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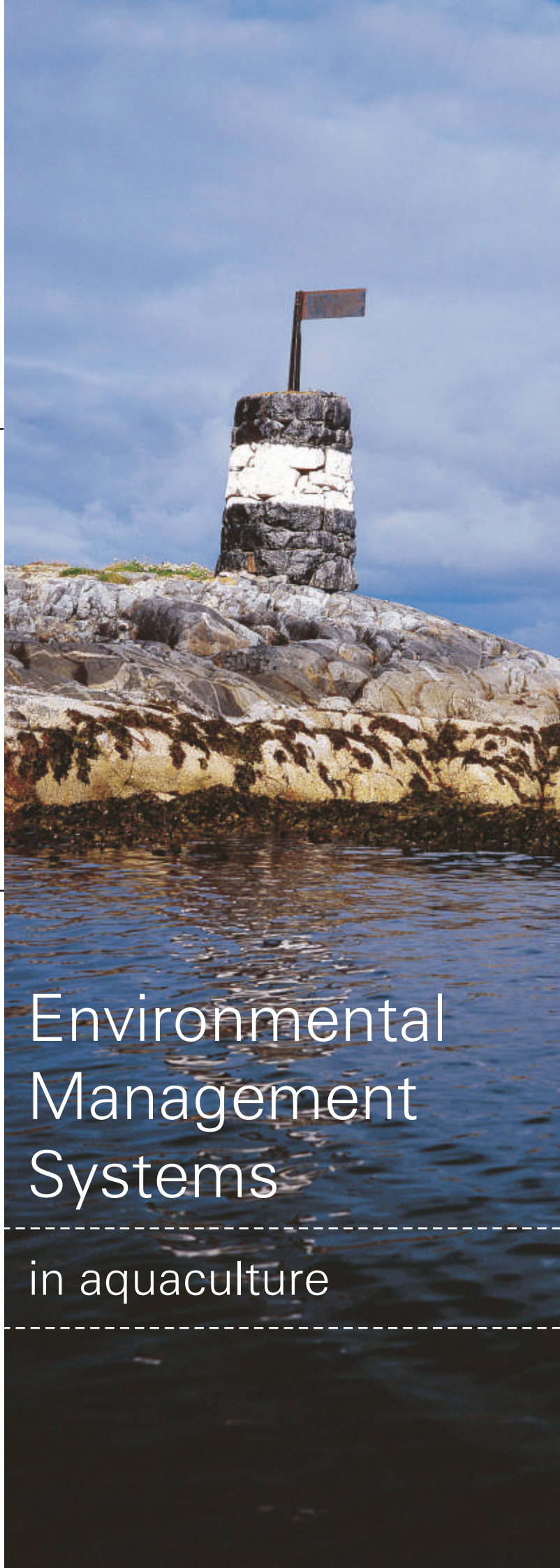
Introduction to

Environmental  
Management  
Systems

in aquaculture



Prepared by  
KPMG Centre for aquaculture and fisheries



## FOREWORD TO THE ENGLISH VERSION

This Guide has been developed on the basis of experiences from farming of salmon and trout under Norwegian conditions. However, the method is universal and not specific to any industry or species. The method described in this Guide can therefore easily be adapted to other countries and other species. We have consequently chosen to use the term “aquaculture” rather than “fish farming” so as to make the Guide more general.

The examples used in this Guide should only be used as illustrations, and the individual company must consequently make its own evaluations and adaptations. KPMG AS does not assume the responsibility for evaluations made or systems developed by companies or individuals based on this Guide.

The English version is available at:

The Norwegian Industrial and Regional Development Fund (SND)

Telephone: (+47) 2200 2500

[www.snd.no](http://www.snd.no)

KPMG AS

Centre for Aquaculture and Fisheries

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[www.kpmg.no](http://www.kpmg.no)

Trondheim, January 2003

## FOREWORD TO THE NORWEGIAN VERSION

Environmental considerations are becoming more and more important in public debate, and public opinion is increasingly focusing on the environmental impact of industrial activity. The aquaculture industry is no exception from this. In the future, it will be important to continue the good work that has been achieved in certain areas of environmental protection, while at the same time it will be important to achieve improvements in other areas.

*This Guide – Introduction to environmental management for aquaculture operations* is intended as a tool for companies engaged in aquaculture that wish to work systematically toward environmental improvement through the application of the environmental standards ISO 14001 and EMAS.

The Guide has been developed by KPMG AS, Centre for Aquaculture and Fisheries, under the leadership of Manager Ulf Winther and Senior Consultant Trude Olafsen as the main authors. Four pilot companies participated in the work:

- Aqua Gen AS
- Dåfjord Laks AS
- Erfjord Stamfisk AS
- Nettet Fiskeoppdrett AS

These companies have developed their own environmental management systems with the assistance of KPMG AS, and in the process, they have contributed valuable initiatives and ideas to the Guide.

The Guide has been financed by The Norwegian Industrial and Regional Development Fund (SND), which in the future will have increasing expectations to its client companies with regard to environmental management. SND advises companies that are export oriented to become EMAS registered or certified according to the ISO 14001 standard.

The Norwegian Seafood Federation acted as distributor of the Norwegian version of the Guide.

Trondheim, December 2001

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# 1. Environment as a strategic opportunity

## Environmental responsibility

Today's business enterprises are increasingly in focus with regard to their impact on the environment. The aquaculture industry has also noticed that public environmental awareness has increased, and the motivation in our industry to work with environmental improvement is also increasing.

In addition to the demands put on the industry by public awareness, each enterprise has an overall responsibility for the environment in which the enterprise operates. The impact on the surrounding environment should be as limited as possible. This is particularly important with regard to the local environment such as neighbours, the local community and other so-called interested parties.

If an enterprise is careless about its impact on the environment, it may become the focus of strong, negative attention, and the company's image in the community can suffer great damage. Possible consequences can be problems with customers, questions or doubts about its products, or the development of a negative attitude on the part of the authorities vis-à-vis the company. If this happens, it may be very difficult to re-establish the trust that the company held.

Environmental management includes a systematic approach to the company's efforts to control and reduce its impact on the environment. The introduction of environmental management systems can result in operational and other improvements as well as improved profitability for the company.

## Customer requirements

Especially large customers, such as supermarket chain within the EU, have begun to make demands on suppliers such as aquaculture producers with regard to the environment in which the fish is reared, whether the fish has been treated with chemical substances, or whether the fish has been treated with antibiotics. The Norwegian Seafood Export Council (NSEC) have recommended that Norwegian fish farmers should strive to document all aspects related to the production of farmed salmon, including the fact that the salmon is healthy and has been produced according to the very best and accepted methods.

## The authorities' requirements

The authorities have established precise demands and requirements for the Norwegian aquaculture industry in the form of enterprise-related demands as well and industry-related demands. A number of the objectives established for the industry as a whole have been

achieved. But the objective related to escaped fish, for example, has not been achieved. Both escaped fish and large occurrences of salmon lice create worries for the industry, the general public and environmental organisations.

## Public opinion

In a recent analysis of future challenges and barriers to the Norwegian aquaculture industry (“Norwegian aquaculture towards 2005”) undertaken at the initiative of the Norwegian Seafood Federation in 1998, it is pointed out that public opinion towards the industry is negative in relation to environmental aspects, and that several of the environmental objectives set for the industry have not been achieved. The analysis states that one of the great challenges facing the industry will be to combine the achievement of the environmental objectives with efficient operations. The industry has become well prepared in some environmental areas in the course of recent years, but there are still important environmental challenges that need attention.

## Statement by one of the pilot companies

One of the pilot companies that has contributed to the development of this Guide, says:

*“We are concerned about presenting ourselves as a company that takes the environment seriously so that we can continue to operate as a fish farmer in the local community. Among other things, we have become more conscious about reducing escapes, waste of feed, and other discharges. Consequently, we will now put priority on developing an environmental management system so that we can be in the forefront of the development.”*

## Benefits from day 1

An environmental management system yields benefits from the day the company decides to establish one, provided that the company is serious about utilising the work. Just initiating the process gives positive signals to the community, and can be useful in itself.

## First come, ....

Companies that are working seriously with environmental issues and use this work in their relations with customers, authorities and public opinion will, at least for a while, reap the benefits of being a “first player”.

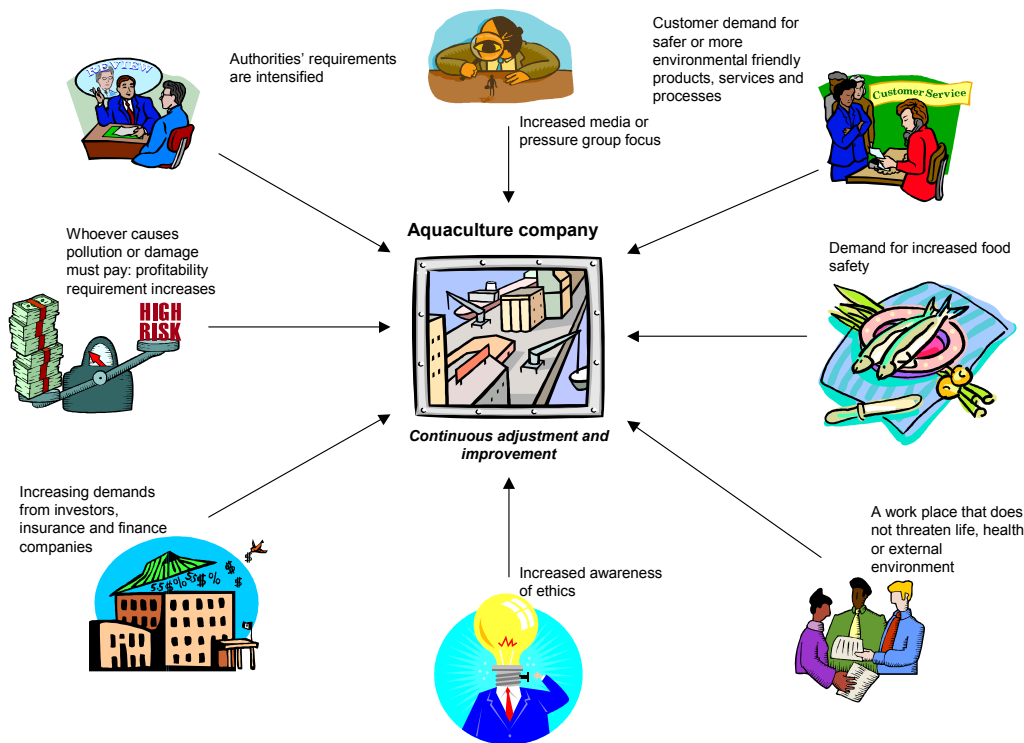
Efforts to introduce environmental management systems are expended in several countries. In the UK and Chile, there are companies that are in the process of establishing environmental management systems. If Norwegian companies are to succeed in the competition for the most important customers, they must put themselves in a position where they can document their environmental achievements in all parts in the value chain. It will also be important to show that

they are serious about environmental issues.

## A new competitive situation

In the figure below we have tried to illustrate the challenges facing today's aquaculture enterprises. In addition to producing a quality product at the correct price, the company must relate to a flow of new and stricter demands in a number of fields.

Especially in the fields of environmental issues, food safety, and ethics in animal husbandry, demands on the producer will become even more pronounced than they are today, and will form a substantial part of the framework within which the industry operates.



Source: KPMG AS

**Figure 1 Drivers – a new competitive situation**

## 2. How to use this Guide

### Reference

The Guide is not meant to be a textbook in environmental management. There are other books and courses for that purpose. The Guide is to be used as a reference guide when developing and implementing an environmental management system.

We have constructed this Guide step by step in the way in which we believe one should work with an environmental management system in an aquaculture company.

### Integration with quality control and internal control

All Norwegian companies are required to have an internal control system to ensure proper health, environmental and safety conditions. Those involved in slaughtering and processing shall in addition have a HACCP based control system. For companies that wish to work with environmental management and quality insurance, it is important to integrate these systems to the extent possible.

### Adaptation to the company's requirements

An environmental management system will not be the same for all aquaculture companies. The system design will depend on the scope of the operations, the size of the company, the equipment used by the company, and last but not least the degree of environmental impact caused by the operations. It is consequently important that the environmental management system is adapted to the specific company and its operations. For example, smaller companies should not design a system that is very comprehensive or requires a lot of work to keep updated.

Small and medium size companies often have short lines of communication, a simple organisation, and ready access to top management. This can be an advantage when developing an effective environmental management system.

### Employees must be involved

We emphasise that it is important to involve the employees early in the process. They should be directly involved in developing the system if it is to be successfully implemented. At the same time, the development and implementation of an environmental management system represents a unique opportunity to discuss the implementation of various tasks in the company.

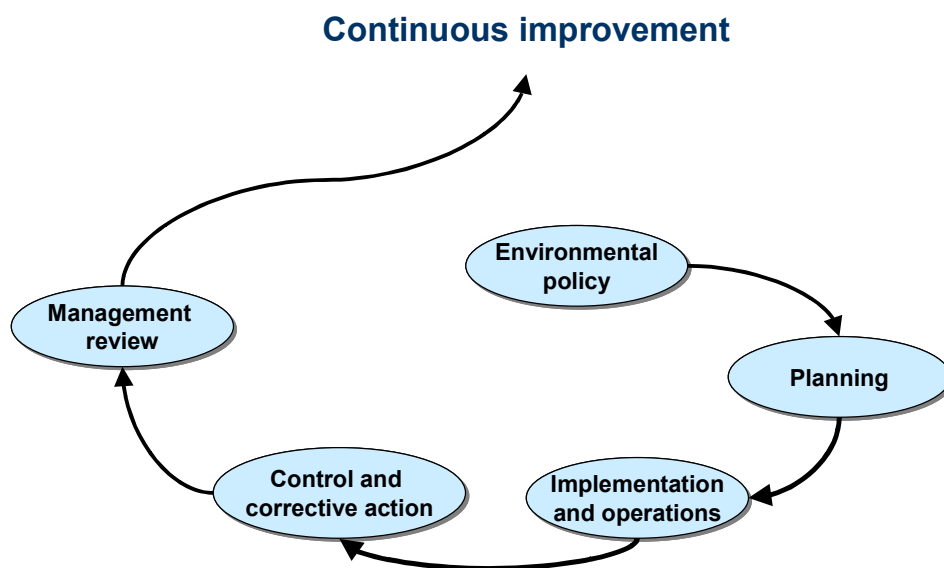
### 3. Key concepts of environmental management

#### Continuous improvement

An environmental management system should be a tool for the company to ensure the systematic and continuous environmental improvement. Neither ISO 14001 nor EMAS sets the environmental objectives or standards for environmental achievement. It is up to the individual enterprise to set these after having evaluated its own situation.

**Environmental management is, in this Guide, understood as a continuous cycle of planning, implementation, control and improvement in order to ensure the company's achievement of continuous improvement in its environmental impact.**

Continuous improvement is a central concept in environmental management. The company shall be continually involved to reduce its environmental impact. When the improvement objectives set by the enterprise have been achieved, new and more ambitious objectives must be established. The concept of continuous improvement can be illustrated by Deming's Circle, which forms the basis for most management control systems:



## Flexibility and simplicity

An efficient environmental management system must be simple and flexible in order to be adaptable to changing conditions. This also makes it simple to use and to communicate to employees and the general community.

## Two standards for environmental management

There are two standards that are applicable to Norwegian enterprises: ISO 14001 and EMAS. Both standards are international and have a large degree of overlapping requirements. Many companies have chosen to work with both standards, which we will comment on later.

In Norway, ISO 14001 can be obtained from Norwegian Standards Association, while EMAS can be obtained by contacting the Ministry of the Environment or the Norwegian State Pollution Control Authority (SFT) (see useful addresses in Appendix 2).

### ISO 14001

ISO 14001 is an international standard for the construction of environmental management systems. It includes detailed requirements for how an environmental management system shall be constructed. The continuous improvement requirement is a central feature. This standard is one of several ISO standards that relate to the environment.

ISO 14001 is valid worldwide and is a well-known standard in all of the most important markets for Norwegian seafood. One may seek certification according to this standard. It is not a requirement that companies certified according to ISO 14001 shall publish an environmental report, which is required for EMAS.

As of October 2002 there were a total of 330 Norwegian enterprises certified according to ISO 14001.

### EMAS

EMAS (Eco-Management and Audit Scheme) is an environmental management and auditing arrangement that was established by the EU in 1995. Companies that adopt this arrangement are obliged to achieve a continuous improvement of its own environmental performance.

Adoption of an arrangement established by the EU may give an advantage in this market. The EU still represents the largest single market for Norwegian aquaculture products, - approx. 60% of Norwegian salmon and trout exports went to EU member countries in 2001 (by volume). EMAS is relatively unknown outside of the EU, and will consequently have a limited marketing effect in countries outside the EU.

As of October 2002, 53 Norwegian enterprises had been approved and registered according to the EMAS regulations in Norway.

The system must be approved by so-called environmental verifiers, which are approved by Norwegian Accreditation. When an enterprise is approved, it is registered in a register in Brønnøysund, and in addition it is entered into the central EMAS register in Brussels.

EMAS and ISO 14001 are overlapping in a number of fields. EMAS requires that the enterprise has an environmental management system, and a system established according to ISO 14001 meets the requirements of EMAS.

Many enterprises choose to first establish an ISO 14001 system, and then to expand this system to an EMAS system. See Figure 3 page 18, which illustrates the relationship between EMAS and ISO 14001.

## Certification - registration

It may be confusing that the concepts certification and registration are used about practically the same services.

In Norway, certification is commonly used when talking about ISO 14001, while registration is used when talking about EMAS. Both concepts include an evaluation of the company's environmental management system by established criteria by a publicly approved (accredited) institution.

These institutions must be approved by Norwegian Accreditation and are called accredited (approved) certification companies/institutions when talking about ISO 14001, and accredited environmental verifiers when talking about EMAS.

An overview of current accredited/approved institutions for environmental management can be found on the web pages of Norwegian Accreditation and the Norwegian Federation of Industries (NHO) (addresses in Appendices 2 and 3).

## Similarities and differences between EMAS and ISO 14001

As is illustrated in Figure 3, EMAS and ISO 14001 are to a large extent similar in the way they are constructed, and the first steps in the process are overlapping.

Both systems are based on the requirement of continuous improvement, as well as requirements to satisfy the authorities' regulations. Both systems also imply auditing the company's documentation and environmental efforts. Some differences between the systems are shown in

Table 1.

**Table 1 Differences between EMAS and ISO 14001**

	EMAS	ISO 14001
<b>Scope</b>	Applicable within EU/EEA	Worldwide
<b>Status</b>	In Norway based on the Emissions Act, voluntary	No basis in law, voluntary
<b>Area of application</b>	Applicable to industrial activity in an industrial zone <sup>1)</sup>	Applicable to all types of activity – gives more freedom for the enterprise
<b>Public access</b>	Environmental report shall be publicly available	Policy shall be publicly available
<b>Continuous improvement</b>	Continuous environmental improvement shall be documented in the environmental report	Continuous improvement of environmental achievements
<b>External audit</b>	Minimum every 3 years by external auditor	Frequency of environmental audit determined by the enterprise/certification institution

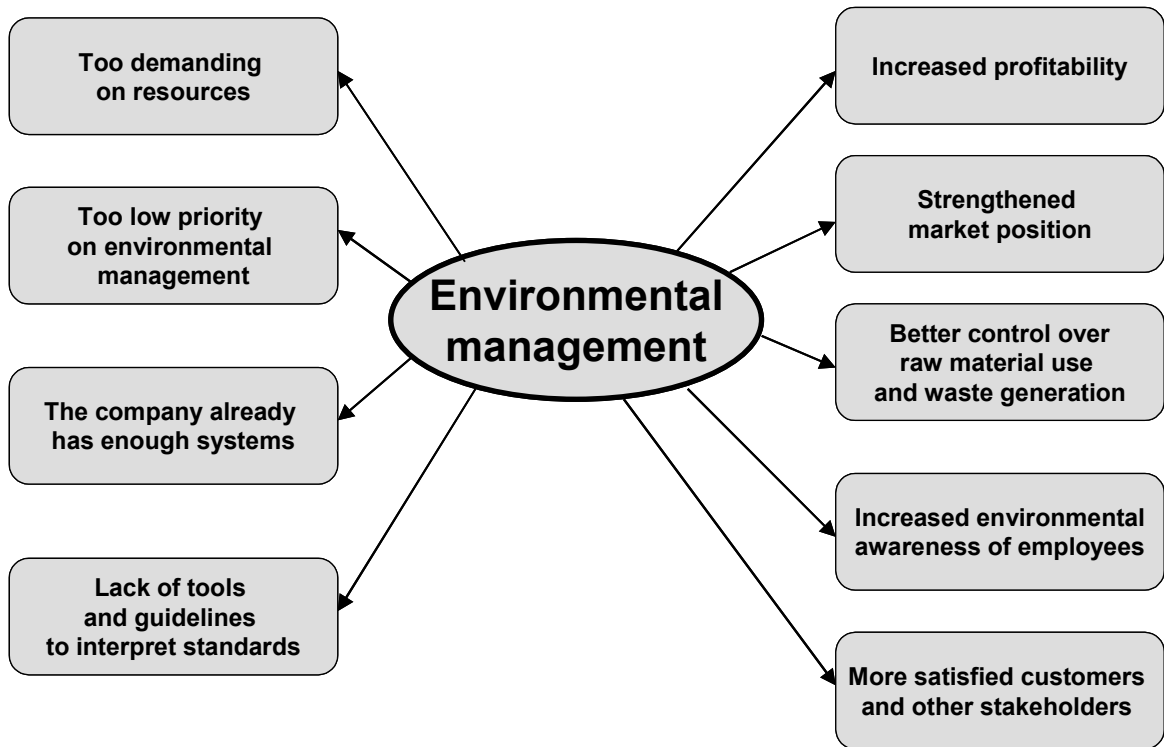
1) Aquaculture companies may have to go through several registrations

## Certification or not?

It is of course possible to establish and use an environmental management system without going through certification or registration. The key question is whether one achieves the same effect by not being certified. We are of the opinion that certification is preferable if one has invested the time and effort to introduce an environmental management system. The reasons are as follow:

- Management commitment will be stronger
- Customers, authorities and other interested parties will take the system more seriously
- The company will try harder when an external auditor is involved
- It is not always easy to maintain a system that is not certified.

Figure 4 illustrates some of the advantages and disadvantages of EMAS registration, issues that need to be considered by those who consider working with environmental management before they start. The same advantages and disadvantages more or less apply to ISO 14001.



Source: KPMG AS

**Figure 2** Advantages and disadvantages by introducing EMAS in a company

## 4. How to work with environmental management in a company

### Development and maintenance – two different processes

Experience shows that it is important how companies chose to work with environmental management in order to achieve a good result. Broadly speaking, one may divide the work into two phases:

- Development and implementation of the environmental management system
- Use and maintenance of the system.

The development and implementation of an environmental management system is naturally more demanding in terms of time and resources than the use and maintenance of the system. But it may be demanding in a different way to keep the system “alive” in the enterprise after it has been implemented.

In this chapter our main focus will be on how one may develop an environmental management system in a company, who should be involved in the implementation process, and what costs may be required. Furthermore, we focus on how environmental management systems can be co-ordinated with other management systems.

### Management involvement

Without the involvement and commitment of top management it will be next to impossible to work with environmental management in a sensible way:

- Management must allocate funds and other resources both for the system itself and for the improvements that will have to be implemented
- Once the environmental management system has been introduced, it must be maintained and improved. A one-shot effort to establish a system is not sufficient.
- The environmental management system should be integrated with other guidance systems in the enterprise.
- Top management involvement is necessary in order to exploit the opportunities for positive image projection that normally follows an intensified environmental effort.

The Managing Director should be the main sponsor for the work with environmental management systems in the company, while the daily work with development and use of the system should be delegated to a person who is given the authority, time and resources necessary to succeed.

### **Our participating companies say the following:**

**Experience shows that top management is often involved in initiating the project, but it is more difficult to get them to focus on this during the development of the system. In a way, they have “delegated” the job to the staff. Consequently they must be involved the sooner the better.**

## Management representation

Both ISO 14001 and EMAS require the appointment of a management representative. This person must be given the responsibility for planning and implementing the project, and to report directly to top management.

This function may be allocated to a separate environment function in the enterprise, with enough resources to see it through. Or one may consider whether the HES responsible also should be in charge of environmental management. The most important thing is that whoever is made responsible has enough time and resources to succeed. It may be an advantage if the responsible person knows the company intimately. In general, it appears more advantageous to appoint someone who has been with the company for some time rather than a newly person who does not know the entire organisation.

In larger companies, especially in companies where operations are distributed over different geographic sites, it may be necessary to engage more than one person in this work, so that one may consider appointing a project team.

### **Our participating companies say the following:**

**The problem is to have enough time to work with environmental management in addition to all the other tasks we have. We therefore recommend strongly that whoever is appointed responsible is relieved of other duties.**

## Work and progress plan

The introduction of an environmental management system should follow a carefully prepared work and progress plan, divided into specific tasks. Experience shows that it is very important to establish deadlines for when the various phases in the work (environmental review, environmental programme, procedures, first environmental audit, etc.) shall be completed. Unless this is done, the work has a tendency to drag on.

Do not forget that the implementation phase takes time. The work is not finished when the system has been designed. The accredited environmental controller / certification institution shall verify that all environmental management systems are in place, understood by the employees and in use. How much time will elapse from the time a company decides to

introduce a system until it is ready for registration will vary? In order not to create delays in the progress, one should right from the start be conscious of the necessity to allocate enough resources, be it funds or time.

## Employee involvement

Employees should be involved in the work as early as possible, both in order to give the work internal importance in the enterprise, and because involvement increases motivation to participate in the work. Information and training of personnel is central in environmental management. Employee involvement in the development of the system will be important in order to achieve both of these objectives.

## External consultants

Many companies will need external assistance. It is important to consider in advance the advantages and disadvantages of this, such as the cost of using consultants, the need for knowledge transfer and training of the organisation. Using external consultants may be necessary because:

- The company wants to improve its own competence and its knowledge about environmental issues in general as well as environmental management systems specifically.
- The company needs assistance in the process itself. The consultant should primarily act as a catalyst and discussion partner in the process of development and implementation of the system.
- The company may need extra working capacity and experience from similar types of work.

### **Our participating companies say the following:**

**It is important to get advice from someone who is experienced in establishing such systems. It has also been useful to meet representatives of other companies that are working with similar systems.**

## Costs

The greatest costs are usually related to the development of the environmental management system. Cost will first and foremost be related to:

- Develop an environmental policy, undertake the initial environmental review, evaluate important environmental issues, and establish environmental objectives and environmental management programmes.
- Develop or upgrade and implement procedures and routines.
- Implement training activities
- Develop an environmental report

- Engage and external environmental auditor

For certification / registration, external costs will include costs related to the use of time by the certification institution / environmental controller used.

## Integration and co-ordination with other systems

It is cost-effective to co-ordinate the various guidance systems that a company has. The most common such systems include:

- The company's internal control system for health, environment and safety (HES)
- The company's HACCP system
- The company's quality control system according to ISO standards /for example ISO 9000 series).

All Norwegian companies are required to have an internal control system. The internal control system's overall system specification and the part that covers the external environment is a good point of departure for an environmental management system.

Many aquaculture companies have implemented ISO 9000 standards in its quality control work. There are many similarities between quality control and environmental management systems with regard to design and maintenance of the systems.

Both certified quality control and environmental management systems must be followed up through external audits by the certifying institutions. In addition, the authorities undertake system revisions of the company's internal control systems. In all, this may include several internal and external audits every year. Through co-ordination of these, the company can make significant savings both in terms of time and money.

### Experience of one of the pilot companies

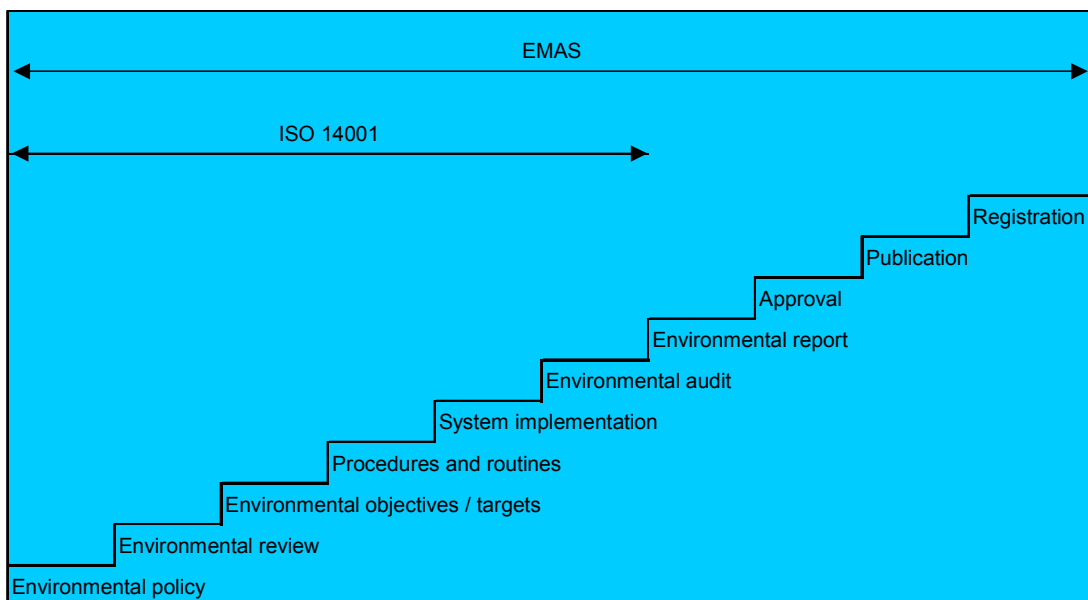
**We had a functioning quality control system when we started and immediately saw that there were many things in this system that we could use directly in the environmental management system.**

## 5. Development of an environmental management system

### - Step by step

#### 5.1 Overview of the task

ISO 14001 and EMAS have very similar requirements with regard to the steps one has to go through.



**Figure 3 Introduction of an environmental management system, step by step**

Chapter 5 focuses on the steps from environmental policy through procedures and routines, while Chapter 6 includes advice on how the company shall implement the system. Environmental audit, certification, environmental reporting and the remaining steps are covered in Chapter 7.

The requirements within the various steps are to a great extent overlapping in ISO 14001 and EMAS. Differences are treated in the chapters that cover the various steps.

## 5.2 Environmental policy

### **Establish level of ambitions and vision**

The overall objective of the environmental policy is to establish the company's level of ambition and a vision for the environmental engagement, and thereby indicate the basic guidelines for the environmental engagement of the company. The environmental policy shall also give the basis on which environmental objectives are formulated.

The environmental policy should be unequivocal and brief, and should be understood by all parties involved, from investors and shareholders to employees, customers and neighbours. The company shall inform the general public as well as employees about the company's commitment to continuous improvement of its environmental engagement through the environmental policy.

The environmental policy should be far-sighted enough to give guidelines for choices of direction within environmental issues, but at the same time it should be updated at intervals if the need arises.

For the text in ISO 14001 regarding environmental policy, see clause 4.2.

For text in EMAS regarding environmental policy, see article 2.

### **Continuous improvement and the observance of legal and other requirements**

Both ISO 14001 and EMAS contain some absolute requirements regarding the scope of environmental policy and that this should be expressed explicitly:

- The company's commitment to continuous improvement and prevention of pollution
- Compliance with all legally based environmental requirements.

In addition, it is important that the environmental policy is based on the company's production which the environmental management system shall cover. It should therefore not be too general, but be clearly related to the company's activities and the environmental challenges facing the company.

The environmental policy should be written down and be signed by the top management of the company. The top management can include one person or a group of persons charged with the ultimate responsibility for the running of the company.

## Transparency

The environmental policy shall be available to the general public, and employees shall be familiar with the content of the policy.

The company can use the environmental policy in profiling and marketing, for example vis-à-vis customers, authorities and the local community.

## Hints on development of the environmental policy

In addition to the requirements of the standard, the following elements should be mentioned:

- **Take your time**

Developing an environmental policy, environmental objectives and an environmental programme is a learning process. It is therefore useful to start with a draft policy before the initial environmental review is made. Based on the results of the assessment, the draft policy can be further developed and adjusted so as to be a more adequate environmental policy. Later in the process it may also be necessary to go back and adjust the environmental policy.

- **Management must be active**

It is important that top management is actively engaged in establishing the company's environmental policy.

- **Co-ordination with other policies**

If the company has already established policies for quality, HES, or HACCP, the establishment of a co-ordinated policy, covering all needs, should be considered. If a separate policy for each field is chosen, it is important that these are co-ordinated so that they are in harmony with each other.

## Environmental policy example

**Environmental Salmon Ltd will work towards ensuring that the company and its subsidiaries develop their activities in accordance with sustainable principles. This is important both for the company's and the aquaculture industry's reputation, and it is a decisive precondition for the company to grow and develop in harmonic accordance with the requirements of society and the market.**

**Environmental Salmon Ltd shall at all times abide by the regulations imposed by the authorities.**

**Environmental Salmon Ltd shall in its development respect commonly accepted norms of animal welfare and other ethical ramifications. In the choice of operational methods, environmental issues shall be considered.**

**Environmental Salmon Ltd shall emphasise pre-emptive action against fish disease, and utilise environmentally safe methods of treatment of parasites and diseases.**

**Environmental Salmon Ltd shall, through training and information, stimulate to increased environmental awareness at all levels in the company. Environmental efforts shall be included as an integrated part of the company's total quality efforts and the legally based work withing health, environment and safety (HES), and shall be subject to the same system of documentation, audits and of non-conformance handling. In order to achieve continuous improvement in this field, environmental efforts shall be subject to continuous adjustment and improvement.**

**Environmental Salmon Ltd shall at all times be able to document to both customers and consumers that our products are produced under conditions where environment, food safety and other ethical considerations are observed.**

**The environmental policy forms an integrated part of the company's quality policy.**

## 5.3 Initial environmental review

### Objective

The objective of the initial environmental review is to identify all relevant aspects of the company's activities that may have an impact on the environment. The environmental review shall, in turn, form the basis on which decisions are made with regard to which improvements the company shall undertake. The results of the assessment shall be used to establish the company's environmental objectives.

In addition to reviewing conditions that have a direct impact on the environment, the company shall also review other important factors that are required by law and the requirements and opinions of other interested parties. The requirements of ISO 14001 and EMAS are relatively similar.

### ISO 14001

The standard requires the identification of "significant environmental aspects" that have or may have significant impact on the environment (clause 4.3.1). This includes not only aspects that

are related to the activities of the company, but also aspects related to the company's products and services. Only aspects that the company are in direct control of or may have some influence over, shall be included.

The standard does not directly specify that an initial environmental review shall be undertaken, but in order to undertake an assessment of the environmental impact of the company's activities, a thorough environmental review must in reality be undertaken.

ISO 14001 also states that the company shall be aware of the requirements of laws, regulations and other documents that regulate its activities (clause 4.3.2). Since the minimum requirement of the standard specifies that the authorities' requirements are met, this is a very important part of the assessment.

## **EMAS**

EMAS requires an environmental review of activities, products and services (article 3.2a) within 5 key areas. EMAS requires in addition to the four requirements of ISO 14001 that a description of the criteria used for evaluating the importance of the environmental impact.

## **Interested parties**

In addition to the requirements mentioned above, it is important that the company is oriented towards the community surrounding the company in its environmental efforts. Both ISO 14001 and EMAS state that the company shall consider the opinions and problems of other interested parties.

ISO 14001 requires that the views of other interested parties shall be considered when establishing the environmental policy (clause 4.3.3.), and EMAS requires that the company shall have an open dialogue with the public and other parties (for example authorities and customers) so as to be aware of the problems of these groups.

## Requirements of ISO 14001 and EMAS, summarised

Content of environmental review	Requirements of ISO 14001	Requirements of EMAS
1. Identify activities, products and services that have a significant impact on the environment	x	x
2. Identify laws, regulations and other legal requirements that apply to the company	x	x
3. Review routines and procedures that the company already has and that relate to or have an impact on the environment	x	x
4. Evaluate the results of previous incidents that have an impact on the environment	x	x
5. Obtain the views of other interested parties.	x	x
6. Description of the criteria used for evaluating the importance of the environmental impact		x

The requirements relating to environmental review for EMAS regulations are to be found in article 3 and in attachments VI and VII.

The requirements of ISO 14001 are mainly given in Chapter 4.3.

### Other important aspects

It is important to be aware of the fact that the company shall also consider the following:

- Its own activities, products and services
- The environmental impact of the products and any services shall also be taken into consideration
- Normal situations, start / completion and potential emergency situation shall also be considered
- In addition to today's situation, the company should also consider previous and planned situations. For example, the company should consider whether new activities may have significant environmental impact.

Only aspects that the company can control or have influence over shall be considered.

### Later environmental reviews

The environmental review shall be repeated at regular intervals. The initial assessment forms the basis for the environmental efforts of the company in the initial stage (1 to 3 years).

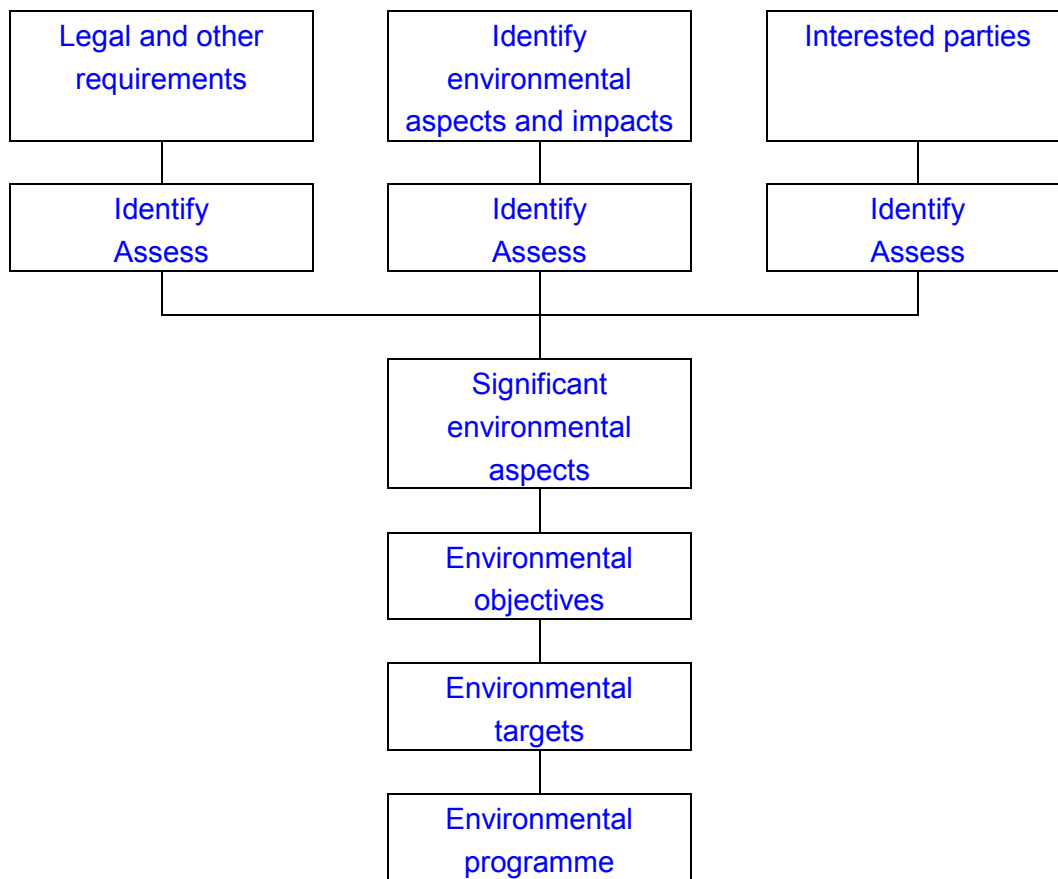
Thereafter, an assessment of the same areas shall be undertaken, based on information obtained

through the period from the first assessment and new collection and registration of information.

An important part of the following environmental reviews will be to determine whether the company has managed to achieve the environmental objectives and targets established at the previous assessment.

### The initial environmental review – a practical approach for aquaculture companies

In the following, we shall illustrate through the use of examples how the initial environmental review can be undertaken. The process from the initial environmental review until the establishment of environmental objectives and an environmental management programme is illustrated in Figure 4.



**Figure 4** The process from environmental review to environmental management programme.

In the following we have divided the process into four parts:

1. **Identification of environmental aspects and environmental impact**  
This is a systematic review and evaluation of the company's environmental impact.
2. **Identification of legal and other requirements**  
The company shall ensure that it knows and observes all relevant legal and other requirements.
3. **Identification of views of other interested parties**  
The company shall ensure that it is aware of and takes into serious consideration the views of the local community.
4. **Identify significant environmental aspects**  
These are the issues that have been picked out after a review of the three preceding steps and shall form the basis for the work with the environmental objectives and the environmental programme.

### **Split up the environmental review**

In aquaculture, it may be sensible to split up the environmental review so that the company can identify environmental aspects in the following fields:

- Breeding / broodstock
- Fingerling / smolt
- Foodfish
- Harvesting / processing.

If the company has several units in each part of the business, each unit should be assessed separately in order to identify significant environmental aspects for each unit. For example, each fingerling/smolt operation should be assessed separately. With regard to foodfish (growout) operations, the company should consider what constitutes a "natural" unit. This may vary from company to company, but it seems reasonable to define several sites that are under the supervision of one operations manager as one unit.

### **Visit all units and sites – and involve the employees**

The initial environmental review gives a unique opportunity to involve the employees in the work. In many cases, the operators will be the best sources of information, both in terms of other interested parties as well as the environmental impact of operations.

All units (growout installations, smolt production units, slaughteries /processing plants) should be visited in order to obtain first-hand information about the relevant conditions. The visits will also provide an excellent opportunity to inform the staff about the environmental efforts and the background for them.

### 5.3.1 Identify environmental aspects and environmental impact

#### **Environmental conditions, environmental aspects, and environmental impact**

It is common to distinguish between environmental conditions (EMAS) and environmental aspects (ISO 14001) on the one hand, and environmental impact on the other hand. An environmental condition or aspect constitutes an activity or incident that leads to environmental impact. Some examples:

- Overfeeding is an environmental condition / aspect that leads to feed not being consumed and thus sinking to the seabed. The environmental impact is how the accumulation of sediment underneath the cages affects the seabed fauna.
- Escaped fish is an environmental condition / aspect and the environmental impact of this is the impact that escaped fish has on potential genetic changes in wild salmon stocks, or the transfer of disease to other fish.

In the following, we shall use environmental aspect as the concept.

#### **Aspects that the company must assess**

ISO 14001 and EMAS have requirements that are relatively similar in relation to what aspects the company must examine during the environmental review, but EMAS includes a few more:

Aspects that shall be considered during the environmental review		
	ISO 14001	EMAS
Emissions into the air	x	x
Emissions into water	x	x
Waste and waste treatment	x	x
Pollution of soil	x	x
Use of raw materials and natural resources (incl. energy)	x	x
Other local and community environmental aspects	x	x
Transport		x
Risk of environmental accidents and their impact		x
Impact on biodiversity		x

---

**In addition, EMAS requires that the company shall consider the so-called indirect environmental aspects (appendix VI in EMAS). These are not included in the present Guide.**

---

It is important to remember that only those aspects that the company itself can control or have some influence over shall be included.

### **Basic priorities and objectives**

A central issue in the assessment of what environmental aspects are important to an aquaculture company, are the priorities of the authorities and industry associations. Norwegian authorities have established guidelines and environmental objectives for the Norwegian aquaculture industry. In addition, the Norwegian Seafood Federation is involved in environmental issues. The following documents are relevant:

- The Ministry of Fisheries' Environmental Action Plan 2000 – 2004: [www.odin.no/fid/](http://www.odin.no/fid/)
- Environmental Objectives for the Norwegian aquaculture industry (Directorate for Nature Management and others): [www.naturforvaltning.no](http://www.naturforvaltning.no)
- National action plan against escapes (Norwegian Seafood Federation): [www.fiskeoppdrett.no](http://www.fiskeoppdrett.no)
- National action plan against lice on salmon (Norwegian Seafood Federation)
- Action plan to reduce emissions of copper from Norwegian aquaculture industry (Norwegian Seafood Federation).

### **The company' / unit's own aspects**

The central part of the initial environmental review is, however, the company's assessment of its own environmental aspects and impact. This assessment must be based on different types of information and documentation that the company possesses, as well as the knowledge possessed by the employees.

By documentation we understand for example environmental analyses, recipient studies, emissions permits etc. For an aquaculture company, the following are relevant:

- Site / recipient studies
- Operations reports that document:
  - Feed consumption
  - Use of medication
  - Use of chemicals / product fact sheets
  - Fish health certificates
  - Other relevant lists of consumption and status.

In the initial environmental review, most companies will discover that they lack information on

a number of important aspects. In some companies, it will be useful to try and provide better information before continuing with the assessment. In other cases it may be practical to initiate a longer term information collection in order to improve the basis for decisions.

### Site assessment

The degree of impact on sites available to the company will constitute a major part of the assessment. This is especially true for the growout operations, but also with regard to emissions from fingerling production and harvesting / processing operations.

If the company does not have updated site studies, it will be necessary that such studies are undertaken in connection with the initial environmental review. Several studies are relevant:

- Seabed studies. These should be undertaken in accordance with *NS 9410 Environmental monitoring of marine fish farms*
- Survey of the seabed topography (a requirement of NS 9410)
- Measurements of hydrographic data (temperature, salinity, oxygen) (a requirement of NS 9410)
- Current measurements (over a sufficiently long period)

### Evaluation of the environmental aspects

We have developed an auxiliary form that covers the items to be included according to ISO 14001 and EMAS (see Appendix 4). The form is meant as a tool and does not constitute an exhaustive list for the specific areas that shall be assessed for each individual company. In the following we use parts of the form to illustrate how this work can be done in real life.

We recommend the following procedure:

- First, go through each area in detail and consider whether the aspects listed in the form are relevant to your company. Supplement or delete when appropriate.
- Consider whether the information available for each environmental aspect is sufficient for evaluation of the importance of this aspect.
- When the available information is insufficient, try to obtain better information. This may require some time and resources.
- Examine the routines and procedures already used by the company to regulate aspects that have an impact on the environment. These may be operational procedures within for example feeding, maintenance of nets, emergency plans etc.
- Examine the results of previous incidents, for example escapes.
- Evaluate each individual aspect in relation to the evaluation criteria in the form.
- Make a written evaluation of each item and list arguments for and against why this environmental aspect is important.

### *Evaluation criteria*

The following criteria are used for the evaluation of environmental impact:

Criteria	3 points	2 points	1 point	NA
<b>Environmental impact</b>	Great	Moderate	Little	NA

The terms great, moderate and little are subjective, and the company must therefore try and establish in writing what is meant by these terms.

### *Evaluation example*

In order to show how the evaluation can be done, we have used part of the form in Appendix 4:

Field / environmental aspect	Growout / smolt	Does the company have sufficient information? Y / N	Evaluation Environmental impact
<b>Emissions to air</b>			
- noise	m	N	1
- incineration of waste	m / g	Y	2
<b>Emissions to water</b>			
<b>Chemicals</b>			
- antibiotics	m / g	Y	3
- lice feed	m	Y	2
- anaesthetics	m / g	N	2
- antifouling (copper)	m	N	2
- formic acid	m / g	Y	1

## 5.3.2 Identify legal and other requirements

In both ISO 14001 and EMAS there are requirements that as a minimum the company shall observe the legal and other requirements and other requirements by the authorities. An important part of the initial environmental review is therefore to establish whether the company has a full overview of all legal requirements relating to the environmental that are applicable to the company, rectify any shortcomings and evaluate the company's compliancy with these legal and other requirements.

Sources of information may be:

- Permit documentation, emissions permits
- Other requirements from the authorities
- Internet services like Lovdata (Law data), which includes all relevant legal and other requirements.

These web pages are useful sources of information:

- Lovdata (Law Data): [www.lovdata.no](http://www.lovdata.no)
- Norwegian State Pollution Control Authority: [www.sft.no](http://www.sft.no)
- Directorate of Nature Management: [www.dirnat.no](http://www.dirnat.no)
- Ministry of Fisheries: [www.odin.dep.no/fid/](http://www.odin.dep.no/fid/)
- Ministry of the Environment: [www.odin.dep.no/md/](http://www.odin.dep.no/md/)
- Ministry of Agriculture: [www.odin.dep.no/ld/](http://www.odin.dep.no/ld/)
- Directorate of Fisheries: [www.fiskeridir.no](http://www.fiskeridir.no)
- Norwegian Federation of Industries: [www.nho.no](http://www.nho.no)

*Evaluation criteria:*

Criteria	3 points	2 points	1 point	NA
<b>Legal and other requirements</b>	Non-compliance	-	Compliance	NA

*Evaluation example*

When updating, review and evaluation are completed, one may use the form for evaluation:

Field / environmental aspect	Growout / smolt	Does the company have sufficient information? Y / N	Evaluation	
			Environmental impact	Legal and other requirements
<b>Emissions to air</b>				
- noise	m	Y	1	NA
- incineration of waste	m / g	Y	2	3
<b>Emissions to water</b>				
<b>Chemicals</b>				
- antibiotics	m / g	Y	3	1
- lice feed	m	Y	2	1
- anaesthetics	m / g	N	2	1
- anti-fouling (copper)	m	N	2	1
- formic acid	m / g	Y	1	1

### 5.3.3 Identification of interested parties

Most companies have received some reactions or feedback to the way they operate or to plans they have for future operations. These reactions must be considered in the assessment.

Interested parties may include:

- neighbours
- local authorities
- environmental groups
- other individuals or organisations that have an interest in or are affected by the company's activities, products or services

Many companies do not have a system for recording such reactions, and the initial environmental review must therefore usually use a reconstruction of previous communication. Once the company has completed the reconstruction of this communications, the next step in the evaluation in the form may be completed.

### Evaluation criteria

Criteria	3 points	2 points	1 point
<b>Interested parties</b>	Significant comments	Moderate comments	Insignificant/no comments

The terms significant and moderate are subjective, and the company must therefore define these terms in writing.

### Evaluation example

Field / environmental aspect	Growout / smolt	Does the company have sufficient information? Y / N	Evaluation		
			Environmental impact	Legal and other requirements	Interested parties
<b>Emissions to air</b>					
- noise	m	Y	1	NA	1
- incineration of waste	m / g	Y	2	3	3
<b>Emissions to water</b>					
<b>Chemicals</b>					
- antibiotics	m / g	Y	3	1	1
- lice feed	m	Y	2	1	1
- anaesthetics	m / g	N	2	1	1
- anti-fouling (copper)	m	N	2	1	1
- formic acid	m / g	Y	1	1	1

## 5.3.4 Total evaluation – selection of significant environmental aspects and environmental impact

In conclusion the company shall evaluate which of the environmental aspects in an overall, compounded evaluation constitute the significant aspects. This is done by doing a compounded evaluation of environmental impact, the status of legal and other requirements, and the views of interested parties. Those environmental aspects that are considered the most pressing and significant shall then form the basis for establishing the company's environmental objectives in the next phase of the process.

Central authorities and industry associations have, as mentioned earlier, identified specific areas as the priority fields of effort and improvement within the environmental effort in Norwegian aquaculture. Against this background, and based on our general experience with Norwegian aquaculture, we may list the following relevant environmental aspects for growout and fingerling operations:

GROWOUT	FINGERLING
Escapes	Escapes
Emissions of organic material and nutrients	Emissions of organic material and nutrients
Disease / infections	Disease / infections
Chemicals incl antibiotics	Chemicals incl antibiotics
Lice	Use of water from water source
Waste	Waste
Emissions of copper	Anadromous fish in the water source
Aesthetics	Heated waste water
Odour	Aesthetics
	Odour

These items should be central in the initial environmental review. However, it is important that the company undertakes an independent evaluation of aspects not mentioned in this list, as we have recommended in the above, in order that significant local conditions / aspects may be identified. If during the evaluation the company concludes that one or more aspects should not be included in the continuation of the work, this must be properly argued.

#### *Evaluation criteria*

We suggest that the following scale be used for a compounded evaluation of whether the environmental aspects are significant or not:

Conclusion	High priority	Medium priority	Low priority
------------	---------------	-----------------	--------------

In this also the company should define in writing how the different terms are understood. We would, however, recommend that aspects that have received at least one “3” are identified as significant environmental aspects and are consequently given a high priority in the next phases.

### Evaluation example

Field / Environmental aspect	Growout / Smolt	Does the company have sufficient information? Y / N	Environmental impact	Evaluation Legal and other requirements	Interested parties	Conclusion
<b>Emissions to air</b>						
- noise	m	Y	1	NA	1	Low
- incineration of waste	m / g	Y	2	3	3	High
<b>Emissions to water</b>						
<b>Chemicals</b>						
- antibiotics	m / g	Y	3	1	1	High
- lice feed	m	Y	2	1	1	Medium
- anaesthetics	m / g	N	2	1	1	Medium
- anti-fouling (copper)	m	N	2	1	1	Medium
- formic acid	m / g	Y	1	1	1	Low

In this example, the company has identified two significant environmental aspects after a thorough evaluation of status:

- Incineration of waste (does not comply with legal and other requirements and have received complaints from neighbours)
- use of antibiotics (have used a lot of antibiotics over the last two years; this is a high priority aspects as defined by the authorities)

These significant environmental aspects shall then form the basis for the further work with environmental objectives for the company. Other aspects that have received a lower score than the two that have been picked out, for example the use of high copper-content antifouling agent, may be the subject of evaluation at a later stage, if the authorities tighten their regulations or if new research show that the problems are greater than previously assumed.

### Environmental policy

Against the background of what has been found during the environmental review and the evaluations done, it may now be useful to go back and see whether the environmental policy is adequate or whether it needs to be reviewed.

## Procedures

It may be useful to establish procedures for the identification of environmental aspects, legal and other requirements as well as the views of interested parties during the process or immediately after the process has been completed. See Chapter 5.6 (the paragraph on planning) for a description of the requirements of ISO 14001 as well as hints for the procedures.

## 5.4 Environmental objectives

### The establishment of environmental objectives

Based on the environmental policy established by the company and the results of the initial environmental review, the company must now establish objectives for improvements in its environmental achievements.

Both ISO 14001 and EMAS differentiate between two levels:

- **The basic environmental objectives: Environmental objectives**  
These are based on the environmental policy and the environmental review. They shall be specific and measurable if possible, and they shall establish the basic objective.
- **The detailed objectives: Environmental targets**  
These represent a detailed breakdown into specific operationalisation of the basic objectives. They should be quantitative and measurable. .

The two standards use a different terminology in this case, but the content is very similar. We have chosen to use the terminology of ISO 14001 as this is more self-explanatory with regard to what type of level is referred to.

For the text in NS-ISO 14001 on basic and specific objectives, see clause 4.3.3.

### Split up the evaluation

We have previously recommended that the initial environmental review should be undertaken in such a way that the differences in the environmental challenges relating to whether a company has several functions or levels of operations (fingerlings, growout, several areas of growout) are identified. This should be reflected in the levels of objectives so that these are adapted to the specific situation for each business unit. One may, however, have environmental objectives for the company as a whole as well as environmental objectives for the individual operational unit.

### Establish environmental objectives

The environmental objectives should be specific and to the extent possible be quantifiable and measurable. However, it is not always possible to give the environmental objectives in such a

way that they are quantifiable. One reason for this can be that one does not know enough about the status to give meaning to specific and quantifiable objectives. Nevertheless it may be desirable for the company to establish an environmental objective, e.g. regarding one of the areas given high priority by the authorities (escapes, lice, antibiotics etc.). The alternative may be to establish an objective that is not quantifiable during the first year, then undertake registrations and measurements, and thereafter establish a more quantifiable objective for the next period.

The procedure is as follows:

- **Identify significant environmental aspects**

As a general rule, environmental objectives should be established for aspects that have been given a "high priority" during the initial environmental review, i.e. aspects that have been evaluated as significant.

- **Check the environmental policy**

If there are aspects that the company has committed itself to, but which have not been included as a result of the initial environmental review, these aspects should be included with a corresponding environmental objective.

Examples of relevant environmental objectives:

NO	ENVIRONMENTAL OBJECTIVES
1.	Reduce the impact on the seabed at the Salmon Bay site.
2.	Biological feed factor to be reduced to less than 1.10 in the course of the next year.
3.	No antibiotics are to be used in our operations.
4.	Escapes of fish shall not occur
5.	We shall have the best possible control with and reduction of salmon lice
6.	Trout Lake water levels shall not be reduced to less than 0.5 m above the lowest allowable level.
7.	Approved deliveries with sorting of waste shall be established for all types of waste in the course of the next year.

The above list is of course not conclusive, and we must emphasise that each individual company must establish its own environmental objectives after a thorough review of its own environmental aspects.

When establishing the environmental objectives, the technological choices, the company

finances, operational methods and business requirements must be included in the evaluation and establishment of environmental objectives. This means that there must be a realistic possibility of achieving the objectives established by the company. On the other hand, it is also important that the objectives are sufficiently ambitious for the company to have something worthwhile to work towards.

It is important for the individual company to limit the number of environmental objectives in such a way that it becomes possible to achieve the improvements the company has identified as its objectives. One may therefore put some objectives on a “waiting list”, and then apply these when achievements have been realised in the fields of the highest priority.

### **Establish targets**

For each individual environmental objective, specific environmental targets shall be established. To an even greater extent than for the general environmental objectives, the targets should be quantifiable and measurable so that goal achievement can be controlled. Often it will be difficult to formulate these targets, as they sometimes have the character of actions that are necessary to achieve the overall objectives more than specifications of the overall environmental objectives. It may therefore be a practical approach to the requirements of the standard to reduce the number of objective levels and thus adapt to the reality of the company.

Example of targets / action within escapes:

**ENVIRONMENTAL OBJECTIVE: Escapes of fish shall not occur**

#### **TARGET / ACTION**

**All smolt when transferred to cages are to be counted**

**Testing of the strength of the nets shall be undertaken. Nets that do not meet the requirements of the Industry Standard shall be replaced.**

**When changing nets, the new nets shall be examined by divers before fish is transferred into the net.**

**An annual major control of moorings shall be carried out**

**Specific procedures for vessels delivering smolt or feed shall be established**

### **Goal achievement**

It is desirable, but not required, that environmental objective and targets are achieved. If objectives are not achieved, it is natural that these become environmental objectives for the following period. It may then be necessary to revise the ambitions included in the environmental objective as well as the targets in order to adapt these to the new situation.

In those cases where the company has achieved its objectives, or where the situation has improved so much that there is no longer any need to maintain the objective, the company should identify new aspects for which it may be desirable to establish environmental objectives. As times goes on, one may find oneself in a situation where all the top priority aspects have achieved improvements. It is then time to move down the list of priorities and work with aspects that were given a lower priority in the environmental review.

## 5.5 Environmental programme

The organisation shall establish and maintain an environmental programme in order to control its efforts in achieving objectives and targets. The environmental programme shall include distribution of responsibilities, setting a time frame and identify and allocate the resources necessary to complete the task or implement the investment.

For text in ISO 14001 about environmental programmes, see clause 4.3.4. An example of an environmental programme for environmental objectives regarding escapes:

<b>GENERAL ENVIRONMENTAL OBJECTIVE: Escapes of fish shall not occur</b>					
<b>TARGET / ACTION</b>	<b>PRIORITY</b>	<b>RESPONSIBILITY</b>	<b>TIME FRAME</b>	<b>RESOURCES<sup>1)</sup></b>	<b>COMMENTS</b>
<b>1. All smolt when transferred to cages are to be counted</b>	1	Site leader	01.01.2004	2 persons, 50 hours internal	
<b>2. Testing of the strength of the nets shall be undertaken. Nets that do not meet the requirements of the Industry Standard shall be replaced</b>	1	Chief of maintenance	April 2004	NOK 50 000	
<b>3. When changing nets, the new nets shall be examined by divers before fish is transferred into the net.</b>	1	Site leader	Continuous	NOK 200 000	
<b>4. An annual major control of moorings shall be carried out</b>	1	Chief of maintenance	Continuous	NOK 250 000, 100 hours internal	
<b>5. Specific procedures for vessels delivering smolt or feed shall be established</b>	1	Site leader	01.11.2003	20 hours internal	

*1) May be in the form of money, time, persons, equipment*

Similar environmental management programmes shall be established for each of the environmental objectives of the company.

If the company is involved in new development, starts new activities or is changing routines, products or services, the environmental management programme must be changed. In reality, this means that the company must undertake a review of the environmental review and the environmental objectives in order to see if these have to be revised.

## 5.6 Procedures and other documents

An important part of the environmental management system is procedures, routines, and other documentation designed to ensure direction and control over significant environmental aspects that have been identified. In addition, documentation to ensure that the company plans, controls and improves the environmental management system in compliance with the requirements of the standard are included in this part.

### **Procedures – requirements of ISO 14001 and EMAS**

ISO 14001 includes a detailed list of requirements for the environmental management system in its Chapter 4. EMAS has in the March 2001 version established the same requirements as ISO 14001. In the table below we have therefore made a proposed list of main procedures covering the requirements of ISO 14001.

We strongly emphasise that the individual company must adapt the collection of procedures to its own purposes. It is, i.a., important to co-ordinate this with other guidance systems. Several procedures will be the same whether they apply to quality control systems, HSE or environmental management systems. A procedure may therefore be described in detail in only one part, as long as there are references to this in other guidance systems and procedures. It is also important that there are good routines regarding the updating of the procedures so that updates are registered in all guidance systems.

NO	DOCUMENT	REQUIREMENT ISO 14 001 <sup>1)</sup>
1.	COMPANY, POLICY	
1.10	This is Environmental Salmon Ltd	
1.20	Environmental policy	4.2
1.30	Significant environmental aspects	4.3.1
1.40	Evaluation of environmental impact and environmental aspects – initial environmental review	4.3.1
1.50	Evaluation form – initial environmental review	4.3.1
1.60	Environmental programme	4.3.3 / 4.3.4
1.70	Procedures and other documents	4.4.4
2.	ORGANISATION	
2.10	Organisation chart	4.4.1
2.20	Job descriptions	4.4.1
2.30	Training, awareness and qualifications.	4.4.2
2.40	Internal and external communications	4.4.3 (a) / (b)
3.	PLANNING	
3.10	Identification of significant environmental aspects	4.3.1
3.20	Identification of legal and other requirements	4.3.2
3.30	Interested parties	4.3.3
3.40	Establishment of environmental objectives and environmental programme	4.3.3 / 4.3.4
4.	SYSTEMS AND PROCESS FOLLOW-UP	
4.10	Document control and registration	4.4.5 / 4.5.3
4.20	Environmental audit and management review	4.5.1 / 4.5.4 / 4.6
4.30	Non-conformance treatment and corrective and preventive action	4.5.2
5.	OPERATIONS, EMERGENCY PREPAREDNESS AND MONITORING	
5.10	Procedures controlling activities that influence significant environmental aspects	4.4.6
5.20	Emergency preparedness (several)	4.4.7
5.30	Monitoring and measurement (several)	4.5.1 / 4.5.3
5.40	Calibration of measuring instruments (several)	4.5.1
5.50	Purchases	4.4.6 (c)

1) EMAS has the same requirements with regard to content as ISO 14001, Chapter 4.

### Software for document control

The procedures handbook may be in the form of a paper printed handbook and/or in electronic form. There are a number of software programmes on the market that are specifically designed

for document development and control for such guidance systems. This software can simplify the work considerably for those in charge of the documentation, especially if the company has several systems to follow up.

### **Staff involvement - again**

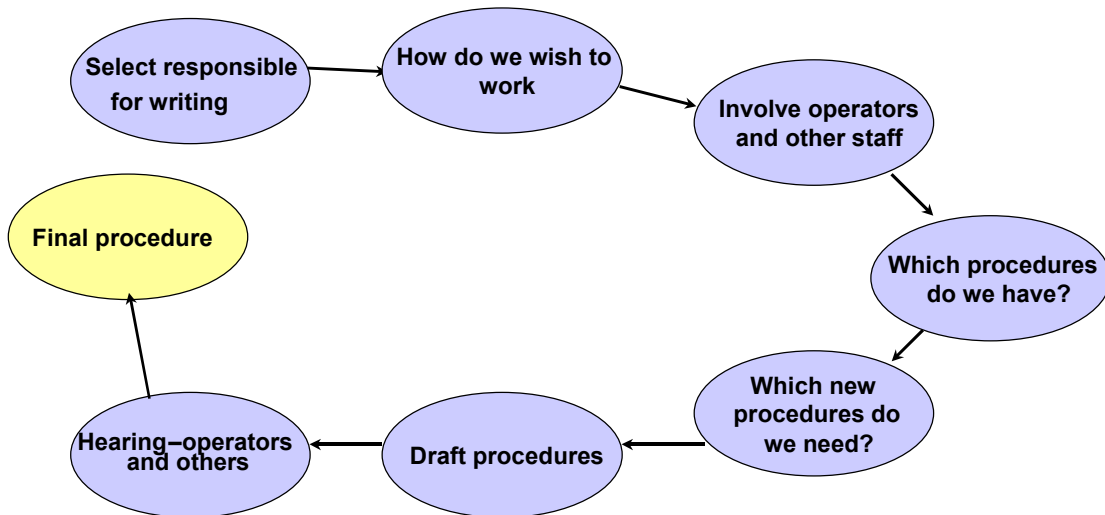
It is very important to involve the staff in the design of procedures, especially procedures regarding operations. There must be conformity between how the system describes the work tasks and what is happening in reality. The staff must therefore be involved in the actual design of the procedures. They will then also acquire an “ownership” in relation to the system, and the system will be “alive” for the company. When auditors review the company, they will focus especially on this.

### **The content of a procedure**

A proposal for a procedure template is found in Appendix 5. Procedures should include the following data:

- The objective of the procedure
- Scope
- Description of the work tasks – implementation (this is the most comprehensive part of the procedure)
- A list of responsibilities
- Document number, document title, date, name, who has written the procedure, references to other systems
- Signature by person responsible (all documents must be signed – also when updating)

## How to write a procedure



**Figure 5** Schematic description of how a procedure or other document may be made

There are several ways in which one may involve the operators and other personnel:

- Have a meeting with the operators. Be secretary and advisor, while the operators give inputs to the procedure
- Let the operators make draft procedures. This may require advice and a lot of time.
- If possible, arrange a meeting of operators from different sites.

### Development sequence of the procedures

We would recommend a somewhat different sequence than the sequence presented in the requirements of ISO 14001. Most companies are operations oriented, and it is therefore natural that the procedures for operations, emergency preparedness and monitoring are covered immediately after the environmental objectives have been established as these procedures are directly related to the environmental objectives. We shall cover the chapters in the following order (see the list of documents above):

- Operations, emergency preparedness and monitoring
- Organisation
- Systems and process follow-up
- Planning
- The company, policy

## 5.6.1 Operations, emergency preparedness and monitoring

### Operational procedures

The company must ensure that it is in control of processes related to significant environmental aspects identified earlier. In practice, this may be done in several ways:

- By deciding how the various tasks shall be performed, and to document this in written procedures or routines.
- By establishing standards for how specific equipment shall be designed (for example nets and moorings)

For text in ISO 14001 about operational control, see clause 4.4.6.

A simple form to identify the tasks and activities for which the company should have procedures and routines may be used. We have used salmon lice and waste to illustrate how the form can be used. Remember that this must be done for all identified significant environmental aspects, including those that the company has decided to postpone the establishment of environmental objectives for.

SIGNIFICANT ENVIRONMENTAL ASPECTS	TASKS AND ACTIVITIES
1. <b>Salmon Lice</b>	<ul style="list-style-type: none"> <li>▪ Counting and monitoring lice</li> <li>▪ Use of wrasse</li> <li>▪ De-licing through baths</li> <li>▪ Regional de-licing</li> </ul>
2. <b>Waste</b>	<ul style="list-style-type: none"> <li>▪ Collection and delivery of plastic bags</li> <li>▪ Agreement for collection of silage</li> <li>▪ Collection and delivery of other waste</li> </ul>

In this example, it is natural for the company to establish procedures that cover the tasks and activities covered in the right hand column. When practical, and when it does not affect the usefulness of the procedures, one procedure may cover several of the activities identified. Example: one procedure may cover both the counting of lice as well as the de-licing operation itself.

The procedures should be as concrete as possible with regard to how tasks are to be performed and what constitutes the limits for what one may accept or reject, or what ISO 14001 calls establishing operational criteria. Example: Instead of saying that a net shall not be used “when it is not strong enough”, one should for example say that it may not be used “when after stretch testing it shows that it has less than 70% of the original strength”.

## Suppliers

It is not only the company’s own activities and operations that affect the environment. Suppliers and their products also do so. Products and services used by the company are also covered by the standard. The company must therefore make procedures including the significant environmental aspects that can be identified for the products and services the company buys. This is covered in clause 4.4.6. of the standard.

By establishing requirements to the suppliers, the company can contribute to the reduction of environmental impact beyond what the company itself does. ISO 14001 requires that the company shall make demands on suppliers that have an influence on the company’s significant environmental aspects. In aquaculture, the operations of the feed producers, for example, and the characteristics of the products they supply, will be of importance. The same is true for producers of antifouling agents for the nets.

The company should set up a list of its suppliers and consider whether these have an impact on the significant environmental aspects.

## Emergency preparedness

The company must consider in which areas there is the greatest risk of accidents and emergencies, and develop procedures for handling these. The procedures shall describe preventive measures, how to limit damage, and how to limit the environmental impact.

For text in ISO 14001 about preparedness and prevention, see clause 4.4.7.

After serious incidents, including both near accidents and real accidents, the company shall review the procedures in order to evaluate whether there is reason to update or change the procedures. The company shall also undertake training for emergency situation if this is practically possible.

Some possible preparedness situations in aquaculture where the incident may have consequences for the environment:

Growout	Fingerlings
Escapes (all causes)	Escapes
Damage/total loss because of weather	
Large amounts of dead fish (disease, algae)	
Loss of large amounts of feed	
Fuel leaks	

### Monitoring and measurement

The company shall make sure that it can follow up and monitor the achievement of environmental objectives and to what extent it is having an impact on the environment. In order to meet this requirement, the company must collect data on significant aspects through monitoring. Much of the collection of data is done routinely anyway, so for most companies it is a matter of co-ordinating this requirement with routines that are already in place.

For text in ISO 14001 about monitoring and measurement, see clause 4.5.1.

The most important elements that the company needs to document are:

- Performance, especially to show that the company has control over the significant environmental aspects identified
- Operational control, also related to the company's control over significant aspects
- Conformance with basic objectives and targets
- Compliance with laws and regulations related to the environment

The company shall establish one or more procedures to ensure that these aspects are monitored and measured.

### Calibration

If the company is using equipment that needs to be calibrated for monitoring and measurement, it must register when calibration is done. The company should also have the same requirements for its suppliers, for example companies that undertake site studies with the use of measuring equipment.

## 5.6.2 Organisation

The procedures include organisation chart, job descriptions, training and communications documentation.

No	Procedure	Comments
2.10	Organisation chart	An organisation chart that shows general lines of responsibility as well as specific responsibilities for environmental issues.
2.20	Job descriptions	Job descriptions for positions with responsibility within environmental management.
2.30	Training, awareness and qualifications	Description of how employees shall be trained in the use of the environmental management system
2.40	Internal and external communications	Description of how internal and external communications are to be handled in the company

### Structure and responsibility – organisation chart and job descriptions

According to clause 4.4.1. of ISO 14001, tasks, responsibilities and authority shall be assigned, documented and communicated in order to achieve an effective environmental management.

For text in ISO 14001 about structure and responsibility, see clause 4.4.1.

The management has the responsibility to provide the necessary resources to introduce and operate an environmental management system, and management shall appoint a special representative of the management who shall:

- Make sure that the requirements of the environmental management system are established, implemented and maintained according to the standard
- Report on the system's performance to top management as a foundation for further continuous improvements.

The company should establish an organisation plan where it is clear which position is responsible, as the representative of management, and which other positions are responsible for various aspects of environmental management.

Job descriptions shall be made for that/those position(s) that have the responsibility for the environmental management system in the company.

### Training, awareness and qualifications

The standard establishes requirements regarding training of employees, both regarding their understanding of the importance of environmental management, what the tasks are, and what their own responsibilities are as well as the consequences of non-compliance with requirements. In addition, there are specific requirements about the qualifications of the staff that is charged

with performing the tasks specified.

For text in ISO 14001 about training, awareness and qualifications, see clause 4.4.2.

The establishment of procedures may be part of the training of the staff that the organisation has to undertake in connection with the implementation of the environmental management system, provided employees are involved in this work, as we proposed in Chapter 4.

Elements that should be included in the procedure are:

- A training plan. The need for training should be reviewed annually.
- All personnel involved in tasks that may have significant environmental impact shall be included in the training program to reduce this risk.

### **Internal and external communications**

The company shall establish and maintain procedures for internal communications between the different levels and functions in the company. There shall also be procedures for communications with external parties.

For text in ISO 14001 about communications, see clause 4.4.3.

#### ***Internal communications***

Elements that should be covered in internal communications to employees include:

- Information to employees regarding the environmental policy, environmental objectives and the environmental programme
- Information about procedures that are relevant for their own work tasks (in this, training is also very important)
- Results of following up accidents and near accidents (for example escapes)

Reporting from employees to management is also important:

- Reports on acute incidents to superiors
- Proposals for improvements of procedures that reduce the environmental impact

In order to ensure proper communications, regular operational meetings shall be held (every fortnight or every three weeks), where environmental issues and environmental management are discussed in addition to other operational issues.

### *External communications*

There are two aspects of external communications that should be covered. The company shall describe how:

- Input from interested parties shall be handled and responded to
- The significant environmental aspects should be communication externally

Please note that the company should "register its decision" on how it wants to communicate the significant aspects to the outside world. This means that there should be a document describing how this shall be done.

## 5.6.3 Systems and process follow-up

The procedures include document control and registrations, environmental audit and the management review, as well as non-conformance handling and corrective action.

No	Document	Comments
4.10	Document control and registration	Description of how documents shall be handled and updated.
4.20	Environmental audit and the management review	Description of how the audit is to be done (content, frequency, responsibility, management review, etc.)
4.30	Non-conformance handling and corrective action	Description of how non-conformance shall be handled and how corrective and preventive action shall be implemented.

### **Document control and registration**

The company shall have procedures for document control in order to ensure proper identification of the documents, that they are reviewed at regular intervals, that the necessary documentation exists where the work tasks are done, and that outdated documents are removed and marked.

It is also a requirement that the company shall have procedures to ensure that registrations are done in the proper manner. We have chosen to treat these aspects in one procedure.

For text in ISO 14001 about document control, see clause 4.4.5.

For text in ISO 14001 about registration, see clause 4.5.3.

Elements that should be covered in document control include:

- Responsibility for writing and updating the documents in the environmental management system

- Unambiguous labelling of the documents with name, date, etc. (see example of procedures in Appendix 5)
- All approved documents shall be signed by the person responsible
- Instructions as to where the documents shall be kept (files and paper copies); different documents may be available at different levels or in different operational units).
- How often shall the documents be reviewed and updated
- Removal / identification of outdated documents: for example destruction of outdated paper copies and marking outdated files.

Important elements about registrations:

- Descriptions of what the registration shall include, registrations from training, audits and reviews are obligatory
- In addition, it is important to register information that enables the company to check whether the environmental objectives have been achieved, whether the company has control over circumstances relating to significant environmental aspects, and whether legal and other requirements are observed.
- Storage time of the registrations (remember that requirements regarding this are included in several official regulations)
- How shall the registrations be stored.

### **Environmental audit and management review**

The company's internal control of its observance of important guidance documents such as the environmental policy, objectives and programme, and whether the environmental management system is adequate, are important elements in environmental management. The environmental audit and the management review are the tools that shall ensure a systematic appraisal of the system. We have chosen to describe the related requirements in one procedure.

For text in ISO 14001 about audit of the environmental management system, see clause 4.5.4.

For text in ISO 14001 about the management review, see clause 4.6.

Important elements that should be described in a procedure for environmental audit:

- How often should an audit be undertaken, and what elements of the environmental management system should be included in the audit
- How shall the audit be carried out (notice of audit, programme, opening meeting / interviews and observations, closing meeting)
- Qualification requirements of the internal auditor
- Who is responsible for carrying out the audit
- Who shall receive the auditor's report (management first, then other employees who are

affected by it)

Important elements in the management review:

- How often shall it be done
- What shall the review be based on; internal audit reports, non-conformance handling, etc.
- Evaluation of the need for changing parts of the environmental management system, the environmental policy, the environmental objectives or other elements in the system in light of the results of internal audits and non-conformance handling
- Minutes shall be taken
- Who shall receive information about the results of the management review

### **Non-conformance handling and corrective and preventive action**

Non-conformance handling shall ensure that the company identifies mistakes that are made in relation to guidelines included in the environmental policy, objectives, procedures and other guidance documents. In addition, it is important to identify accidents and near accidents in order to avoid such later.

Non-conformances should be registered on separate forms where there is room for both registration of the non-conformance and a description of which initiatives that have been made in the short term (corrective action) and in the long term (preventive action). It may be useful to call non-conformance handling improvement action in order to create a more positive attitude towards this work. The non-conformance report may then be called “Improvement report”. Example of such a form is included in Appendix 5.

For text in ISO 14001 about non-conformance and corrective and preventive action, see clause 4.5.2.

Important elements in a procedure for non-conformance handling:

- Non-conformances are corrected immediately by whoever caused or discovered the non-conformance
- Both corrective and preventive action shall be considered
- Non-conformance forms shall be filed, preferably in a separate folder
- Non-conformances and the handling of same should be discussed in management meetings and operational meetings so that the company may learn from the mistakes
- If the company changes its procedures as a result of non-conformance handling, this must be registered

## 5.6.4 Planning

The procedures in this chapter describe how the company works with identifying significant environmental aspects, establishes environmental objectives and the environmental programme.

In the practical review to identify the significant environmental aspects, we have combined the requirements relating to identification of significant environmental aspects, the identification of legal and other requirements and the identification of the views of interested parties in one initial environmental review. When describing how the requirements of the standards are to be observed in practice, we have chosen to describe this in three separate procedures. The individual company may choose to describe the requirements in fewer procedures if desirable.

No	Procedure	Comments
3.10	Identification of significant environmental aspects	Describe how the process is organised in relation to identification of significant environmental aspects
3.20	Identification of legal and other requirements	
3.30	Interested parties	
3.40	Establishment of environmental objectives and environmental programme	Describe how the process is organised in relation to establishing environmental objectives and environmental programme

### *Identification of significant environmental aspects*

For text in ISO 14001 about environmental aspects, see clause 4.3.1.

The procedure should describe the most important elements in the review, as it has been described in Chapter 5.3. Some important elements:

- The company's activities, products and services shall be considered
- Only those aspects that the company can control or have some influence over, shall be included
- Both normal and irregular conditions shall be considered
- How often shall the company update its review of the environmental aspects to ensure that the environmental objectives are relevant at all times
- Make a work sheet (see Appendix 4)

Several elements in the procedural content are to be found in Chapter 5.3, where the practical implementation is described.

### *Identification of legal and other requirements*

For text in ISO 14001 about legal and other requirements, see clause 4.3.2.

- How shall the company gain access to an overview of legal and other requirements related to the company
- The company shall make a list of the requirements
- How and how often shall the company update the information; the company should make sure that it is continuously updated.
- Information to employees

#### ***Identification of the views of interested parties***

The requirement of taking into consideration the views of other interested parties is only described in ISO 14001, clause 4.3.3, where it is stated that the views of interested parties shall be considered when establishing the environmental objectives. We recommend that a procedure is established to describe how the company shall handle this. Some pointers:

- Who are the interested parties (in the view of the company)
- How shall the views of the interested parties be registered to ensure that the company has a full view of and is able to document these inputs (telephone log, other oral inputs, letters, e-mails etc.)
- How shall these inputs be handled (important inputs should be handled through the non-conformance procedures)
- Information to those employees who may be affected by these inputs

#### ***Establishment of environmental objectives and environmental management programme***

In this procedure the company shall describe how environmental objectives and targets as well as the environmental management programme shall be developed. We have chosen to combine the requirements in two clauses of the ISO 14001 standard into one procedure.

For text in ISO 14001 about objectives and targets, see clause 4.3.3.

For text in ISO 14001 about environmental management programmes, see clause 4.3.4.

Some important elements in the procedure:

- The environmental objectives shall be consistent with the environmental policy
- The company shall establish environmental objectives for each relevant function and level of the company
- The environmental objectives must be specific and the targets must be measurable if at all possible
- In establishing the environmental objectives, the following issues shall be considered:
  - Legal and other requirements
  - The company's significant environmental aspects

- Technological options
- Financial, operational and business requirements
- The views of interested parties

## 5.6.5 The company, policy

In this chapter, we shall describe how the company and the environmental management system shall be documented (procedures 1.10 and 1.70). The remaining documents shall be the current version of the completed documents that the company has developed. These are not covered here.

No	Document	Comments
1.10	This is Environmental Salmon Ltd	Short description of the company
1.20	Environmental policy	The environmental policy approved by the top management of the company
1.30	Significant environmental aspects	The company's list of significant environmental aspects
1.40	Evaluation of environmental impact and environmental aspects – initial environmental review	The written evaluation which is to follow the review of the work sheet (see Chapter 5.3)
1.50	Evaluation form – initial environmental review	The completed form (see Chapter 5.3)
1.60	The environmental management programme	The completed environmental management programme including environmental objectives and targets
1.70	Procedures and other documents	Description of the establishment and maintenance of necessary documentation

### *Description of the company*

This document should be made as a one-page overview including the following elements:

- Company name, address, telephone number, telefax number, e-mail address
- Company registration number, license number
- Business area
- Managing director, CEO
- Position/person responsible for the environmental management system (management representative), and other key personnel involved in environmental matters
- Certification
- Other information such as owners, board of directors etc.

### *Procedures and other documents*

The company shall have a description, either electronic or on paper, of the main elements of the environmental management system, including where other relevant information may be found.

For text in ISO 14001 about documentation of environmental management systems, see clause 4.4.4.

Some elements for a procedure:

- The main elements of the system shall be described; which documents are included in the system, which folders the documents can be found in, which computer / files the documents are stored in.
- Which position categories shall have access to which documents
- Where shall folders be stored, or where shall files be available
- References to other documents in the company that have not been included in the documentation of the environmental management system:
  - Detailed instructions for the use of equipment, machines etc that may have an environmental impact, but which are too detailed to be included in the collection of procedures
  - Operational procedures that are not directly related to the environmental management system but which are a part of the company's total management system
  - Other related systems, such as for example the HSE and/or HACCP system.

## 6. Implementing the environmental management system

### **Theory and practice must be compatible**

One of the most important tasks for those who audit the environmental management system is to make sure that the system corresponds to reality. When a procedure for the control of nets exists, the auditor expects to find that the control is performed in accordance with the description in the system. If he is in addition convinced that non-conformances are handled in a correct manner, a long step towards approval of the system has been made. Only then is the system implemented in the company.

Implementation and use is therefore dependent on all employees knowing the system and understanding what the system requires of them in their daily work.

### **Proposal for implementation process**

Often one person in the company is charged with the task of both establishing the environmental management system and implementing it in the company. We have made a proposal for how such an implementation process may be done. We emphasise that there are many ways to achieve this, and that the implementation process must be adapted to the individual company.

- Management involvement. The involvement of management is extremely important, also after the management decision to introduce the system. The environmental management system should be an integral part of management meetings.
- The official date of implementation should be clearly established.
- The environmental management system should be a regular item for discussion in management meetings also at the middle management level.
- Internal audits should be undertaken within 3 to 6 months after the implementation of the system so that one may see whether it has been implemented according to intentions and whether it is necessary to apply increased efforts to make the organisation follow up.
- It is important that the internal audit is used to motivate the employees, not just to be a control function.
- It may be useful to introduce incentives to encourage practical use of the system, for example “friendly competition” between sites or operational units.
- Decision about certification will put extra pressure on the company to get things moving

and may in many cases be advantageous for the proper implementation of the system.

## 7. Environmental audit

### Three types of audit

It may be useful to distinguish between three types of audit:

- **First Party Audit**  
The objective is to evaluate the company's environmental management system by using the company's own resources; this is usually called an internal audit.
- **Second Party Audit**  
Evaluation of the company's ability to supply products and services.
- **Third Party Audit**  
The objective is usually to evaluate in connection with certification/registration.

In this chapter we shall concentrate on the First Party Audit as a management tool to examine to what extent the environmental management system has been implemented and whether it function according to intentions. Internal audits is also one of the main management tools to ensure continuous improvement.

There are specific standards for environmental audits in the ISO 14001 series.

### Undertaking the audit

An environmental audit should contain the following elements:

- Appoint an audit team
- Decide the scope of the audit
- Set up an audit programme
- Notify the unit to be audited and management
- The audit should follow the following sequence:
  - Opening meeting to ensure that all practical details are in order, agree on a time schedule and inform all interested parties
  - Examine the system's conformance with the standard and with the environmental policy
  - Examine if environmental objectives and targets, environmental programme and procedures are implemented and appropriate; visit the site, talk to operators and make notes.
  - Write a report
  - Closing meeting where the report is presented for the involved parties.

An audit can be done more or less formally. The persons performing the audit should adapt to a certain degree to the unit visited, but we do recommend a measure of formality in the process.

It is very important that one creates a good atmosphere during the audit so that the audited unit and persons understand that the audit is part of the improvement programmes and that it is not undertaken "to get" those who do not observe the procedures.

### **Auditor's report**

The auditor's report shall be submitted to management and to the unit audited. As internal audits form such an important part of the improvement efforts, audit reports will be reviewed by the certification institution during its audit of the company.

### **Audit team**

It may often be an advantage if two persons undertake at least some of the audits so that one gets more than one person's impressions of the situation. The auditors should receive some training in auditing.

### **Scope and frequency**

Parts of the system should be selected for each audit. It would be too much to go through the whole system during each audit. Which parts to be selected should be determined by their importance, by the results of previous audits, and general knowledge of problem areas. Internal audits should be done once or twice per year, usually more frequently in the beginning. The whole system should be covered by audits in the course of 1 – 1.5 years.

It may be useful to make an overall audit plan that focuses on:

- The activities and areas to be covered by the audit
- How often should the audit be done. Twice a year is usual.
- Responsibility for leading and undertaking the audit.
- Communication of the audit results
- The auditor's qualifications
- How the audit will be done

### **Non-conformance and observations**

In connection with the audit, the auditor makes a list of non-conformance and observations. There are several ways of defining these concepts. We suggest that matters that are not consistent with the standard and the company's environmental management system are called non-conformances. Observations are then matters that could have been done better, but which are not in breach of the formal requirements.

### **Auxiliary forms**

The following auxiliary forms are included in Appendix 5:

- Notice of audit and audit report
- Form for questions and notes
- Form for non-conformance and observations.

### **EMAS**

EMAS intends the company to:

- Register with EMAS
- Undertake audits as specified in the EMAS requirements

EMAS registration will be commented on in the next chapter.

The internal environmental audit shall give an overview of the environmental effort and control that the guidance system is effective and understood. Not all activities need to be audited at the same time or with the same frequency. The company may establish an auditing cycle that imply that high-risk activities are audited more frequently than lower risk activities. The company is free to choose its own auditing cycle as long as it does not exceed three years. The EU Commission has given guidelines for the establishment of auditing frequency.

		The complexity of the company		
		Low	Medium	High
Number of years since first registration	Less than 2 years	2 years	1 year	1 years
	Less than 4 years	3 years	2 years	1 year
	More than 4 years	3 years	3 years	2 years

Source: EMAS Handbook, Norwegian Federation of Industries

## 8. Certification, environmental report and registration

Some of the requirements under these issues differ quite a bit from ISO 14001 to EMAS, and we have therefore chosen to treat these separately.

### 8.1 ISO 14001

#### **The certification process**

The company's tasks in the certification process are to:

- Establish an environmental policy, environmental objectives and guidance documents
- Implement the environmental management system
- Maintain and improve the system
- Abide by the environmental policy and achieve the environmental objectives
- Apply for certification

Each certification institution has its own way of completing the certification process, but the differences are usually marginal. In general, the process includes:

1. The company applies for certification
2. The certification institution appoints a lead auditor and an industry auditor (aquaculture)
3. The certification institution goes through the documentation. This can be done on the company's premises, or the certification institution is sent the relevant documentation.
4. Non-conformance and needs for improvements must be attended to by the company within a set time frame, for example maximum 6 months (usually 1-2 months)
5. The main audit takes 1-2 days and is usually done 1-2 months after step 3
6. The audit report including non-conformance and observations is submitted, and the company is usually given 3 months to implement corrective action
7. The audit team visits the company again to control that corrective action has been completed
8. If this is satisfactory, a new certificate is usually issued for a period of 3 years
9. Audit by the certification institution is usually done 1-2 times per year; re-certification is usually done every second or third year.

#### **Important points for the company at certification**

Below we give some examples of important points that the certification institution usually put emphasis on during the certification process:

## WHAT IS CHECKED DURING CERTIFICATION?

- That the environmental policy is comprehensive and relevant for the company
- That the objectives and targets are based on the policy and are measurable
- That the system shows how the company implements policy and achieves objectives
- That training is important and that there are practical training programmes
- That environmental issues are considered in new projects. The company must be able to show procedures and documentation that ensures this
- Employees' awareness and understanding of the environmental management system. They should know the intentions and have the correct attitude. Involvement is easy to measure!
- Responsibility and authority in accordance with the environmental management system must be known by employees
- Access to relevant legal and other requirements as well as conditions for permits and emission permits. For growout operations, these must be found in each site, or in a common database
- Environmental review and measurements that show environmental status
- Continuous registration is important to measure goal achievement
- The system for handling non-conformance must be "alive" and uncover all relevant and important environmental non-conformances. These must be attended to and followed up by corrective and preventive action.
- Environmental pollution is prevented through proper preventive procedures and maintenance
- Operational procedures and control procedures that ensure control over the environmental aspects must be in place
- Internal and external communications must function well
- Internal audits must be undertaken and must function as an improvement tool
- Management review must be completed and the management must have performed a real evaluation of the environmental management system's relevance, policy and objectives

*Source: Nemko Certification*

### **Environmental report**

ISO 14001 does not require certified companies to write an environmental report. The standard requires only that the environmental policy is available to the general public (clause 4.2.f), and that the company shall decide how it communicates its significant environmental aspects externally (clause 4.4.3).

There may, however, be good reasons to write a report on the company's environmental efforts. An environmental report may be used for a number of purposes, such as vis-avis- environmental authorities, local authorities, fisheries authorities, as well as customers. It should be written in a clear and easily understandable way, it should be brief, and in many cases it constitutes a good promotion of the company. The Federation of Norwegian Industries (NHO) has published guidelines for how an environmental report should be written. A Norwegian standard, *NS 9440 Environmental reporting*, has been established, and may be used as a guideline in writing the environmental report.

## 8.2 EMAS

In EMAS, certification is closely related to the development of a so-called environmental statement. The certification institution is called an environmental verifier in EMAS terminology.

The main objective of the environmental statement is to give the general public a correct view of the company's environmental efforts and environmental activities, as well as a description of the company's intended efforts in environmental issues. The environmental statement shall be written for each industrial activity area that is participating in the arrangement.

### **When to make an environmental statement?**

Environmental statements shall be made when:

- The company is first registered
- At the end of each auditing cycle
- In those years when environmental audits are not performed, a simplified environmental statement shall be made (this may be discussed with the environmental controller)

### **Scope and level of detail**

The scope and level of detail can vary considerably, dependent on what type of relevant environmental statement that is relevant. The information should be relevant, plausible and comparable from year to year. It should be reader friendly and explain any professional concepts used.

An adequate length of the statement is 5-6 pages for a medium sized company (50 – 200 employees). Such a relatively short statement requires an extra effort in relation to what information to include, and is more demanding to write than a 20-page document.

### **Content**

The statement should include the following:

- A description of the company's activities

- An evaluation of all significant environmental aspects
- An overview including quantitative information regarding emissions, waste, use of raw materials, water, energy etc.
- Other factors relevant to the environmental effort
- A presentation of environmental policy, environmental programme and environmental management system
- The deadline for submitting the next environmental statement
- The name of the accredited environmental controller

The environmental statement shall focus on significant changes since the previous auditing period.

### **Approval by the environmental verifier**

The environmental statement shall be approved by an accredited environmental verifier. Both Norwegian and foreign verifiers may be used. A list of the Norwegian environmental verifiers is included in appendix 3, or can be obtained from Norwegian Accreditation or The Norwegian Federation of Industries. The foreign environmental verifiers are listed in the Official Journal of the European Communities.

### **Registration**

In order to obtain EMAS registration, the company has to fill out the application form which can be obtained from the Brønnøysund registers. The completed forms are then sent with an approved environmental statement to the Brønnøysund registers for registration. The name of the registered industrial area will then be listed in:

- An EMAS register in the Brønnøysund registers
- An EMAS register in the Official Journal of the European Communities.  
(<http://europa.eu.int/eur-lex/da/>)

Depending on the size and complexity of the company, an approved environmental statement shall be submitted to the Brønnøysund registers every three years.

In order to obtain EMAS registration, the company must observe all relevant legal and other requirements related to the environment. If an EMAS registered company violates any such regulations, the pollution authorities (Norwegian State Pollution Control Authority or the County Governors) have the right to demand that the company is not registered, or that it is removed from the EMAS register.

### **EMAS logo**

EMAS registered companies have the right to use a specific logo, for example on their stationary. This logo is the same for all of Europe, and will thus be recognised abroad. The

company's environmental engagement and efforts is thus easily visualised. It is not, however, allowed to use this logo directly on products, or on advertisements for the products. There are also four different statements that can be used in conjunction with the logo.

# Appendix 1 – Explanation of concepts

Please also see Chapter 3 in ISO 14001 and Article 2 and Annex I in the EMAS regulation.

## ***Environmental policy***

The company's basic objectives and principles with regard to environmental issues, including conformity with relevant legal environmental requirements.

## ***Environmental review***

A thorough initial assessment of the environmental aspects, environmental impact and environmental efforts of the company.

## ***Environmental impact***

Any change in the environment, be it negative or positive, which in whole or in part is caused by an organisation's activities, products or services.

## ***Environmental aspect***

Part of the organisation's activities, products or services which can influence the environment.

## ***Environmental programme***

A description of the company's practical objectives and activities intended to better protect the environment. This includes a description of those activities that are initiated or planned in order to achieve the objectives, as well as deadlines to achieve the activities and objectives.

## ***Environmental objectives***

Basic objectives, based on the environmental policy, that the company defines, and that are quantifiable to the extent possible.

## ***Environmental management system***

That part of the company's total management system which relates to the environmental policy, significant environmental aspects, environmental objectives, environmental programme, procedures and activities which meet the requirements of ISO 14001 or EMAS.

## ***Environmental audit***

A systematic review of the environmental management system in order to control whether it is in compliance with the requirements of the standard and the requirements set by the company itself. The result shall be communicated to the management of the company.

## Appendix 2 – Useful web pages

### Norwegian addresses:

Lovdata (Legal data)	<a href="http://www.lovdata.no">www.lovdata.no</a>
Norwegian State Pollution Control Authority	<a href="http://www.sft.no">www.sft.no</a>
Ministry of Fisheries	<a href="http://www.odin.dep.no/fid/">www.odin.dep.no/fid/</a>
Ministry of the Environment	<a href="http://www.odin.dep.no/md/">www.odin.dep.no/md/</a>
Ministry of Agriculture	<a href="http://www.odin.dep.no/ld/">www.odin.dep.no/ld/</a>
Directorate of Fisheries	<a href="http://www.fiskeridir.no">www.fiskeridir.no</a>
Directorate of Nature Management	<a href="http://www.naturforvaltning.no">www.naturforvaltning.no</a>
NHO (Norwegian Federation of Industries)	<a href="http://www.nho.no">www.nho.no</a>
Norwegian Accreditation	<a href="http://www.justervesenet.no/na/">www.justervesenet.no/na/</a>
Norwegian Federation of Standardisation	<a href="http://www.standard.no">www.standard.no</a>
Brønnøysund registers	<a href="http://www.brreg.no">www.brreg.no</a>
The Official Journal of the European Communities	<a href="http://www.europa.eu.int/eur-lex/en/">www.europa.eu.int/eur-lex/en/</a>
Norwegian Seafood Federation	<a href="http://www.fiskeoppdrett.no">www.fiskeoppdrett.no</a>
Norwegian Fisheries and Aquaculture Federation	<a href="http://www.fhl.no">www.fhl.no</a>
The Norwegian State Industrial and Regional Development Fund	<a href="http://www.snd.no">www.snd.no</a>

### Other Useful addresses:

ISO 14001	<a href="http://www.iso.org/iso/en/ISOonline.frontpage">www.iso.org/iso/en/ISOonline.frontpage</a>
EMAS	<a href="http://www.europa.eu.int/comm/environment/emas/">www.europa.eu.int/comm/environment/emas/</a>
Aquaculture links	<a href="http://www.seaweb.org">www.seaweb.org</a> <a href="http://www.agriculturelaw.com/links/aqua.htm">www.agriculturelaw.com/links/aqua.htm</a>

## Appendix 3 – List of accredited certification institutions / environmental verifiers

**As of December 2002, companies accredited in Norway for ISO 14001 were also accredited for EMAS in the industry group “Aquaculture and hatcheries”:**

Det Norske Veritas Certification AS

[www.dnv.com](http://www.dnv.com)

Dovre Sertifisering AS

Tel: 51 50 01 70

Nemko Certification AS

[www.norsert.no](http://www.norsert.no)

Teknologisk Institutt Certification AS

[www.teknologisk.no/ti-sertifisering](http://www.teknologisk.no/ti-sertifisering)

## Appendix 4 – Auxiliary form – initial environmental review

*Consider:*

- *Activities, products, services*
- *Normal situations, start-up situations, completion and potential emergency situations*
- *In addition to today's situation, the company should also consider previous and planned situations*

NB: The company must review and adapt the environmental aspects in the left hand column to what is under consideration (smolt / growout / other) and its own situation.

<i>Area / Environmental aspect</i>	<i>Growout / smolt</i>	<i>Does the company have adequate information? Y/N</i>	<i>Evaluation</i>			<i>Conclusion</i>
			<i>Environmental impact</i>	<i>Legal and other requirements</i>	<i>Interested parties</i>	
<b>Emissions to air</b>						
- noise from generator						
- incineration of waste						
- odours						
- exhaust						

<i>Area / Environmental aspect</i>	<i>Growout / smolt</i>	<i>Does the company have adequate information? Y/N</i>	<i>Evaluation</i>			<i>Conclusion</i>
			<i>Environmental impact</i>	<i>Legal and other requirements</i>	<i>Interested parties</i>	
<b>Emissions to water</b>						
<i>Chemicals</i>						
- antibiotics						
- lice feed						
- anti-lice agent						
- anaesthetics						
- anti-fouling (copper)						
- formic acid						
- malachite green						
- vaccines (leakage during vaccination)						
- cleaning and disinfection agents						
- other chemicals						
<i>Organic material</i>						

<i>Area / Environmental aspect</i>	<i>Growout / smolt</i>	<i>Does the company have adequate information? Y/N</i>	<i>Evaluation</i>			<i>Conclusion</i>
			<i>Environmental impact</i>	<i>Legal and other requirements</i>	<i>Interested parties</i>	
- excess feed / feces						
- nutrient						
- waste from rafts						
- breakdown of feeding equipment						
- organic material from nets						
<i>Disease / infections</i>						
- salmon lice						
- disease (ILA, IPN etc.)						
<i>Other</i>						
- heated wastewater						
<b>Waste / waste treatment</b>						
- dead fish						
- silage						
- plastics						

<i>Area / Environmental aspect</i>	<i>Growout / smolt</i>	<i>Does the company have adequate information? Y/N</i>	<i>Evaluation</i>			<i>Conclusion</i>
			<i>Environmental impact</i>	<i>Legal and other requirements</i>	<i>Interested parties</i>	
- moorings (land and sea)						
- cages on land (whole or parts)						
- nets						
- batteries						
- waste oil / oil filters						
- ordinary waste						
<b>Soil pollution</b>						
- buried waste						
- fuel leaks						
<b>Consumption of raw materials / natural resources / energy</b>						
- raw material for feed from wild stocks						
- GMO						
- use of freshwater						

<i>Area / Environmental aspect</i>	<i>Growout / smolt</i>	<i>Does the company have adequate information? Y/N</i>	<i>Evaluation</i>			<i>Conclusion</i>
			<i>Environmental impact</i>	<i>Legal and other requirements</i>	<i>Interested parties</i>	
- heating of water						
<b>Transport</b>						
- fuel for transport vessels						
- fuel for well boats						
- other fuel						
- road transport of packaged fish						
<b>Risk of accidents</b>						
- escapes						
- large amounts of dead fish (algae, disease)						
- fuel leaks						
- loss of large amounts of feed						
<b>Impact on biodiversity</b>						
- escapes						
- salmon lice						

<i>Area / Environmental aspect</i>	<i>Growout / smolt</i>	<i>Does the company have adequate information? Y/N</i>	<i>Evaluation</i>			<i>Conclusion</i>
			<i>Environmental impact</i>	<i>Legal and other requirements</i>	<i>Interested parties</i>	
- contagious diseases						
- predators						
- fishing of wrasse						
<b>Other local and community matters</b>						
- use of light on cages						
- parking						

**Evaluation criteria:**

<b>Criteria</b>	<b>3 points</b>	<b>2 points</b>	<b>1 point</b>	<b>Not applicable</b>
<b>Environmental impact</b>	Great	Medium	Small	NA
<b>Legal and other requirements</b>	Non-compliance		Compliance	NA
<b>Interested parties</b>	Significant input	Moderate input	Insignificant / no input	
<b>Conclusion</b>	High priority	Medium priority	Low priority	

## Appendix 5 – Example of procedures

Doc no.:	<b>Precedure template</b>			<b>Environmental Salmon Ltd</b> ENVIRONMENTAL MANAGEMENT
Page of 1 1	Date:	Author:	Approved sign.:	

**OBJECTIVE:**

**SCOPE:**

IMPLEMENTATION		RESPONSIBLE
1.		
2.		
3.		
4.		

<b>NOTICE OF AUDIT</b> <input type="checkbox"/>	<b>ENVIRONMENTAL SALMON LTD</b>	
<b>AUDIT REPORT</b> <input type="checkbox"/>		
<b>Audit no.:</b>	<b>Date :</b>	<b>Oper. unit:</b>
<b>What is to be audited :</b>		
<b>Audit programme :</b>		
Opening meeting time :	Interview / visit time:	Closing meeting time:
<b>Audit team:</b>		
<b>We would like to meet with :</b>		
<b>Participants in opening meeting :</b>	<b>- closing meeting :</b>	

<b>What we would like to review:</b>

<b>Short summary / results of audit (see encl. detailed report):</b>	
<b>Performed by :</b>	<b>Approved by :</b>
Date :	Date :
<b>Distribution :</b>	



**ENVIRONMENTAL SALMON LTD**

**AUDIT CHECK-LIST**

Page: \_\_\_\_\_

<b>Audit no. :</b>		<b>Audit date :</b>	<b>Auditor :</b>
<b>Company / unit :</b>		<b>Function / department :</b>	<b>Interviewed person(s) :</b>
<b>No.</b>	<b>Question</b>	<b>Document ref.</b>	<b>Reply / comments</b>



**SND**

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Telefax: (+47) 2242 3222  
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