer's data sheet, unless otherwise specified by a vet. Vaccine use must be recorded in the Veterinary Health and Welfare Plan.	Important	Records, documents, on-site observation.		
6.5	There must be backup systems and contingency plans in place to deal with vaccination system malfunctions and breakdowns in order to safeguard fish welfare.	Important	Records, documents.		

7 – GRADING

No.	Requirement	Level	Parameters and information	Y/N	Comments
7.1	Grading must be minimised and only be performed when absolutely necessary, e.g., before vaccination, to avoid cannibalism, or before slaughtering.	Important	Records, documents, Standard Operational Procedures (SOPs), and on-site observation. (grading		
7.2	All grading equipment must be designed and maintained in order to prevent damage or cause stress to the fish (e.g., absence of protrusions to avoid injuries; fish should be kept submerged at all times).	Important	Records, documents, on-site observation. (grading system).		
7.3	A written protocol/working procedure for grading must be in place and carried out at all times.	Important	Records, Standard Operational Procedures (SOPs), and documents.		

7.4	Fish must be monitored throughout the operation by a designated person who is responsible for identifying welfare issues and taking appropriate action if necessary.	Important	Records, documents.		

8 – TRANSPORTATION

No.	Requirement	Level	Parameters and information	Y/N	Comments
8.1	Transport must be planned in order to minimise possible adverse effects on fish welfare. Transport on land: max. 8 h.	Important	Records, documents.		
8.2	Water quality parameters (oxygenation, ammonia levels, pH, temperature) must be monitored during transport and match the arrival tanks. A surface skimmer must be present in all transport containers.	Important	Records, documents.		
8.3	Biosecurity and fish welfare should be considered before transporting fish populations.	Important	Records, documents.		
8.4	All equipment that the fish rely on for life support must be constantly monitored throughout the journey. The absence of protrusions (to avoid injuries) in the equipment is requested.	Important	Records, documents, on-site observation.		
8.5	Water quality parameters must always comply with those described in the requirement FOS Aqua-inland rev 3 (requirements 8.1.1 to 8.1.11) and FOS Aqua Inland-Marine Rev. 4 (requirements 8.1.1 to 8.1.7).	Important	Records, documents.		

8.6	Supplementary oxygen or air supply must be sufficient to last 50% longer than the anticipated length of the journey (see Section 8.1 Transportation).	Important	Records, documents.		
8.7	Excessive or rapid changes in water temperature or pH during transport must be avoided, unless there are clear health and welfare reasons to do so.	Important	Records, documents.		
8.8	Any fish that die during transportation must be separated from live fish as soon as possible after arrival. The cause of death must be determined by a competent person.	Important	Records, documents.		
8.9	Records of any deaths or injuries that occur during transportation must be kept.	Important	Records, documents.		
8.10	Contingency plans must exist for all frequent transport problems.	Important	Records, documents.		

8.11	Starvation before transport should not be longer than 50 degree-days and preferably just enough to achieve gut clearance (see Section 9 Starvation).	Important	Records, documents.		

9 – STARVATION

No.	Requirement	Level	Parameters and information	Y/N	Comments
9.1	Starvation periods must be justified.	Important	Records, documents.		
9.2	The period during which fish are deprived of food to achieve gut clearance prior to certain procedures, or harvesting must be appropriate and as short as possible. Unless justified, it must always be < 50 degree days.	Important	Records, documents, on-site observation.		
9.3	Feed withdrawal may form part of the response to the onset of adverse environmental conditions and in the treatment of certain diseases. Veterinary and welfare specialist advice should be sought and appropriate feed withdrawal protocols should be included if deviation periods from above.	Important	Records, documents.		

10 – CROWDING

No.	Requirement	Level	Parameters and information	Y/N	Comments
10.1	A written procedure for fish crowding must be validated by a welfare specialist and followed every time.	Important	Standard Operational Procedures (SOPs).		
10.2	Operators must be trained in the appropriate crowding techniques.	Important	Standard Operational Procedures (SOPs).		
10.3	The frequency and duration of crowding should be kept to the minimum and clearly justified. The period for fish crowding on any occasion must not exceed 1.5 hours for grading or treatments and 2 hours for harvest.	Important	Records, Standard Operational Procedures (SOPs), videos, on-site observation.		

10.4	Operators must monitor fish behaviour during crowding and take action if fish show signs of stress or damage. Surface activity should never reach stage 4 on the crowd intensity scale.	Important	Crowd intensity scale: A simple fish behaviour scale from 1–5 may be used as a guide to managing acute stress, i.e.: 1(optimum). Importantly, no fins breaking the surface of the water. 2 (Acceptable). Fins above the water over a small part of the surface of the crowd. 3 (Undesirable). Fins and part of the fish above the water over the whole surface of the crowd. Some burrowing, gasping and vigorous activity in parts of the crowd. 4 (Unacceptable). The whole surface of the crowd vigorously burrowing, gasping and splashing. 5. Whole surface of the pen boiling with violent splashing.		

10.5	Oxygen levels during crowding must be monitored, and corrective action must be taken if levels fall below a critical point (the critical point will vary between species and with environmental factors). Critical level for White sturgeon: 4 mg/L.	Important	Records, documents, videos, on-site measurements.		

11 – CULLING

No.	Requirement	Level	Parameters and information	Y/N	Comments
11.1	Any seriously sick or injured fish, or fish found not to be recovering, must be immediately removed and humanely killed without delay.	Important	Records, documents.		
11.2	Fish must only be culled using an overdose of anesthetic.	Important	Documents and on-site observations.		
11.3	Culling of any fish must only be conducted by suitably trained and competent personnel.	Important	Documents.		

12 – WELFARE ASSESSMENT

No.	Requirement	Level	Parameters and information	Y/N	Comments
12.1	Appropriate systems for on-site or remote behavioural observations must be implemented: fixed or mobile live cameras underwater (preferred), live surface observations (if the previous is not possible), surface windows, or others. Behavioural observations should be regularly recorded during routine procedures or any other action which can cause stress or discomfort to fish, in order to identify caveats and improve protocols.	Important	Documents, videos, on-site observation of major behaviour patterns: swimming behaviour should be calm schooling, no panic reactions, no isolated individuals, no aggression, no abnormal behaviour (see points below).		
12.2	Fish must be inspected on a daily basis and dead or moribund fish should be removed, minimising handling to avoid stress to the live fish within the enclosure (see Section 11 Culling).	Important	Documents, videos, on-site observation.		
12.3	Abnormal behaviour must be investigated to identify its cause, and effective prevention strategies must be implemented to prevent recurrence.	Important	On-site observation.		

12.4	Fish should be shoaling or schooling (i.e., group swimming with polarized orientation).	Important	On-site observation.		
12.5	Aggression events should be absent in 5 consecutive mins. of observation (minimum).	Important	On-site observation.		
12.6	Abnormal, vacuum or stereotypical behaviour should be absent in 5 consecutive mins. of observation (minimum).	Important	On-site observation.		
12.7	Anticipatory behaviour must be apparent prior to feeding routines.	Important	On-site observation.		
12.8	If individual observation is possible in detail, ventilatory activity should be normal (50-70 opercular beats per min. (bpm)); hyperventilation (>90 bpm) should be absent at all times. Abnormal values must be reported to the welfare specialist.	Important	On-site observation.		
12.9	Swimming activity should be regular, without major or sudden changes.	Important	On-site observation.		

12.10	Before transfer to on-growing sites, a sample of ca. 100 fish must be examined at the point of weight sampling for the following outcomes: a) fin damage, b) opercular damage, c) eye damage, d) spine or jaw deformities, e) poor skin condition.	Important	On-site observation.		
12.11	Farmers should be aware of, and consider the use of, new technology that improves the welfare of fish.	Recommended	Evidence of conformity.		
12.12	Farmers should have access to reliable and relevant information on fish welfare.	Recommended	Evidence of conformity.		
12.13	Farmers must implement a protocol to perform routine monitoring and assessments of fish welfare status in their facilities, *i.e.*, an internal evaluation based on welfare indicators.	Important	On-site observation.		

13 – STOCKING AND MORTALITY

No.	Requirement	Level	Parameters and information	Y/N	Comments
13.1	Fish stock numbers, average weight, and total biomass must be monitored weekly. Records for monitoring and documentation must be available for inspection.	Important	Records, documents.		
13.2	Stocking density should be monitored in relation to fish health and behaviour indicators (see Section 3 Animal Health and Welfare and Section 12 Welfare Assessment). Water quality must be monitored frequently and on demand (see Aqua-inland point 8 and Section 2 Water).	Important	Records, documents.		
13.3	Mortality must be checked daily and dead fish should be removed from the water immediately. Mortality records must be available at inspection.	Important	Mortality rates should not exceed 1% of biomass per month.		
13.4	Deviation from expected mortalities (included in the Veterinary Health Plan) must be discussed with a Veterinary and a Welfare specialist.	Important	Evidence of conformity.		

13.5	Records of mortality causes must be in place per production unit. Operators must show awareness of mortality causes at inspection.	Important	Evidence of conformity.		
13.6	When unexplained mortalities exceed 0.5% per day, samples are submitted for analysis by a veterinarian.	Important	Evidence of conformity.		
13.7	Managers must: a) ensure that all staff working with stock are trained and competent in aspects of fish husbandry and welfare, relevant to their duties; b) ensure that staff working with stock must have attended a recognised fish welfare course.	Important	Evidence of conformity.		
13.8	Operators must be able to demonstrate their proficiency in procedures that have the potential to cause pain or distress, including handling, crowding and culling.	Important	Evidence of conformity.		
13.9	Stock-keepers must be able to recognise indicators of poor welfare in fish, including abnormal behaviour, physical injury and symptoms of disease.	Important	Evidence of conformity.		

14 – BROODSTOCK AND EGGS

No.	Requirement	Level	Parameters and information	Y/N	Comments
14.1	Tank sizes must be > $5m^3$ and > 1m deep, rounded or avoiding angles, and contain structural enrichment, provided that it does not hinder fish swimming activities or tank cleaning operations.	Important	Evidence of conformity.		
14.2	Environmental parameters (temperature and photoperiod) of broodstock tanks should follow the natural rhythms for overwintering.	Important	Records, documents.		
14.3	Natural spawning methods, *i.e.,* without handling or manipulation, should be implemented. In the absence of such, all handling procedures (*e.g.,* stripping) must be performed under anesthesia by a trained staff member or team.	Important	Records, documents.		
14.4	Developing eggs may be maintained in dim light or darkness to reduce mortality and must not be handled after placement for 40-45 degree days (e.g. 4 days at 10 °C).	Important	Records, documents.		

ON-GROWING REQUIREMENTS

15 – CAPTIVE ENVIRONMENT

No.	Requirement	Level	Parameters and information	Y/N	Comments
15.1	Production units should provide horizontal and vertical withdrawal space, optimising fish welfare conditions regarding spatial constraints.	Important	There must always be horizontal and vertical empty space.		
15.2	Production units must not have sharp protrusions which may be injurious to the fish.	Important	Absence of dangerous protrusions.		
15.3	Production units and equipment must be checked for holes, faults, and fouling. All equipment must be maintained regularly, and records must be ready for inspection.	Important	Good overall condition of nets and infrastructure. Records of periodicity and methods of assessment.		
15.4	Farm design should be such that inspection of all stock is possible.	Important	Water visibility, ROVs, divers, cameras, etc.		
15.5	Optimal photoperiod for fish welfare must be determined on a site-by-site basis using practical experience, research, and welfare specialist advice. Maximum range: 6:18 to 18:6 L:D.	Important	Facility allocated within the natural photoperiod and geographical range of the species.		
15.6	Production units must be of adequate depth to prevent damage from ultraviolet radiation, or shade must be provided if considered appropriate.	Important	Depth of net-pen.		

15.7	Additional lighting, either fixed or portable, must be available, but should only be switched on to allow examination of the animals and equipment.	Important	Stock inspection at all times.		
15.8	Structural enrichment should be provided. If deemed impossible or harmful, another type of enrichment should be implemented (occupational, dietary, social, sensorial).	Recommended	Presence of enrichment – refer to Section 15.2 Captive Environment.		
15.9	The tanks should be located in a site protected from human-induced noise. No loud noises are permitted in the vicinity of the tanks or raceways: air compressors, loading docks, air guns, machinery, etc.	Recommended	Absence of noise, recorded with a hydrophone and analysed with appropriate software.		

16 – WATER

No.	Requirement	Level	Parameters and information	Y/N	Comments
16.1	A contingency plan must exist to correct water quality parameters when they deviate from reference values.	Important	Water transparency, absence of foam, food, or other items on the surface or in suspension, and overall good water quality.		
16.2	Temperature should be verifiable at all times and must be below 19 °C.	Important	Regular records of temperature.		

17 – ANIMAL HEALTH AND ANIMAL WELFARE

No.	Requirement	Level	Parameters and information	Y/N	Comments
17.1	Each site must either employ a qualified fish vet or have access to one.	Important	Records, documents, contracts.		
17.2	Each site must either employ a qualified fish welfare specialist or have regular access to one.	Important	Records, documents.		
17.3	All sites must have a documented fish health and welfare plan.	Important	Records, documents.		
17.4	The documented fish health and welfare plan must be reviewed on at least an annual basis by an experienced fish veterinary and welfare specialist.	Important	Records, documents.		

18 – FEEDING

No.	Requirement	Level	Parameters and information	Y/N	Comments
18.1	The farm must implement a system that ensures appropriate feed logistics (storage, transport, distribution, traceability), records, and contingency plans.	Important	Records, documents.		

18.2	The farm must ensure that feeding regimes are carried out in accordance with the manufacturer's guidelines, the farmer's experience, and fish feeding behaviour. Adjustments to feeding regimes should be based on fish behaviour, appetite, expected biomass, and minimisation of feed waste.	Important	Records, documents.		
18.3	Feed must be dispensed and spread throughout the rearing space to minimise the risk of over- and under-feeding and to reduce feeding competition.	Important	Records, feeding technique, and protocol.		
18.4	Fish must be observed at least once per day during feeding, and feeding behaviour should be registered. Records must be available for inspection.	Important	Records, documents.		

19 – HANDLING AND MANIPULATION PROCEDURES

No.	Requirement	Level	Parameters and information	Y/N	Comments
19.1	Fish must be protected at all times from avoidable injuries, pain, and stress. Farm operators must be able to demonstrate awareness at inspection.	Important	Records, documents, Standard Operational Procedures (SOPs), on-site observation, and training.		
19.2	Cleaning and maintenance operations must be carried out with minimal impact to fish welfare and health.	Important	Records, documents, on-site observation, and training.		

19.3	Live fish must only be removed from water and handled when absolutely necessary. The maximum emersion time without anesthesia is 15 seconds.	Important	Records, documents, on-site observation, and training.		
19.4	When fish are handled, adequate support must be given to the body: live fish should never be held by the gills, tail only, and/or thrown.	Important	Records, documents, videos, on-site observation.		
19.5	Handling nets must be of a suitable size and ideally knotless. They must be kept clean, disinfected after use, and replaced when damaged. Their design must be as to not risk injuring the fish. In case equipment other than nets is used, it must be in good condition and without protrusions.	Important	Net design, size, and condition.		

20 – VACCINATION

No.	Requirement	Level	Parameters and information	Y/N	Comments
20.1	All vaccination procedures must be conducted with care and with the minimum possible distress caused to the fish.	Important	Records, documents, Standard Operational Procedures (SOPs), and on-site observation.		
20.2	All fish must be sedated before being injected, unless there are clear health and welfare reasons not to.	Important	Records, documents, on-site observation.		

20.3	Vaccines and anesthetics must be used according to the manufacturer's data sheet, unless otherwise specified by a vet. Vaccine use must be recorded in the Veterinary Health and Welfare Plan.	Important	Records, documents, on-site observation.		
20.4	There must be backup systems and contingency plans in place to deal with vaccination system malfunctions and breakdowns in order to safeguard fish welfare.	Important	Records, documents.		

21 – GRADING

No.	Requirement	Level	Parameters and information	Y/N	Comments
21.1	Grading must be minimised and only be performed when absolutely necessary, *e.g.,* before vaccination, to avoid cannibalism, or before slaughtering.	Important	Records, documents, Standard Operational Procedures (SOPs), on-site observation (grading system).		
21.2	All grading equipment must be designed and maintained in order to prevent damage or cause stress to the fish (*e.g.*, absence of protrusions to avoid injuries; fish should be kept submerged at all times).	Important	Records, documents, on-site observation (grading system).		
21.3	A written protocol/working procedure for grading must be in place and carried out at all times.	Important	Records, Standard Operational Procedures (SOPs), and documents.		
21.4	Fish must be monitored throughout the operation by a designated person who is responsible for identifying welfare issues and taking appropriate action if necessary.	Important	Records, documents.		

21.5	If passive grading is used, the size and design of the grading panel must be appropriate for the size of fish that are to be graded, and the enclosure they are contained within.	Important	Records, documents, on-site observation (grading system).		

22 – TRANSPORTATION

No.	Requirement	Level	Parameters and information	Y/N	Comments
22.1	Transport must be planned in order to minimise possible adverse effects on fish welfare. Transport on land: max. 8 h.	Important	Records, documents.		
22.2	Water quality parameters (oxygenation, ammonia levels, pH, temperature) must be monitored during transport and match the arrival tanks. A surface skimmer must be present in all transport containers.	Important	Records, documents.		
22.3	Biosecurity and fish welfare should be considered before transporting fish populations.	Important	Records, documents.		
22.4	All equipment that the fish rely on for life support must be constantly monitored throughout the journey. The absence of protrusions (to avoid injuries) in the equipment is requested.	Important	Records, documents, on-site observation.		
22.5	Water quality parameters must always comply with those described in the requirement FOS Aqua-inland rev 3 (requirements 8.1.1 to 8.1.11) and FOS Aqua Inland-Marine Rev. 4 (requirements 8.1.1 to 8.1.7).	Important	Records, documents.		

22.6	Supplementary oxygen or air supply must be sufficient to last 50% longer than the anticipated length of the journey (see Section 22.1 Transportation).	Important	Records, documents.		
22.7	Excessive or rapid changes in water temperature or pH during transport must be avoided unless there are clear health and welfare reasons to do so.	Important	Records, documents.		
22.8	Any fish that die during transportation must be separated from live fish as soon as possible after arrival. The cause of death must be determined by a competent person.	Important	Records, documents.		
22.9	Records of any deaths or injuries that occur during transportation must be kept.	Important	Records, documents.		
22.10	Contingency plans must exist for all frequent transport problems.	Important	Records, documents.		

22.11	Starvation before transport should not be longer than 50 degree-days and preferably just enough to achieve gut clearance (see Section 23 Starvation).	Important	Records, documents.		

23 – STARVATION

No.	Requirement	Level	Parameters and information	Y/N	Comments
23.1	Starvation periods must be justified.	Important	Records, documents.		
23.2	The period during which fish are deprived of food to achieve gut clearance prior to certain procedures, or harvesting must be appropriate and as short as possible. Unless justified, it must always be < 50 degree-days.	Important	Records, documents, on-site observation.		
23.3	Feed withdrawal may form part of the response to the onset of adverse environmental conditions and in the treatment of certain diseases. Veterinary and welfare specialist advice should be sought, and appropriate feed withdrawal protocols should be included if deviation periods from above.	Important	Records, documents.		

24 – CROWDING

No.	Requirement	Level	Parameters and	Y/N	Comments
24.1	A written procedure for fish crowding must be validated by a welfare specialist and followed every time.	Important	Standard Operational Procedures (SOPs).		
24.2	Operators must be trained in the appropriate crowding techniques.	Important	Standard Operational Procedures (SOPs).		
24.3	The frequency and duration of crowding should be kept to the minimum and clearly justified. The period for fish crowding on any occasion must not exceed 1.5 hours for grading or treatments and 2 hours for harvest.	Important	Records, Standard Operational Procedures (SOPs), videos, observation on site.		

24.4	Operators must monitor fish behaviour during crowding and take action if fish show signs of stress or damage. Surface activity should never reach stage 4 on the crowd intensity scale.	Important	Crowd intensity scale: A simple fish behaviour scale from 1–5 may be used as a guide to managing acute stress, i.e.: 1(optimum). Importantly, no fins breaking the surface of the water. 2 (Acceptable). Fins above the water over a small part of the surface of the crowd. 3 (Undesirable). Fins and part of the fish above the water over the whole surface of the crowd. Some burrowing, gasping and vigorous activity in parts of the crowd. 4 (Unacceptable). The whole surface of the crowd vigorously burrowing, gasping and splashing. 5. Whole surface of the pen boiling with violent splashing.		

24.5	Oxygen levels during crowding must be monitored, and corrective action must be taken if levels fall below a critical point (the critical point will vary between species and with environmental factors). Critical saturation levels for White sturgeon: 5 mg/L.	Important	Records, documents, videos, on-site measurements.		

25 – CULLING

No.	Requirement	Level	Parameters and information	Y/N	Comments
25.1	Any seriously sick or injured fish, or fish found not to be recovering, must be immediately removed and humanely killed without delay.	Important	Records, documents.		
25.2	Fish must only be culled using an overdose of anesthetic.	Important	Documents, on-site observation.		
25.3	Culling of any fish must only be conducted by suitably trained and competent personnel.	Important	Records, documents, on-site observation, and training.		

26 – WELFARE ASSESSMENT

No.	Requirement	Level	Parameters and information	Y/N	Comments
26.1	Appropriate systems for on-site or remote behavioural observations must be implemented: fixed or mobile live cameras underwater (preferred), live surface observations (if the previous is not possible), surface windows, or others. Behavioural observations should be regularly recorded during routine procedures or any other action which can cause stress or discomfort to fish, in order to identify caveats and improve protocols.	Important	Documents, videos, on-site observation of major behaviour patterns: swimming behaviour should be calm, schooling, no panic reactions, no isolated individuals, no aggression, no abnormal behaviours (see points below).		
26.2	Fish must be inspected on a daily basis and dead or moribund fish should be removed, minimising handling to avoid stress to the live fish within the enclosure (see Section 25 Culling).	Important	Documents, videos, on-site observation.		
26.3	Abnormal behaviour must be investigated to identify its cause, and effective prevention strategies must be implemented to prevent recurrence.	Important	On-site observation.		

26.4	Fish should be shoaling or schooling (*i.e.,* group swimming with polarized orientation).	Important	On-site observation.		
26.5	Aggression events should be absent in 5 consecutive mins of observation (minimum).	Important	On-site observation.		
26.6	Abnormal, vacuum, or stereotypical behaviours should be absent in 5 consecutive mins of observation (minimum).	Important	On-site observation.		
26.7	Anticipatory behaviour must appear prior to feeding routines.	Important	On-site observation.		
26.8	Swimming activity should be regular, without major or sudden changes.	Important	On-site observation.		

26.9	Before transfer to on-growing sites, a sample of ca. 100 fish must be examined at the point of weight sampling for the following outcomes: a) fin damage, b) opercular damage, c) eye damage, d) spine or jaw deformities, e) poor skin condition.	Recommended	Evidence of conformity.		
26.10	Farmers should be aware of, and consider, the use of new technology that improves the welfare of fish.	Recommended	Evidence of conformity.		
26.11	Farmers should have access to reliable and relevant information on fish welfare.	Important	On-site observation.		
26.12	Farmers must implement a protocol to perform routine monitoring and assessments of fish welfare status in their facilities, *i.e.,* an internal evaluation based on welfare indicators.	Important	On-site observation.		

27 – STOCKING AND MORTALITY

No.	Requirement	Level	Parameters and information	Y/N	Comments
27.1	Fish stock numbers, average weight, and total biomass must be monitored weekly. Records for monitoring and documentation must be available for inspection.	Important	Records, documents.		
27.2	Density of fish must be below 15 kg/m^3 for White sturgeon.	Important	Records, documents.		
27.3	Mortality must be checked daily, and dead fish should be removed from the production units. Mortality records must be available at inspection.	Important	Mortality rates should not exceed 1% of biomass per month.		
27.4	Deviation from expected mortalities (included in the Veterinary Health Plan) must be discussed with a Veterinary and a Welfare specialist.	Important	Evidence of conformity.		
27.5	Records of mortality causes must be in place per production unit. Operators must show awareness of mortality causes at inspection.	Important	Evidence of conformity.		

27.6	When unexplained mortalities exceed 0.5% per day, samples are submitted for analysis by a veterinarian.	Important	Evidence of conformity.		
27.7	Managers must: a) ensure that all staff working with stock are trained and competent in aspects of fish husbandry and welfare, relevant to their duties; b) ensure that staff working with stock must have attended a recognised fish welfare course.	Important	Evidence of conformity.		
27.8	Operators must be able to demonstrate that they received training and that they are proficient in procedures that have the potential to cause pain or distress, including handling, crowding and culling.	Important	Evidence of conformity.		
27.9	Stock-keepers must be able to recognise indicators of poor welfare in fish, including abnormal behaviour, physical injury and symptoms of disease (see Section 26 Welfare Assessment).	Important	Evidence of conformity.		

28 – HARVESTING, STUNNING AND SLAUGHTER

No.	Requirement	Level	Parameters and information	Y/N	Comments
28.1	Harvesting can only be performed using fish pumps. The dimensions of pumps and tubes must be scaled to the operation and approved by an engineer. The maximum flow rate should be 3m/s.	Important	Documents, videos, on-site observation.		
28.2	The only permitted stunning and subsequent killing methods are: a) an effectively applied percussive blow, b) electronarcosis followed by bleeding, asphyxia or other slaughter method that must be applied while the fish are unconscious, c) electrocution (*i.e.* killing by electrical current).	Important	Documents, videos, on-site observation.		
28.3	A backup system, *e.g.,* 'priest' must be available throughout the killing process.	Important	Documents, videos, on-site observation.		
28.4	Any fish that fall to the ground during the process must be humanely killed with the main or backup system.	Important	Documents, videos, on-site observation.		

28.5	External damage such as scale loss, fin erosion, predator bites, lesions resulting from aggression, handling scars, parasite lesions and deformities must be noted at slaughter or upon arrival to the processing station.	Important	Documents, videos, on-site observation.		
28.6	All staff involved with the stunning and killing process must have received full training.	Important	Documents, videos, on-site observation.		
28.7	There must be a named person responsible for fish welfare throughout the killing process. This person is responsible for harvest records, including stunning and slaughtering efficiency.	Important	Documents, videos, on-site observation.		
28.8	A written procedure for humane stunning and slaughtering of fish (see Section 28.1 – 28.4 Harvesting, stunning and slaughter) must be in place and carried out at all times.	Important	Documents, videos, on-site observation.		
28.9	Video recordings of harvesting, stunning, and slaughtering must be performed regularly (once per month or every time there is any change in protocols).	Important	Documents, videos, on-site observation.		

Further comments:

The Auditor shall also fill in the following fields:

□ **The products of the Organisation come from an aquaculture system that COMPLIES with Friend of the Sea Fish Welfare requirements**.

□ **The products of the Organisation come from an aquaculture system that DOES NOT COMPLY with Friend of the Sea Fish Welfare requirements**.

The Auditor found the following non-conformities:

MAJOR NON-CONFORMITIES (to be conformed to within 3 months)

Specify the points (e.g. Hatchery 1.1, On-growing 3.1, …)

MINOR NON-CONFORMITIES (to be reported within 3 weeks and conformed to within 1 year)

Specify the points

RECOMMENDATIONS (to be communicated within the next inspection)

Specify the points