

ANNEX E

USE OF SCIENCE AND EVIDENCE IN AQUACULTURE CONSENTING AND THE SUSTAINABLE DEVELOPMENT OF SCOTTISH AQUACULTURE

International Aquaculture Regulation

Information provided by the Scottish Government Central Analysis Division.

Norway

The Norwegian Directorate of Fisheries (DoF)'s website is a useful source of information describing the application processes and regulations relevant to aquaculture businesses¹.

Norwegian aquaculture is mainly controlled by the following regulations:

- The Aquaculture Act² – operational requirements including release of medicines – reference to land use, conservation and cultural heritage.
- The Food Act³ – food production and food safety.
- Ports and Waters Act⁴ – navigation and water safety.
- Pollution Control Act⁵ – to ensure no harmful pollution occurs as a result of the activity. Assesses potential conflict with wildlife and biological diversity, fish, nature, outdoor life and the interests of the general public.
- The Planning and Building Act⁶ – land use plans, environmental impact assessment.

Figure 1 outlines the different authorities involved in giving permission and overseeing aquaculture in Norway.

¹ [The Directorate of Fisheries | Marine life – our shared responsibility \(fiskeridir.no\)](https://www.fiskeridir.no)

² [Layout 1 \(regjeringen.no\)](https://www.regjeringen.no)

³ [Food Production and Food Safety Act etc. \(Food Act\) - Lovdata](#)

⁴ [Aquaculture Act - Lovdata](#)

⁵ [Act relating to protection against pollution and waste \(the Pollution Control Act\) - Lovdata](#)

⁶ [Act relating to planning and processing of building applications \(Planning and Building Act\) - Lovdata](#)

Governance: Formal organizations

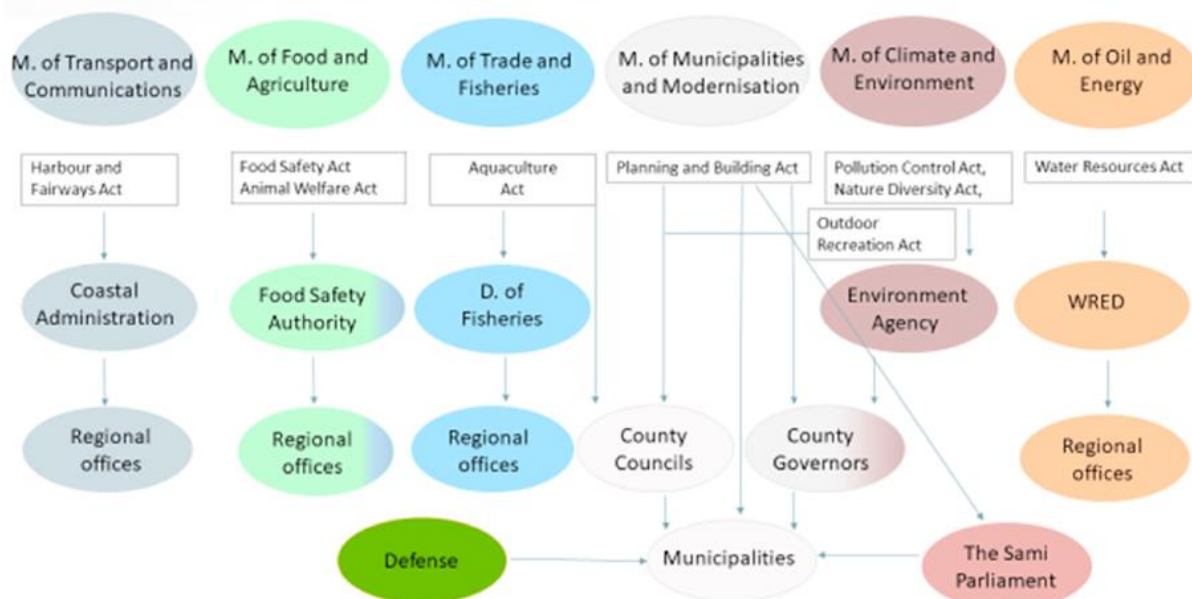


Figure 1. The different authorities involved in giving permissions and overseeing aquaculture in Norway⁷

In order to start an aquaculture site in Norway you need two types of individual licenses.

First, a production license. These licenses were first allocated for free, object to strict regulations pertaining to ownership (one license per owner) and volume of net pens, later to be sold at fixed prices and finally partly allocated by auction. They will grant the license holder to either a 780 tonne maximum allowed biomass, or 945 tonne in the northern most regions. If eligible, additional biomass can be purchased to increase this biomass allowance, farms are only eligible when in a green zone (the traffic light system for regulating growth at aquaculture sites is discussed in further detail later on in this section). These licenses are administered by the Directorate of Fisheries.

Secondly, in addition to the production license, all operators need a site license. These are allocated by the county, if in accordance with the municipal area plan, and in line with a range of sector authorities who approve or object in line with their mandates. Figure 2 demonstrates the process to gain a site license.

⁷ [Hersoug, B., Mikkelsen, E. and Osmundsen, T.C., 2021. What's the clue; better planning, new technology or just more money? – The area challenge in Norwegian salmon farming. Ocean and Coastal Management, Vol 199](#)

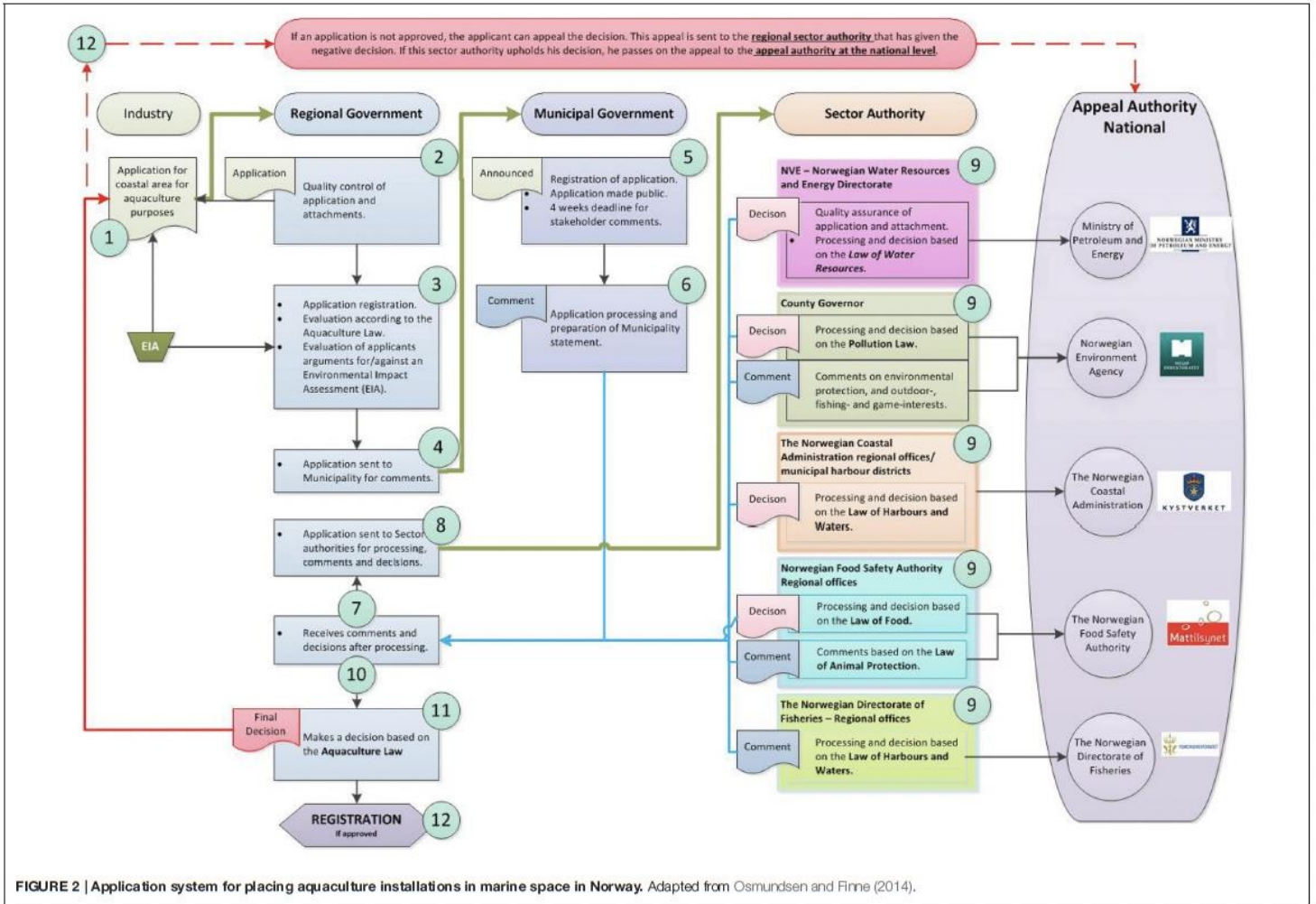
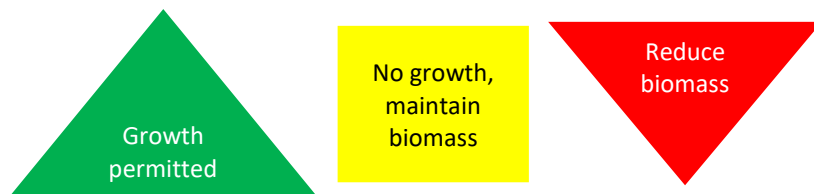


FIGURE 2 | Application system for placing aquaculture installations in marine space in Norway. Adapted from Osmundsen and Firne (2014).

Figure 2. Application process for an aquaculture site license in Norway⁸

In Norway regional growth is limited on an environmental perspective through a traffic light system based on the modelled impact of sea lice on different marine regions. Coastal regions are subdivided into 13, and each region given a rating (red, yellow, green) based on the modelled impact of sea lice that year. Less than 10% risk for increased mortality in wild salmonids is defined as low impact, 10%-30% is moderate impact, whilst greater than 30% is high impact. The scientists assign the impact level, and the Government are responsible for assigning the colour to regulate biomass, and they carry out this assessment every second year. Growth is permitted in green zones only, and in red zones biomass must be reduced, whilst biomass can be maintained within yellow zones.



⁸ Tiller, R.G., De Kok, J-L., Vermeiren, K., and Thorvaldsen, T., 2017. Accountability as a Governance Paradox in the Norwegian Salmon Aquaculture Industry, *Frontiers in Marine Science*, Vol. 4

The Norwegian traffic light system is underpinned by a modelling framework comprised of the Institute of Marine Research (IMR) dispersion model, SINTEF's numerical ocean model, SINMOD, the Norwegian Veterinary Institute (NVI) risk model, and smolt migration models, which are used to predict the impact of sea lice levels on local wild populations. An expert group comes together annually, and they examine the series of models and datasets producing a report that is sent forward to a steering group that makes a final decision on the risk-zoning, who then advise the Ministry⁹. The steering group is currently led by Eirik Biering (NVI), with Karin K. Boxaspen (IMR) and Tor F. Naesje (Norwegian Institute for Nature Research (NINA) in Trondheim). The science underpinning the assessment has since been evaluated by the Research Council of Norway using an international committee, and their evaluation report is publicly available and includes commentary on models used, and estimates of uncertainty¹⁰.

The Norwegian government launched a new aquaculture strategy, "A Sea of Opportunities" on 6 July 2021, which sets out the strategy for the next 10-15 years and focuses on the industry's sustainable growth. Among other objectives is a broad review of the licensing system to make it more uniform and co-ordinated, to examine the effectiveness of using biomass as a limit on production, and to improve the traffic light system, as well as setting out future research and innovation policy. The conclusions of this review are expected in September 2023.

The topic of digitalisation and sharing of data is also discussed within the plan and a commitment to further research, as well as a goal to make regulation as technology neutral as possible to facilitate innovation. A new technical standard for aquaculture facilities (NYTEK22) is in development that aims to incentivise use of new technology.

⁹ [SLC 2022: Karin K. Boxaspen, Research Director, Institute of Marine Research, NORWAY - YouTube](#)

¹⁰ [an-evaluation-of-the-scientific-basis-of-the-traffic-light-system-for-norwegian-salmonid-aquaculture.pdf \(forskningsradet.no\)](#)

Canada

Aquaculture is regulated differently, depending on the province within Canada. In the provinces of British Columbia and Prince Edward Island they are regulated federally by Fisheries and Oceans Canada; whilst in Ontario, Quebec, New Brunswick Nova Scotia, and Newfoundland and Labrador they are regulated provincially.

Across Canada, fish farming is managed sustainably under the *Fisheries Act*¹¹. Federal partners work together to make sure fish are healthy and safe to eat.

Table 1. Outline of responsibilities between federal and provincial powers in Canada¹²

| | British Columbia (BC) | PEI (Prince Edward Island) | Rest of Canada |
|--|------------------------------|-----------------------------------|-----------------------|
| Site approval | Shared | Shared | Provincial |
| Land management | Provincial | Federal | Provincial |
| Day-to-day operations and oversight | Federal | Federal | Provincial |
| Introductions and transfers | Shared | Shared | Shared |
| Drugs and pesticide approvals | Shared | Shared | Shared |
| Food safety | Federal | Federal | Federal |

In British Columbia, under the *Pacific Aquaculture Regulations*¹³ and the *Aquaculture Activities Regulations*¹⁴, licence holders are required to submit reports to Fisheries and Oceans Canada (DFO) that fall into two broad categories: scheduled reports and event-based reports.

All reports are reviewed by DFO to validate content, to ensure that they contain all elements required by the licence conditions, and to determine if they were submitted on time.

DFO is developing the General Aquaculture Regulations (GAR)¹⁵ to improve and consolidate DFO's diverse regulatory provisions pertaining to aquaculture into one comprehensive set of regulations. DFO has begun development of a proposed national Aquaculture Act¹⁶. Also proposed is the amendment and consolidation of all aquaculture-related regulatory provisions under the *Fisheries Act*, including those of the *Pacific Aquaculture Regulations* and *Aquaculture Activities Regulations*, into one set of regulations under the proposed Act. These new regulations would help operationalize the proposed *Aquaculture Act*.

¹¹ [Fisheries Act \(justice.gc.ca\)](https://www.justice.gc.ca)

¹² [Regulating and monitoring British Columbia's marine finfish aquaculture facilities - 2020 \(dfo-mpo.gc.ca\)](https://www.dfo-mpo.gc.ca)

¹³ [Pacific Aquaculture Regulations \(justice.gc.ca\)](https://www.justice.gc.ca)

¹⁴ [Aquaculture Activities Regulations \(justice.gc.ca\)](https://www.justice.gc.ca)

¹⁵ [Forward Regulatory Plan 2022-2024 \(dfo-mpo.gc.ca\)](https://www.dfo-mpo.gc.ca)

¹⁶ [Federal Aquaculture Act \(dfo-mpo.gc.ca\)](https://www.dfo-mpo.gc.ca)

For the development of new sites, aquaculture must comply with key environmental and health legislation, e.g. Health of Animals Act¹⁷, Food and Drugs Act¹⁸ and Species at Risk Act¹⁹. Licences for marine finfish generally last for 6 years.

DFO, Transport Canada and the British Columbia Ministry of Land, Water and Resource Stewardship work together to review applications, using a combined application form for all three agencies. A digital platform, FrontCounter BC²⁰, provides a single point of contact for all applications.

¹⁷ [Health of Animals Act \(justice.gc.ca\)](http://justice.gc.ca)

¹⁸ [Food and Drugs Act \(justice.gc.ca\)](http://justice.gc.ca)

¹⁹ [Species at Risk Act \(justice.gc.ca\)](http://justice.gc.ca)

²⁰ [FrontCounter BC Discovery Tool - Pages - Natural Resource Online Services \(gov.bc.ca\)](http://gov.bc.ca)