SEAWEED CULTIVATION IN SCOTLAND

A guide for community participation in seaweed farm applications

SIFT
Sustainable Inshore Fisheries Trust

Credit: Cat Wilding

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Find out more at www.cornishseaweed.co.uk

DISCLAIMER

This Guide provides an overview of the processes involved in seaweed aquaculture. Much of the content is drawn from the publications and websites of relevant public agencies. Readers should note that aquaculture and its regulation is constantly evolving. So the content of the Guide may be superseded by newer regulations. Readers seeking to engage with an aquaculture development should obtain specific professional advice at the earliest possible stage.

Sugar kelp growing on cultivation lines.
Credit: Cat Wilding

CONTENTS

INTRODUCTION

What is seaweed cultivation?

There is growing interest in seaweed cultivation around the coasts of Scotland. Particular attention is being paid to the cultivation of kelp and similar species which have high growth and biomass. The main species of interest are: *Laminaria hyperborea* (cuvie), *Laminaria digitate* (oarweed), *Saccharina latissima* (sugar kelp), *Alaria esculenta* (dabberlocks), *Saccorhiza polyschides* (furbellow). Cultivated seaweed can be used for a variety of purposes, including human consumption, animal feed, biofuel, fertiliser, cosmetics and pharmaceuticals.

There are significant risks if the industry is allowed to expand without taking sufficient account of the potential effects on marine ecosystems.

Seaweed cultivation largely takes place on long-lines which are suspended below the water (often in grids) and fixed in place by a system of buoys and anchors. Cultivation will generally take place in coastal areas which provide sufficient nutrients and appropriate depth, salinity and temperature. Typically, seeding of long-lines will take place in the autumn with a view to harvesting the following spring or early summer. Harvesting is usually conducted from a boat, with the seaweed either being removed from the long-lines by hand or using some sort of mechanical cutter[1], and then transferred to land for processing. Seaweed cultivation can also take place alongside fish farming, particularly as a means to reduce the nutrient impacts of this activity.

Harvesting kelp, Cornish Seaweed Company.
Credit: Cat Wilding

Since November 2018, applications have been submitted to grow and harvest seaweed in an area covering more than 2 million square metres of the Scottish marine area and the sector is expected to continue growing. Whilst there are many socio-economic benefits to be gained from the sustainable development of the seaweed industry, there are also significant risks if the industry is allowed to expand without taking sufficient account of the potential effects on marine ecosystems or the consequences for other legitimate uses of the marine environment.

1 Harvesting techniques are likely to evolve as the industry develops and it has been recognised that 'increasing harvesting efficiency is *crucial* to reduce costs and optimise harvesting times'; see *Seaweed Farming Feasibility Study for Argyll and Bute* (November 2019) 36.

What is the purpose of this guide?

The guide provides an overview of the potential impacts of seaweed cultivation in Scotland, how those impacts are managed through the regulatory process, and how communities can participate in the process.

The guide is divided in two sections:

SECTION 1

UNDERSTANDING IMPACTS

This section provides an introduction to the potential impacts of seaweed cultivation. We hope this will help local communities to understand how proposals for seaweed cultivation in their area might impact upon the marine environment and other marine activities. Many of the impacts will depend upon the scale and location of proposed seaweed cultivation. There are also uncertainties about the severity of many impacts. This part also highlights the types of questions that individual stakeholders or communities may want to ask about proposals to develop seaweed cultivation in their local area.

SECTION 2

UNDERSTANDING OPPORTUNITIES

This section explains the policy and legal framework which applies to seaweed cultivation and the decision-making processes for the authorisation of seaweed farms. It also sets out the opportunities for stakeholder participation in the decision-making process with a view to ensuring that local communities can make their voices heard in the debate about the future development of the seaweed industry in Scotland.

SECTION 1

UNDERSTANDING IMPACTS

Potential benefits of seaweed cultivation

It is widely accepted that seaweed cultivation offers opportunities for economic activity which can bring jobs and income to coastal communities around Scotland. Seaweed cultivation may also increase marine biodiversity, as cultivated seaweed will provide both food and shelter for other marine organisms whilst it is growing. In its natural condition, seaweed provides important habitats for a number of fish and crustacean species and some fish, sea urchins and molluscs graze on seaweed. In turn, this can attract and support other marine life, such as birds and mammals.

There is also growing support for the potential benefits of Integrated Multi-Trophic Aquaculture (IMTA) which involves the co-location of seaweed cultivation with finfish aquaculture. The objective of IMTA is to mimic nutrient flows between ecosystem components so that the excess nutrients from finfish aquaculture, which could otherwise harm the marine ecosystem, provide nutrition to seaweeds that are grown for commercial purposes.

Research from other countries has suggested that many ecosystem services can be positively affected by well designed and well operated seaweed farms.[2] This includes potential carbon sequestration benefits arising from seaweed growth – although the long-term benefits are significantly dependent upon the fate of the seaweed after it has been harvested. It should be noted that this same research also underlines that 'emerging industries can result in unforeseen ecological and societal consequences' and it is therefore vital that careful impact studies are carried out prior to any activity being authorised.[3]

> Seaweed cultivation offers opportunities for economic activity which can bring jobs and income to coastal communities around Scotland.

2 See L Hasselström et al, 'The impact of seaweed cultivation on ecosystem services – a case study from the west coast of Sweden' (2018) 13 *Marine Pollution Bulletin* 53-64.

3 Ibid, 53.

Potential adverse environmental impacts of seaweed cultivation

Impacts on seabed habitats

The impacts of a seaweed farm on the seabed will depend upon the character of the seabed underneath a farm, as well as the proposed method of anchoring the farm in place. There is the potential for some habitat loss arising from the installation of the infrastructure, for example if concrete anchoring structures are used. However, it may be possible to hold the long-lines and supporting grids in place in less intrusive ways, such as by means of anchors.

Relevant questions

- What are the proposed methods of anchoring the farm infrastructure in place?
- What consideration has been given to the impacts on seabed habitats?
- How regularly will the anchoring structures be checked and how?

Impacts on marine species

One of the risks posed by the infrastructure deployed for the purposes of seaweed cultivation is entanglement of marine mammals and other larger marine species (e.g. sharks, turtles) in the lines or ropes used to secure the site. The risks will depend upon the scale and type of equipment used. For example, greater risks may arise if a seaweed farm employs seeded nets rather than long-lines.[4] In contrast, the risks posed by smaller seaweed farms using long-lines are thought to be low.[5] Risks can be minimised if the anchoring lines are kept at high tension, but this requires on-going maintenance of farming sites. In any case, the scientific literature reinforces that 'entanglement of animals cannot be completely ruled out, even when assuming cultivation practices will be managed to reduce the likelihood of entanglement.'[6] Risks can be further minimised by careful siting of a facility away from known areas which are used by relevant marine species for foraging, feeding or breeding, as well as careful monitoring and reporting of entanglements. Seaweed farms should also be located away from known migration routes of marine mammals and other migratory marine species, such as salmon, in order to minimise obstacles to migration.[7]

Relevant questions

- How has the location and design of a site taken into account the potential impacts on marine species known to be present in the local area?
- Is there a designated Marine Protected Area in existence in the local area, and, if so, what are the Priority Marine Features the site(s) is designated for?
- What is the on-going maintenance schedule for a site and what impacts might it have over time?

See Seaweed cultivation in sites designated under relevant nature conservation legislation on page 27.

4 *Seaweed Farming Feasibility Study for Argyll and Bute* (November 2019) 78.

5 Scottish Government, *Environmental Assessment (Scotland) Act 2005 – Seaweed Policy Statement Consultation Document: Environmental Report* (August 2013) para. 7.2.7.

6 I Campbell et al, 'The Environmental Risks Associated with the Development of Seaweed Farming in Europe – Prioritising Key Knowledge Gaps' (2019) 6 *Frontiers in Marine Science* Article 107.

7 Scottish Government, *Environmental Assessment (Scotland) Act 2005 – Seaweed Policy Statement Consultation Document: Environmental Report* (August 2013) para. 7.2.6.

Impacts on tidal currents/water movement

The structures used for the purposes of seaweed cultivation will have impacts upon water movements, particularly by absorbing and deflecting wave energy, which could have knock-on effects for coastal hydrology. Risks will increase for larger facilities or in areas where hydrodynamics have an important influence on local marine ecosystems. The assessment of such impacts must take into account local conditions, as well as cumulative impacts of other processes and activities which may affect water movements.

Relevant question

- To what extent have the proposal's impacts on tidal currents and water movements been assessed?

Impacts on genetic diversity

There is a risk that genes from cultivated seaweed may flow into neighbouring wild seaweed communities. Little is currently known about the effect of such gene flow from cultivated seaweed species[8] but it is evident that the risks are likely to be impacted by the practices adopted by cultivators in selecting the seaweed for cultivation. Recent research suggests that there may be substantial genetic diversity amongst seaweed populations of the same species.[9] In order to protect genetic diversity, it is recommended that seedstock should not be collected directly from cultivated seaweed[10] but rather should be collected from naturally occurring seaweed from the same body of water in which the seaweed farm is located.[11]

Relevant questions

- What protocols have been established for sourcing seedstock for the seaweed farm?
- What biosecurity measures will be put in place in order to ensure that non-local variants are not inadvertently introduced?

Seaweed pathogens

Little is known about pathogens connected with European species of seaweed[12], but there is a risk that cultivated seaweed could provide a vector for inadvertently spreading disease, including to naturally occurring specimens. Evidence from commercial seaweed farming to date suggests that the risks of disease transfer are likely to be low[13] but further research may be needed in order to address uncertainties in the science.

Relevant question

- What protocols have been established to minimise the risk of pathogens?
- How regularly will growing stock be inspected for signs of disease and how?

8 I Campbell et al, 'The Environmental Risks Associated with the Development of Seaweed Farming in Europe – Prioritising Key Knowledge Gaps' (2019) 6 *Frontiers in Marine Science* Article 107.

9 *Seaweed Farming Feasibility Study for Argyll and Bute* (November 2019) 51.

10 Ibid 13.

11 Ibid, 51.

12 See I Campbell et al, 'The Environmental Risks Associated with the Development of Seaweed Farming in Europe – Prioritising Key Knowledge Gaps' (2019) 6 *Frontiers in Marine Science* Article 107.

13 *Scottish Government, Environmental Assessment (Scotland) Act 2005 – Seaweed Policy Statement Consultation Document: Environmental Report* (August 2013) para. 7.2.12.

Alien invasive species

The introduction of alien invasive species can be highly disruptive to natural ecosystems and it can have significant economic impacts. As a result, most countries take this risk very seriously and restrictions are placed on the introduction of non-native species. The introduction of non-native species of seaweed is addressed by the legal framework in Scotland, which makes it a criminal offence to plant or otherwise grow any plant in the wild outside of its natural range.[14] This is reinforced by the Seaweed Cultivation Policy Statement which provides that 'only species native to the area where seaweed cultivation will take place should be cultivated.' Such requirements need to be strictly enforced in order to ensure that they are effective. Moreover, particular care needs to be taken where seaweed seedstock is reared in hatchery facilities which serve seaweed farms located in different areas.[15]

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Another potential risk arises from the movement or construction of infrastructure to support seaweed cultivation, which may provide a platform to support the transfer of other alien marine organisms through the marine environment.

Relevant question

- What biosecurity plans or measures[16] are in place to minimise risks posed by alien invasive species?

Checking on growth of some 3 month old juvenile Sugar Kelp.
Credit: Sophie Corrigan

Impacts of seaweed detritus

Inevitably, some seaweed will be lost during the cultivation process, either as a result of wave action or natural decomposition. Such fragments may end up on the seabed, potentially smothering existing seabed habitat. In small quantities, such loss is unlikely to be problematic although the precise impacts will depend upon the area of dispersal and which species may be present.

Relevant question

- What assessment has been undertaken of the potential impact of seaweed detritus on the surrounding seabed?

14 Wildlife and Countryside Act 1981, s. 14(2).
15 *Seaweed Farming Feasibility Study for Argyll and Bute* (November 2019) 51.
16 See e.g. Scottish Natural Heritage/Firth of Clyde Forum, *Marine Biosecurity Planning: Guidance for Producing Site and Operation-based Plans for Preventing the Introduction of Non-Native Species* (February 2014).

Other pollution impacts

Other potential sources of pollution include discarded or lost ropes or other parts of the mooring system that is used in the cultivation process. Modern equipment is designed to be robust and therefore accidental loss or degradation should be kept to a minimum, provided that the equipment is properly used and maintained.

Relevant questions

- What is the nature of the materials that will be used in the proposed facility?
- How will accidental loss or damage be avoided?
- How will seedlings be attached to the mooring system?

Increased activity during the seeding and harvesting periods may also cause additional noise pollution at a site. Whilst the overall impacts are unlikely to be great, given the scale and limited timeframe, it is necessary to take into account local conditions in order to ensure that disturbance is not caused to species which use a particular location during the relevant period, for example at a seal haul-out site[17] or a known breeding site for wild birds.

Relevant questions

- What local wildlife may be affected by increased activity around a seaweed farm, particularly during seeding and harvesting?
- What measures have been taken to avoid or minimise disturbance?

Seabed shading

As cultivation of seaweed takes place on long-lines suspended in the water column, cultivated seaweed may reduce the light that is available to underlying seabed habitats, what is known as seabed shading. This is particularly an issue for cultivation taking place in shallower waters or for larger scale cultivation.
The impacts of seabed shading will depend upon the sensitivity of species found in proximity to a proposed seaweed farm. In particular, it has been suggested that co-location with maerl beds and seagrass beds should be avoided, as both habitats are sensitive to shading effects.[18] At a minimum, the shading effects of seaweed cultivation must be taken into account when determining the location of a seaweed farm.

Relevant questions

- How has seabed shading been taken into account in the selection of the site?
- Are there any known marine species or habitats at the proposed location which could be negatively affected by reduced light in the water column?

17 See Protection of Seals (Designation of Haul-Out Sites) (Scotland) Order 2014 (as amended) for a list of specific sites.

18 See I Campbell et al, 'The Environmental Risks Associated with the Development of Seaweed Farming in Europe – Prioritising Key Knowledge Gaps' (2019) 6 *Frontiers in Marine Science* Article 107.

Nutrients

It is a condition of existing marine licences that the marine environment is not artificially enriched for any purpose. However, seaweed removes nutrients from the marine environment as it grows. This may result in nutrient depletion in surrounding waters, with impacts for other marine species or the broader marine ecosystem. Evidence from other parts of the world has shown that excessive seaweed farming can deplete nutrients in localised areas.[19] Such risks must be avoided in Scotland. Small-scale cultivation is unlikely to have significant detrimental impacts on nutrient levels and may even have positive effects where seaweed removes excess nutrients caused by other human activities, such as fish farming. As the scale of seaweed farming increases, the risk that cultivation could negatively impact upon nutrient levels, not only through direct absorption of nutrients, but also by affecting the water flow around the site in a manner which impacts upon nutrient levels in other places. Such impacts may not only occur at the level of an individual seaweed farm but may have cumulative impacts where multiple sites are co-located.

Relevant questions

- What information is available relating to nutrient levels at the proposed site?
- What assessment has been made of the impacts of cultivation on nutrient levels at the site, and of the cumulative impact of other sites in the area?
- Has current/flow modelling been developed to understand in-water movement of nutrients?

Visual impacts

Most proposals for seaweed farms are concerned with the erection of long-lines which are suspended below the sea surface. This reduces the visual impact that farming will have on the seascape. Nevertheless, all sites will have some form of buoy system (potentially including illuminated marks) to ensure safety of navigation and to prevent collision with farm infrastructure. The extent of any visual impact will depend upon the proposed size of the development and its proximity to the shore. The character of the area (for example if it is a National Scenic Area) will also be a relevant factor in assessing visual impacts. Cumulative visual impacts of multiple sites must also be taken into account. Developers should expressly consider the visual impacts of their proposal in their application including through the use of accepted standardised Visual Impact Assessment (VIA) methodologies.[20]

Relevant questions

- What number, size and colour of buoys and other features which may be visible at the water surface are proposed?
- What VIA methodologies, including verifiable visualisations of the site, have been provided?

19 Scottish Government, *Environmental Assessment (Scotland) Act 2005 – Seaweed Policy Statement Consultation Document: Environmental Report* (August 2013) para. 7.2.17.

20 See www.nature.scot/professional-advice/landscape/landscape-tools-and-techniques/landscape-and-visual-impact-assessment

Impacts upon other marine users

Regardless of the environmental impacts of seaweed cultivation, it will affect other users of the marine space. To date, most proposals for seaweed cultivation cover relatively small areas, from 200 m^2 to 500,000 m^2 (50 hectares) and their impacts may be limited. However, as the industry develops, it is possible that seaweed farms will take up increasing space and other marine users would be increasingly affected.

The extent of any displacement depends upon the nature and scale of activity of other marine users. Some activities will be highly incompatible with seaweed cultivation - for example, trawling or creeling, because of the risk of entanglement with the farm's infrastructure - at least during the seaweed growing season. For other marine users, the impacts will depend upon the precise design of the seaweed farm, for example, where seaweed is grown on long-lines which are suspended several meters under the water surface, it may still be possible for individuals to kayak over the area.

Impacts upon other marine users of proposed activities is a key consideration of the marine licensing process and it is therefore vital that any potentially affected users of the marine environment are well informed about the precise implications of a proposal for their particular interests.

Relevant question

- How have the potential displacement effects of the farm, as a consequence of its size, design and seasonal use been assessed?

Impacts of future expansion of seaweed cultivation on communities

Seaweed cultivation in Scotland is a new industry and most proposals to date have been for small-medium sized sites. It is plausible that sites will expand in future. It is therefore important when considering the possible environmental and other impacts of a proposal that it's maximum – rather than starting - capacity is taken into account.

Relevant question

- What plans are there to expand production over time?

It is also important to consider how the expansion of a seaweed farm may impact upon other stakeholders if the expansion takes the form of new small-medium sized sites in proximity to, as opposed to an extension of, the original site.

Relevant question

- How will the cumulative impacts from multiple sites be assessed?

Harvesting kelp, Cornish Seaweed Company.
Credit: Cat Wilding

Impact of transport activity and shore-based expansion

Consideration needs to be given to the impacts of support vessel traffic and land-based facilities. Seaweed farms will not typically demand the level of monitoring required of finfish farms, however maintenance, harvesting and seeding will all require vessel-based support. Once harvested, seaweed will have to be processed, which will require infrastructure on land. This may take place in the vicinity of the proposed seaweed farm (potentially creating additional local employment opportunities) or the harvested seaweed may be transported by land or sea to processing facilities elsewhere. These land-based operations should be taken into account when considering the full range of impacts that a seaweed farm may have on the local community.

Relevant questions

- What level of marine traffic associated with the site is projected?
- What land-based impacts – including odour, effluent treatment, noise and vehicle traffic - associated with the site are projected?

As the planned use and market for the seaweed product will dictate the amount of land-based infrastructure required, it is reasonable to consider the implications these will have for other stakeholders.

Relevant questions

- What is the expected market for the harvest?
- What product will be created and how much of this will be done locally?

SECTION 2

UNDERSTANDING OPPORTUNITIES

Seaweed cultivation policy framework

National Marine Plan

The National Marine Plan was adopted in 2015 in order to provide an overarching policy framework for the sustainable development of the seas around Scotland, including the sustainable use of its resources. Public authorities must have regard to the National Marine Plan in their decision-making and any authorisation or enforcement decision (such as the granting of a marine licence discussed below) must be made in accordance with the policies within the National Marine Plan, unless relevant considerations indicate otherwise.[21]

The National Marine Plan is structured around five objectives, namely:

- achieving a sustainable marine economy;
- ensuring a strong healthy and just society;
- living within environmental limits;
- promoting good governance; and
- using sound science responsibly.

In furtherance of these objectives, the National Marine Plan sets out a range of general policies which apply to all marine activities. In addition, it includes a number of sector specific policies relating to sea fisheries; aquaculture; wild salmon and diadromous fish; oil and gas; carbon capture and storage; offshore wind and renewable energy; recreation and tourism; shipping; ports; harbours and ferries; submarine cables; defence; and aggregates.

The General Policies contained in **the National Marine Plan provide a set of overarching considerations which all developments in the marine environment must take into account.**[22] Broadly speaking, the General Policies promote developments which will provide economic and social benefits to Scottish communities and a particular emphasis is put on local job creation and training opportunities, as well as improved quality of life and community regeneration. At the same time, the National Marine Plan underlines that all environmental impacts of any activity must be taken into account.

21 See Marine (Scotland) Act 2010, s. 15.

22 The main text of the General Policies is contained in Annex 1 of this document.

This includes addressing the impacts of an activity on local environmental conditions, including impacts on marine protected areas[23] or priority marine features[24], but it also covers broader environmental considerations such as climate change mitigation and adaptation. **Furthermore, any visual impacts must also be taken into account**, particularly in National Scenic Areas, National Parks, World Heritage Sites, locally designated areas, wild land areas, or coastlines which are largely undeveloped. Wherever possible, decisions **should take into account not only the impacts of an individual development, but broader cumulative impacts of developments in the marine environment**.

As well as identifying the considerations that must be taken into account by decision-makers when authorising new developments or activities in the marine environment, the National Marine Plan also demands that the procedures that are followed are inclusive, fair, and transparent.

Whilst the National Marine Plan does contain a chapter on Aquaculture, it is largely concerned with finfish and shellfish farming. Nevertheless, some of the Aquaculture policies are worded in general terms, which means that they may apply to other forms of aquaculture, such as seaweed cultivation. The overarching objective in the Aquaculture chapter is to promote *'an aquaculture industry that is sustainable, diverse, competitive, economically viable and which contributes to food security whilst minimising environmental impact.'* In furtherance of this objective, the Aquaculture policies provide that:

- Marine planners and decision makers should seek to **identify appropriate locations** for future aquaculture development and use;
- Marine and terrestrial development plans should jointly identify areas which are potentially suitable and sensitive areas which are unlikely to be appropriate for such development;
- **Aquaculture developments should avoid and/or mitigate adverse impacts** upon the seascape, landscape and visual amenity of an area, following [Nature Scot] guidance on the siting and design of aquaculture;
- The Scottish Government, aquaculture companies and local authorities should work together to **maximise benefit to communities from aquaculture development**;
- **Operators should carry out pre-application discussion and consultation** and engage with local communities and others who may be affected, to identify and, where possible, address any concerns in advance of submitting an application.

23 For these purposes, marine protected areas include Nature Conservation Marine Protected Areas, Marine Special Areas of Conservation, Marine Specially Protected Areas, Marine Sites of Special Scientific Interest and Marine Ramsar Sites; see section 4 below.

24 For a list of Priority Marine Features, see www.nature.scot/professional-advice/protected-areas-and-species/priority-marine-features-scotlands-seas

Seaweed Cultivation Policy Statement

It has been recognised that there is a gap in the National Marine Plan in relation to seaweed cultivation[25] and it is likely that this gap will be addressed during the next review of the National Marine Plan in 2021.[26] In the meantime, the Scottish Government has developed a Seaweed Cultivation Policy Statement, which provides guidance on the types of developments which will be given approval.[27]

The Seaweed Policy Statement provides that the Scottish Government is **supportive of 'small-medium farm seaweed cultivation'**[28], provided that they align with the policies in the National Marine Plan. Small-medium sized farms are defined in the Policy Statement as operations with up to 50 x 200m lines. The emphasis on small-medium sized farms in the Policy Statement does not necessarily rule out applications for larger sized developments being approved.

The Seaweed Policy Statement goes on to underline a number of specific requirements that must be met by a developer when proposing seaweed cultivation, including that:

- only species that are native to the particular area should be farmed;
- equipment used in cultivation should be fit for purpose to withstand damage from adverse weather conditions;
- other marine users and activities should be considered in the siting of farms.

The Policy Statement also expresses support for Integrated Multi-Trophic Aquaculture (IMTA) systems, which involves the co-culture of species, such as seaweed and shellfish. The development of such activities goes beyond the scope of this guide, which is focussed on seaweed cultivation as an individual activity. In particular, IMTA systems will require a broader range of regulatory approval, given that they also involve the rearing of fish. For further information on the approval procedures for finfish and shellfish aquaculture developments, see the Marine Aquaculture Consenting Guide produced by the Sustainable Inshore Fisheries Trust and the Marine Conservation Society.

25 See National Marine Plan Review 2018: Three-year report

26 Any changes are likely to be informed by the outcome of the Seaweed Review initiated by the Scottish Government in 2018; see www.gov.scot/Topics/marine/seamanagement/seaweedrev

27 The full text of the Policy Statement is contained in Annex 2 to this document.

28 Policy 1.

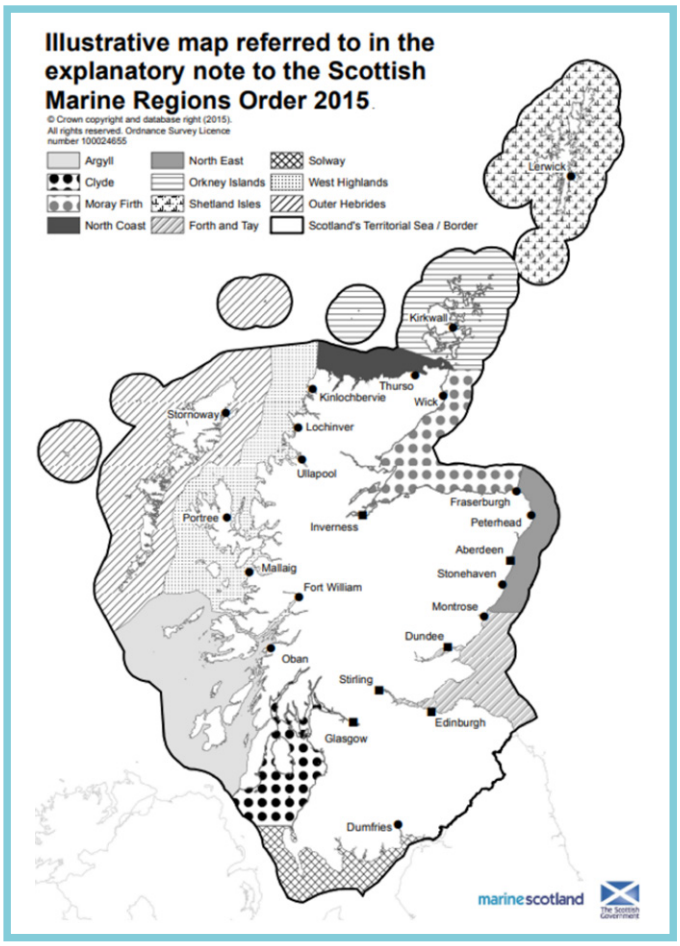
Regional Marine Plans

Alongside the National Marine Plan, it is anticipated that a number of Regional Marine Plans will be developed at a regional level.

These documents are intended to provide more detailed policies which take into account the specific characteristics of the region. There are 11 marine regions which have been established by the Scottish Government.[29] These marine regions extend up to 12 nautical miles from the baselines from which the territorial sea is measured.

To date, the regional marine planning process has been initiated in just three regions, namely Clyde, Shetland and Orkney[30], and no Regional Marine Plan has yet been formally adopted. However, the draft Regional Marine Plans which have been produced in the Clyde and Shetland contain specific policies on seaweed cultivation as discussed below.

Figure 2: Scottish Marine Regions.



The Shetlands

The Draft Shetland Islands Regional Marine Plan identifies two existing seaweed cultivation sites in the Shetlands and it sets out the following policy for future development:

Figure 3: Shetland Islands seaweed policy

POLICY MP SWD1

Seaweed Cultivation Applications for the development of seaweed cultivation should demonstrate that: a) they have complied with all policies included in Policy Framework Section (a) and (b) and Policy MP DEV1; b) there will be no adverse effects on the integrity of a Natura 2000 site or a proposed site; c) only seaweed species native to Shetland will be grown; d) measures are included to prevent the introduction and spread of non-native species; and e) there is no artificial enrichment of the marine environment to aid production.

29 See the Scottish Marine Regions Order 2015.

30 Powers to carry out regional marine planning in Orkney were delegated to Orkney Islands Council in September 2020.

The Clyde

The Pre-consultation Draft Clyde Regional Marine Plan explains that there is currently no existing commercial seaweed cultivation in the Clyde and it sets out the following policy for future development:

> **Policy AQUA 2**
> Applications for the development of seaweed cultivation should demonstrate that proposals are in accordance with the Scottish Government's Seaweed Cultivation Policy Statement and any subsequent guidance and/or planning requirements.

Once these Regional Marine Plans have been formally adopted by the Scottish Ministers, public authorities will have to have regard to them in their decision-making and any authorisation or enforcement decision (such as the granting of a marine licence discussed below) must be made in accordance with the policies in the regional marine plans, unless relevant considerations indicate otherwise.[31] Regional marine planning authorities will also become statutory consultees to advise on whether proposed developments are in line with the relevant regional marine plan.

Crown Estate Scotland and seaweed cultivation

What is Crown Estate Scotland?

Crown Estate Scotland (CES) was established in 2017 following the devolution of the Crown Estate to Scotland.[32] Its purpose is to manage the property and assets of the Crown in Scotland, which includes management of large proportions of the foreshore[33] and the seabed of Scottish coastal waters.[34] Any activity which involves the occupation of the seabed will require the permission of CES as the manager of that area. CES can exercise a broad range of powers over those assets under its control, including the granting of leases over portions of the seabed or the issuing of licenses to carry out activities on the seabed. An important limitation in this context is that CES cannot sell portions of the seabed without the consent of the Scottish Ministers[35], who have emphasised that 'Scotland's seabed is a national strategic asset and should be managed at the national level'[36] and maintains 'a policy of there being a presumption against the sale of the seabed.'[37]

31 See Marine (Scotland) Act 2010, s. 15.
32 See the Crown Estate Transfer Scheme 2017, which established Crown Estate Scotland (Interim Management). This body was renamed Crown Estate Scotland by the Scottish Crown Estate Act 2019.
33 Foreshore means 'land in Scotland owned by Her Majesty which lies between the high and low water marks of ordinary spring tides'; The Crown Estate Transfer Scheme 2017, para. 1.
34 Scottish coastal waters means 'means those parts of Scotland which are internal waters or are in the territorial sea of the United Kingdom'; The Crown Estate Transfer Scheme 2017, para. 1
35 Scottish Crown Estate Act 2019, s. 10.
36 Scottish Crown Estate: Strategic Management Plan (2020) policy 10.
37 Scottish Crown Estate: Strategic Management Plan (2020) para. 102.

In carrying out its functions, CES must comply with the conditions laid down in the Scottish Crown Estate Act 2019. In particular, CES is under a duty to *'maintain and seek to enhance the value of the assets and the income arising from them.'*[38] However, in achieving this overarching duty, CES must also *'act in the best way calculated to further the achievement of sustainable development in Scotland' and 'seek to manage the assets in such a way that is likely to contribute to the promotion or improvement in Scotland of economic development, regeneration, social wellbeing and environmental wellbeing.'*[39] These broad ranging considerations give a degree of flexibility to CES to determine how it exercises its management functions.

Leases for seaweed farms

Given that seaweed farms must be anchored to the seabed, it will be necessary for any operator to obtain the consent of CES to carry out this activity. Consent will normally take the form of a lease over the relevant portion of the seabed. A lease grants an exclusive right for the lease holder to use that particular portion of seabed for the defined activity, subject to any conditions contained in the lease.

A lease will typically be granted for a limited period[40], will be subject to payment of rent, the calculation of which is usually based upon the scale of the operation[41] and will be required to restore the site on lease termination.

Process for granting leases

Lease

An application for a lease may be submitted to CES on the basis of the standard application form available on their website. The application must be accompanied by relevant documentation, including a business plan and evidence that other relevant statutory requirements have been met. There is no fee for making an application. The decision to grant a lease will be based upon a number of criteria, including whether:

- the proposed operation can comply with all regulatory requirements;
- the operators will comply with industry best practices;
- the activity will contribute significantly to economic or environmental sustainability;
- it might provide other community or environmental benefits;[42]
- the past record of the applicant in complying with conditions of other leases obtained from CES will also be taken into account.

38 Scottish Crown Estate Act 2019, s. 7.
39 Scottish Crown Estate Act 2019, s. 7.
40 Fish farm leases are typically for 25 years.
41 Existing CES guidance only refers to factors to be taken into account in relation to fish farming, not seaweed farming; see www.crownestatescotland.com/what-we-do/marine/asset/aquaculture/section/rents-charges
42 See CES, Guidance Notes for Applicants for Aquaculture Leases in Scotland

Young (3-4 months old) Sugar kelp growing on cultivation lines. Credit: Cat Wilding

Lease Option Agreements

Normally, CES will only grant a lease once an applicant has obtained authorisation to carry out the proposed activity from all relevant regulatory bodies, including the marine licence discussed below. Where other statutory consents have not been obtained, it may be possible for an operator to apply for a lease option agreement (also known as a LOA), which temporarily reserves an area of seabed to the operator pending completion of the full application, including other consents. A full business plan as well as evidence of necessary financial capacity is required for the grant of a LOA. A LOA is normally granted free of charge for a three year period, following which an extension may be granted on payment of a fee (usually £1000).

Opportunities for community participation

As CES is not a regulator of seaweed cultivation, but rather a manager of the seabed, there are limited opportunities for participation in the relevant decision-making procedures. Applications for leases and LOAs are not published on the CES website and there is no formal opportunity to comment on applications before they are decided by CES. Given that CES will only sign a lease following the completion of other statutory procedures, it is assumed that stakeholders will have engaged with those other regulatory processes (see Marine Licences below).

CES publishes a map[43] identifying the areas in which leases (and other rights) have been granted, but this does not include lease option agreements.

43 www.crownestatescotland.com/maps-and-publications

Marine Licences and Seaweed Cultivation

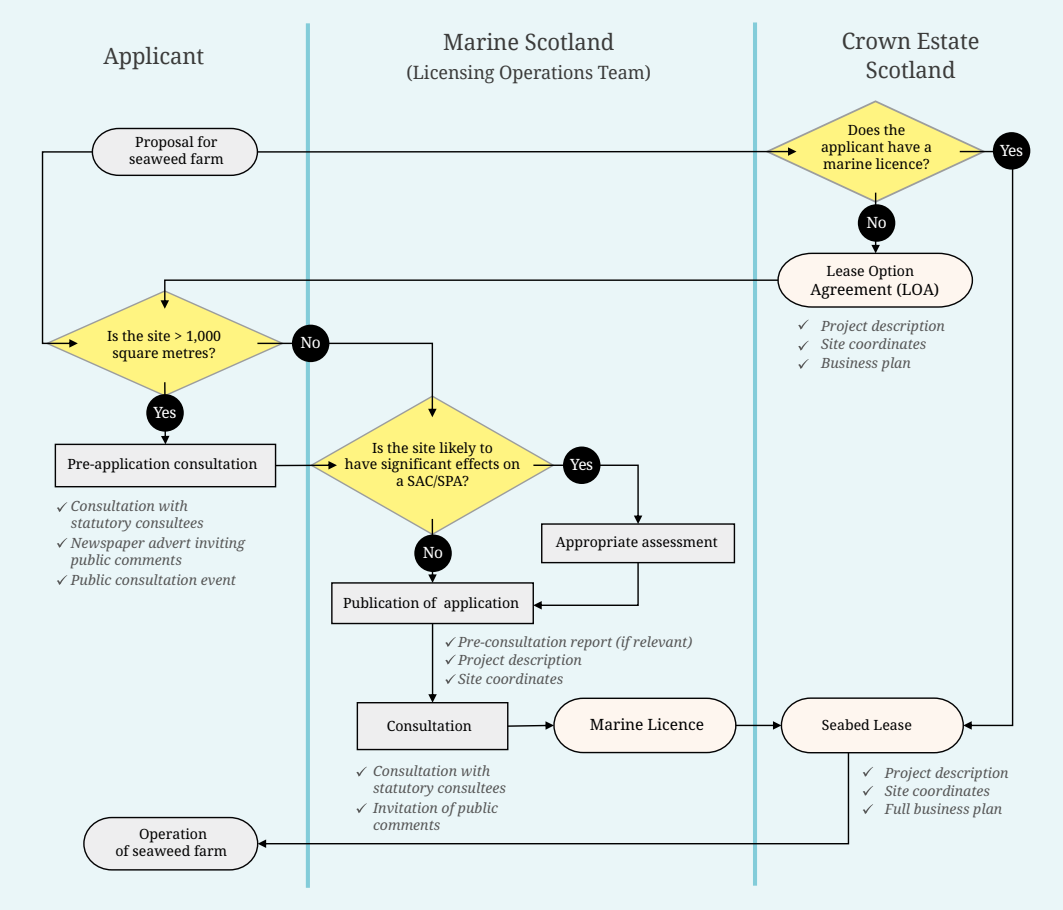
Requirements for a marine licence under the Marine (Scotland) Act 2010

The Scottish Ministers regulate many activities in Scottish waters in the public interest. A number of activities require a marine licence, including:

- the deposit of any substance or object either in the sea or on or under the seabed, from a vehicle, vessel, aircraft or marine structure, a container floating in the sea, or a structure on land constructed or adapted wholly or mainly for the purpose of depositing solids in the sea;
- the use of a vehicle, vessel, aircraft, marine structure or floating container to remove any substance or object from the seabed; or
- the construction, alteration or improvement of any works within the Scottish marine area either in or over the sea, or on or under the seabed.[44]

As a seaweed farm will either require the deposit of objects in the sea or the construction of works, it will require a marine licence.

Process for obtaining necessary consents for the operation of a seaweed farm



Credit: Pakatida Suwonnawong

44 Marine (Scotland) Act 2010, s. 21(1).

Application requirements

Some larger marine activities require an applicant to carry out a consultation with the local community and other relevant stakeholders prior to making an application for a marine licence. The purpose of such a pre-application consultation is to encourage the developer to take into account a wide range of views in the development of the application itself. At present, this requirement applies to the construction of any works (with the exception of a renewable energy structure) within the Scottish marine area either in or over the sea or on or under the seabed, but only where the total area in which such works are to be located exceeds 1000 square metres in extent.[45] The procedure will also apply where an application is made to alter or improve an existing work with the consequence that the total area in which such works, as extended, are to be located exceeds 1000 square metres in extent.[46] **It follows that many medium sized seaweed farm proposals will have to meet this requirement**.

Pre-application Process

Under the pre-application consultation procedure, an applicant must give at least 12 weeks notice that they intend to make an application for a marine licence. This notice must include:

- information about the general nature of the activity that they intend to carry out;
- a plan or chart showing the outline of the location at which the activity is to be carried out;
- details of how the applicant is to be contacted.

This notice must be submitted directly to the Commissioners of the Northern Lighthouses, the Maritime and Coastguard Agency, the Scottish Environmental Protection Agency, Scottish Natural Heritage and any relevant regional marine planning authority.[47]

Pre-application public notification

In addition, the prospective applicant must publish a notice in a local newspaper inviting comments on the proposals and providing details of where further information may be obtained concerning the proposed licensable marine activity and explaining how persons wishing to provide comments to the prospective applicant relating to the proposed licensable marine activity may do so, and the date by which this must be done. **Significant discretion is left to the applicant to determine where to publish this notice.**

Opportunities for community participation

Members of the public may provide comments to the applicant as detailed in the public notice.

45 The Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013, Regulation 4(d).
46 The Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013, Regulation 4(e).
47 The Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013, Regulation 6.

Public Consultation Event

Under the pre-application consultation procedure, the applicant must also hold a pre-application consultation event at which members of the public may provide comments regarding the proposals.[48] This event must be held at least six weeks after notification of the pre-consultation event is published in a local newspaper. Due to the public health emergency, any pre-consultation events have had to be held on-line since 20 May 2020.[49] As a temporary measure, notifications of online pre-consultation events are also being published centrally on the Marine Scotland website. Regardless of format, the pre-consultation event is a valuable opportunity to not only make comments, but also to ask relevant questions from the developer. It is worth bearing in mind that **comments at this stage are made directly to the developer and there is nothing to prevent the same or similar comments being made at a later stage in the process when Scottish Ministers invite comments once an application has been formally made (see below)**.

Opportunities for community participation

Members of the public may attend the public consultation event and provide comments to the applicant as detailed in the public notice.

Consultation report

On the basis of the pre-application consultation event and the consultation with the statutory agencies, **applicant must prepare a pre-application consultation report which describes the steps taken to elicit feedback on the proposals, as well as information about how any relevant comments or feedback were addressed in the developing the final application**. This includes a requirement to explain why no amendments were made to the proposals, despite relevant comments or objections having been received through the pre-consultation exercise. **The pre-application consultation report must then be submitted as part of the formal marine licence application**. The pre-consultation report will normally be published as part of the application and therefore it is possible to see how, if at all, the prospective applicant addressed any comments raised at this stage in the process.

Opportunity for Community Participation

If any commentator is dissatisfied with the manner in which their comments are addressed, they have an opportunity to make representations directly to the Scottish Ministers during formal consideration of the application (see below).

48 The Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013, Regulation 7.

49 See The Marine Works and Marine Licensing (Miscellaneous Temporary Modifications) (Coronavirus) (Scotland) Regulations 2020.

Application

Applications for marine licences are made directly to the Scottish Ministers and they are dealt with by the Licencing Operations Team within Marine Scotland. Applications are made on the basis of a standard application form available on the Marine Scotland website. The applicant is required to indicate:

- the location of the proposed seaweed farm;
- the equipment to be used;
- the total area to be covered;
- the proposed start date;
- the costs of the works;
- a full method statement of how the equipment is to be deposited and removed;
- an assessment of the potential impacts that the works may have, including impacts on;
  - other users of the marine environment
  - marine ecosystems
  - cultural heritage sites
  - visual impacts.

Finally, the applicant should demonstrate how the proposed works engage with the policies contained in the National Marine Plan. A fee is charged for applications in accordance with a pricing scheme set out in secondary legislation.[50]

All applications for marine licences must be published and the full application is made available on the Marine Scotland website. Generally speaking, applications for marine licences relating to seaweed cultivation are recorded as 'macroalgae' applications and it is possible to search the list of applications to find specific applications on this subject.

Opportunity for Community Participation

There is no legal requirement for Scottish Ministers to consult the public on applications, but in practice, it is possible to make comments on an individual application. Comments are normally invited, via the Marine Scotland website, by email to ms.marinelicensing@gov.scot. It is important that when submitting comments, you make clear which application you are commenting on by including the application reference number. There is no set consultation period and the dates for comments appear to be set on a case by case basis.

Commenting on the application is a key opportunity to raise concerns about a particular application. To be effective, comments must be clearly related to the application and they should be stated as accurately and concisely as possible, with relevant evidence to support the comments, where relevant. Comments may also wish to identify shortcomings in the application, such as missing detail or failure to address key points. Comments on applications are not automatically published, although they may be available under freedom of information legislation, subject to any exceptions to protect personal information.

50 See The Marine Licensing (Fees) (Scotland) Regulations 2011.

Once they have received comments on applications from any person with an interest in the outcome of the application, the Scottish Ministers are required to have regard to such representations in their decision[51], although Scottish Ministers are not required to inform commentators of their decision.

The Scottish Ministers must also consult relevant statutory agencies (see below) on the application before making a decision.[52] The role of these statutory agencies is to provide advice to the Scottish Ministers on the issues which fall within their particular area of competence.

Principal statutory consultees in marine licence applications

Commissioners of the Northern Lights: The Commissioners of Northern Lighthouses are responsible for the superintendence and management of all lighthouses, buoys and beacons in Scottish waters.[53] The placing of any navigational buoy or beacon requires permission of the Northern Lighthouse Board and any equipment must comply with the regulations laid down by the Board. Marking requirements are generally imposed by way of conditions in a marine licence.

Maritime and Coastguard Agency: The Maritime and Coastguard Agency (MCA) is a UK-wide governmental agency with powers to regulate the safety of shipping and related matters. It advises the Scottish Ministers on how proposals requiring marine licences may impact upon maritime safety matters.

Historic Environment Scotland: Historic Environment Scotland (HES) is responsible for advising the Scottish Ministers on matters relating to the protection of historic sites and in particular designated heritage assets, such as scheduled monuments, historic marine protected areas and world heritage sites.[54]

Scottish Environmental Protection Agency: The Scottish Environment Protection Agency (SEPA) is a statutory body responsible for protecting and improving the environment, including improving the health and wellbeing of people in Scotland and promoting sustainable economic growth.[55] One of its key functions is to regulate business activities which may pollute the environment, including the marine environment. In particular, it regulates discharges into water[56], emissions from industrial activities[57], and the disposal and management of waste.[58] In doing so, SEPA seeks not only to ensure compliance with minimum environmental standards, but it promotes businesses 'moving beyond compliance' through sustainable innovation.[59] SEPA's role in advising the Scottish Ministers on marine licence applications is to consider the environmental impacts of any proposed activity.

51 Marine (Scotland) Act 2010, s. 27(6).
52 Marine (Scotland) Act 2010, s. 27(4)(a).
53 See Merchant Shipping Act 1995, s. 195(1).
54 Historic Environment Scotland Act 2014.
55 Environment Act 1995, s. 20A.
56 E.g. The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended).
57 E.g. The Pollution Prevention and Control (Scotland) Regulations 2012 (as amended).
58 E.g. The Waste Management Licensing (Scotland) Regulations 2011 (as amended).
59 SEPA, One Planet Prosperity – Our Regulatory Strategy (2016).

Nature Scot: Nature Scot provides advice to the Scottish Government on the conservation of biological diversity.[60] In particular, it advises on the effects of development proposals on Scotland's nature.[61] In exercising its functions, Nature Scot is required to take into account actual or possible ecological or other environmental changes to the natural heritage, the need for social and economic development, the need to conserve sites and landscapes of archaeological or historical interest, the interests of owners and occupiers of land and the interests of local communities.[62] Nature Scot may provide advice to applicants on how to ensure that developments do not have a significant impact on natural heritage resources by identifying appropriate measures to avoid, reduce, mitigate or compensate for the most developments where the proposal raises issues of national interest.[63]

In determining a licence application, Scottish Ministers are mandated to have regard to the need to protect the environment, protect human health and prevent interference with legitimate uses of the sea.[64] A licence may be granted subject to conditions, which may regulate the manner in which an activity is carried out. A licence will be time-limited, although there is not fixed duration for a licence and it is possible to apply for an extension.

Once granted licences are published on a central register available on the Marine Scotland website.

Monitoring and enforcement

Enforcement of marine licences is carried out by Marine Enforcement Officers[65], who are usually officials from Marine Scotland Compliance, a department within the Marine Scotland Directorate of the Scottish Government. Marine Enforcement Officers have a range of powers to inspect licensed activities (including searching premises, requiring documents, and seizing items) in order to identify potential breaches of licence conditions or violations of other legal requirements. It is a criminal offence to operate a licensable activity without a marine licence or in a manner that contravenes the conditions imposed by a marine licence.[66] The Scottish Ministers may also issue a compliance notice, requiring the licence holder to take steps within a particular timeframe to ensure that licence conditions are met.[67]

Marine Enforcement Officers will normally operate out of local fisheries offices located around the coast.

Opportunities for Community Participation

If there are concerns regarding the operation of a seaweed farm, the public may contact Marine Scotland Compliance. Full details of how to contact a local fisheries office can be found on the Marine Scotland website.

60 Natural Heritage (Scotland) Act 1991, s. 1.
61 See Scottish Natural Heritage, Planning for Great Places – Connecting People and Nature: Our Planning for Development Service Statement 2018.
62 See Natural Heritage (Scotland) Act 1991, s. 3.
63 See SNH Guidance – Identifying natural heritage issues of national interest in development proposals
64 Marine (Scotland) Act 2010, s. 27(1).
65 Marine (Scotland) Act 2010, s. 131.
66 Marine (Scotland) Act 2010 s. 39.
67 Marine (Scotland) Act 2010 s. 43.

Seaweed cultivation in sites designated under relevant nature conservation legislation

Some marine sites receive special protection because they have been designated for nature conservation purposes under relevant legislation.

SACs and SPAs

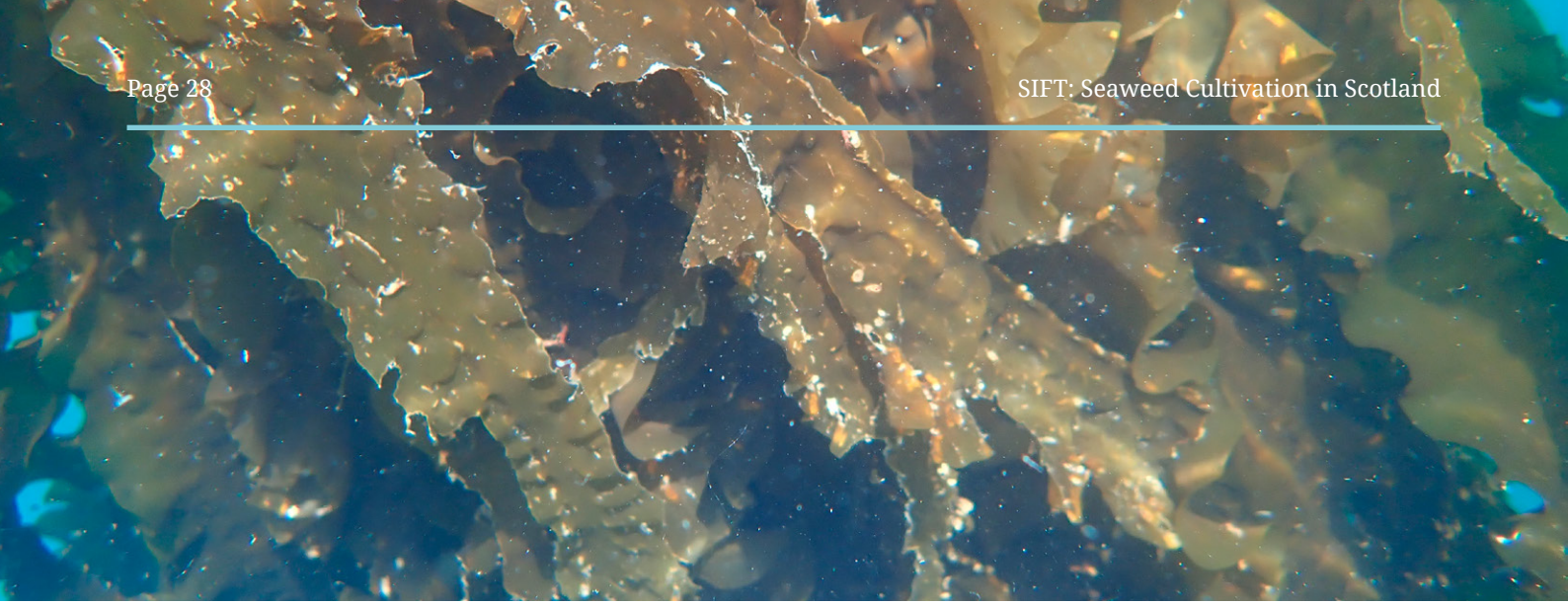
If a proposed seaweed farm is located in or near an area that has been designated as a SPA or as a SAC (see Figure 5 below), additional requirements may need to be met before authorisation can be given. In particular, where an activity is likely to have a significant effect on the SPA or SAC, it will be necessary for the decision-making authority to carry out an appropriate assessment of the implications of the activity for the site in view of the site's conservation objectives. If the results of the assessment reveal that an activity is likely to have significant adverse effects on the site, the authority may only authorise the activity if there are no alternative solutions and if it can demonstrate that there are imperative reasons of overriding public interest.[68] Furthermore, the Scottish Ministers must ensure that compensatory measures are taken to offset any damage caused by the authorised activity.[69]

Figure 5: SPAs ands SACs

Specially Protected Areas (SPAs) are areas which have been designated as protected habitat for bird species listed under the Birds Directive. SPAs are normally designated for breeding sites on land, but a number of marine spaces important for foraging or feeding have also been designated as SPAs.

Special Areas of Conservation (SACs) are areas which have been designated as protected because they either contain priority habitats listed in the Habitats Directive or they contain habitat or species which have been listed under the Habitats Directive. Priority marine habitats include estuaries, coastal lagoons, large shallow inlets and bays, and reefs.[70] Protected species include varieties of fish (e.g. Atlantic salmon), otters, dolphins, seals, and porpoises.[71]

68 See Conservation (Natural Habitats &c) Regulations 1994/2716, regulation 85C.
69 See Conservation (Natural Habitats &c) Regulations 1994/2716, regulation 85E.
70 See Annex I: eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:01992L0043-20130701
71 See jncc.gov.uk/our-work/article-17-habitats-directive-report-2019-species/#regularly-occurring-species-invertebrate-species-molluscs



Fully grown Sugar kelp ready to harvest.
Credit: Cat Wilding

Nature Conservation MPAs

Similar restrictions apply to sites which have been designated as Nature Conservation Marine Protected Areas (NCMPA) under the Marine (Scotland) Act 2010. (See Figure 6 below)

An authority must only authorise an act which is likely to damage the protected features of a NCMPA where it is satisfied that there is no other means of proceeding with the act which would create a substantially lower risk and it is satisfied that the benefit of proceeding with the act clearly outweighs the risk of damage to the environment.[72] Furthermore, as with SPAs and SACs, the Scottish Ministers must ensure that the developer takes measures of equivalent environmental benefit in order to compensate for any damage caused to the protected features.

Figure 6: NCMPAs

To date, 22 NCMPAs have been designated within the territorial seas and internal waters of Scotland in order to protect a number of specified species, habitats and geomorphological or geological features (see table below). Any public authority must exercise its functions in a manner which it considers best furthers the stated conservation objectives of a NCMPA[73] and it must notify and/or seek the advice of the Scottish Ministers, Nature Scot or Historic Environment Scotland before authorising any act which has a significant risk of hindering the achievement of the conservation objectives of the NCMPA.[74]

Opportunities for Community Participation

The Scottish Ministers have produced general guidance on the sensitivities of particular features to certain pressures and associated activities, known as the Feature Activity Sensitivity Tool (FEAST). This information is publicly accessible and it may help communities to understand some of the potential issues that might arise from a particular activity in relation to a NCMPA in their area.

72 Marine (Scotland) Act 2010, s. 83(4).
73 Marine (Scotland) Act 2010, s. 82(2).
74 Marine (Scotland) Act 2010, s. 83(2).

Figure 7: Nature Conservation Marine Protected Areas

Nature Conservation Marine Protected Areas	Marine Region	Protected Features
South Arran	Clyde	Burrowed mud; Kelp and seaweed communities on sublittoral sediment; maerl beds; maerl or coarse shell gravel with burrowing sea cucumbers; ocean quahog aggregations; seagrass beds; shallow tide-swept coarse sands with burrowing bivalves
Wester Ross	West Highland	Burrowed mud; Kelp and seaweed communities on sublittoral sediment; maerl beds; maerl or coarse shell gravel with burrowing sea cucumbers; circalittoral muddy sand communities; flame shell beds; northern featherstar aggregations on mixed substrata; banks of unknown substrate; glaciated channels/troughs, megascale glacial lineations, moraines; pockmarks; slide scars
Wyre and Rousay Sounds	Orkney	Kelp and seaweed communities on sublittoral sediment; maerl beds; marine geomorphology of the Scottish Shelf Seabed
Upper Loch Fyne and Loch Goil	Clyde	Burrowed mud; ocean quahog aggregations; flame shell beds; horse mussel beds; sublittoral mud and specific mixed sediment communities
Papa Westray	Orkney	Black guillemot; sand wave fields
Noss Head	North Coast	Horse mussel beds
Mousa to Boddam	Shetland	Marine geomorphology of the Scottish Shelf Seabed; sandeels
Monach Islands	Outer Hebrides	Marine geomorphology of the Scottish Shelf Seabed; black guillemot; landscape of areal glacial scour
Lochs Duich, Long and Alsch	West Highland	Burrowed mud; flame shell beds;
Loch Sween	Argyll	Burrowed mud; maerl beds; native oysters; sublittoral mud and mixed sediment communities
Loch Sunart to Sound of Jura	Argyll	Common skate; channels/troughs
Loch Sunart	Argyll	Flame shell beds; northern featherstar aggregations on mixed substrata
Loch Creran	Argyll	Flame shell beds; quarternary of Scotland
Fetlar to Haroldswick	Shetland	Kelp and seaweed communities on sublittoral sediment; maerl beds; shallow tide-swept coarse sands with burrowing bivalves; circalittoral sand and coarse sediment communities; marine geomorphology of the Scottish Shelf Seabed; horse mussel beds; black guillemot
East Caithness Cliffs	Moray Firth	Black guillemot
Clyde Sea Sill	Clyde	Circalittoral and offshore sand and coarse sediment communities; sand wave fields, sand ribbon fields and sand banks; black guillemot; fronts
Small Isles	West Highland	Burrowed mud; fan mussel aggregations; circalittoral sand and mud communities; northern featherstar aggregations on mixed substrata; northern sea fan and sponge communities; horse mussel beds; black guillemot; glaciated channels/troughs, glacial lineations, meltwater channels, moraines, and streamlined bedforms; shelf deeps; white cluster anemones
Loch Carron	West Highland	Maerl beds; flame shell beds
Southern Trench	Moray Firth/ North East	Burrowed mud; Minke whale; fronts; shelf deeps; sub-glacial tunnel valleys; moraines; slide scars
Shiant East Bank	Outer Hebrides/ West Highland	Circalittoral sands and mixed sediment communities; northern sea fan and sponge communities; shelf banks and mounds; drumlinoid forms; glacial lineations; iceberg ploughmark field; streamlined bedrock
North-east Lewis	Outer Hebrides	Risso's dolphin; sandeels; longitudinal bedform field; glaciated channel/troughs; landscape of areal glacial scour; megascale glacial lineations
Sea of Hebrides	West Highland/ Outer Hebrides/ Argyll	Basking shark; Minke whale; fronts; Inner Hebrides carbonate production area

Annex 1 – National Marine Plan General Policies

GEN 1 General planning principle: There is a presumption in favour of sustainable development and use of the marine environment when consistent with the policies and objectives of this Plan.

GEN 2 Economic benefit: Sustainable development and use which provides economic benefit to Scottish communities is encouraged when consistent with the objectives and policies of this Plan.

GEN 3 Social benefit: Sustainable development and use which provides social benefits is encouraged when consistent with the objectives and policies of this Plan.

GEN 4 Co-existence: Proposals which enable coexistence with other development sectors and activities within the Scottish marine area are encouraged in planning and decision making processes, when consistent with policies and objectives of this Plan.

GEN 5 Climate change: Marine planners and decision makers must act in the way best calculated to mitigate, and adapt to, climate change.

GEN 6 Historic environment: Development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance.

GEN 7 Landscape/seascape: Marine planners and decision makers should ensure that development and use of the marine environment take seascape, landscape and visual impacts into account.

GEN 8 Coastal process and flooding: Developments and activities in the marine environment should be resilient to coastal change and flooding, and not have unacceptable adverse impact on coastal processes or contribute to coastal flooding.

GEN 9 Natural heritage: Development and use of the marine environment must:

(a) Comply with legal requirements for protected areas and protected species.

(b) Not result in significant impact on the national status of Priority Marine Features.

(c) Protect and, where appropriate, enhance the health of the marine area.

GEN 10 Invasive non-native species: Opportunities to reduce the introduction of invasive non-native species to a minimum or proactively improve the practice of existing activity should be taken when decisions are being made.

GEN 11 Marine litter: Developers, users and those accessing the marine environment must take measures to address marine litter where appropriate. Reduction of litter must be taken into account by decision makers.

GEN 12 Water quality and resource: Developments and activities should not result in a deterioration of the quality of waters to which the Water Framework Directive, Marine Strategy Framework Directive or other related Directives apply.

GEN 13 Noise: Development and use in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.

GEN 14 Air quality: Development and use of the marine environment should not result in the deterioration of air quality and should not breach any statutory air quality limits.

GEN 15 Planning alignment A: Marine and terrestrial plans should align to support marine and land-based components required by development and seek to facilitate appropriate access to the shore and sea.

GEN 16 Planning alignment B: Marine plans should align and comply where possible with other statutory plans and should consider objectives and policies of relevant non-statutory plans where appropriate to do so.

GEN 17 Fairness: All marine interests will be treated with fairness and in a transparent manner when decisions are being made in the marine environment.

GEN 18 Engagement: Early and effective engagement should be undertaken with the general public and all interested stakeholders to facilitate planning and consenting processes.

GEN 19 Sound evidence: Decision making in the marine environment will be based on sound scientific and socio-economic evidence.

GEN 20 Adaptive management: Adaptive management practices should take account of new data and information in decision making, informing future decisions and future iterations of policy.

GEN 21 Cumulative impacts: Cumulative impacts affecting the ecosystem of the marine plan area should be addressed in decision making and plan implementation.

Annex 2 – Seaweed Cultivation Policy Statement

Policy 1: In principle, the Scottish Government is supportive of small-medium farm seaweed cultivation, subject to regulatory consideration; the General Policies set out in Chapter 4 of Scotland's' National Marine Plan; and any other relevant policies within that Plan. Applications for such seaweed farms should demonstrate that mitigation measures have been considered to prevent adverse environmental impacts, and set out how these will be delivered.

Policy 2: Only species native to the area where seaweed cultivation will take place should be cultivated, to minimise the risk from non-native species.

Policy 3: Where seaweed is grown for human consumption, cultivators should site farms away from sewage outfalls and other potential sources of pollution.

Policy 4: Equipment used in seaweed cultivation should be fit for purpose to withstand damage from adverse weather conditions.

Policy 5: Other marine users and activities should be considered in the siting of farms.

Policy 6: Small-medium size farming is unlikely to be spatially limited, and may be located anywhere in Scotland, subject to agreement and appropriate local conditions.

Policy 7: The Scottish Government is supportive of Integrated Multi-Trophic Aquaculture.

Sustainable Inshore Fisheries Trust (SIFT) is a Scottish charity founded in 2011 with the aim of achieving the sustainable management of Scotland's inshore waters so that they provide the maximum long-term benefits to all coastal communities.

Sustainable Inshore Fisheries Trust

5 Rose Street Edinburgh EH2 2PR
www.sift.scot

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