

Order on environmental permitting and concurrent case management with regard to freshwater fish farming¹⁾

The following is laid down in pursuance of Section 7, subsection 1, Section 7a, subsections 1 and 2, Section 29, Section 35, subsection 2, Section 39, subsections 3 and 4, Section 41b, subsection 1, Section 73, subsections 1 and 2, and Section 110, subsection 3 of the Environmental Protection Act, cf. Consolidated Act No 879 of 26 June 2010, as amended by Act No 484 of 11 May 2010, Section 8, Section 22, subsection 6, Section 74c and Section 84, subsection 2 of the Water Supply Act, cf. Consolidated Act No 635 of 7 June 2010, as amended by Act No 1273 of 21 December 2011, Section 70b of the Nature Protection Act, cf. Consolidated Act No 933 of 24 September 2009, as amended by Act No 1519 of 27 December 2009, and Section 70b of the Act on watercourses, cf. Consolidated Act No 927 of 24 September 2009, as amended by Act No 1519 of 27 December 2009:

Chapter 1

Purpose, scope and definitions

§ 1. The purpose of this Order is to introduce result-based administration which has built-in incentives for the freshwater fish farming industry to use the best available techniques, and also to facilitate production expansion without increasing pollution of the aquatic environment.

Subsection 2. The Order establishes rules concerning environmental permitting and concurrent management of cases concerning freshwater fish farms pursuant to Chapter 5 of the Environmental Protection Act, decisions made pursuant to Section 20 of the Water Supply Act, decisions made pursuant to Section 65, subsection 3 (cf. Section 3) of the Nature Protection Act, and decisions made pursuant to Section 48 and Section 50 of the Act on watercourses.

Subsection 3. This Order shall apply to companies covered by list point I 202 of Annex 2 to the Order on the permitting of listed activities, including freshwater fish farms operated in accordance with the regulations governing the organic sector.

Subsection 4. The provisions in the Order on the permitting of listed activities and the Order on environmental quality requirements for aquatic areas and requirements concerning the discharge of pollutants into watercourses, lakes and the sea shall apply in connection with granting environmental permits for freshwater fish farms.

§ 2. Conditions that are more far-reaching than the provisions in this Order may be laid down by the local authority in connection with permitting and the re-evaluation of freshwater fish farm permits pursuant to Chapter 5 of the Environmental Protection Act.

§ 3. Freshwater fish farming production capacity means the increase in the weight of the fish produced at the freshwater fish farm during an operating period of one year (including dead fish).

Subsection 2. Feed quota means the quantity of feed, measured in kg, used to produce one kg of fish.

Subsection 3. Feed consumption F_{per} means the annual feed consumption that is notified to the individual company in a feed permit in accordance with the Order on freshwater fish farming.

Subsection 4. Related feed consumption means the feed consumption F_{per} (cf. subsection 3) multiplied by the constant 1.86.

Chapter 2

Concurrent permitting for freshwater fish farms, expansion or alteration of existing freshwater fish farms¹⁾

§ 4. When the local authority issues a permit concerning a freshwater fish farm pursuant to Chapter 5 of the Environmental Protection Act, the local authority shall at the same time issue a permit pursuant to Section 20 of the Water Supply Act.

Subsection 2. If the establishment, expansion or alteration of the freshwater fish farm implies that a dispensation from Section 3, (cf. Section 65, subsection 3) of the Nature Protection Act must be sought, the local authority shall also reach a decision concerning this at the same time. The same shall apply to decisions concerning permitting pursuant to Section 48, or orders pursuant to Section 50 of the Act on watercourses.

Subsection 3. In the environmental permit, the local authority shall establish a condition that the decision must be re-evaluated at least every ten years. The date for re-evaluation shall coincide with the date for renewal of the water extraction licence pursuant to Section 20 of the Water Supply Act (cf. however subsection 4).

Subsection 4. If the water extraction licence is due for renewal during the legal protection period (cf. Section 41a of the Environmental Protection Act) a condition shall be established as part of the permit pursuant to Section 20 of the Water Supply Act, which states that the permit shall expire at the same time as permitting pursuant to Chapter 5 of the Environmental Protection Act is due for re-evaluation.

Concurrent re-evaluation, etc. of freshwater fish farms

§ 5. The local authority shall regularly and at least every ten years re-evaluate permits for freshwater fish farms issued pursuant to Chapter 5 of the Environmental Protection Act, and if necessary update the permit in the light of technological developments or new information.

Subsection 2. Concurrently with the re-evaluation, the local authority shall reach a decision concerning renewal of the water extraction licence pursuant to Section 20 of the Water Supply Act.

Subsection 3. If it is of relevance in a particular case concerning a freshwater fish farm, the local authority shall concurrently with the re-evaluation reach decisions concerning possible dispensation from Section 3 (cf. Section 65 subsection 3), of the Nature Protection Act and concerning permitting pursuant to Section 48, or orders pursuant to Section 50 of the Act on watercourses.

Subsection 4. The local authority shall furthermore re-evaluate permits for a freshwater fish farm pursuant to Chapter 5 of the Environmental Protection Act when the water extraction licence pursuant to Section 20 of the Water Supply Act is due for renewal, unless the renewal takes place during the legal protection period (cf. Section 41a of the Environmental Protection Act).

Subsection 5. The local authority shall announce orders on the basis of re-evaluations (cf. Section 41 of the Environmental Protection Act) and decisions concerning other legislation that is referred to in subsections 2-3 concurrently.

Chapter 3

Discharge control

§ 6. An application for permitting of an expansion or alteration pursuant to Chapter 5 of the Environmental Protection Act based on discharge control shall demonstrate that design and operation are in accordance with the requirements specified in Annex 1 and Annexes 4-8 (cf. however subsection 2).

Subsection 2. An application for the establishment, expansion or alteration which is based on design and operation other than as described in Annex 1 shall demonstrate that at least an equivalent degree of purification (cf. Annex 2) can be achieved with a different design of purification measures at the freshwater fish farm. It shall also be demonstrated that environmental quality requirements in accordance with the Order on environmental quality requirements for aquatic areas and requirements concerning the discharge of pollutants into watercourses can be met through the establishment of a retention pond system.

§ 7. In an application for a permit pursuant to Chapter 5 of the Environmental Protection Act, freshwater fish farms wishing to switch from regulation based on feed consumption to regulation based on discharge control shall demonstrate that the polluter requirements can be met and the capacity for cleaning measures in Annex 2 can be provided.

§ 8. The local authority shall use Annexes 1-2 and 4-8 as a basis in connection with the granting of a permit pursuant to Chapter 5 of the Environmental Protection Act in respect of freshwater fish farms subject to discharge control (cf. however subsection 2 and Section 9, subsection 5).

Subsection 2. The local authority may grant dispensation from requirements concerning design (cf. Annex 1) which have the aim of ensuring, through retention time, compliance with environmental quality requirements for medicines and water treatment chemicals in watercourses, lakes and the sea, if the applicant has demonstrated that environmental quality requirements can be met through the establishment of a retention pond system.

§ 9. In addition to the conditions that follow from Section 14 of the Order on the permitting of listed activities, the local authority shall, as part of the permit issued pursuant to Chapter 5 of the Environmental Protection Act, establish conditions concerning:

- 1) The design and operation of the freshwater fish farm in accordance with the requirements specified in Annex 1, or conditions which ensure a corresponding degree of purification through a different design of purification measures at the freshwater fish farm.
- 2) The maximum permissible annual and daily discharge of nutrients and organic matter (cf. Annex 2) and the maximum permissible water consumption (cf. Annex 1).
- 3) Use and composition of feed in accordance with Annex 5.
- 4) Daily collection of dead fish, including storage and appropriate disposal thereof to a destruction or incineration facility.
- 5) The operating record's content, etc. (cf. Annex 6).
- 6) BAT standard requirements, minimum requirements for the oxygen saturation in discharges, and requirements concerning maximum discharges per day of medicines and water treatment chemicals (cf. the Order on environmental quality requirements for aquatic areas and requirements concerning the discharge of pollutants into watercourses, lakes and the sea, and Annexes 7 and 8).
- 7) Treatment plants shall be designed for the water quantities that are discharged. Water that is not used in connection with the operation of the freshwater fish farm shall be discharged via the weir. If there are fish ladders or similar, the unused water should preferably be discharged through such facilities.

Subsection 2. If the application concerns a freshwater fish farm that wishes to switch from regulation based on feed consumption to regulation based on discharge control, the conditions in accordance with subsection 1(2) shall be established in accordance with Annexes 1 and 2.

Subsection 3. As part of the permit pursuant to Chapter 5 of the Environmental Protection Act, the local authority shall, in addition to the conditions that follow from Section 14, subsection 1(4) of the Order on the permitting of listed activities, establish self-regulation conditions according to which:

- 1) sampling and self-regulation shall be in accordance with Annex 4,

- 2) water flow rates must be continually measured for both the total water intake and the total water outflow of the freshwater fish farm (cf. Annex 1),
- 3) the supplementary information referred to in Annex 4, point 2, concerning sampling shall be entered in the operating record,
- 4) the samples must be extracted (cf. Annex 4, point 1) and analysed for the parameters referred to in Annex 4 by an accredited laboratory, and
- 5) the local authority shall receive the sample results and the supplementary information no later than four weeks after the samples are taken.

Subsection 4. In addition to the conditions in subsection 4, the local authority shall establish the following conditions concerning the quantity of self-regulation samples:

- 1) During an operating period of one year (365 days +/- 15 days), 26 sets of samples shall be taken from the total discharge water, in addition to 26 sets of samples from the total water intake which supplies the freshwater fish farm with water. Providing the freshwater fish farm exclusively uses a water intake from drainage or groundwater and the concentrations in the inlet water samples that have been taken are stable, the number of samples may be reduced to 12 samples after a period of one year.

- 2) The sampling shall be distributed evenly over the operating period. In the case of 26 samples, two to three samples shall be taken per month, while in the case of 12 samples, one sample per month shall be taken.

Subsection 5. The local authority may replace conditions pursuant to subsections 3 and 4 with conditions that give at least the same degree of precision and statistical certainty with regard to determination of the quantities and concentrations of substances that are being received and discharged as the method in accordance with Annex 4.

§ 10. When the local authority grants a permit pursuant to Chapter 5 of the Environmental Protection Act of a freshwater fish farm which is regulated on the basis of discharge control, the local authority shall in the water extraction permit pursuant to Chapter 4 of the Water Supply Act establish conditions which require:

- 1) the water to be pumped into the freshwater fish farm and
- 2) drainage or groundwater to be extracted (cf. however subsections 2 and 3).

Subsection 2. Subsection 1(2) shall not apply to freshwater fish farms if the feed consumption at the time of entry into force of the Order does not exceed 230 tonnes (F_{per}) per year.

Subsection 3. Subsection 1(2) shall furthermore not apply to freshwater fish farms where the feed consumption at the time of entry into force of the Order exceeds 230 tonnes (F_{per}) per year, and local water resources render it impracticable to switch from surface water to drainage or groundwater.

Chapter 4

Regulation on the basis of feed consumption

§ 11. The local authority shall use Annexes 3-8 as a basis in connection with the granting of permits pursuant to Chapter 5 of the Environmental Protection Act in respect of freshwater fish farms that are regulated on the basis of feed consumption.

§ 12. In addition to the conditions that follow from Section 14 of the Order on the permitting of listed activities, the local authority shall, as part of the permit issued pursuant to Chapter 5 of the Environmental Protection Act, establish conditions concerning:

- 1) Maximum permissible feed consumption, F_{per} .
- 2) Operating and design requirements (cf. Annex 3).
- 3) Use and composition of feed in accordance with Annex 5.
- 4) Daily collection of dead fish, including appropriate storage and disposal thereof to a destruction or incineration facility.
- 5) The operating record's content, etc. (cf. Annex 6).
- 6) BAT standard requirements, minimum requirements for the oxygen saturation in discharges, and requirements for maximum discharges per day of medicines and water treatment chemicals (cf. the Order on environmental quality requirements for aquatic areas and requirements concerning the discharge of pollutants into watercourses, lakes and the sea, and Annexes 7 and 8).
- 7) Treatment plants shall be designed for the water quantities that are discharged. Water that is not used in connection with the operation of the freshwater fish farm shall be discharged via the weir. If there are fish ladders or similar, the unused water should preferably be discharged through such facilities.
- 8) Retention pond systems which are intended through their retention time to ensure compliance with environmental quality requirements for medicines and water treatment chemicals in watercourses, lakes and the sea.

Subsection 2. As part of the permit issued pursuant to Chapter 5 of the Environmental Protection Act, the local authority shall, in addition to the conditions that follow from Section 14, subsection 1(4) of the Order on the permitting of listed activities, establish self-regulation conditions according to which:

- 1) sampling and self-regulation shall take place in accordance with Annex 4,
- 2) water flow must be continually measured for both total water intake and the total water outflow of the freshwater fish farm (cf. Annex 3),
- 3) the supplementary information referred to in Annex 4, point 2, concerning sampling shall be entered in the operating record,

- 4) the samples must be extracted (cf. Annex 4, point 1) and analysed for the parameters referred to in Annex 4 by an accredited laboratory, and
- 5) the local authority shall receive the sample results and supplementary information no later than four weeks after the samples are taken.

Subsection 3. In addition to the conditions in subsection 2, the local authority shall establish the following conditions concerning the quantity of self-regulation samples:

- 1) During an operating period of one year (365 days +/-15 days) 12 samples shall be taken of the total water intake in addition to 12 samples from the total water outflow.
- 2) The sampling shall be distributed evenly over the operating period, with one set of samples per month.

Chapter 5

Administrative provisions

§ 13. The local authority shall carry out inspections to ensure compliance with the provisions in the Order.

Subsection 2. The local authority shall carry out at least one annual inspection of all freshwater fish farms in the municipality.

Subsection 3. At least once a year in March or April, the local authority shall assess the quality of the watercourse upstream and downstream from the freshwater fish farm. The freshwater fish farm's self-regulation (cf. Section 9, subsections 3 and 4, and Section 12, subsections 2 and 3) shall be covered by the local authority's inspections.

§ 14. Inspections and enforcement shall be subject to the regulations in Chapter 9 of the Environmental Protection Act.

§ 15. The Danish Environmental Protection Agency may amend the Order's annexes.

Chapter 6

Penalties

§ 16. Unless a higher penalty is applicable in accordance with other legislation, a penalty fine shall be imposed on those who

- 1) breach the conditions established pursuant to Sections 9, 10 and 12, or
- 2) fail to submit an application or information by the deadline established by the local authority (cf. Section 20, subsection 2).

Subsection 2. The penalty may be increased to imprisonment for up to two years if the infringement was committed intentionally or as a result of gross negligence and if, as a result of the infringement:

- 1) damage has been caused to the environment or a risk of such damage has arisen, or
- 2) an economic advantage has been obtained or is intended to be obtained for the person concerned or others, including through savings.

Subsection 3. Companies and others (legal persons) may be fined in accordance with the rules in Chapter 5 of the Criminal Code.

Chapter 7

Implementation and transitional provisions

§ 17. This Order shall enter into force on 15 February 2012.

Subsection 2. Order No 1325 of 20 November 2006 on freshwater fish farming, Order No 267 of 19 March 2010 on environmental permitting and concurrent case management with regard to freshwater fish farming and Order No 478 of 10 May 2011 on model fish farms type 3 or similar facilities are annulled (cf. however subsection 3).

Subsection 3. Notwithstanding the foregoing, Order No 1325 of 20 November 2006 on freshwater fish farming shall apply until the freshwater fish farm has obtained an environmental permit pursuant to the provisions of this Order, or until the freshwater fish farm is due for re-evaluation (cf. Section 41a and Section 41b of the Environmental Protection Act).

§ 18. Section 4, subsection 1 shall apply from 1 January 2014 for the freshwater fish farms which have not been certified pursuant to Chapter 5 of the Environmental Protection Act and which are regulated in accordance with Chapter 4 of the Order.

§ 19. On the first occasion after entry into force of the Order that an application is submitted by a freshwater fish farm for a permit pursuant to Chapter 5 of the Environmental Protection Act of an alteration or expansion of an existing freshwater fish farm, the permit that is subsequently issued shall comply with the provisions of the Order, with the exception of the provisions in Chapter 4 concerning feed quota regulation, and shall cover the entire freshwater fish farm.

Subsection 2. The provisions in this Order, with the exception of the provisions in Chapter 4 concerning feed quota regulation, shall also apply to existing freshwater fish farms that are covered by an environmental permit issued pursuant to

Chapter 5 of the Environmental Protection Act from the date on which the local authority deems it necessary to re-evaluate the permit for the freshwater fish farm (cf. Section 41a and Section 41b of the Environmental Protection Act).

§ 20. The management of pending cases in the municipality concerning the permitting of model fish farms pursuant to Chapter 5 of the Environmental Protection Act shall be completed pursuant to the previously applicable provisions in Order No 1325 of 20 November 2006 on model fish farms and Order No 478 of 10 May 2011 on model fish farms type 3 or similar facilities, unless the freshwater fish farm submits a new application pursuant to the provisions in this Order.

Subsection 2. In the case of pending cases concerning a permit for an existing freshwater fish farm not authorised pursuant to Chapter 5 of the Environmental Protection Act that wishes to be regulated on the basis of feed quotas, the freshwater fish farm shall submit a new or revised application pursuant to Chapter 4 of the Order by a fixed deadline established by the municipal authority. If the application does not include the information referred to in Annexes 3-8, the local authority shall notify the freshwater fish farm of this and give a statement of the information that is still required. At the same time, the local authority shall establish a deadline for the freshwater fish farm to submit the information.

Subsection 3. If the local authority has not received the information by the established deadline (cf. subsection 2), the local authority may rule that the uncertified part of the freshwater fish farm cease operating.

Subsection 4. No later than 2022, the local authority shall re-evaluate the freshwater fish farms that are regulated pursuant to Chapter 4 of the Order, with the aim of transferring the fish farm to regulation pursuant to Chapter 3 of the Order, (cf. however subsection 5).

Subsection 5. In the case of a freshwater fish farm for which the legal protection period (cf. Section 41a of the Environmental Protection Act) has not yet expired in 2022, the local authority shall upon expiry of the legal protection period re-evaluate the freshwater fish farm pursuant to the provisions in Chapter 3 of the Order.

Subsection 6. The management of freshwater fish farm cases within the municipality (cf. Section 20, subsection 1) shall be completed pursuant to the provisions in Chapter 2.

§ 21. The management of appeal cases concerning environmental permitting by the Environmental Board of Appeal shall be completed in accordance with the previously applicable provisions.

The Ministry of the Environment, 8 February 2012

Ida Auken

/ Michel Schilling

Annex 1

Design and operation of freshwater fish farms subject to discharge control (cf. Chapter 3)

Freshwater fish farms that are regulated on the basis of requirements concerning discharge control shall submit (cf. Section 6 and Section 7) an application for an environmental permit containing information relating to design and operation. The local authority shall establish conditions concerning design and operation as part of the environmental permit, Section 9. Dispensation from the requirements in the Annex may be granted (cf. Section 8, subsection 2).

1. Requirements concerning design, operation and purification measures

Operation and design			
Production size before write-up (F per)	0-25 tonnes feed consumption	> 25 to ≤ 230 tonnes feed consumption	> 230 tonnes feed consumption
Pond type	-	The pond shall consist of impermeable material, concrete or another material with similar properties	The pond shall consist of impermeable material, concrete or another material with similar properties
Operating conditions:			
Degree of water recirculation at facilities (min. %)	-	70 ¹⁾	95 ¹⁾
Retention time for water in production facilities/plant lagoons (min. hours)	4	2/12	18/36

Water flow meter (accuracy of 5%)	Yes - water meter	Yes - water meter	Yes - water meter
Limited consumption of the water resource (max. l/sec.)	250 per 100 tonnes related feed consumption ²⁾	75 per 100 tonnes related feed consumption	15 per 100 tonnes related feed consumption
Purification measures:			
Sludge basin	Yes	Yes	Yes
Biofilter	-	-	Yes
Facility for particle removal	Yes	Yes	Yes
Plant lagoon	-	Yes	Yes
Size of plant lagoon	-	Min. 40 m ² / tonnes related feed consumption.	Min. 25 m ² / tonnes related feed consumption.
<p>1) <i>Degree of recirculation</i> is calculated as follows: $100\% * (F_r - F_i) / F_r$ F_r = Total recirculation flow F_i = Water intake</p> <p>2) In connection with egg and fry production, the local authority may reduce the requirements concerning water consumption if necessary in order to maintain a high veterinary status.</p>			

2. Description of operation, design and purification measures:

Sludge basin

The sides and base of the sludge basin shall be made from impermeable material, so that sludge/water cannot seep out into watercourses and lakes, or seep down into the ground or groundwater. The sludge basin shall have a storage capacity equivalent to at least nine months' operation. Surplus water from the sludge basin shall be clarified before being returned to the inlet of the plant lagoon or similar purification measure with an equivalent retention time and purification effect. Between the sludge basin and plant lagoon, before the clarified sludge water is transported to the plant lagoon, one or more intermediate filters may be installed for phosphorous removal and/or nitrification and/or denitrification. The freshwater fish farmer shall be able to document the further processing of sludge through specific agreements concerning incineration, removal or similar.

Biofilters

Dimensional requirements where biofilters are mandatory: minimum 400 m² biofilter surface area per tonne of related feed consumption. With this minimum dimensioning, operating conditions shall be ensured via design and operation which ensure that the specific turnover of ammonium is maintained at a min. 0.15 g NH₄-N per m² surface area per day as an annual average. If this turnover cannot be realised, the requirement for biofilter surface area shall be increased correspondingly.

Facility for particle removal

Different types of facility for particle removal may be used.

- 1) Decentralised sedimentation zones. These shall be established in outlet channels with fish production or production channels made from concrete (raceways) and with facilities for the automatic extraction of sludge (sludge cones or equivalent). The sedimentation zones shall cover the entire width of outlet or production channels. The distance between the sedimentation zones shall be adapted so that particles are not sedimented outside the sedimentation zone. There must be no fish in the sedimentation zone. The decentralised sedimentation zones shall be emptied of sludge at least every two days. The sludge shall be transported directly to the sludge basin.
- 2) Microsieve (belt filter, drum filter or similar). The microsieve shall be installed ahead of the biological filter if one is required. The mesh size of the microsieve shall not exceed 75 µm, and the hydraulic capacity of the sieves shall not be less than the recirculation flow at the production facility. Any sludge deposits in production channels/ponds/basins shall be removed immediately.

Plant lagoon

Design requirements: The plant lagoon shall be designed as a meandering watercourse-like lagoon.

Dimensioning requirements: hydraulic load max. 0.021 litres per sec. per m² plant lagoon. The lagoon shall have a water depth of 0.5-1 metres with an average depth not exceeding 0.9 metres. After the plant lagoon, additional purification measures may be installed, which shall not be included in the requirements for water depth and average depth.

Measurement of water in inlets and outlets.

A water meter shall be installed with a logging function or equivalent instrument for measuring the water flow in all water inlets to the freshwater fish farm and all water outlets from the freshwater fish farm, so that the total water intake and water

discharge can be continuously monitored (min. measurement of water flow every 10 minutes or min. average every 10 minutes in the case of more frequent measurement).

If there is a net water loss across the facility, the water loss shall be assumed to have the same concentration as the concentration of dissolved nutrients and dissolved organic matter in the outlet water to the watercourse.

If there is a net inward seepage of water across the facility and no measurements or documentation are available which indicate otherwise, it shall be assumed that the inflowing water contains concentrations of nutrients and organic matter equivalent to the concentrations in the inlet water, if groundwater and/or drainage water is used as inlet water. If the only inlet water originates from watercourses, the concentration shall be determined on the basis of an annual analysis of groundwater/drainage water at the freshwater fish farm.

Annex 2

Calculation of maximum annual and daily discharges from freshwater fish farms subject to discharge control, Chapter 3

In an environmental permit for a freshwater fish farm which is applying (cf. Sections 6 and 7) to switch from feed quota regulation to regulation based on discharge control, conditions shall be established (cf. Section 9) in accordance with Annex 2, through converting the feed quota to a maximum annual and daily discharge of organic matter measured as modified BOD, total phosphorous, total nitrogen and ammonium nitrogen.

1. Determination of maximum annual discharge

The freshwater fish farm's net discharge (U), i.e. the discharge of a given substance (BOD, ammonium nitrogen, total N, total P) minus the content of the substance in the inlet water, shall be calculated in accordance with:

$$U = P - (R_N * P) = P * (100\% - R_N)$$

where

R_N = The fish farm's total degree of purification R_N (%) which for the various production sizes is determined as:

Production size (F_{per})	≤ 25 tonnes feed consumption Degree of purification	25 to 230 tonnes feed consumption Degree of purification	>230 tonnes feed consumption Degree of purification
R_N ammonium_N	47 %	55 %	65 %
R_N total_N	50 %	50 %	50 %
R_N total P	60 %	65 %	70 %
R_N BI ₅	60 %	75 %	85 %

P = Production contribution of NH₄-N, total N, total P and organic matter, where the production contribution is calculated as F_{per} multiplied by the standard production contribution per tonne of feed, where F_{per} is the maximum feed consumption notified pursuant to the Order on freshwater fish farming. If an environmental permit with conditions concerning a revised feed quota and other purification measures applies, these conditions shall be used as a basis for the conversion from feed quota to maximum discharge requirements.

The following standard production contribution per tonne of feed shall be used for all production sizes:

Ammonium nitrogen:	39 kg per tonne of feed
Total nitrogen:	56 kg per tonne of feed
Total phosphorous:	4.9 kg per tonne of feed
BI ₅ :	97 kg per tonne of feed

The maximum net discharge U is calculated as follows, using F_{per}

For total nitrogen, the following is used:	$U_{TN} = P_{TN} * (100\% - R_N(TN)) * 1.86$
For ammonium nitrogen, the following is used:	$U_{NH4-N} = P_{NH4-N} * (100\% - R_N(NH_4-N)) * 1.86$
For total phosphorous, the following is used:	$U_P = P_{TP} * (100\% - R_N(P)) * 1.86$
For BOD, the following is used:	$U_{BI5} = P_{BI5} * (100\% - R_N(BI_5)) * 1.86$

The maximum net discharge U_{\max} is calculated by multiplying F_{per} by the maximum discharge per tonne F_{per} , which for the various production sizes is determined as:

Production size (F_{per})	≤ 25 tonnes feed consumption	25 to 230 tonnes feed consumption	>230 tonnes feed consumption
	kg per tonne F_{per}	kg per tonne F_{per}	kg per tonne F_{per}
U_{\max} ammonium_N	38.5	32.6	25.4
U_{\max} total N	52.1	52.1	52.1
U_{\max} total P	3.7	3.2	2.7
U_{\max} BI ₅	72.2	45.1	27.1

2. Control of maximum annual discharges

In connection with the monitoring of compliance with maximum annual discharges, condition controls shall be performed for ammonium nitrogen and BI₅, along with transport controls for total nitrogen and total phosphorous; cf. Svendsen et al. (2008) Modeldambrug under forsøgsordninger. Technical final report "Måle- og dokumentationsprojektet for modeldambrug". DTU-Aqua report no. 193-08, page 206-212 and "Notat vedrørende tilpasning af udlederkrav ved overgang fra tilstandskontrol til transportkontrol" by the Danish National Environmental Research Institute (Larsen S. E. and Svendsen, L. M. 2002).

Condition controls:

As a basis for the performance of condition controls, the annual permissible maximum discharge of ammonium nitrogen and BI₅ respectively shall be divided by 365 and the permissible water discharge in order to determine the discharge thresholds U_k , which must be complied with.

The condition controls shall subsequently be performed through:

$$d_k + k_k(n) * s_k \leq U_k$$

where d_k = the average of the daily measured net concentrations in the discharge (the difference in concentrations at the outlet and the inlet for the sampling)

$k_k(n)$ = adjustment factor for condition controls for n samples. $k_k(26) = 0.5035$, $k_k(12) = 0.3586$

s_k = the spread of the n net concentrations in the discharges

U_k = discharge threshold (mg/l)

Transport controls:

As a basis for the performance of transport controls, the annual permissible maximum discharge of total nitrogen and total phosphorous respectively shall be divided by 365 in order to determine the daily discharge thresholds which must be complied with. The discharge requirement shall be adjusted upon transition from condition control to transport control as follows:

$$U_T = U_{T_k} + (k_T - k_k) * s_T$$

The transport controls shall subsequently be performed as follows:

$$d_T + k_T(n) * s_T \leq U_T$$

where

d_T = average of the net discharge on sampling days (difference in transport at outlet and transport at inlet based on measured concentrations in inlet water and water discharge and corresponding measured water volumes during the sampling day)

$k_T(n)$ = adjustment factor for transport control for n samples. $k_T(26) = -0.3352$; $k_T(12) = -0.5205$

$k_k(n)$ = adjustment factor for condition controls for n samples. $k_k(26) = 0.5035$, $k_k(12) = 0.3586$

s_T = the spread of the n net daily discharges

U_{T_k} = discharge threshold transferred directly by dividing the annual maximum permissible discharge by 365

U_T = corrected discharge threshold (kg per day)

The following standard spreads s_T shall be used when calculating the adjusted discharge requirements upon transition from condition control to discharge control (n = number of samples) if there are insufficient measurement sets (minimum of 26 in one year) to calculate spreads:

Production size (F_{per})	≤ 25 tonnes	25 to 230 tonnes	> 230 tonnes
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	n=12 and 26	n=12 and 26	n = 12 and 26
Total nitrogen	0.150	0.502	2.51
Total phosphorous	0.010	0.032	0.160

Prior to insertion in:

$$U_T = U_{Tk} + (k_T(n) - k_i(n)) * s_T$$

the above standard spread which is specified as a normalised value in relation to the water discharge is multiplied by the freshwater fish farm's permissible daily water discharge, so that s_T is inserted in the formula as kg per day. After at least one year's measurement series, the standard spread can be replaced by the measured substance discharge from the freshwater fish farm.

3. Determination of maximum daily discharge

To determine the distribution of the annual production, the following shall be determined:

– a maximum daily discharge for total nitrogen and total phosphorous (specified in kg per day)

The maximum daily discharge U_d for total nitrogen and total phosphorous must not exceed 1% of the freshwater fish farm's total annual net discharge, i.e. $U_d \leq 0.01 * U$ (U for total nitrogen and total phosphorous respectively), where U_d must not be exceeded, calculated as a moving average over seven days.

4. Determination of maximum ammonium nitrogen and organic matter concentration

Maximum concentrations in the discharges of ammonium nitrogen and organic matter are determined in order to prevent concentration levels downstream from the freshwater fish farm that are harmful to the fauna.

The maximum concentration C_{max} of ammonium nitrogen and organic matter which must never be exceeded in the discharge is determined as follows:

- During the period April - September, the concentration in the discharges must at no time be greater than:
 - $C_{max} = 4 * K_{disf} * Q_{nm}/Q_{wa}$
- During the period October - March, the concentration in the discharges must at no time be greater than:
 - $C_{max} = 6 * K_{disf} * Q_{nm}/Q_{wa}$

Where

C_{max} = maximum concentration of ammonium nitrogen or organic matter (BI_5)

K_{dis} = discharge thresholds for ammonium nitrogen (0.4 mg/l) and BI_5 (1.0 mg/l)

Q_{nm} = the medium minimum of the watercourse immediately downstream of the freshwater fish farm

Q_{wa} = relevant water discharge from the freshwater fish farm

Annex 3

Operating and design requirements for facilities subject to regulation based on feed consumption, Chapter 4

Freshwater fish farms that are regulated on the basis of requirements concerning feed consumption shall submit (cf. Section 10, subsection 2) an application for an environmental permit containing information relating to design and operation, with reference to the requirements in this Annex. The local authority shall establish conditions concerning design and operation as part of an environmental permit (cf. Section 12), with reference to the requirements in this Annex.

Operational and design requirements.

Sludge basin

The sides and base of the sludge basin shall be made from impermeable material, so that sludge/water cannot seep out into watercourses and lakes, or seep down into the ground or groundwater. The sludge basin shall have a storage capacity equivalent to at least nine months' operation. Surplus water from the sludge basin shall be transported to a treatment works.

Purification measures:

The freshwater fish farm shall be equipped with one of the purification measures described under point 1 or 2.

1. Sedimentation facility in the individual ponds.

Ponds and channels in which fish are being reared or stored shall be equipped with a sedimentation facility, as a grated area around the outlet from the individual ponds and channels. The grated area shall be dimensioned on the basis of the largest occurring water flow (including recycled water). In ponds, the sedimentation area shall be dimensioned so that the hydraulic

surface load does not exceed 10 m/hour. In the case of earth dams, the distance from the boundary to the outlet shall be at least 2 metres. In channels, the sedimentation area shall be dimensioned so that the velocity of the water in the area does not exceed 2.5 cm/sec. , and so that the retention time is at least 25 min. Notwithstanding the foregoing, the surface area of the channel shall be equivalent to at least 15% of the surface area of the channel, and the distance from the boundary to the outlet shall be at least 2.5 metres. The sedimentation area in ponds and channels shall be established in the form of a sludge sump. The base of the area shall slope towards the sludge sump and be made from impermeable material.

The facility shall furthermore fulfil the following requirements:

- 1) The outlet from the facility shall be designed as a solid threshold, so that the flushing of sludge cannot occur.
- 2) The outflow from the facility shall take place from the surface and be equipped with a foam-board or similar before the outlet.
- 3) The facility shall be equipped with a bypass pipe, bypass channel or parallel pond or facility for use when the facility is being emptied of sludge.
- 4) There shall be no fish in the facility.
- 5) During the production period, the facility's sludge sump shall regularly be emptied of sludge, so that the sludge sump never overflows. Large accumulations of sludge in the sedimentation facility shall be removed immediately. In connection with any daily emptying of the sludge sump, the surplus water may be diverted to the freshwater fish farm's channels and ponds if the sludge that is pumped has already been separated in a filter plant.
- 6) During clean-up which is not carried out through the regular pumping of sludge from a sludge sump, the outlet shall be closed and the water shall be transported through a bypass device or parallel facility (cf. no 3). The clean-up process shall not result in sludge being discharged into watercourses, lakes or the sea. In the case of ice cover, clean-up shall only take place insofar as is possible.
- 7) At the boundary to the sedimentation facility in some of the individual fish ponds with fish, a grate shall be used to prevent fish from entering the sedimentation section.
- 8) During the production period, ponds, with the exception of self-cleaning ponds, and channels in which fish are being reared or kept shall be emptied of sludge in connection with fish removal or at intervals of more than six weeks. Large accumulations of sludge shall be removed immediately.

2. Central sedimentation facility with sludge sump.

8) During the production period, ponds, with the exception of self-cleaning ponds, and channels in which fish are being reared or kept shall be emptied of sludge in connection with fish removal or at intervals of more than six weeks. Large accumulations of sludge shall be removed immediately.

The freshwater fish farm shall be equipped with one or more central sedimentation facilities, through which all the water that has been used by the freshwater fish farm shall pass. The velocity of the water through the sedimentation facility shall not exceed 2.5 cm/sec. The retention time in the facility shall be at least 25 min.

The sedimentation facility shall be established in the form of a sludge sump in the area nearest the inlet to the facility, unless other purification measures have been established to retain sludge. The base of the area shall slope towards the sludge sump and be made from impermeable material.

Central sedimentation facilities shall furthermore fulfil the following requirements:

- 1) The outlet of the facility shall be designed as a solid threshold, so that the flushing of sludge cannot occur.
- 2) A foam-board or similar shall be installed before the outlet from the facility.
- 3) The facility shall be equipped with a bypass pipe, bypass channel or parallel facility for use when the facility is being emptied of sludge.
- 4) There shall be no fish in the facility.
- 5) During the production period, the facility's sludge sump shall regularly be emptied of sludge, so that the sludge sump never overflows. The surplus water may be diverted to the freshwater fish farm's ponds, channels and sedimentation facility if the sludge that is pumped has already been separated in a filter plant.
- 6) The facility shall be cleaned at least once a month during the production period. Large accumulations of sludge shall be removed immediately. The cleaning process shall not result in sludge being discharged into watercourses, lakes or the sea. In the case of ice cover, clean-up shall only take place insofar as is possible.
- 7) During clean-up, the outlet shall be closed and the water shall be transported through a bypass device (cf. no 3). This shall however not apply if the sludge is removed through regular pumping from the sludge sump.

Water resource consumption, water meters and water management

The freshwater fish farm shall be operated so that use of the water resource is limited as far as possible. A maximum water consumption of 250 l/s is considered to be sufficient in relation to 100 tonnes of feed, specified as related feed consumption.

2) In connection with egg and fry production, the local authority may adapt the requirements for water consumption if necessary in order to maintain a high veterinary status.

A water meter (with an accuracy of 5%) shall be installed with a logging function or equivalent instrument for measuring the water flow in all water inlets to the freshwater fish farm and all water outlets from the freshwater fish farm, so that the total water intake and water discharge can be continuously monitored (min. measurement of water flow every 10 minutes or min. average of every 10 minutes in the case of more frequent measurement).

Discharge thresholds for freshwater fish farms subject to a feed quota

Concentrations of the following substances in unfiltered water from the total intake and total outflow to/from the freshwater fish farm shall not be increased by more than the following values.

Ammonium_N = 0.4 mg/l * $Q_{\text{min}}/Q_{\text{wa}}$

Total N = 0.6 mg/l * $Q_{\text{min}}/Q_{\text{wa}}$

Total P = 0.05 mg/l * $Q_{\text{min}}/Q_{\text{wa}}$

BI5 = 1.0 mg/l * $Q_{\text{min}}/Q_{\text{wa}}$, where

Q_{min} = median minimum

Q_{wa} relevant water discharge from freshwater fish farm

Annex 4

Requirements concerning sampling and analysis (cf. Chapters 3 and 4)

The local authority shall establish conditions concerning sampling and analysis as part of an environmental permit granted pursuant to Section 9 in the case of fish farms subject to discharge control, and as part of an environmental permit pursuant to Section 12 in the case of fish farms regulated on the basis of feed consumption.

1. Sample collection:

Sample collection, analysis and subsequent testing shall follow the instructions in technical report no 260 from the Danish National Environmental Research Institute (1998) "Afløbskontrol af ferskvandsdambrug. Statistiske aspekter og kontrolprogrammer".

The samples shall be taken from the freshwater fish farm's inlet and outlet as pooled day-samples and analysed for the concentration of:

- 1) Organic matter measured as modified BOD (mg/l)
- 2) Total phosphorous (mg/l)
- 3) Total nitrogen (mg/l)
- 4) Ammonium nitrogen (mg/l)

The samples shall be representative and taken from fully mixed bodies of water. The suction tip shall be placed in the middle of the water flow, one-third of the water depth above the bottom.

Samples from springs or boreholes may be taken as random samples.

All analyses shall be performed in accordance with the Order on quality requirements for environmental measurements (the Analysis Quality Order).

2. Supplementary information:

In connection with each sampling series, the following information shall be given:

- a) The water flow in the freshwater fish farm's total intake (l/sec.) and a log file containing all measurements since the last sampling.
- b) The water flow in the freshwater fish farm's total outflow (l/sec.) and a log file containing all measurements since the last sampling.
- c) The water temperature (°C) at each measuring point.
- d) pH at each measuring point.
- e) Oxygen saturation (%) at each measuring point.
- f) Stock (tonnes) on the day of sampling and the preceding day.
- g) The total quantity of nitrogen and phosphorous in the feed used in production during the 48-hour period before sampling is commenced.
- h) Date of commencement and conclusion of sampling.

Annex 5

Requirements concerning the use and composition of feed (cf. Chapters 3 and 4)

The local authority shall establish conditions concerning the use and composition of feed as part of an environmental permit granted pursuant to Section 9 in the case of fish farms subject to discharge control, and as part of an environmental permit pursuant to Section 12 in the case of fish farms regulated on the basis of feed consumption.

1) With the exception of the production of fish over 1 kg (mother fish, fish for release at marine fish farms and fish for P&T etc.,), production shall be organised so that the feed quota does not exceed 0.95 on an annual basis. In other cases, a feed quota of 1.0 must not be exceeded.

2) Only dry feed that is rich in energy and easily digestible shall be used. The following requirements for feed for fish for consumption and stocked fish shall be met:

a) Net energy content.

The content of digestible energy (net energy content): The content of digestible energy (DE) in the feed shall be at least 18.2 MJoule/kg (4.35 Mcal/kg)

b) Dust content

The dust content shall not exceed 1%.

The dust content is defined as the fraction of the feed that can be sieved out using a sieve with a mesh size that is 0.25 times the width of the feed pellets

c) Nitrogen content.

The nitrogen content shall not exceed 9% of the dry weight of the feed.

d) Phosphorous content.

The phosphorous content shall not exceed 1% of the dry weight of the feed.

The requirement concerning nitrogen and phosphorous content specified under c. and d. above shall not apply to facilities that exclusively use drainage water or groundwater, that are exclusively regulated on the basis of discharge controls and have a degree of recirculation of at least 95%.

Annex 6

The content of the operating record (cf. Chapters 3 and 4)

The local authority shall establish conditions concerning the content of the operating record as part of an environmental permit (cf. Section 9), for fish farms regulated on the basis of discharge control, and as part of an environmental permit (cf. Section 12), for fish farms regulated on the basis of feed consumption.

The freshwater fish farmer shall keep an operating record which shall be summarised at least once a year. Unless agreed otherwise, the record shall be summarised as of 31 December, and the supervisory authority shall receive the results no later than 1 February during the following year. The operating record shall be presented to the supervisory authority upon request. The record shall be archived for at least five years after the conclusion.

The freshwater fish farm's operating record shall contain information on the following circumstances:

1) Current stocks of fish per month.

2) Supply of fish.

3) Disposal of fish through sale.

4) Purchase of feed with a statement of feed types. The composition of the feed shall also be documented through a product declaration or analysis results from an authorised laboratory.

5) The quantity of auxiliary substances used for water treatment, with a statement of the name and quantity of the auxiliary substance, the numbers of the ponds that have been treated, and the dates of commencement and conclusion of the treatment.

6) The quantity of medicines used to combat disease, with a statement of the name and quantity of the preparations, the numbers of the ponds that have been treated, and the dates of commencement and conclusion of the treatment.

7) The time of cleaning of the channels and fish ponds, and the removal of sludge from sedimentation facilities. The quantity of sludge treated shall be estimated.

8) Time of clean-up of sludge basin. The quantity of sludge treated shall be estimated.

9) Disposal of dead fish with a statement of the quantity, species and determination period. Extraordinarily large quantities shall be determined immediately.

10) Water consumption. The recording shall be carried out continuously with the aid of flow meters at inlet and outlet to an accuracy of 5%. The log file shall be available in connection with the operating record. Instantaneous and average water consumption shall always be determined at the same time as the self-regulation.

11) Return pumping. Specification of period and quantity.

12) Final disposal of sludge. The determination shall be carried out on each occasion that sludge is disposed of, with a statement of where the sludge was disposed of

13) The freshwater fish farm's self-regulation.

Annex 7

BAT standard requirements and oxygen saturation in outlet water (cf. Chapters 3 and 4)

The local authority shall establish conditions concerning BAT standard requirements and oxygen saturation as part of an environmental permit granted pursuant to Section 9 in the case of fish farms subject to discharge control, and an environmental permit granted pursuant to Section 12 in the case of fish farms regulated on the basis of feed consumption.

Production size Cf. F _{per}	Nitrogen	Phosphorous	BI _s
0 - 25 tonnes	42 kg/tonnes of fish	3.2 kg/tonnes of fish	65 kg/tonnes of fish
25 - 55 tonnes	35 kg/tonnes of fish	2.5 kg /tonnes of fish	35 kg/tonnes of fish
55 - 230 tonnes	28 kg/tonnes of fish	2.1 kg/tonnes of fish	20 kg/tonnes of fish
≥230	27 kg/tonnes of fish	1.4 kg/tonnes of fish	14 kg/tonnes of fish

BAT standard requirements are used to ensure the effective utilisation of the pollutant discharge that the local authority has granted the freshwater fish farmer concerned. If the freshwater fish farmer does not fulfil the BAT standard requirements, the local authority shall impose stricter requirements for treatment.

The BAT standards are assessed against the freshwater fish farmer's self-regulation samples over a production period of one year based on the net substance input which the freshwater fish farm contributes per tonne of produced fish.

The oxygen saturation in the outlet to the watercourse must never fall below 70% oxygen saturation, except if the discharge of water from the freshwater fish farm is less than 10% of the median minimum (Q_{min}), where the oxygen saturation must be at least 50%.

Reference is also made to the other provisions in the Order on quality requirements for aquatic areas and requirements concerning the discharge of pollutants into watercourses, lakes and the sea

Annex 8

Medicine and water treatment chemicals regulation (cf. Chapters 3 and 4)

Conditions concerning medicines and water treatment chemicals shall be established as part of an environmental permit granted pursuant to Section 9 in the case of fish farms that are regulated on the basis of discharge controls, and pursuant to Section 12 in the case of fish farms regulated on the basis of feed consumption.

In accordance with Section 15 of the Order on environmental quality requirements for aquatic areas and requirements concerning the discharge of pollutants into watercourses, lakes and the sea, conditions shall be established as part of permits through calculations to ensure that environmental quality requirements for pollutants for the aquatic area concerned can be met. The following conversion rates shall be used for these calculations.

For water treatment chemicals, the following shall apply:

Substance	Matrix	Unit	Rate
Formaldehyde	Water phase ¹⁾	Mg/l/hour	0,05
	Sediment ²⁾	Mg/m ² /h	115
	Biofilter	Mg/m ² /h	10
	Plant lagoon	Mg/m ² /h	130
Hydrogen peroxide	Water phase ¹⁾	Mg/l/hour	2,0
	Sediment ²⁾	Mg/m ² /h	1000
	Biofilter	Mg/m ² /h	100
	Plant lagoon	Mg/m ² /h	4000
Peroxyacetic acid	Water phase ¹⁾	Mg/l/h	0,25
	Sediment ²⁾	Mg/m ² /h	-
	Biofilter	Mg/m ² /h	5
	Plant lagoon	Mg/m ² /h	500

ponds, back-channels and sedimentation basins)
bottom surface area, ponds, back-channel and sedimentation basins)

There are no conversion rates for other water treatment chemicals.

For medicines, the following shall apply:

Substance	Secretion from trout (% of submitted substance quantity)	Discharge period in connection with 10 days' treatment 90% of the substance discharged
Florfenicol	61 %	21 days - peak after 10 days
Oxolinic acid	100 %	17 days - peak after 10 days
Sulphadiazine	100 %	15 days - peak after 10 days
Trimethoprim	100 %	15 days - peak after 10 days

There are no conversion rates for other medicines.

Demonstration of compliance with the applicable environmental quality requirements in the environmental permit

An overview shall be prepared of the freshwater fish farm's ponds which, with regard to water consumption, retention time and treatment concentration, can illustrate procedures for simultaneous treatment and which ponds and how many ponds can be treated simultaneously.

In the case of freshwater fish farms which as a result of their design will not achieve a retention time that is sufficient to comply with the environmental quality requirements concerning medicines and water treatment chemicals, a retention pond/tank of an appropriate size shall be established which satisfies environmental quality requirements.

BAT for water treatment chemicals:

In connection with water treatment chemicals, the freshwater fish farm shall use extended treatment and reduced water consumption insofar as is possible in order to minimise the use of water treatment chemicals.

Official notes

²³ The provisions in Annex 5, formerly Annex 2, of Order No 945 of 30 November 1995 on fish farms, which is superseded by this Order, have been notified as a draft in accordance with Directive 98/34/EC of the European Parliament and of the Council (the Information Procedure Directive), as amended by Directive 98/48/EC.