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Our mission
Working with Scotland's people to care for our natural heritage.

Our aim
Scotland's natural heritage is a local, national and global asset. We promote its care and improvement, its responsible enjoyment, its greater understanding and appreciation and its sustainable use now and for future generations.

Our operating principles
We work in partnership, by co-operation, negotiation and consensus, where possible, with all relevant interests in Scotland: public, private and voluntary organisations, and individuals.

We operate in a devolved manner, delegating decision-making to the local level within the organisation to encourage and assist SNH to be accessible, sensitive and responsive to local needs and circumstances.

We operate in an open and accountable manner in all our activities.

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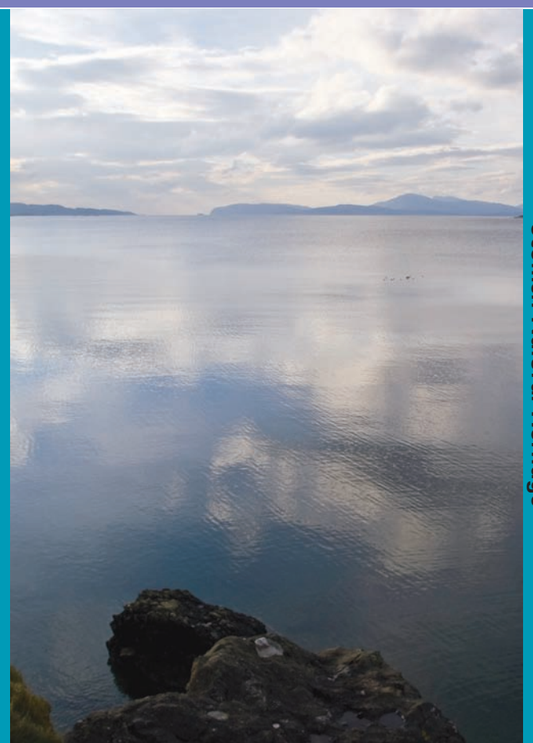
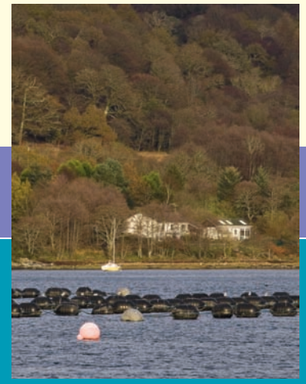


Guidance on Landscape/Seascape Capacity for Aquaculture

Scottish Natural Heritage

Guidance on Landscape/Seascape Capacity for Aquaculture

Natural Heritage Management



SCOTTISH NATURAL HERITAGE

Guidance on Landscape/Seascape Capacity for Aquaculture

Natural Heritage Management

SCOTTISH NATURAL HERITAGE

CONTENTS

1. Introduction

Marine aquaculture – fin fish and shellfish farms – continues to expand and develop predominantly along the west and north coasts of mainland Scotland and around many of the offshore islands. People have become more accustomed to seeing fish farms, but like all development, if poorly sited or designed, they can still sometimes have a negative effect on both coastal character and visual amenity. While in some places negative effects can be minimised by improving the detailed design of the individual structures, many potential landscape, seascape and visual problems can be avoided by choosing sites where fin and shell fish farms may be more easily absorbed into the landscape in the first place.

1.1 Background

This guidance has been prepared on behalf of SNH to fulfil a commitment in the Strategic Framework for Scottish Aquaculture[1]. It has been informed by a research study[2] which developed a method for undertaking seascape capacity assessments for aquaculture development. The method was tested in pilot studies in Argyll and Galloway in 2006. In addition, a site visit to check the applicability of the process to the Shetland Isles was carried out in 2007.

Where appropriate, these pilot studies are referred to within the text, and specific examples from capacity studies have been used to animate and explain the process. These examples are indicative and do not necessarily reflect the views or policies of the relevant Local Authorities.

1.2 Scope

This guidance provides a methodology for assessing the character and visual qualities of the coastal landscape and seascape to work out where aquaculture development may best be accommodated in principle. The methodology does not simply address where to site new aquaculture developments. It also takes into account whether or not existing sites could accommodate larger developments, and helps identify where existing developments should be removed to improve landscape character or visual amenity.

The guidance only deals with coastal landscape, seascape and visual criteria. It can be used to inform coastal zone management plans, planning policies or other similar strategic policy tools. However, it makes no reference to other natural and cultural heritage issues, or other practical and physical constraints, which may require to be assessed separately.

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[1] 'A Strategic Framework for Scottish Aquaculture', developed by the Ministerial Working Group on Aquaculture is available as a web only publication dated 24 March 2003 (ISBN 0-7559-0727-2) from the Scottish Executive website.

[2] Grant, A (2006) 'Landscape/Seascape Carrying Capacity for Aquaculture'. Scottish Natural Heritage Commissioned Report no 215 (ROAME No. F04NC12).

This assessment process has been specifically developed to address the attributes of aquaculture, and not any other type of sea or coastal based structure.

Finally, this guidance does not offer advice on the layout and design of structures. Further advice on this can be found in 'Marine Aquaculture and the Landscape: The siting and design of marine aquaculture developments in the landscape'[3], which is available from SNH.

1.3 Audience

The guidance is aimed at two main audiences: Local Authority or SNH staff who might wish to undertake or commission work to inform strategies for the location of aquaculture developments, and landscape architects who have been commissioned to undertake assessments.

1.4 Introducing capacity assessment

Landscape capacity is described as 'the degree to which a particular landscape character type or area is able to accommodate change without significant effects on its character, or overall change of landscape character type. Capacity is likely to vary according to the type and nature of change being proposed'[4].

Unless otherwise stated by the client, landscape capacity assessment aims to sustain the significant characteristics of the existing character and visual amenity. The process aims to identify where and how a specified development can be accommodated without undermining or detracting from these characteristics.

To do this effectively, the assessor needs to have a good understanding of the attributes of the development, and how they might affect the landscape or seascape. The attributes of aquaculture development most likely to affect the landscape are summarised in Box 1. However, the industry is constantly changing, and a brief review of current practice should precede any future assessments to ensure that a capacity assessment is up to date.

[3] 'Marine Aquaculture and the Landscape: The siting and design of marine aquaculture developments in the landscape', 2000, SNH
[4] 'Landscape Character Assessment: Guidance for England and Scotland' Swanwick, C. and Land Use Consultants, 2002, page 53.

Box 1: Key attributes of aquaculture

Fin fish cages

- Generally regular, geometric, circular or square shapes, placed in lines or grids which reinforce geometry **(1)**
- Newer cages can be up to 100m circumference, are usually dark in colour and are relatively low lying in the water **(2)**
- Light conditions can affect visibility, as the dark structure can disappear in overcast conditions or shade, but then can standout against light coloured water **(3)**
- Feed hoppers may be attached to each individual cage – these may be light coloured and visually prominent
- Brightly coloured location buoys are generally sited at the outer perimeter of the development, and brightly coloured anti-predatory nets can also be visually prominent **(4)**
- Large feed barges may be located close to cages. These are often large, upstanding above the water and may be much more prominent that the lower lying cages **(5)**
- Feed barges may generate power, and a low humming noise can be heard, while some cages are lit at night, all of which reinforce their relatively industrial character
- Boats travelling to and from the cages, feeding and harvesting processes all generate marine activity and noise **(6)**
- Shore bases can be large and include extensive out door storage yards as well as sheds and jetties, but they can be accommodated in existing built up areas

1 The geometry of a fin fish farm layout is emphasised by the symmetry of the cage layout, and in this picture it is further emphasised by the outlying buoys. While this organised layout does not reflect the organic shape of many coastlines, it does look tidy and unified.

2 The circular shape of newer cages, dark in colour, here seen against a pale coloured sea.

3 In more varied light and sea conditions, the cages are slightly less visible.

4 Anti predatory nets and feeding hoppers attached to every cage potentially make this fish farm more obtrusive.

5 Often the cages are low-lying in the water and can be relatively difficult to see, while the large mass of the feed barges is much more obvious.

6 Feeding, harvesting and general care generate boating activity and movement around the cages.

Box 1continued: Key attributes of aquaculture

Mussel lines

- Most mussel lines are visible as lines of grey, black or occasionally green plastic barrel shaped buoys, generally evenly distributed along ropes, which themselves can sometimes be coloured, drawing attention to the structure **(7)**
- The plastic of the buoys is reflective, and the sunlight bouncing off the individual buoys can sometimes be the most noticeable part of the structure **(8)**
- There is no set distance between buoys or ropes, and the number and length of lines can vary widely **(9)**
- The geometry of the lines can be relatively easily interpreted from the formal arrangement of the buoys
- They are often located close to shore
- When carrying little weight (early in the process), these buoys are very visible, floating on the surface. When heavy, they are partially submerged
- Larger installations may be accompanied by rafts used for storing materials and equipment
- Older mussel lines may be supported by square rafts **(10)**
- Shorelines adjacent to mussel farms may be used for storing materials and equipment

7 Relatively evenly spaced lines of uniformly dark buoys support the lines of mussels.

8 An 'end on' view of mussel lines, showing their linear arrangement and the light reflective surface of the buoys

9 A variety of different colours and spacing create a more cluttered composition – it is likely that not all of these lines are in use.

10 Older structures: although the barrel shaped floats are now most common, older lines may still use a wide range of floating plastic containers and mussel rafts can still be seen on occasion.

Box 1continued: Key attributes of aquaculture

Oyster trestles[5]

- Timber or metal frames support the mesh oyster bags and are sited on the foreshore in the intertidal. They can restrict access to the coast and sea. **(11)**
- They are submerged when the tide is in, and are only visible when the tide is out, for a few hours each day at certain times of the month when the handler can then gain access to turn the bags
- The rectangular trestles are often arranged in a geometric pattern **(12)**
- The trestles and mesh bags are often darkly coloured when revealed at low tide, partly because they are wet, but often also these may be some seaweed attached to the structures **(13)**
- Larger farms use tractors or other vehicles to gain access at low tide, churning up the foreshore **(14)**
- Sometimes redundant equipment is left along the shoreline

Scallop lines

- Small buoys are generally the only visual sign of this development
- The small size of the buoys makes this development the least intrusive, and they are often difficult to spot, even if there are several hundred buoys, as they lie low in the water, and can be easily hidden by any movement of the water surface

11 Mesh bags are placed on the top of trestles.

[5] This study did not consider the attributes of bst oyersterlines, but these fence like structures may have to be considered in future assessments

12 The rectangular shapes of the trestles appear as the water recedes.

13 A more loosely arranged series of trestles, dark coloured from the seaweed and the wetness as they are revealed by the tide.

14 Oyster trestles, showing trestles emerging from the sea, with visible tracks and foreshore management created by tractors.

Once the relevant attributes of both shellfish and fin fish farms have been identified, it is possible to assess which characteristics of any seascape[6] are most likely to be affected by aquaculture development. This informs the survey, analysis and assessment of seascape character which forms the basis of a sensitivity assessment. Recommendations on the ability of the seascape to accommodate the development then follow.

The methodology outlined in this guidance combines analytical survey, professional assessment and judgements, and uses a format which allows a reader to follow an accessible and transparent 'trail of reasoning' which supports each recommendation. A more detailed explanation of the background to this approach can be found in the original research study[7].

[6] In this report , the term 'seascape' refers to the visual and physical conjunction of land and sea which combines maritime, coast and hinterland character. The specific geographic focus is the area of seascape likely to be affected by aquaculture development.
[7] Grant, A (2006) 'Landscape/Seascape Carrying Capacity for Aquaculture'. Scottish Natural Heritage Commissioned Report no 215 (ROAME No. F04NC12).

1.5 Summary of approach

The method of seascape capacity assessment for aquaculture can be divided into six broad stages, the first is a preliminary stage which focuses on preparing a brief. The next five stages are the assessment process:

Preliminary stage:
Prepare a brief

- Prepare a brief, agree the study area, update the attributes of aquaculture development and agree development scenarios

Stage one:
Identify Coastal Character Areas

- Undertake an initial site visit to identify the Coastal Character Areas

Stage two:
Undertake detailed survey work

- Carry out a survey and analysis of relevant coastal character issues within each Coastal Character Area and identify any further character based subdivisions (called 'Local Coastal Character Areas')

Stage three:
Identify opportunities and constraints

- Identify opportunities and constraints in relation to aquaculture development

Stage four:
Undertake sensitivity analysis

- Assess the sensitivity of the individual coastal character areas to potential aquaculture development

Stage five:
Prepare recommendations

- Produce final conclusions on capacity, accompanied by any guidance which would help to accommodate aquaculture development in the seascape.

This approach is outlined in more detail in the following table.

Table 2: Summary of Approach

Stage	Key tasks	Source of further information
Preliminary desk study: Preparation of the brief	• Choose the study area • Allocate the timescale • Identify a working map scale • Decide on development scenarios	Section 1.4 and Section 2
Output: A finalised brief		
1.0 Make the initial site visit: Decide on Coastal Character Areas	• Undertake a strategic assessment of character during a car based survey of the study area • Identify Coastal Character Areas which have geographical integrity and recognisable identity	3.1
Output: A map showing the Coastal Character Areas		
2.0 Undertake detailed survey and analysis: Decide on Local Coastal Character Areas and Key Features	• Survey and analyse the seascape character • Identify key characteristics, experiences, features and visual qualities • Identify Local Coastal Character Areas which have consistent character and integrity • Identify key viewpoints and take photographs if required	3.2 Tables 1A and 1B Appendix One
Output: A map showing the Local Coastal Character Areas and key features. Key characteristics within each Local Coastal Character Area should be listed using bullet point style text, accompanied by photographs if required.		
3.0 Identify opportunities and constraints: Analyse the survey work to identify	• Decide which characteristics or features of the seascape are likely to be helpful in accommodating aquaculture development • Identify which qualities and characteristics are likely to be compromised or detrimentally affected by aquaculture development • Assess the potential impact of aquaculture on visual amenity and key viewpoints to contribute to the opportunities and constraints analysis	3.3
Output: Identified opportunities and constraints within each Local Coastal Character Area should be presented as bullet pointed text. Key features mentioned in this text should be mapped.		

4.0 Undertake the sensitivity assessment: Assess and rate sensitivity and then prepare justifications for sensitivity ratings	• Carefully analyse the sensitivity of each Local Coastal Character Area to aquaculture development, using the six criteria listed in this guidance • Allocate sensitivity using the five point rating for each of the criteria • Prepare explanations and justifications to be included in the matrix	3.4
Output: Your rating and justifications against each of the six relevant criteria within each Local Coastal Character Area should be recorded in matrix format		
5.0 Present conclusions: Draw up recommendations and guidance	• Drawing on the sensitivities identified, prepare written recommendations on the potential to accommodate aquaculture development in each Local Coastal Character Area • Write up guidance and advice on accommodating new development if relevant • Prepare strategic conclusions which draw out over arching themes and general findings which will accompany a composite map of all the recommendations within the whole study area	3.5
Output: Recommendations are presented in the form of text, with any guidance included as bullet point advice. An accompanying map brings together all the recommendations across the whole study area.		

2. Preparing the brief

Whether the study is commissioned or carried out in house, some key considerations should be incorporated into a brief. These include:

- Choosing an area for the study
- Identifying an appropriate timescale
- Identifying key milestones in the project
- Proposing development scenarios
- Identifying an appropriate scale for presentation of the mapped work

2.1 Choosing the area for study

The area chosen for the capacity assessment should be substantial, and should have a recognisable integrity. This is because:

- capacity assessment inevitably involves considering relative sensitivity between different areas, therefore a large area offers more scope than a small area
- it makes sense to undertake a capacity study of the whole of an area with physical or perceptual identity at the one time, so that any relative sensitivities can be assessed across the whole area at once

Experience has shown that a large sea loch (such as Loch Fyne), an extensive stretch of coast (such as within an NSA, or one which is managed as a sub-area by a Planning Authority), the area covered by a coastal zone management plan, or even an island and the mainland coast with which it is associated are all representative of appropriate areas for assessment.

2.2 Allocating a timescale

To undertake the detailed site assessments, and present the explanations and justifications clearly, takes time.

Based on the pilot studies carried out to inform this guidance, it is suggested that several days are allocated to getting a strategic overview of the whole area and identifying Coastal Character Areas. This is best carried out by two assessors in a car based survey, and the actual time allocated will vary according to the overall size of the whole study area.

Two days should then be allocated for the site work for each Coastal Character Area identified. This allows for initial survey, definition of Local Coastal Character areas, access to more remote areas and walk over surveys, as well as time to select and take photographs. In winter, more days will have to be allocated to site work, as the daylight is limited and weather can often restrict visibility.

In the pilot studies two site visits to each Coastal Character Area were carried out. Generally, one assessor carried out the detailed survey work for each character area, but where issues were complex or ambiguous, two assessors carried out a field visit.

For every two days onsite, two and a half days were spent in the office, writing up and refining the survey information, preparing the maps and working through the justifications and agreeing the sensitivity assessments: the wording of the sensitivity matrixes is particularly time consuming.

In addition, two to three days should be allocated for survey work from the sea, depending on the size of the study area. This should be undertaken after the initial land based study, and offers an opportunity to assess identified impacts from the sea.

This does not include any time putting information into a GIS.

2.3 Identifying an appropriate map scale for site work and presentation

A scale of 1: 100 000 is the most appropriate scale for the presentation of both contextual information and cumulative assessment. This scale is appropriate for presenting the necessary strategic overview while providing a suitable level of detail.

For detailed assessment and presentation of findings in the individual study areas, research in the pilot studies concluded that a 1: 50 000 map scale gave the best visual representation of the level of detail required to present the more strategic assessment required to undertake this type of study.

The 1: 50 000 scale ensured that the study areas were always viewed in context and that the relationship with neighbouring areas of hinterland and seascape character was always properly illustrated, while at the same time the detail of the articulation of the coastal edge, key features and visual analysis could be conveyed.

In conclusion, while 1: 25 000 maps may be useful during site visits to help identify features, 1: 50 000 scaled maps are the best scale at which to present the findings.

2.4 Development scenarios

Development scenarios are used to focus thinking on the potential effects of development on the seascape, particularly during the opportunities and constraints analysis, the sensitivity assessment and the assessment of capacity which is described in the conclusions.

Development scenarios are therefore ***indicative rather than prescriptive***. They represent the general size, range of components and layout of developments. They cannot however, aim to cover all variables in the design, size and layout of aquaculture structures.

In all cases, it was expected that good siting and design guidance would be followed, as described in Grant (2000)[8], although it was recognised that larger structures, a more recent trend, were perhaps not adequately catered for by this guidance.

The scenarios reflect recent trends towards larger scale structures with more mechanisation, including the increasing presence of feed barges associated with fin fish cages.

The following example scenarios are based on those used in recent studies:

2.4.1 Small scale

- Up to six cages or rafts with no offshore storage or other infrastructure. It was noted that there may be very little demand for this scale of development in the future
- Up to four mussel lines or rafts occupying up to one third of the length of a bay, with no additional infrastructure. Generally the lines are likely to be about 100m – 200m in length, but it is the proportion to the length of bay or defined coastline which is the overriding consideration
- Oyster trestles which occupy up to one quarter of the arc of a bay when revealed[9]
- Scallop lines which require up to fifty buoys to be visible

2.4.2 Modest scale

- Between six and ten cages or rafts, up to 80 m circumference or 22m in diameter, with one non residential feed barge or small feed hoppers attached to each cage, but no other offshore infrastructure **(15)**
- Up to six mussel lines or rafts, occupying up to one half of the length of a bay, with associated offshore infrastructure. Generally the lines are likely to be about 200m – 440m in length, but it is the proportion of the length of the lines to the length of bay or defined coastline which is the overriding consideration
- Oyster trestles or similar which occupy up to one third of the arc of a bay when revealed
- Scallop lines which require between fifty and one hundred and twenty buoys to be visible

[8] 'Marine Aquaculture and the Landscape: The siting and design of marine aquaculture developments in the landscape', 2000, SNH etc

[9] These scenarios are drawn from studies where there were long, expansive bays which were the most likely site for oyster trestles. Where coastlines are indented with numerous smaller bays, a different development scenario might be appropriate. In addition, these scenarios do not consider bst lines, a relatively recent development in Scotland.

2.4.3 Large scale

- More than ten cages or rafts, often over 80m in circumference, or 22m in diameter, with a feed barge and possibly additional water based infrastructure **(16)**
- More than six mussel lines or rafts, occupying up to two thirds of the length of a bay, with associated offshore infrastructure. Generally the lines are likely to greater than 440m in length, but it is the proportion of the length of the lines to the length of bay or defined coastline which is the overriding consideration **(17)**
- Oyster trestles or similar which occupy up to two thirds of the arc of a bay when revealed
- Scallop lines which require more than one hundred and twenty buoys to be visible

It was noted that if the visual influence of mussel lines or oyster trestles appears to extend over more than two thirds of a long sweeping bay, the area is often perceived to have been largely 'filled up' with structures.

It will almost certainly be necessary to create development scenarios which reflect changes in practice, for example the use of BST lines in oyster farming, or to respond to development options or coastal character most typical of the study area.

15 A more modest scale fin fish farm, with on shore feeding facilities attached to the cages by pipes.

16 Part of a large scale fin fish farm, although some cages are missing in this view, set in an expansive stretch of loch.

17 Mussel lines: ten lines, extending across a substantial extent of the width of this bay – this would be considered a large scale development scenario.

3. Undertaking the assessment

This section of guidance describes the principal stages of assessment:

Stage 1: Initial Site Visit

Stage 2: Carrying out detailed site survey

Stage 3: Identifying opportunities and constraints

Stage 4: Undertaking the sensitivity assessment

Stage 5: Presenting conclusions

3.1 Stage 1: Initial site visit and identifying Coastal Character Areas

To assist in analysis and presentation of findings, and to remain consistent with the recommended approaches to capacity assessment outlined in recent publications[9] it is appropriate to base assessment and recommendations on areas of consistent character.

To increase understanding and accessibility, these areas should be geographically coherent locations which are not only similar in overall landscape character but are recognisable as one entity which can be referred to by name. It is also important, simply for ease of reporting, that the areas can be accommodated on one A3 map at a scale of 1: 50 000.

This approach to capacity assessment uses two area based subdivisions:

- Coastal Character Areas, which embrace a large but consistent area of seascape, usually with a common geographic or place name, which forms the basis of the study area. These are identified during the initial site visit.
- Local Coastal Character Areas, which are smaller in size and further subdivide the Coastal Character Area into areas of consistent seascape character with a strong integrity, such as a specific bay or section of coast or loch with a similar character. These are identified following the detailed site survey work.

This is illustrated in **Figure 1** (overleaf).

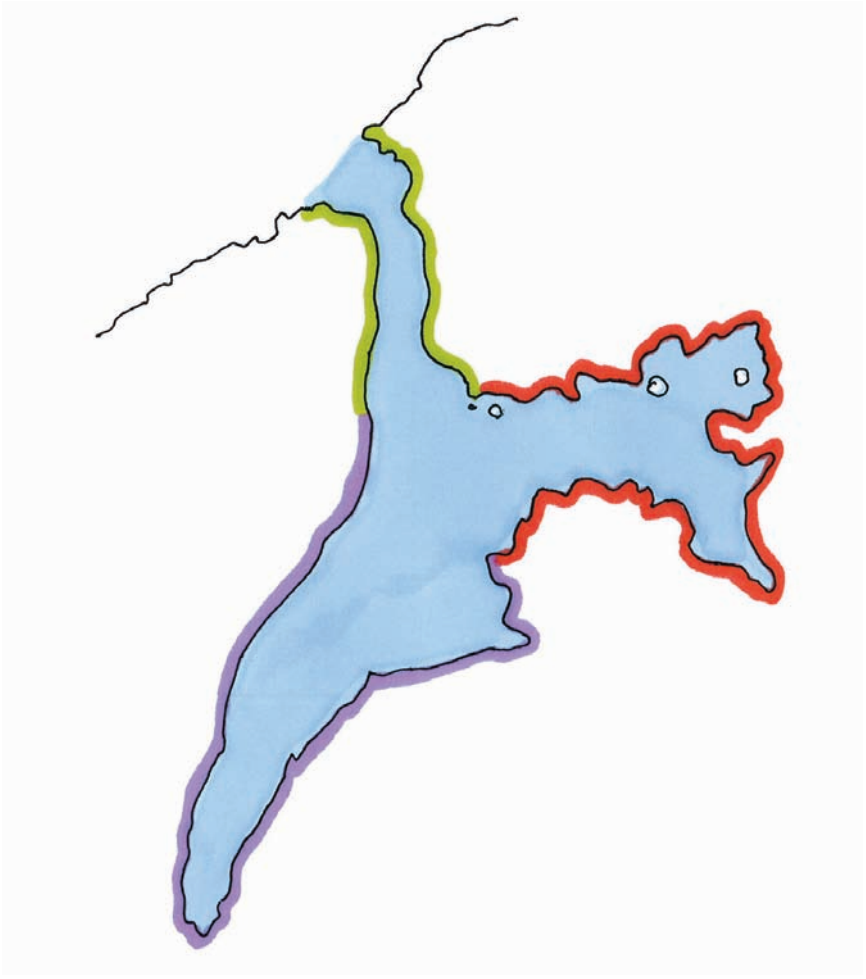


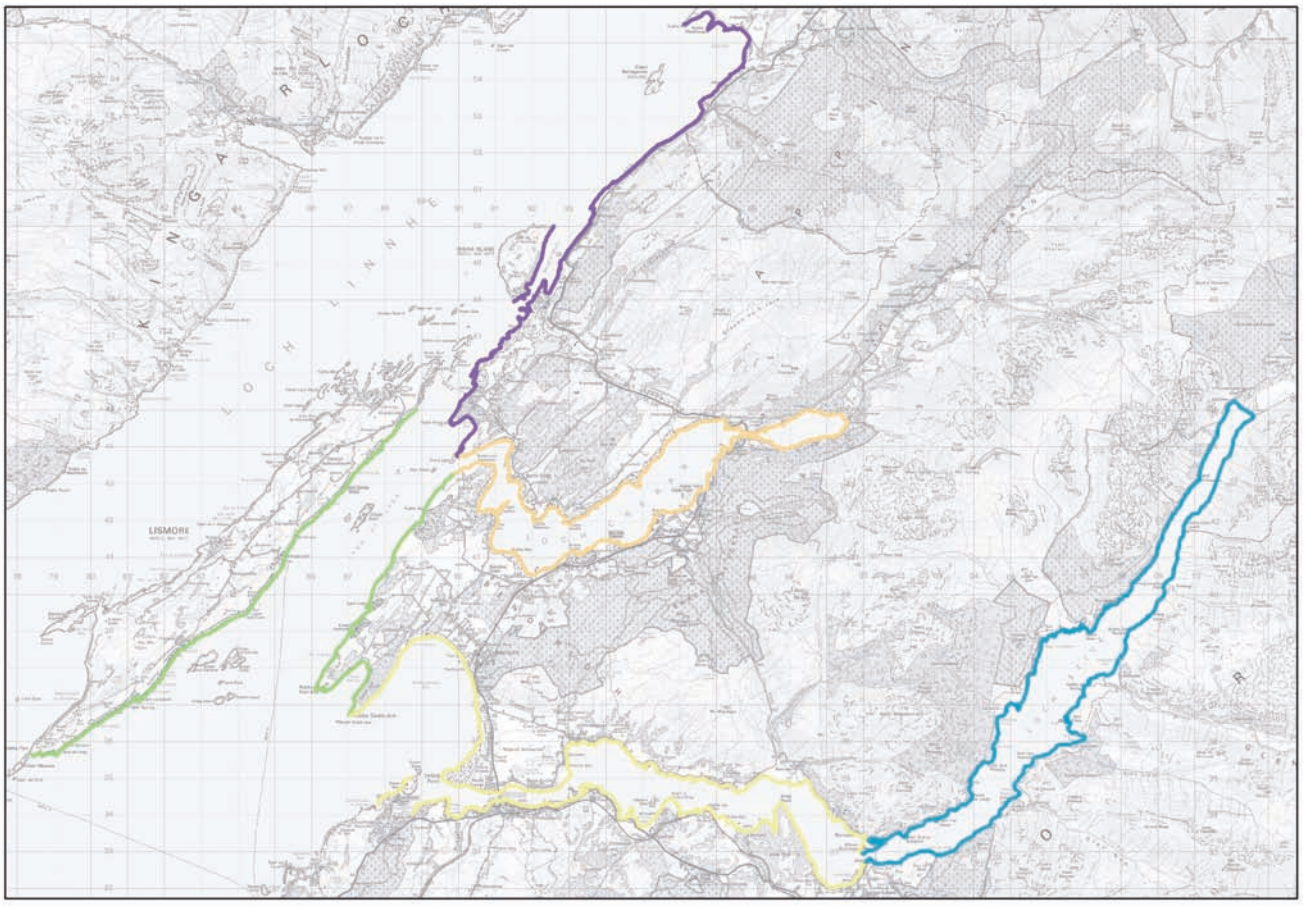
Figure 1: *The whole of this indicative sea loch, coloured blue, is one Coastal Character Area. However, following detailed assessment it is further subdivided into three Local Coastal Character Areas: Green is a narrow channel of water, purple is a more enclosed, steep sided section of loch with a regular coastline, while red indicates an area where the coastline is indented and fragmented, and the hinterland has relatively low relief.*

3.1.1 Identifying Coastal Character Areas

The main purpose of the initial site visit is to identify the strategic Coastal Character Areas. A car based survey, with possibly two assessors, can be used to explore and then define these areas, which form the first building block in the assessment process.

Coastal Character Areas are recognisable geographical areas which have a consistent overall character at a strategic level. They are usually a modest single loch within a larger system, a stretch of coastline with a relatively consistent overall character, or a whole island. In the pilot studies, these areas are named after the common place name or geographical location of the area for ease of reference. An example taken from the pilot studies is shown in **Figure 2**.

Figure 2: *Coastal Character Areas are recognisable geographical areas, which have a broadly consistent landscape character at a strategic scale. They are usually named after the common place name or geographical location.*



Landscape Capacity Assessment for Aquaculture

North Argyll Study Area

CONTEXT

1:100 000

Coastal Character Areas

- Inner Loch Etive
- Outer Loch Etive
- The Isle of Lismore and the Lynn of Lorn
- Loch Creran
- Lower Loch Linnhe

3.2 Stage 2: Undertaking detailed site survey

The purpose of the detailed site survey is to identify, analyse and present those elements of the seascape which are most likely to be affected by aquaculture development. This is likely to involve walking or cycling, as well as travel by boat, to develop a comprehensive and detailed knowledge of the individual Local Coastal Character Areas.

The detailed survey work is presented in text form accompanied by a map. Each Coastal Character Area is surveyed and presented as a whole and a key task within the detailed survey work and analysis is to define the Local Coastal Character Areas. For each Local Coastal Character Area, a series of bullet points describes the key landscape elements, and the accompanying map indicates the extent of each Local Coastal Character Area, and key features which are mentioned in the text.

3.2.1 Undertaking survey and analysis

Good survey work focuses on those elements of the landscape which are relevant to the particular study in hand. It is not an opportunity to describe all aspects of landscape character: some elements will quite simply not be relevant.

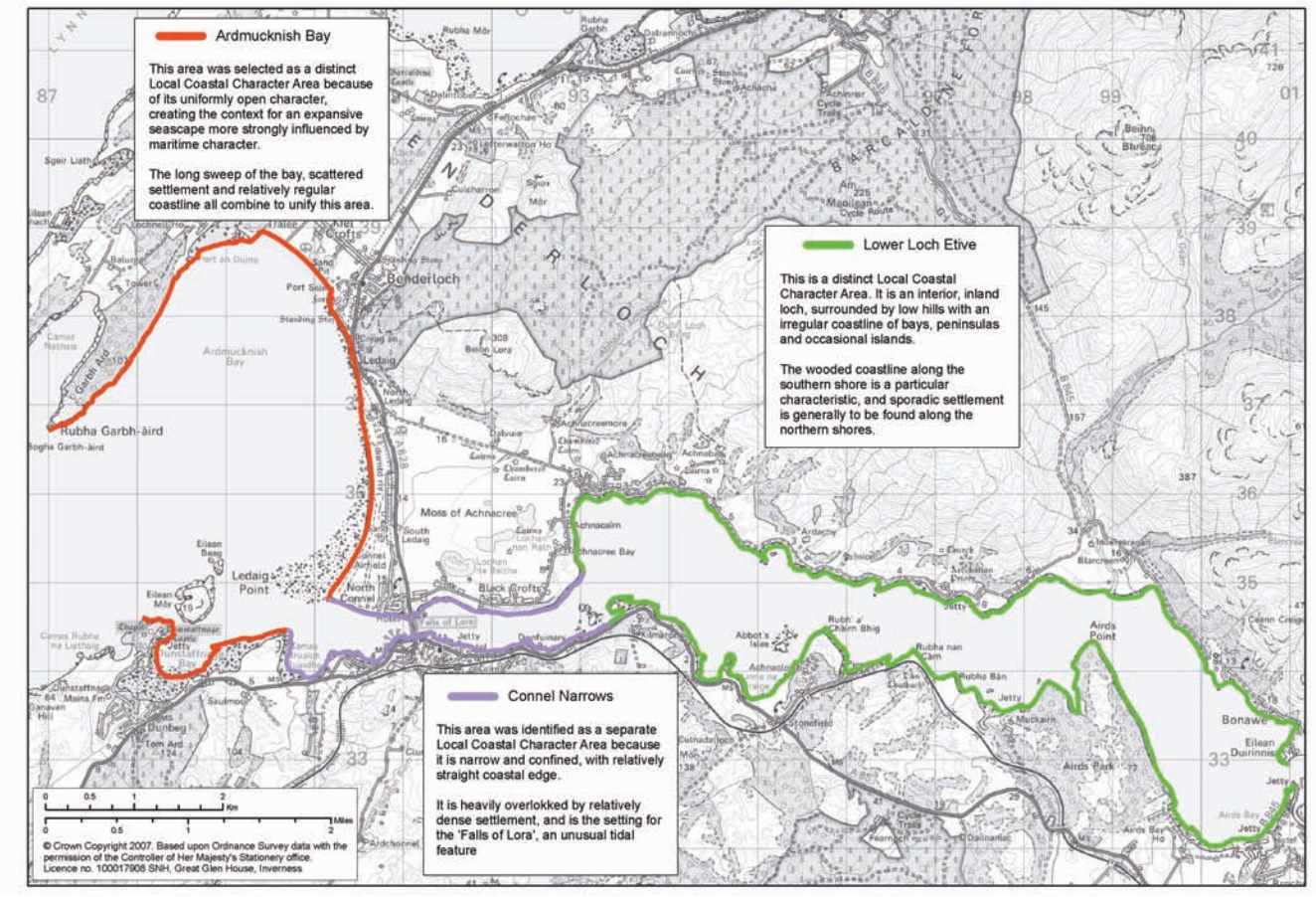
It is also very important that at this stage the assessors establish Local Coastal Character Areas which have a very consistent character. This means that both the analysis and the recommendations will apply consistently across the whole of each Local Coastal Character Area.

3.2.2 Identifying Local Coastal Character Areas

The Coastal Character Areas identified during the initial site visit are further subdivided into smaller areas of distinct character. These are the primary tool for assessment, as the analysis and recommendations will apply to these individual areas in their entirety. These areas are called 'Local Coastal Character Areas', and the following characteristics are used to help identify them:

- Physical landform, the degree of enclosure or openness and an assessment of both horizontal and vertical scale
- The degree of influence of the sea and qualities which may be described as 'maritime' on the landscape and coast of the area, including coastal dynamics
- The shape, scale and degree of fragmentation of the coastline
- The presence of human artefacts, distribution of settlement pattern and amount of human activity
- Landscape features, including historic features, and their setting
- Experience of the coast, landscape and seascape, including the degree of remoteness and potential opportunities to appreciate wildness
- Visual catchment

Figure 3: *Local coastal character areas are indicated on the 1:50 000 scale map by a coloured line. This figure also explains the different seascape characteristics which informed the selection of the Local Coastal Character Areas.*



Photographs showing Local Coastal Character Areas identified on **Figure 3**

18 Lower Loch Etive: an interior loch surrounded by low hills with an irregular coastline and sporadic settlement.

19 Connel Narrows: Narrow and confined, this slender stretch of sea is overlooked by dense settlement along both sides. The rapid tidal flow, called 'The Falls of Lora', under the bridge is a distinctive maritime feature.

20 Ardmucknish Bay: the openness and large scale of the seascape, as well as the simple regularity of the long sweep of the coastline characterises this expansive bay.

Where there is doubt about identifying boundaries between the areas, give priority to those characteristics which specifically influence the character of the coastal edge, which is where aquaculture developments are most likely to be located.

In the pilot studies, the Local Coastal Character Areas were illustrated on a map by drawing a coloured line along the coastal edge. They were named after geographic features and place names which could be located on a 1: 50 000 map. This is illustrated on the map in **Figure 3** (on previous page), which is accompanied by photographs illustrating the three different Local Coastal Character Areas identified on the map.

3.2.3 Identifying key characteristics and features

Tables 2A and 2B list those issues of seascape character and visual assessment which are particularly relevant for assessing the potential capacity for accommodating new aquaculture development within the seascape.

The tables are laid out to try to distinguish between the different types of assessment made on site. They draw a distinction between those aspects of the seascape which relate to physical character and are therefore relatively objective, and those aspects of character and visual assessment which are more subjective, and within which professional judgement plays a significant role.

However, the distinction is never quite as black and white as it is presented. All assessment – even the process of identifying and describing physical characteristics – involves sorting, assessing and prioritising information, and therefore necessarily involves a degree of judgement.

The primary role of Tables 2A and 2B is to act as a prompt on site visit – they are simply a form of checklist. Not all topics listed in Tables 2A and 2B will be relevant to all Local Coastal Character Areas, but the site assessment should be comprehensive enough to ensure that all information required to carry out the later stages of assessment has been identified. The topics are therefore further subdivided into relevant issues, which have been paraphrased as bullet points in the table. More detail about the background and relevance of the topics and issues can be found in Appendix One.

3.2.4 Sea based assessment

Site assessment is carried out from the land and from the sea. In the pilot and subsequent studies, land based assessment identified most of the key issues, and the sea based assessment often confirmed the land based analysis. From the sea, however, it was noted that the scale of a water surface or water channel was often even more evident. The experience of moving between an enclosed loch or bay and the wider sea or an expansive sea loch was particularly pronounced. These 'gateways' or 'transition points' between one scale of water surface and another were rated more highly sensitive to development following the sea based analysis, particularly in areas frequented by water based recreation craft.

3.2.5 Presentation of site survey and analysis

The survey and analysis information are presented as a series of bullet points of key characteristics within each Local Coastal Character Area.

The bullet points are listed in the order in which the topics appear in Tables 2A and 2B, which means that the information for each Local Coastal Character Area is consistently presented. This is illustrated by the example in Box 2, which are sample bullet points taken from part of the capacity study undertaken for Loch Fyne. This example illustrates how the survey focuses on those aspects of the landscape which relate to aquaculture – the scale of the water surface, the orientation and shape of the coastline, the presence of shoreline woodland, the location of key views and comments on the amount of existing coastal development are all pertinent.

21 This elevated view of part of Loch Fyne illustrates the transition from the wider loch to the left, where two forks of the loch meet, and the narrower inner loch. The narrowness is further emphasised by the gravel spit at Otterferry, seen here on the right. From the sea, only a narrow stretch of water is navigable, further emphasising the variations in scale of water surface as you travel along the loch.

Table 2A: Issues explored on site visits: Landscape/Seascape character

Topic	Analysis of physical charateristics	Analysis of experimental charateristics	Judgements	Recognised values
Maritime influences	• aspect and orientation • existing marine based activities and aquaculture • maritime processes and dynamics • scale, distance and expansiveness of open sea	• sense of space and light • sense of exposure • sense of containment or open-ness • sounds associated with the sea, smell of the sea	• unity of landscape character • aesthetic qualities, including characteristics, experiences, and perceptions which create exceptional aesthetic quality • assessing significance of physical characteristics • assessing intensity and significance of experiential characteristics • identification of dominant physical or experiential characteristics • identification of aesthetic attributes • determining the extent of the relevant setting for significant features and landmarks • identifying relevant cultural associations with place	• landscapes and seascapes designated because of their scenic, landscape or recreational value • landmarks designated because of their cultural or historic significance • roads designated as scenic or tourist routes
Character of coastal edge	• shape and scale of coastline • degree of indentation and enclosure • presence of offshore islands • fragmentation of edge • deposition features, tidal variations • landmarks • shoreline development	• sense of exposure • sense of containment or open-ness		
Character of immediate hinterland	• description of key elements of landscape character • topography and relief • vegetation pattern • existing settlement pattern • landmarks	• sense of containment or open-ness • presence of maritime influence		
Wildness	• presence of natural processes • presence of development/ human activity • actual accessibility • ruggedness of terrain	• sense of naturalness • perceived remoteness • sense of isolation	• intensity of sense of wildness • degree of ruggedness and perceived accessibility • degree to which natural processes dominate the experience of place	• Wild land search areas

Table 2B: Issues explored on site visits: visual assessment

Topic	Analysis of physical elements	Analysis of type of views	Judgements	Recognised values
Visual assessment	• presence of the coastal edge • presence of the open sea • focal points or features within the views • aspect and orientation of viewpoint, character of seascape	• overlook from settled areas • views experienced as part of a sequence • elevated viewpoints • panoramas • sudden revelations • glimpse views	• significance of views and viewpoints • significance and dominance of compositional elements • quality of visual composition from viewpoints • significance of aspect and transient qualities such as quality of light and reflectivity	• views which contribute to the experience of a landscape or seascape designated for its scenic quality • views to and from features designated because of their historic significance • views from recreation facilities and informal provision

Box 2: Sample of survey information listed as bullet points

Kames to Port Ann landscape and visual elements:

- The variation in the channel width creates a sense of expansiveness where the sea channel is at its widest, notably at Kames and looking south from Port Ann **(22)**
- The coastline is very varied, from the more exposed, outward orientated character of the wooded headland, to the sheltered bay of Port Ann, where enclosure is further reinforced by steep slopes and the presence of an off shore island
- The settlement of Achnaba is located on a more sheltered curve of Port Ann bay **(23)**
- Gentle indentations and tiny shingle bays create further diversity, contrasting with stretches of regular coastal edge and the sweeping bay at Kames
- There is little settlement, and the road is located away from the coastal edge, some of which is inaccessible
- Most of the hinterland is wooded, with some open ground around Kames, and trees extending to the foreshore in places
- Recreation access through the woodland at Port Ann leads primarily to a derelict settlement at west Otterferry, and a viewpoint overlooking the south end of the loch
- Views focus along the length of the loch
- Emerging from the woodland at Port Ann when travelling south on the A83, the view across the bay is suddenly revealed, creating some visual drama

22 Looking south from this stretch of coast, the loch widens to create a more expansive sense of scale.

23 The expansiveness of the loch contrasts with the more intimate scale of the bay at Port Ann.

Box 2 continued: Sample of survey information listed as bullet points

Port Ann to Silver Craigs landscape and visual elements:

- This coastline appears relatively exposed and open, orientated towards a more expansive stretch of water, which allows extensive panoramic views to the south
- However, the spit of land which is revealed at low tide extending west from Otter Ferry creates a narrower stretch of water which is most evident from the sea – this is the 'gateway' to inner Loch Fyne for those travelling by boat
- The coastal edge is regular, with only small indentations and occasional off shore islands fragmenting a relatively linear coast line
- Parts of the coastline are particularly rocky, reinforcing the sense of exposure
- Most of the hinterland is open, with some commercial woodland extending down to the coast, but not the foreshore
- The remainder of the coastline is undeveloped and secluded, although easily accessible on a coastal track

The map which accompanies the bullet points has three key roles:

- Firstly, to indicate the location and extent of the Local Coastal Character Areas
- Secondly, to identify the location of key features mentioned in the bullet points
- Thirdly, if necessary, to indicate the location of viewpoints from which photographs have been taken to accompany the report

The map also includes the locations of existing aquaculture leases.

Appendix Two contains a full worked example showing how the detailed analysis for individual Local Coastal Character Areas might be presented along with an example of an accompanying map.

3.3 Stage 3: Identifying opportunities and constraints

The purpose of including an opportunities and constraints analysis is to focus on the potential effect of aquaculture development in the individual Local Coastal Character Areas.

This stage in the assessment process is used to draw out and systematically record those aspects of landscape character and visual amenity which would be helpful in accommodating aquaculture (opportunities), and conversely those which would be detrimentally affected by development (constraints). This stage is closely linked to the next stage, which assesses the sensitivity of the seascape to aquaculture development.

The opportunities and constraints are presented in text form accompanied by a map. For each Local Coastal Character Area bullet points describe the key opportunities and constraints, drawing on the analysis of both landscape character and visual amenity. The accompanying map records key features which are mentioned in the text.

3.3.1 Identifying opportunities

Opportunities to accommodate aquaculture development may relate to:

- the physical character of the shoreline, such as a simple, linear coastline against which development can be located
- the scale and expansiveness of the seascape,
- the 'ambience' of the coast, for example where a coastline is busy and developed, or
- the character of the hinterland

In addition,

- the degree of visibility from settlements,
- off shore and on shore recreational use; and
- visual seclusion of coastal areas

will all influence which opportunities can be identified. Examples of the type of opportunities identified in the pilot studies are recorded in **Box 3**.

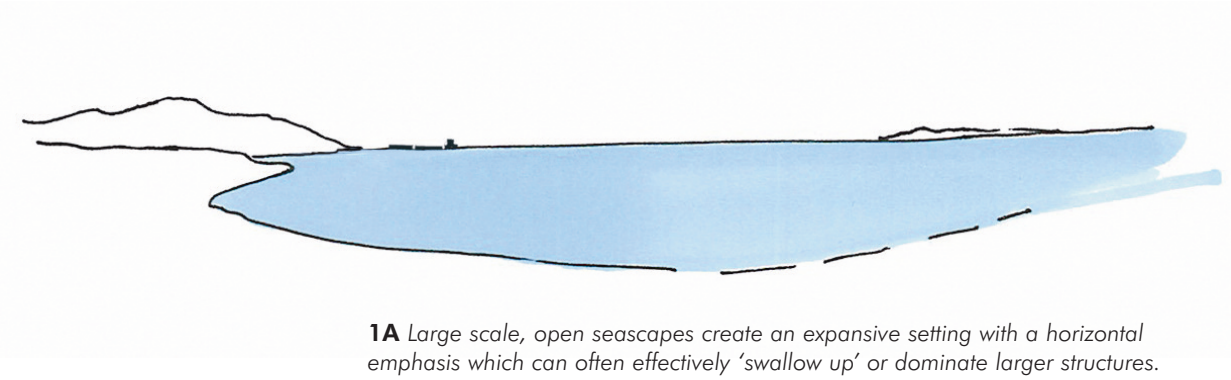
Box 3: Examples of opportunities, drawn from previous studies, illustrate the range of potential opportunities and how they were described

Examples of opportunities which relate to the character and experience of the seascape:

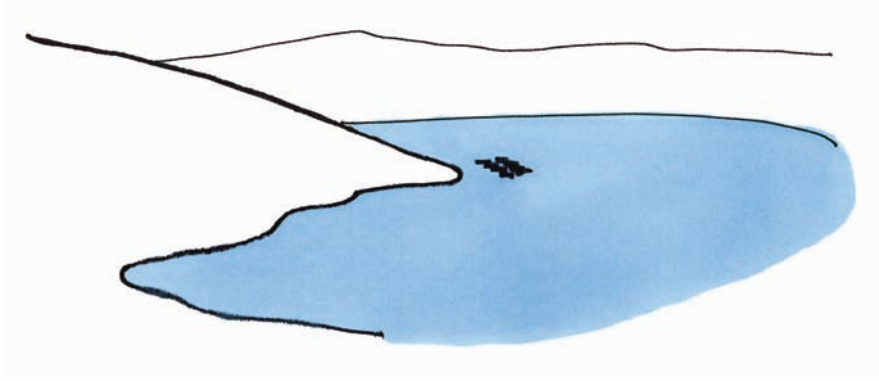
- The expansive scale of this seascape could accommodate some development, even of moderate to large scale, without dominating water surface **(1A)**
- Several promontories offer the opportunity for development to be located where it could form a 'visual extension' to the landform **(1B)**
- The regular, almost straight, shape of the coastline could be reflected in the parallel linear alignment of cages or shell fish lines **(1C)**
- Existing frequent marine activity could absorb traffic associated with aquaculture **(1D)**
- The relatively well-developed character of the coastal edge, where industry, noise and lighting is already a feature, could absorb the lighting, noise and activity associated with aquaculture
- Onshore development could be sited in existing settled areas
- Onshore development could relate to existing infrastructure

Examples of opportunities which relate to visibility and visual amenity:

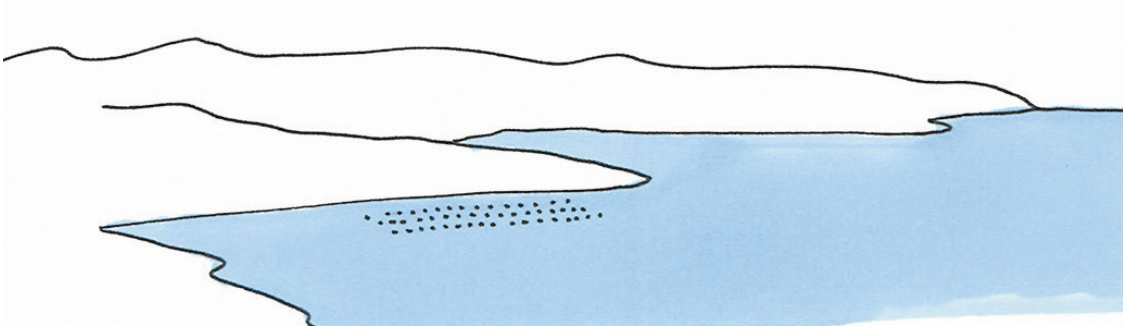
- Woodland and hedgerows could provide some screening from public roads on both sides of the loch **(1E)**
- The steep coastal edge and woodland could create a visual backdrop which may more readily absorb structures when viewed from the sea
- The wooded shoreline intensifies dark shadows and provides a backdrop against which structures can be located **(1F)**
- The general lack of accessibility along the shore limits land based viewpoints
- This area is not highly populated and accessible largely by foot and boat, therefore is not seen by large numbers of people
- Deep shadows created by the north facing orientation of these slopes could create some visual camouflage for off shore structures



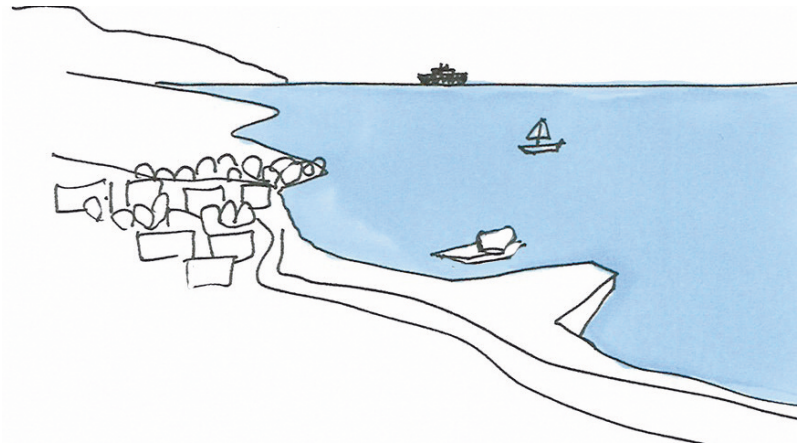
1A *Large scale, open seascapes create an expansive setting with a horizontal emphasis which can often effectively 'swallow up' or dominate larger structures.*



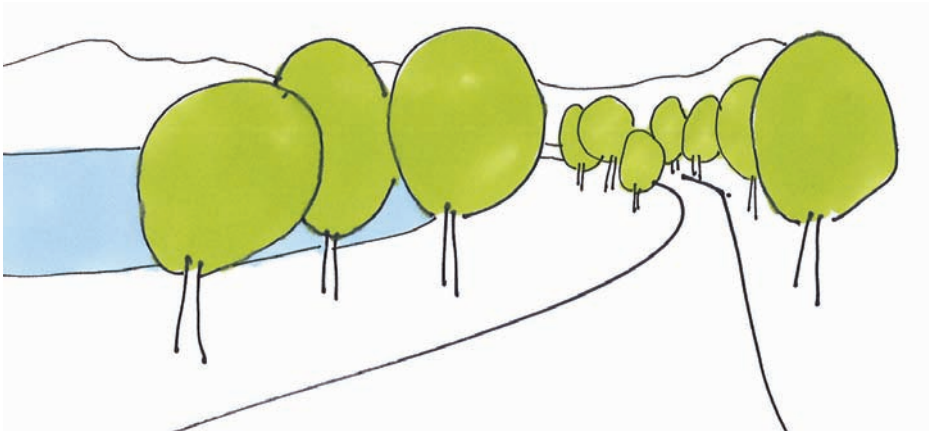
1B *Structures located against irregular coastlines are best sited near to a promontory. The opportunity for aquaculture development is likely to be limited to small structures where the irregularity of the coastline is made up of small scale indentations.*



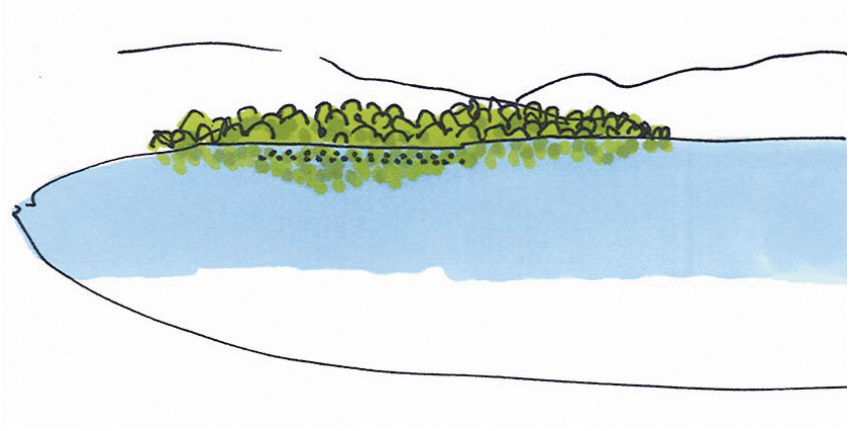
1C *There is often more opportunity to site and align linear features and larger structures adjacent and parallel to a straight length of coastline.*



1D *Boats on the sea, villages, harbour infrastructure and roads all combine to make a more developed character which may absorb the activity associated with fish farming. However, care should be taken not to add so many elements into the landscape that it begins to look 'cluttered'.*



1E *Views of the water from roads and footpaths are sometimes obscured by shoreline trees.*



1F *Woodland can reflect dark shadows on the water, effectively camouflaging structures, particularly if main views are from the north, as the sun will be behind the structure and shadows will be emphasised.*

3.3.2 Identifying constraints

Constraints which are likely to make it difficult to accommodate aquaculture development include:

- significant and defining characteristics of the landscape which will be compromised by aquaculture development, such as small scale indentations along a coast
- specific features valued because of their historic, cultural or aesthetic quality on which aquaculture development will have a negative impact
- aspects of the experience or appreciation of a place which will be adversely affected by the presence of aquaculture development, such as an area characterised by remoteness or lack of structures, or
- areas of visual sensitivity, such as key views or overlook by settlements and popular footpaths

Examples of the type of constraints identified in the pilot studies are shown in **Box 4**.

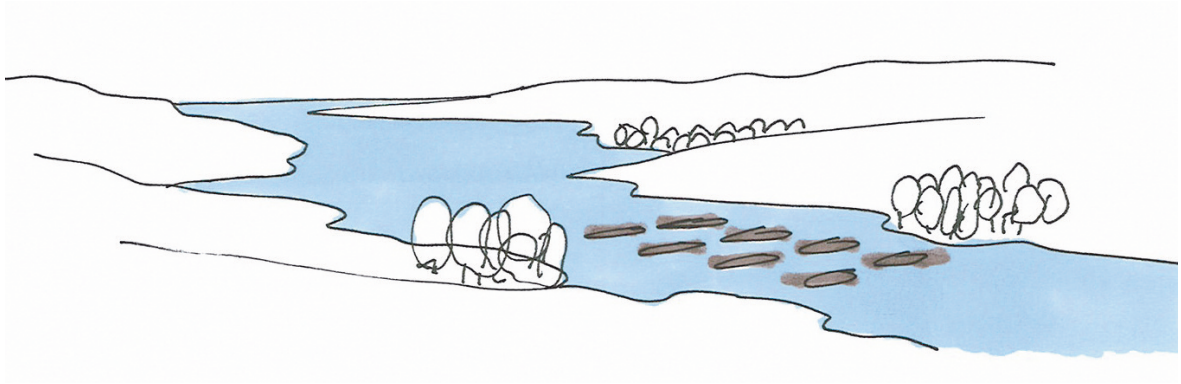
Box 4: Examples of constraints, drawn from previous studies, illustrate the range of potential constraints and how they were described

Examples of constraints which relate to the character and experience of the seascape:

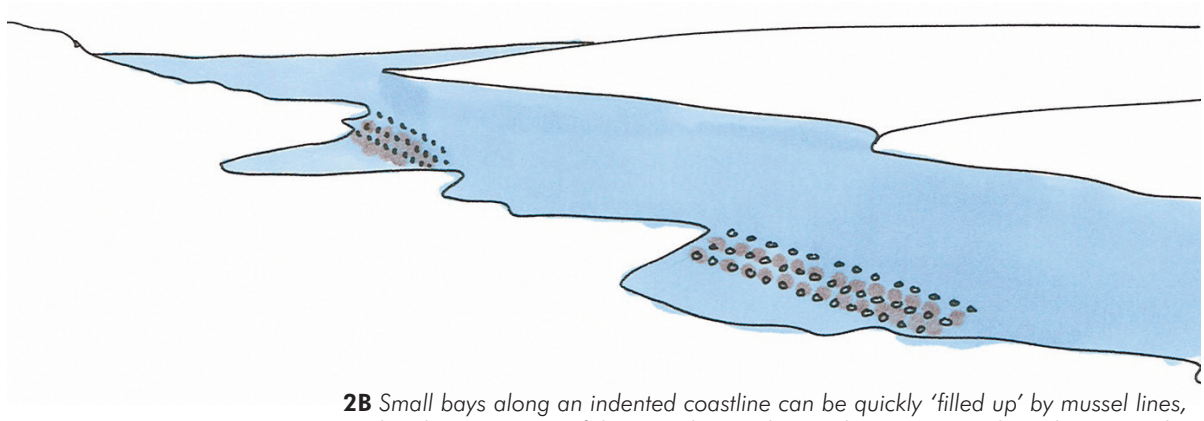
- Simple, uncluttered water surface of this narrow channel would be quickly dominated and fragmented by development **(2A)**
- Small scale of bays along this indented coast can readily be 'filled up' with development
- This channel is an important 'gateway' to the Sound and could be quickly narrowed by development encroaching from each shore
- Avoid developing the majority of bays along the shoreline, as this will lead to an impact on sequential experience when travelling either along the public road or on the water **(2B)**
- Qualities of remoteness, associated with inaccessible, rugged terrain and lack of development, would be compromised by development
- Protect the settings of historic features and small scale islands from aquaculture development to maintain the integrity of their setting **(2C)**
- This area is designated as an NSA, reflecting the high scenic quality of the surrounding landscape
- This accessible coast is used extensively for informal recreation, possibly limiting oyster farming
- The marina is a focus for off shore recreation activity, and will attract recreational boat users to this area

Examples of constraints which relate to visibility and visual amenity:

- The foreground and focal points of key panoramic viewpoints should be avoided
- Some of this coastline is directly overlooked by housing and recreational developments
- Development should avoid the foreground of elevated panoramic views, particularly from the coastal path
- The cliffs of this coast are visually dramatic from the sea, although views from this low level would be foreshortened
- The irregular shape and profile of islands provide a dramatic contrast to the simple expanse of the sea and are the focal point of many views



2A *A narrow channel of water is likely to become quickly dominated by large structures, so is likely to be a landscape constraint.*



2B *Small bays along an indented coastline can be quickly 'filled up' by mussel lines, so that the perception of the irregularity is lost as the eye jumps along the outer edge of the lines.*

2C The setting of historic and natural features is likely to be a constraint to siting development.

3.3.3 Presentation of opportunities and constraints

Opportunities and constraints to aquaculture development are recorded as a series of text bullet points which relate to the individual Local Coastal Character Areas.

To maintain consistency, opportunities and constraints are broadly listed in an order which relates to the topics list in Tables 2A and 2B, in the same order as issues identified in the analysis. Not all topics will be relevant to all areas.

The map has two key roles:

- Firstly, to identify the location of key features mentioned in the bullet points
- Secondly, if necessary, to indicate the location of sensitive viewpoints

Appendix Two contains a full worked example showing how opportunities and constraints might be presented along with an example of an accompanying map.

3.4 Stage 4: Undertaking the sensitivity assessment

The issues explored on the site visit, and the analysis of opportunities and constraints are used in this methodology to inform the sensitivity of the seascape to the presence of aquaculture development.

Sensitivity to aquaculture development is assessed in each Local Coastal Character Area. For each area, the potential impact on six criteria is assessed and presented in text form within a matrix. The six criteria relate to the topic headings listed in Table 2A and 2B, which are the key elements of seascape character which are likely to be influenced by aquaculture development.

3.4.1 Assessing sensitivity

The sensitivity is assessed using the six criteria and measured on a five point scale. The scale records the sensitivity of the six criteria to potential aquaculture development within each Local Coastal Character Area. The five point scale is used as follows:

- Very high sensitivity
- High sensitivity
- Some sensitivity
- Low sensitivity
- Not sensitive

Sensitivity assessment involves professional judgement. Nevertheless, it can be approached systematically, and the 'trail of reasoning' can be transparently presented. This methodology therefore includes a written analysis of each individual sensitivity assessment, so that any reader can see how the rating has been arrived at.

The six criteria or topics against which sensitivity is assessed are identified from the list in Tables 2A and 2B. The topics bring together landscape and visual issues which are most likely to be affected by aquaculture development under the following headings:

- Maritime influences
- Character and experience of the coastal edge
- Setting of landmarks and features
- Experience of wildness
- Aesthetic qualities
- Key viewpoints

3.4.1.1 Maritime influences

This topic assessment considers the sensitivity to change of the physical characteristics and experiential attributes which reinforce the presence of and particular dynamic qualities of the sea, including scale and expanse, degree of openness and exposure as well as tidal movements. **(24,25, 26, 27)**

24 An extensive tidal reach emphasises the dynamic experience of the sea. The static character and geometric shape of aquaculture structures are likely to conflict with the constant change and the organic, fluid shapes of the natural patterns created by water and sand. As a result the maritime character of this area is likely to be rated as highly sensitive to aquaculture development.

25 Dynamic character is also reflected where coasts are exposed to the power of waves.

26 This open, expansive, simple seascape enclosed by the low relief of the surrounding hinterland emphasises the breadth of the water surface. The openness and expanse of water conveys the sense of the sea, an attribute which can be used to help accommodate larger scaled development, which is diminished in scale relative to the expanse of the water.

27 In contrast, these narrower stretches of water appear more like an inland loch. The smaller scale of the water surface is emphasised by the higher hills, which create enclosure, contracting the sense of scale yet further, making this area sensitive to large scale development.

3.4.1.2 Character and experience of the coastal edge

This topic assesses the potential effect of aquaculture development on the physical characteristics of the coast, including shape and form, enclosure, fragmentation and experiential attributes which particularly contribute to its distinctive character. **(28, 29, 30)**

28 The irregular, indented shape of this coastal edge emphasises naturalistic and organic shapes. The small bays and intricate convolutions of the coastline are relatively intimate in scale, contrasting with the expanse of the sea beyond. Large geometric structures will be difficult to accommodate against this small scale, indented coastline, therefore the coastal edge of this type of seascape is likely to be given a high sensitivity rating.

An area such as this is also likely to be highly sensitive due to the experience of wildness and in terms of aesthetic qualities.

29 This more regular coastline, where a shingle beach extends along a relatively straight stretch of shoreline is more capable in landscape terms of accommodating linear structures, which can be aligned parallel with the coast. This type of coast is likely to be less sensitive to introducing aquaculture development.

30 A more regular edge, relatively straight in shape, is less sensitive to geometric and linear structures, as with careful alignment they can reflect the dominant linear character of the landscape.

Here the sense of openness and lack of containment provided by the distant, low profiled hills, further emphasises the dominance of horizontality in this seascape.

3.4.1.3 Setting of landmarks and features

This topic assessment considers the potential sensitivity of the character of the setting and appreciation of particular features – historic, cultural, geological or ecological – which have been recognised as significantly contributing to the seascape in previous analysis. **(31, 32)**

31 Mousa Broch, in the Shetland Isles, is an example of a historic structure where the sea is an integral part of the setting, both visually and in terms of its historic interest. In terms of this attribute, this would be rated a highly sensitive site.

It is also likely to rate highly sensitive from a visual perspective, as it is an important visitor attraction. In addition, as the island is uninhabited, this area may even have some additional sensitivity in terms of 'experience of wildness'.

32 The famous 'St Ninian's Isle' tombolo is also on the Shetland Isles and is an example of a striking natural feature where the seascape is an integral part of the setting. It is likely that this stretch of coast would therefore be rated as 'high sensitivity' in terms of the setting for coastal features.

It is also likely to rate as very sensitive in terms of aesthetic quality, as it is a scenically dramatic feature within an NSA. In addition, the tombolo is a popular visitor attraction, and is therefore likely to rate as highly sensitive in relation to any visibility assessment.

3.4.1.4 Experience of wildness

This topic focuses on assessing the potential effect of aquaculture on the qualities of remoteness, isolation or wildness experienced in the local coastal character area, taking into account the particular characteristics which may contribute to the appreciation of this quality. **(33, 34)**

33 Remoteness is enhanced by inaccessibility and wildness by native woodland or other semi natural vegetation cover. For those who visit these areas – often by access from the sea – the lack of structures and obvious human influence reinforces these qualities.

This area would rate highly sensitive to development in relation to 'experience of wildness', but may rate at a relatively low sensitivity for 'key viewpoints'.

34 In contrast, this busy ferry terminal, and other areas which are fringed with coastal development are unlikely to have qualities of seclusion, isolation or remoteness.

This area would rate as 'low sensitivity' in relation to wildness, but would rate quite highly in relation to key viewpoints.

3.4.1.5 Aesthetic qualities

This topic assessment analyses the potential effect of aquaculture development on the attributes and experiences of the seascape which contribute to the positive aesthetic appreciation of the landscape. This may include visual composition, richness of detail, integrity of character and qualities which may have led to an area being designated for its aesthetic appeal. **(35)**

35 Areas designated for their scenic qualities are likely to be very sensitive to poorly sited and designed development. Here, the sweep of the bay, and the unusual and striking natural colours are instantly eye-catching. In addition, the contrast of the detail of the rocky outcrops against the simplicity of the sea and the rugged backdrop combine to create visual drama and high aesthetic quality which would be marred by insensitive development.

In terms of 'key viewpoints', this is also likely to be highly sensitive as it is a popular recreational beach.

3.4.1.6 Key viewpoints

This topic assessment considers the potential sensitivity of specific key viewpoints, previously identified during site survey, to potential aquaculture development. **(36, 37, 38, 39)**

36 From this viewpoint, the view is focussed down the loch which is framed by the hills. If this view was located at a popular and accessible location, then this would be identified as having a high sensitivity – the aim being to avoid siting structures across the open channel.

37 From this high-level viewpoint, it is possible to take in the expanse of the seascape, but any structures which are on the water are more visible, as they are seen surrounded by the simple openness of the water.

38 Woodland along the coast – here it is coniferous – creates a dark background and often casts dark shadows on the water. This can reduce the visibility of off shore structures, particularly when viewed from the sea. This type of setting is likely to be less sensitive in visual terms to introducing aquaculture structures.

39 Views from the sea, including from ferries and popular routes for recreation craft should also be considered when identifying key viewpoints.

3.4.2 Presentation of the sensitivity assessment

The matrix is a convenient way of expressing sensitivity, allowing each of the Local Coastal Character Areas to be allocated individual columns which then can be compared side by side.

For each of the six criteria which are relevant, the sensitivity rating is recorded and then followed by an explanation of the factors which have led to the sensitivity rating. This is one of the hardest parts of the assessment process: the explanation and justification of the assessors decision must be clearly and succinctly expressed so that any person reading the recommendations can understand the rating.

Figure 3 shows one of the sensitivity tables undertaken for the pilot study. This shows an example of sample text, and how it is laid out within the matrix.

Appendix Two illustrates a full worked example showing how the sensitivity analysis follows on from the opportunities and constraints analysis.

Figure 4: Sample of matrix

Potential sensitivity of the seascape to aquaculture development	Wigtown Sands	East Wigtown Bay	Fleet Bay
Maritime influences	Very high sensitivity Dynamics of intertidal create a dramatic and ever changing, organic pattern of light reflective sand and water which extends to the shore. This would be compromised by static structures and geometric shapes	Some sensitivity Dynamics of intertidal are present but have a less obvious effect on the seascape of the eastern side of Wigtown Bay, largely due to the extensive shingle foreshore. Some marine activity provides context for aquaculture.	High sensitivity In some places, the dynamics of the intertidal create a dramatic and ever changing, organic pattern of light reflective sand and water which extends to the shore. This would be compromised by static structures and geometric shapes
Character and experience of the coastal edge	Very high sensitivity Limited palette of elements – low salt marsh and the intertidal area – create a simple landscape character which would be compromised by introducing complex structures	Some sensitivity Relatively even coastline offers little opportunity for development to be associated with promontories and bays, but varied shoreline of shingle and wooded backdrop may offer opportunities for trestle type or offshore linear structures	Some sensitivity Indented shape, diverse shoreline, islands fragmenting the water surface and a high degree of existing coastal development all offer potential to absorb coastal development, but development of the shore and intertidal difficult to combine with free ranging recreational access
Setting of landmarks and features	Some sensitivity The setting of the Covenanters' Monument, and its board walk access should be avoided	Low sensitivity Setting of Carsluith Castle should be avoided, but this leaves plenty of scope for alternative sites	Some sensitivity Setting of Cardoness House and Cally Palace should be avoided, along with the setting of the main Fleet islands, particularly those which are accessible at low tide
Experience of wildness	High sensitivity Sense of remoteness and dominance of natural processes on sense of place would be lost if development was encountered	Low sensitivity Existing sense of remoteness and isolation is limited, although there is some visual separation between the shore and the nearby busy road	Low sensitivity The most remote locations are the islands of Fleet, while the rest of the coastline is well developed and readily accessible
Aesthetic qualities	Some sensitivity An intriguing rather than classically scenic landscape, but with a strong, uncluttered unity which would be compromised by development. Sense of timelessness and the atmospheric experience of the ever changing interplay of land, sea and light also contribute to aesthetic quality	Low sensitivity This is a landscape of strong unity, with each vegetation element well related to changing topography and aligned parallel to the coast. Nevertheless the area contains no exceptional aesthetic qualities	High sensitivity The drama of the dynamic intertidal zone, ambiguity of whether it is land or sea and ever changing light on wet sand and water combined with the scale and complexity of the islands, all contribute to aesthetic quality. Several well composed set piece panoramas contribute to the visual experience of aesthetic quality
Key Viewpoints	Some sensitivity Low lying development likely to be difficult to see within low level, foreshortened views. Large scale development would be highly visible from panoramic and elevated views from Wigtown	Low sensitivity Apart from key views from Carsluith castle, the occasional settlement and the Cairnholy chambered cairn sites, much of this coastline is hidden from public viewpoints by woodland and steep slopes	High sensitivity Much of this area is overlooked, either by settlements or caravan and chalet parks. There are frequent viewpoints revealing set piece panoramas from roads or well used beaches and coastal facilities

3.5 Stage 5: Presenting conclusions

The conclusions outline the assessors' assessment of the potential capacity of the seascape to accommodate aquaculture development, drawing on the sensitivities recorded in the matrix. The capacity is presented as a description of the potential of the landscape to accommodate the changes brought about by aquaculture development.

3.5.1 Writing conclusions

For each Local Coastal Character Area, conclusions are presented in text form. The text should be kept concise, but elaborates on the reasons for the capacity recommendations, drawing on the sensitivities identified in the previous assessment. Conclusions indicate where there might be:

- 'some potential' to accommodate aquaculture development, and then will go on to describe the appropriate type of installation and any mitigating measures which might be appropriate; and
- 'no potential' to accommodate aquaculture, with a brief description of why this conclusion has been reached.

The text may also identify where it might be appropriate to:

- remove existing development; or
- expand or consolidate existing development

3.5.2 Advice on guidance and mitigation

Conclusions also offer the opportunity to explain in bullet point form any guidance or mitigation which is necessary to accommodate aquaculture development within the Local Coastal Character Area. Examples of mitigation guidance are shown in **Box 5**.

3.5.3 Strategic conclusions

The final stage in the assessment process is to map the conclusions from each Local Coastal Character Area. This is likely to be most effectively undertaken using GIS. The key for this final map should reflect the priorities of the client, and in the studies undertaken to date, this final description of recommendations has varied according to the brief.

For the pilot studies, which were designed to inform future local plan policies, the final recommendations were allocated within the following categories:

Box 5: Examples of mitigation guidance extracted from the pilot studies

- On-shore facilities should avoid the north shore of the loch, using any existing buildings on the southern shore where possible, and thus adopting a strategy of consolidation of existing industrial uses around this loch
- Development should be sited away from open views from the A road and aligned parallel to, and as close to, the shore as possible.
- Development should avoid impacting on open views down the narrow Sound. This view focuses on distant fragmented islands and indented coastline which contributes to the scenic quality of the NSA.
- Development should be located away from the setting of key features and should avoid the foreground and focal points of key panoramic views, or views from settlements
- Development should be located where the sea is expansive in scale, so that structures do not visually dominate the water surface
- On shore development and oyster trestles should avoid shorelines used for informal recreation
- Where possible, development should aim to use the wooded shoreline as an immediate setting and visual backdrop
- Structures should be aligned to reflect the regular, linear character of the coastal

- Areas where existing aquaculture development already reaches capacity in landscape terms and there are no further opportunities for development
- Areas where there is already too much aquaculture development in landscape terms, and where it might be appropriate to consider removal of development should the opportunity arise in the future
- Areas where there is no development and no potential for the landscape to accommodate aquaculture development
- Areas where there is low potential for the landscape to accommodate aquaculture development
- Areas where there is some potential for the landscape to accommodate aquaculture development
- Areas where there is high potential for the landscape to accommodate aquaculture development

However, in a recently completed study on Loch Fyne[10], the outcome of the study was to inform a coastal zone management plan. This plan was required to tackle the issue of consolidating and possibly expanding existing fish farm leases, therefore the final recommendations took this into account. The following categories were identified:

- Areas where existing aquaculture development already reaches capacity in landscape terms and there are no further opportunities for development
- Areas where an existing lease should be removed if an opportunity arises
- Areas where there are no existing leases and no potential for the landscape to accommodate aquaculture development
- Areas where existing aquaculture development could be increased in size
- Areas where there is potential for the landscape to accommodate new aquaculture development (type and size of aquaculture development then indicated)

It is likely that in each study the final strategic overview will be presented using slightly different categories, depending on the agreed scope of the brief and core purpose of the study.

3.5.4 Strategic overview

It should be also possible to provide written commentary on the overarching themes and common issues which were identified during the assessment process. This text is likely to include commentary on:

- The extent and nature of existing leases, including a view of existing impact
- An overall conclusion about the amount of opportunity for expansion of aquaculture development within the study area
- The type of seascape within the study area which might most readily absorb new development
- Key sensitivities which reflect the seascape character or scenic quality of the study area
- Types of seascape which have the most limitations or constraints
- Any broad geographic differences in potential
- Broad guidance on scale and design which might unify the development across the study area
- A brief description of the key seascape characteristics of the area, perhaps drawing out any features or qualities which create overall identity or which should be more widely recognised

[10] 'Landscape/Seascape Capacity for Aquaculture: Loch Fyne', Grant, Alison and Anderson, Carol, for Argyll and Bute Council and SNH, 2006 unpublished report

4. Assessing cumulative effects

Presenting the findings of the sensitivity assessment for each individual local coastal character area on one map raises the possibility of undertaking an assessment of cumulative effects across the whole study area.

Cumulative landscape and visual effects have been defined as 'additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments…or actions…They may also affect the way in which the landscape is experienced.'[11]

4.1 Cumulative effects identified within the Coastal Character Areas

This method of assessing capacity already incorporates some consideration of potential cumulative effects, at least within the individual coastal character areas, at two stages in the process:

- Firstly, the assessment process considers the potential location and type of development appropriate for the individual Local Coastal Character Areas, and offers guidance which influences the amount of development appropriate to this localised landscape.
- Secondly, the sensitivity matrix allows comparisons to be made between the Local Coastal Character Areas within a whole Coastal Character Area. There is an opportunity to adjust the recommendations at this stage, to take into account potential cumulative effects within the Coastal Character Area as a whole.

4.2 Cumulative effects within the whole study area

To undertake cumulative assessment at a more strategic level, the whole study area needs to be assessed in terms of how people use or experience the coast. Criteria used for this include:

4.2.1 Use and experience of the coast from the land

While the capacity assessment focussed on subdividing areas into character based units, people may experience the coast as a linear sequence, from a coastal road, railway or footpath which traverses several character areas. It may be that an appropriate area for

[11] The Landscape Institute and Institute of Environmental Management and Assessment, 2002, page 85, Section 7.12

assessment of cumulative effects is a stretch of coast between two key settlements, or which can be walked in a day along a coastal footpath. Alternatively, some areas are not experienced as part of a linear sequence, but rather as point locations which are visited after travelling through hinterland.

4.2.2 Use and experience of the coast from the sea

Experience of views from the sea again could be assessed by travelling from one location to another, as a sequence. This may be appropriate for ferry routes, or popular day long journeys between overnight moorings used by recreational yachts.

4.2.3 Views and visibility

The sensitivity of views and visibility is identified within the capacity assessment process as a key issue. There may be additional sensitivities applicable when considering potential cumulative effects from a road, footpath or sea going route, particularly if the experience of a linear sequence through a number of character areas is being analysed. Sensitivities are likely to include elevated panoramas, revealed vistas, a sequence of glimpse views, views to particular land marks, or views which introduce the coast or a sea view for the first time in a journey.

4.2.4 Strategic pattern and association

It may be that at a more strategic level, a pattern of aquaculture development can be created, where development is associated with a particular landscape character type, or series of elements, on a regular basis. Aquaculture then becomes part of that character type, with which people become familiar. In this way, potential cumulative effects could be managed.

5. Using the capacity assessment and future monitoring

Landscape capacity assessment can be used to provide a strategic framework for forecasting when development capacity is likely to be reached in landscape and visual terms. Assessments will help work out how best to accommodate as much development as possible while minimising the impact of development on the landscape, and they can be used as a means of communicating ideas about specific landscapes and how to manage change.

A landscape capacity assessment for aquaculture can most readily contribute to development planning and coastal zone management plans. For this type of strategic planning, it is a 'layer' of information, which can be readily accommodated within a GIS system, alongside other layers of information which combine to assist spatial planning.

All management plans are likely to be subject to a review process, and the landscape capacity assessment should then be re-assessed. While it is likely (although not always assured) that the baseline analysis will remain largely the same, opportunities, constraints and recommendations may be altered as new fin fish and shell fish farms are established and existing developments are withdrawn. It is also likely that new technology and developments within the industry itself will influence future landscape capacity.

Landscape capacity assessment offers the opportunity to plan ahead and think strategically about the landscape issues likely to affect the siting of aquaculture over a wide area. The output of the study is nevertheless provided at a site specific scale. The process highlights the issues which are likely to come up when dealing with individual applications and is also presented in a way which can inform both policy makers and spatial planners. It is hoped that by undertaking this process, aquaculture will become positively integrated into the Scottish landscape.

6. Appendix one: Detailed explanation of topics assessed on site

6.1 Maritime influences

The physical, visual and perceptual influences of the sea vary from the exposed coastal areas, where maritime influences are considerable, to sheltered steep sided fjords, with little maritime influence, which could almost be fresh water lochs.

Maritime influences include natural processes, such as the dynamics of waves, tides and currents, exposure to the wind and the influence of the salt laden air on vegetation. They also encompass particular development and activities associated with the open sea, such as harbours and fishing, yachting, marinas, tanker haulage and inter island ferries.

Qualities such as the sense of space and distance, the quality of light and bright reflectivity are associated with the expansive horizon and exposure of the open sea, while the intricate pattern of islands, meandering coastlines and contrast between light and shade are more evident at the coastal edge and within sheltered sea lochs.

The particular maritime issues which are likely to affect the capacity of an area to accommodate aquaculture development are:

6.1.1 Marine based activity

The amount of existing human activity, such as yachting, fishing, existing fish farms and ferries will influence the character of the coastal landscape in two ways. Firstly, through the presence of elements and associated infrastructure required to support the activities and secondly through the amount of movement and noise which is generated by the activities across the water and along the coastal edge.

Where there is a high amount of existing activity, it may on the face of it seem an appropriate area for aquaculture development. In general, the presence of the aquaculture infrastructure, along with the amount of extra noise, light and boat movements may be easily absorbed into the existing level of activity. However, where the existing activities are associated with recreation dependant on the attractiveness of the seascape or the experience of the seascape as a relatively unmanaged environment, the introduction of aquaculture may be less appropriate.

This topic is largely considered to be one appropriate for consideration as a physical characteristic of the coast, although the degree of noise, light and activity across the surface of the sea will influence the experience of the landscape character.

6.1.2 Existing aquaculture development

The aquaculture industry is well established in Scotland and therefore there are numerous sites which have already been developed for fin or shellfish farming, accompanied by the associated infrastructure. Many of these are well located and designed, but where this is not the case, poor decisions about location of development in the past should not be used as a precedent for continuing development in an area in the future.

The presence of existing development therefore should not automatically lead to the conclusion that future development will be acceptable. In addition, increasing existing aquaculture activity is likely to create effects associated with the accumulation of development. Where a small number of individual developments may be acceptable in their own individual settings, the cumulative impact of all the developments in one area, or experienced when travelling through an area, may be more than the sum of the parts, resulting in a negative effect on coastal character or visual amenity.

As with other marine based activities, this topic is largely considered to be one appropriate for consideration as a physical characteristic of the coast, although the degree of noise, light and activity across the surface of the sea will influence the potential sense of place.

6.1.3 Natural dynamics

The natural dynamism of waves, tides, currents, wind and coastal processes is a key characteristic of seascape and frequently influences both the physical environment and experience of the coast. The presence of natural dynamics is strongly influenced by aspect and orientation, which is likely to govern exposure. Changing light and atmospheric conditions are also often most apparent at open sea locations, not least because of the reflectivity of the water, the expanse of visible sky and the vastness of views.

Aquaculture development has only a limited influence over these processes, some of which may also be physical limitations to future development. In terms of seascape, therefore, the key potential negative impact of aquaculture is likely to be on the opportunities which people have to appreciate these qualities, either through visual obstruction or distraction, or because of the contrast between the static presence of the fish farm and the dramatic dynamics of the natural processes, most notably in areas where there is an expansive, shallow intertidal reach.

These processes contribute to the physical and experiential character of the coast. Where they contribute to aesthetic quality, largely through visual drama of light interacting with the dynamic process, this requires professional judgement.

It was also noted, however, that the presence of natural processes may dominate character to such an extent that they contribute to the appreciation of relatively remote and wild character: where this occurs, the effect is noted within the wildness section of the analysis.

6.1.4 Scale and distance

As explained in M. Hill et al (2001), understanding scale and distance is particularly difficult in marine environments if there are no reference points against which size and distance can be judged. This is most likely to occur where views look out over a vast expanse of sea, where no landfall or structure of known dimensions is visible. There is therefore nothing against which size and distance can be measured.

In these scenarios, where large scale is a dominant characteristic, aquaculture is unlikely to affect this perception. It is likely that some large new aquaculture development will move well offshore, where faster moving water results in easier flushing of debris from the farms. These newest designs have very little surface structure, and are therefore likely to be difficult to see, but the infrastructure of lighting, if used, and feed barges may be discernable. The size of the feed barges is likely to be relatively small in relation to the expanse of open sea, and will probably be read as a small, but static, boat.

A related characteristic to the sense of scale is the perception of the sea as an uncluttered expanse of water, even and simple in character. This often contrasts with a more diverse coast and hinterland.

Aquaculture is therefore most likely to have a negative effect on character if a large installation is located where its size dominates small elements, such as tiny islets and skerries, or if the uncluttered expanse of the sea is an important element in visual composition, balancing out a cluttered and busy adjacent landscape.

Scale and expanse are analysed as a physical characteristic, but are often most keenly experienced as a sense of open-ness, expanse or, alternatively, intimate containment.

6.1.5 Experiential qualities associated with the presence of the sea

While many of the factors listed above demonstrate those aspects of seascape which we can ascertain with our eyes, the feeling of the wind, the sound of the waves, birds and wind, the smell of the salt laden air and the sense of being on the 'edge of land' all contribute to our experience of the sea.

The presence of aquaculture development rarely directly affects these attributes, although their presence may contribute to the appreciation of overall aesthetic quality or enhance existing remote or wild character.

6.2 Physical character of coastal edge

The articulation of the coastal edge is one of the key factors in considering the location and siting of aquaculture development. Promontories and bays, as well as offshore skerries and islands, offer features with which a new development can be associated. Enclosed bays offer visual containment, and long simple coastlines can be reflected in the simple, linear layouts related to shellfish lines in particular. Conversely, however, complex coastlines may often also have a high aesthetic quality, the indentations of intimate bays can be obscured or filled up by extensive development on the water surface and the presence of geometric shaped cages can obstruct the simple curvature of a coastline. Assessing the characteristics of the coastal edge therefore contributes to identifying appropriate locations for development and considering how much development may be located on the water before cumulative impact erodes the existing key characteristics of the coastal edge.

The particular characteristics of the coastal edge which are likely to affect the capacity of an area to accommodate aquaculture development are:

6.2.1 Shape and degree of indentation of the coastline

The shape of the coast, where land meets the sea can vary from long, simple, sweeping curves to highly complex and indented margins. The shape is emphasised by the contrast between land and sea, and is often a visually dominant line in views overlooking the coastal edge.

An irregular coastline, with indented bays and extended promontories contains many visual foci as the eye follows the line of the complex boundary between land and sea, resting at each promontory. Adding structures to the coastline – whether on land or in the adjacent sea – which are sited to emphasise these existing promontories tends to reinforce this characteristic. Generally speaking, this offers opportunities for aquaculture development to be located where the structures can emphasise this existing pattern.

However, indented coastlines, with an intricate, small scale pattern of promontories and islands, will be quickly dominated by large scale structures; the opportunities for development therefore tend to be limited to small scale structures.

Along more simple coastlines, the eye sweeps rapidly along the coastal edge to rest at the distant horizon. Aquaculture development located along these coastlines may interrupt the flow of the distinct transition between land and sea, and create an overly complex level of detail within a very simple landscape. In general, however, where aquaculture developments can be sited in a linear form, reflecting the straightness of the coast, they are more likely to reinforce the alignment of the coastal edge and be accommodated in this landscape.

These characteristics rely heavily on the physical components of the landscape, and are therefore included in any analysis of physical characteristics.

6.2.2 Fragmentation of the coastal edge

Allied to the shape of the coast is the degree of fragmentation, where skerries and small islands can create further visual foci and emphasise a more gradual transition from land to sea. This often creates a complex landscape and visual composition.

Such fragmentation offers opportunities to accommodate aquaculture which are similar to those found along the indented coast. Skerries and islands can provide some visual screening for cages. More significantly the characteristic pattern of intermittent land and water can be reinforced by cage and line patterns which are similar in size and distribution to the islands.

These characteristics rely heavily on the physical components of the landscape, and are therefore included in any analysis of physical characteristics.

6.2.3 Shoreline development

Some development is located directly on the shore or the coast, and influences the character of the seascape. Jetties, harbours, pontoons, some fishing infrastructure and boat houses are all the most obvious examples, but bridges, roads and often older settlements can also be located directly on the coast.

Aquaculture may be able to relate to this development by taking physical advantage of buildings and piers which can be used as onshore infrastructure, and by locating offshore installations where they can be visually associated with onshore structures, especially where a developed, busy environment is a key landscape characteristic.

These characteristics rely heavily on the physical components of the landscape, and are therefore included in any analysis of physical characteristics. In addition, however, the degree of development is likely to affect the sense of wildness and may be recorded in this analysis.

6.2.4 Key landscape features and landmarks

Features along a coastline, whether natural, such as prominent geological features or distinctive vegetation patterns; or cultural, such as historic sites, prominent archaeological remains, designed landscapes or distinctive settlement patterns, often require a setting which will include an element of sea, to retain their visual prominence or historic integrity.

Where such features are located, it may be difficult to accommodate additional development – whether onshore or offshore – as this may detract from the setting of the feature or, if appropriate, from their role as a visual focus.

These characteristics rely heavily on the physical components of the landscape, and are therefore included in any analysis of physical characteristics. However, where they became focal points in a view, their presence was also noted within the visual assessment, and if they were landmarks frequented by visitors, they were then also recorded as significant viewpoints.

6.3 Landscape character of the immediate hinterland

The character of the landscape adjacent to the shoreline will influence the potential sensitivity of the landscape to aquaculture development, as it both provides some of the character context and setting for any potential development and also the context from which land based views are experienced.

The particular characteristics of the immediate hinterland which are likely to affect the capacity of an area to accommodate aquaculture development are:

6.3.1 Topography and degree of relief

Low lying relief adjacent to water often has the effect of emphasising the sense of open-ness, as the containment provided by gentle slopes and low hills is often very subtle. Conversely, where the immediate coast or adjacent hinterland rises quite steeply, the sense of containment will be pronounced, and the perception is often of a less expansive stretch of water. Increased containment may also result in a sheltered environment, where there may be extensive reflections of surrounding mountains on a calm loch surface. Frequently, there is a sharp juxtaposition between vertical scale and the expansive horizontal plane of the water.

Aquaculture development does not affect the topography and relief of the hinterland, but may impinge upon the experience generated by the degree of enclosure. For example, a narrow loch, surrounded and contained by high hills, will be seen as a relatively small scale water surface, easily 'filled up' by development.

In addition, if reflections on the loch surface are a key characteristic of a sheltered loch, these could be interrupted by offshore installations.

The nature of the topography is recorded as a physical characteristic.

A rising hinterland very often also gives rise to more elevated views of the water surface, while more low lying relief offers opportunities for more foreshortened views from low viewpoints, an issue which is picked up in the visual assessment.

6.3.2 Vegetation pattern

Wooded vegetation adjacent to the shoreline, particularly on a southern shore, will often cast dark shadows along the water edge, which can reduce visibility. This may become a key characteristic of the coastal edge extending down from the hinterland.

More widely, woodland can create visual screening, or a composed setting, for both onshore and offshore structures, from key view points. However, where woodland is semi-natural in character and organic in shape it may contrast sharply with the more industrial character of fin fish farms in particular.

Vegetation cover which is more open in character may allow more visibility of structures, but may also offer a pattern or structure on land which can provide a geometric pattern which can be reflected in the layout and design of aquaculture development in the water, or associated land based infrastructure.

Vegetation pattern is analysed as a physical characteristic, but the role of woodland as a visual screen contributes to the visual assessment, and where woodland or vegetation is semi-natural and perhaps difficult to traverse, it may enhance the sense of wildness.

6.3.3 Settlement pattern

Settlements tend to be clustered, scattered or even linear in pattern. In some areas settlement will be sparse, while some coastal areas are thriving port towns with a concentration of built structures and all the activity which goes with them.

It may be possible to relate the distribution and scale of aquaculture development to a similar pattern of built development on land, particularly in areas where settlement is characterised by a series of point features within the wider landscape.

Settlement pattern is analysed as a physical characteristic, although coasts overlooked by settlements feature in the visual assessment.

6.4 Judgements and values associated with seascape character

As part of the assessment process, professional judgements are made in relation to:

- identifying the significance and dominance of elements and their contribution to character
- assessing the unity of the seascape; and
- assessing aesthetic qualities

In addition, existing recognised values are recorded. These are usually areas designated for their landscape or historic value.

This part of the assessment draws on the previous analysis of physical and experiential character.

6.4.1 Unity of landscape character

Some areas of landscape character have a particularly strong unity, where the individual elements repeatedly come together to create a consistent pattern which is both physically logical and visually clear. Woodland planted on steep slopes, adjacent to level land which is cultivated, with a road sited between the two so that it avoids the most fertile land but takes advantage of the level terrain, can come together to create a landscape of strong unity. The resulting composition is usually also visually harmonious.

By contrast, some landscapes are fragmented in character, with disparate development and unrelated patterns of land use which do not have a coherent and systematic relationship with the opportunities provided by the underlying physical landscape.

Areas of strong landscape unity may still be a pattern within which aquaculture development can be accommodated, but the location and siting of new development may be limited by the need to respect the unified character of the place. Alternatively, fragmented landscapes may be able to absorb new development into their rather chaotic structure more easily, although more constructively, location and siting of new development may be used to develop or consolidate or develop a more coherent landscape structure which reduces the amount of 'clutter' in the landscape.

6.4.2 Assessing aesthetic quality

'Aesthetic quality' is a value placed on the landscape by the assessors which relates to the overall aesthetic appeal of the seascape. In this report the term 'aesthetic qualities' is used to embrace those attributes of the landscape which enhance scenic quality (often considered to be largely only visual attributes) and other less tangible aspects of the seascape which contribute to a positive appreciation of the landscape. The assessment of these qualities draws partly on a process of landscape character assessment but focuses less on the distinctiveness of individual components or landscape types within an area and more on how they complement each other and interact both together and with other, less tangible aspects of landscape experience.

Key elements and areas of distinctive character which combine to contribute to the aesthetic appeal of a landscape and encourage a very positive appreciation of the landscape are identified in the assessment. Visual and other experiential attributes of the landscape play an important role in the appreciation of the landscape. Positive attributes such as atmospheric quality of light, harmonious composition, diverse and lively sequential experience and spectacular visual drama are likely to contribute to high aesthetic quality.

Aesthetic qualities are those aspects of the seascape which, in the judgement of the assessors, are most likely to be appreciated as beautiful. Some of these aspects may also be noted elsewhere in the

assessment, where they play a different, if at times complementary, role. An element in the landscape can be both a distinctive characteristic and contribute to aesthetic quality. A spectacular panorama will contribute to visual amenity and contribute to the experience of aesthetic quality. Natural pattern may be appreciated as an aesthetic quality, but may also contribute to a sense of wildness.

The assessment focuses on identifying aspects of the seascape which contribute to aesthetic quality as part of the initial analysis. These are recorded as professional judgements. The sensitivity of these aspects to aquaculture development is addressed in the sensitivity assessment matrix.

6.4.3 Recognised values

The value of some areas or features is recognised through existing designations, which include landscape and historic designations. The appreciation of both may be sensitive to landscape change.

Some areas, identified as being nationally significant areas of scenic quality are designated as National Scenic Areas. Landscapes designated because of the quality and coherence of their designed element and areas of regionally important landscape value have also often been designated because of their landscape value. Some roads are designated as scenic or tourist routes. All are recorded as part of the assessment process.

Landscape value alone, whether designated or not, does not preclude development. However, the potential impacts of aquaculture development on those qualities of the landscape which contribute to its value need to be identified. It will not always be the case that aquaculture development is incompatible with a landscape designation.

Archaeological or historical sites may also be of national, regional or local significance. They are often appreciated as landmarks in the seascape, and are therefore analysed as such in the assessment. In addition, however, the quality of their setting, and perhaps even the historic integrity of the setting, may affect the appreciation of the qualities for which they have been designated. Aquaculture development may affect the setting and character of such designated sites, and an analysis is therefore included within the assessment process.

6.5 Wildness

The coast offers particular opportunities to appreciate wildness, and the attributes which contribute to wildness may be easily undermined by the introduction of aquaculture development. This is acknowledged in the NPPG on coastal planning (Scottish Office Development Department, 1997, para 24) which states that 'the qualities of the isolated coast can be easily damaged but are difficult to recreate'.

The significance and fragility of this quality has resulted in a more detailed assessment within the site assessment (as shown in **Table 1A**), and in the sensitivity analysis, where it merits a separate row in the matrix, allowing explanations to be fully justified in reporting.

Wildness is usually encountered when a number of factors come together. These may include the perception of naturalness, the distance travelled from human habitation and infrastructure, perceived remoteness and solitude, quietness or tranquillity, inaccessibility through roughness or ruggedness of terrain, the sense of exposure to the elements and the dominance of natural processes in shaping the landscape and maintaining a sense of dynamism.

The coast is characterised by many features which have the potential to contribute to a sense of wildness. The sense of 'edge', where land meets sea, the presence of intensely elemental forces, the dominance of physical processes in shaping and constant reforming of the land, the relatively inconsequential role which humans have in controlling the sea and its force, combine to create an unmanaged and relatively unmanageable place.

Even small areas of coast can therefore appear relatively wild, particularly where these qualities combine with a lack of development and little evidence of contemporary human intervention. Identifying wildness therefore encompasses an understanding of the physical and dynamic aspects of the seascape, the perception of coastal character and how the seascape is experienced.

Aquaculture is a development which through its infrastructure, noise, activity and potential lighting is likely to affect the sense of wildness or remoteness from human activity found along some parts of the coast.

Key considerations in identifying and analysing wildness include:

6.5.1 Presence of natural processes

Seascapes, as noted above, are a focus for natural processes, being subject to the forces of wave, wind, tide and current, which shape the land and contribute to the sense of exposure. Where natural processes dominate, a sense of naturalness will contribute to any appreciation of wildness.

Natural processes and their contribution to landscape character are included within the analysis of physical character, but they also contribute to the experience of a place, and are therefore also recorded as a perception in relation to experiential characteristics.

6.5.2 Presence of development and human activity

A lack of contemporary development and obvious land management provides a key contribution to wildness. There may often be traces of past habitation or land use which add historical depth to sense of place, but essentially sense of remoteness or isolation depend on the experience of leaving development, artificial noise and light and intensive management of land behind.

These attributes are able to be analysed as a physical characteristic of the seascape.

6.5.3 Accessibility and rugged terrain

Coastline, seascape and hinterland which is relatively difficult to physically access is often more likely to be less developed and less populated, which in itself may contribute to a sense of wildness. However, inaccessibility, through either difficult terrain or distance from vehicular tracks also contributes to wildness in its own right, as the process of travelling is more arduous.

Accessibility can be recorded as a physical element, as tracks and footpaths are physical elements, but there can also be a perception of inaccessibility in areas which are less remote, due to the ruggedness of the terrain.

6.5.4 Intensity of wildness

Sense of wildness varies in degree, with some areas being highly accessible but containing extensive semi natural vegetation, while in contrast, other areas are very difficult to access, characterised by hostile terrain and very distant from human activity, with no evidence of contemporary development, remaining largely unmanaged.

We have therefore assessed the degree of wildness as increasing from simply a sense of naturalness, through to perceived remoteness in areas where there is little human activity or development, to a sense of isolation where physical distance from human activity, combined with quietness and inaccessibility also contribute to the experience of the landscape. Sense of wildness at its most intense is relatively rare, often requiring large tracts of land to consolidate the experience of distance from human intervention.

Judgements relating to the intensity of wildness, and its value and intactness are analysed as part of the assessment.

6.5.5 Wild land search areas

These areas have been identified by SNH in their policy document 'Wildness in Scotland' (SNH, 2003). They are not designated areas, and do not delineate wild land, but rather provide a starting point showing where the main areas of wild land are likely to be found. The search areas do not include smaller areas of land or coast, nor, for example, uninhabited islands.

The location and extent of wild land search areas is considered as a recognised value in the assessment process.

6.6 Visual assessment

The purpose of the visual assessment is to identify key viewpoints from which an area of coastal landscape is most readily visible and come to a judgement of how significant these viewpoints are.

Visual survey records areas of coastline which are overlooked by settlements, panoramic views which are revealed when travelling

along a public road or access route, views from visitor attractions or landmarks which are accessible to the public and viewpoints which are recorded on maps and offer accessible vantage points.

The survey also identifies what is visible. For example, it will record landmarks which are focal points within the view, the orientation of the view and how the eye is reading the landscape.

While many factors in the visual assessment can be recorded as physical places and elements, professional judgement is used to identify which viewpoints are significant and to make a judgement on the quality of visual composition. Visual assessment therefore does not simply record from where the coast is visible, it also aims to identify key views and compositions which contribute to the appreciation of aesthetic quality.

Key considerations in identifying and analysing the visual assessment include:

6.6.1 Type of views

Views may be panoramic, glimpse views, experienced as part of a sequence of coastal vistas or suddenly and unexpectedly revealed. Some views may be overlooked by residential areas, may be visible from popular and accessible elevated viewpoints or contribute to the setting of a settlement, yet others require considerable physical effort to experience.

The assessment aims to identify all these types of views as part of the analysis of physical elements, but judgements are then made on their significance.

6.6.2 Significant viewpoints

The location, accessibility and quality of viewpoints all contribute to assessing the significance of viewpoints. Significance is assessed as a judgement, and factors which are taken into account include:

- views which contribute to the experience of a landscape or seascape designated for its scenic quality
- views to and from features designated because of their historic or cultural significance
- views from recreation facilities and informal provision
- elevated viewpoints
- views from settled areas

6.6.3 Landscape features

Landmarks and features are recorded as part of the analysis of physical factors. These features may be natural or man made, but have a strong visual presence or a significant role in visual composition, usually as a focal point in their own right and sometimes as a point of reference or emphasis within a wider context.

6.6.4 Visual composition

Assessment of visual composition is an important stage in relation to identifying whether aquaculture development will have a significant effect on views and visual amenity. Harmonious composition is generally associated with a balanced proportion of different elements within a landscape, often combining contrast and distinction of form within a strong, unifying pattern or backdrop. Fine panoramas occur where such composition can be appreciated from a single viewpoint. Alternatively, dramatic sequential experience can occur where a series of contrasting views are experienced in sequence, each enhancing the visual appreciation of the next.

The quality of visual composition and landscape elements which contribute to visual amenity were identified using professional judgement, and their sensitivity was assessed within the assessment of aesthetic qualities in the sensitivity matrices.

6.6.5 Transient qualities

Particularly in coastal locations, the effect of light, reflectivity, changing weather conditions, aspect and orientation all play a role in the appreciation of visual amenity. These are not factors which are easy to record systematically, although west facing views, for example are more likely to take in sunsets, and open coasts are more likely to be affected by fast moving changes in light.

The contribution made by transient qualities which contributed to aesthetic quality or the appreciation of wildness is recorded in the visual assessment as a professional judgement, and assessed under the relevant topic heading in the sensitivity assessments.

7. Appendix two: Sample capacity assessment for a Coastal Character Area

The following extract from one of the pilot studies, illustrates a complete assessment for one Coastal Character Area, Outer Loch Etive. This example is included for indicative purposes only and does not necessarily reflect the views or policies of either Argyll and Bute Local Authority or SNH.

7.1 Outer Loch Etive

7.1.1 Outer Loch Etive: site survey and local character analysis

Outer Loch Etive, which for the purposes of this study includes Ardmucknish Bay, lies within a generally low lying landscape, punctuated by more prominent steep sided hills to the north. For the purposes of this study, the coastal character area has been further subdivided into three local coastal character areas, as shown on the Site Survey map. Key landscape and visual elements which are likely to influence the development of aquaculture within these areas are noted below:

7.1.1.1 Ardmucknish Bay key landscape and visual elements:

- Open and exposed seascape character dominated by expanse of sea and distant views to the open sea, Mull, Lismore and Loch Linnhe
- Considerable marine activity on the water
- Simple, sweeping coastline, with shingle and sandy beaches, becoming more indented and rocky south of Lednaig point
- Bay defined by low lying landform, the steep slopes of the Garbh Ard point and the prominent peak of Ben Lora
- Woodland encloses the north and western coasts, but rough grassland extends around Lednaig Point
- Well developed shoreline and coast, including settlement at Benderloch, Dunstaffnage marina, an airfield, caravan sites and recreation facilities, some of which overlook the bay
- Shoreline largely accessible with the exception of Garbh Ard
- Views from the road are limited by woodland
- Key historic features at Dunstaffnage castle, Lochnell House and archaeological sites at Port Selma
- The peninsula of Garbh Ard lies within the Lynn of Lorn NSA

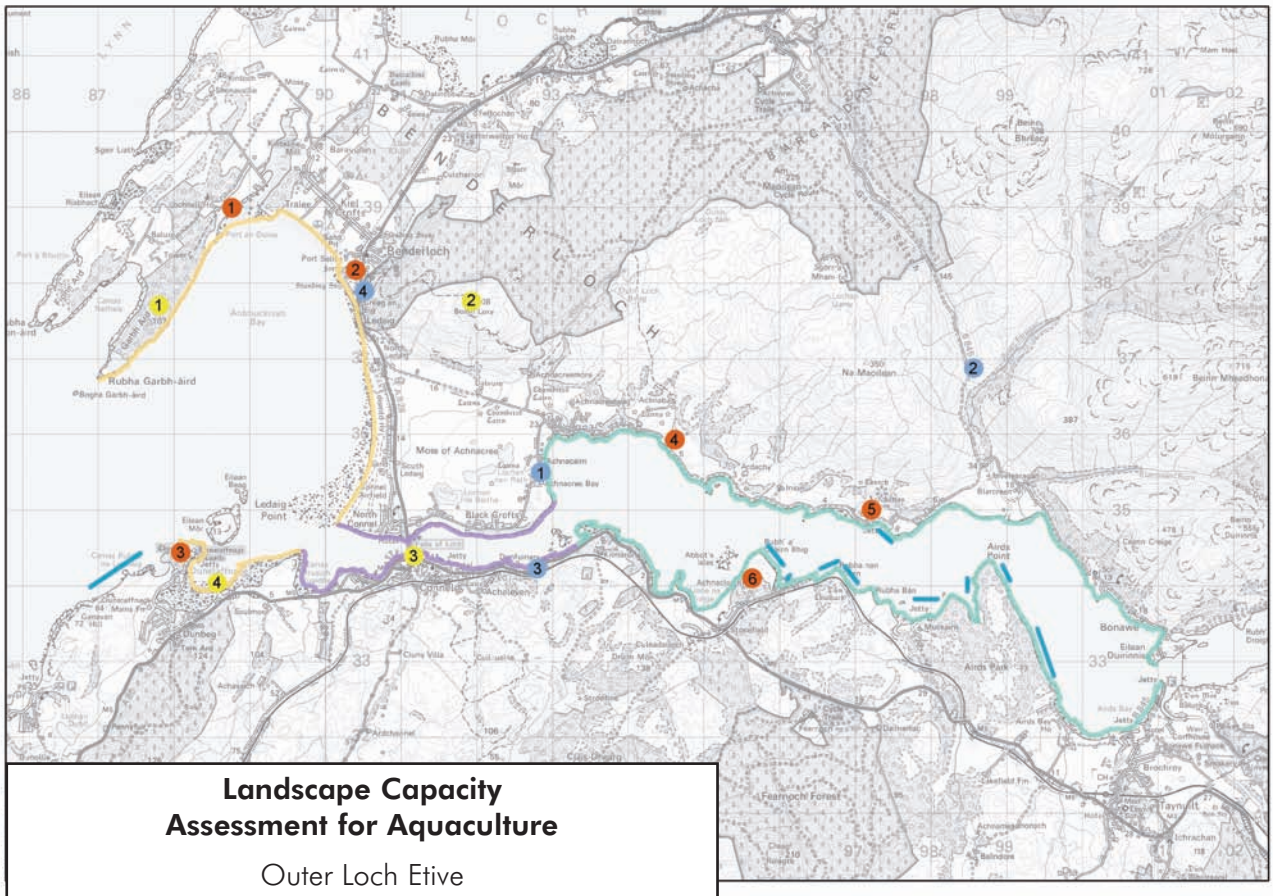
7.1.1.2 Connel Narrows key landscape and visual elements:

- Narrow, elongated channel of fast moving, tidal strait with subtle bays most prominent along the southern shore
- Falls of Lora recognised as a major maritime feature
- Maritime presence most reflected in the movement of boats, and occasional view of open sea
- Contained by low but pronounced slopes, reflecting the continuous scouring of fast moving currents
- Diverse vegetation pattern, including small cultivated fields and woodlands immediately adjacent to the coast
- Well developed hinterland contrasts with the simple uncluttered water surface
- Broadly linear settlement pattern extends along the coast
- Narrow strait encourages views along the length of the water, particularly to and from the Connel bridge

7.1.1.3 Lower Loch Etive key landscape and visual elements:

- Sheltered but expansive loch with no view of the open sea
- Maritime influence limited to presence of narrow intertidal strip and existing aquaculture development
- Wide, open loch characterised by a series of sweeping, pronounced bays along both shores, occasionally further defined by scattered small islands
- Pebble shoreline with occasional rocky inlets
- Expansiveness further emphasised by low relief and gently undulating terrain of immediate hinterland
- Vegetation pattern includes dense shoreline woodland, semi natural vegetation, and occasional small grazed field
- Settlement along the north shore focussed around Achnacairn, Taynuilt and farmed alluvial fans while they are relatively sparse along the south shore
- Key historic features at Ardchattan Priory, Achnacloich, Muckairn and the church at Achnaba
- Several existing fin and shellfish farms occupy bays, with onshore development at Achnacloich and Taynuilt
- Views often screened by shoreline trees, but where possible extend along the length of the loch or to opposite shore
- Occasional panorama from elevated roads and the railway
- Key view of loch from A85 which is first view of sea on approach from the east

- Foreshortening ensures that bays on further shore appear less prominent than they really are
- Harmonious visual composition around Abbotts Isles, where expansive loch meets more intimate arrangement of island



Landscape Capacity Assessment for Aquaculture

Outer Loch Etive

1:50 000

Local Coastal Character Areas

- Ardmucknish Bay
- Connel Narrows
- Lower Loch Etive

Historic Features

1 Lochnell House
2 Port Selma forts
3 Dunstaffnage Castle and chapel
4 Achnaba church
5 Ardchattan priory and garden
6 Achnacloich House and garden

Places and Features mentioned in text

1 Garbh Ard
2 Bein Lora
3 Falls of Lora/Connel Bridge
4 Dunstaffnage marina

Location of existing aquaculture leases

Location of Photograph Viewpoints

1 Achnacairn
2 From B845
3 Dunfuinary
4 Benderloch

40 LOWER LOCH ETIVE from Achnacree Bay: Expansive inland loch sheltered by low relief with the rising mountains of Glen Etive beyond.

41 CONNEL NARROWS from Dunfuinary: the bridge is the focal point.

42 ARDMUCKNISH BAY from near Benderloch: Vast, open bay with a long sweeping coastline from where the distant island of Mull and the open sea are visible on a clear day.

7.1.2 Outer Loch Etive: opportunities and constraints

There is already extensive aquaculture development within Loch Etive, where there are both fin fish and shellfish farms. Landscape opportunities and constraints which are likely to affect further development are noted below. Features identified in the opportunities and constraints presented below are shown on the following map.

7.1.2.1 Ardmucknish Bay

Landscape and visual opportunities for aquaculture development

- Existing marine activity could absorb traffic associated with aquaculture
- Expansive scale of seascape can accommodate some development, even of moderate to large scale, without dominating water surface
- Well developed coastline with structures, noise and lighting strongly featured
- Some visual screening provided by shore line woodland
- Onshore development can be sited in existing settled areas

Landscape and visual constraints for aquaculture development

- Even, regular coastline limits siting options but structures could be aligned parallel to the coast
- Protect the settings of historic features at Dunstaffnage castle, Lochnell House and archaeological sites at Port Selma
- Some stretches of coast used for informal recreation
- Marine based recreation features around Dunstaffnage
- The foreground and focal points of key panoramic viewpoints should be avoided
- Some coastline directly overlooked by housing and recreational developments
- Garbh Ard lies within an NSA, although the focus of scenic quality lies to the west

7.1.2.2 Connel Narrows

Landscape and visual opportunities for aquaculture development

- Wooded shores intensify dark shadows
- Onshore development could relate to existing infrastructure

Landscape and visual constraints for aquaculture development

- Falls of Lora and the Connel bridge are key features
- Static structures on the water surface likely to detract from drama of turbulent, moving water
- Simple, uncluttered water surface of the narrow channel would be quickly dominated and fragmented by development
- Water overlooked by housing and elevated views from bridge

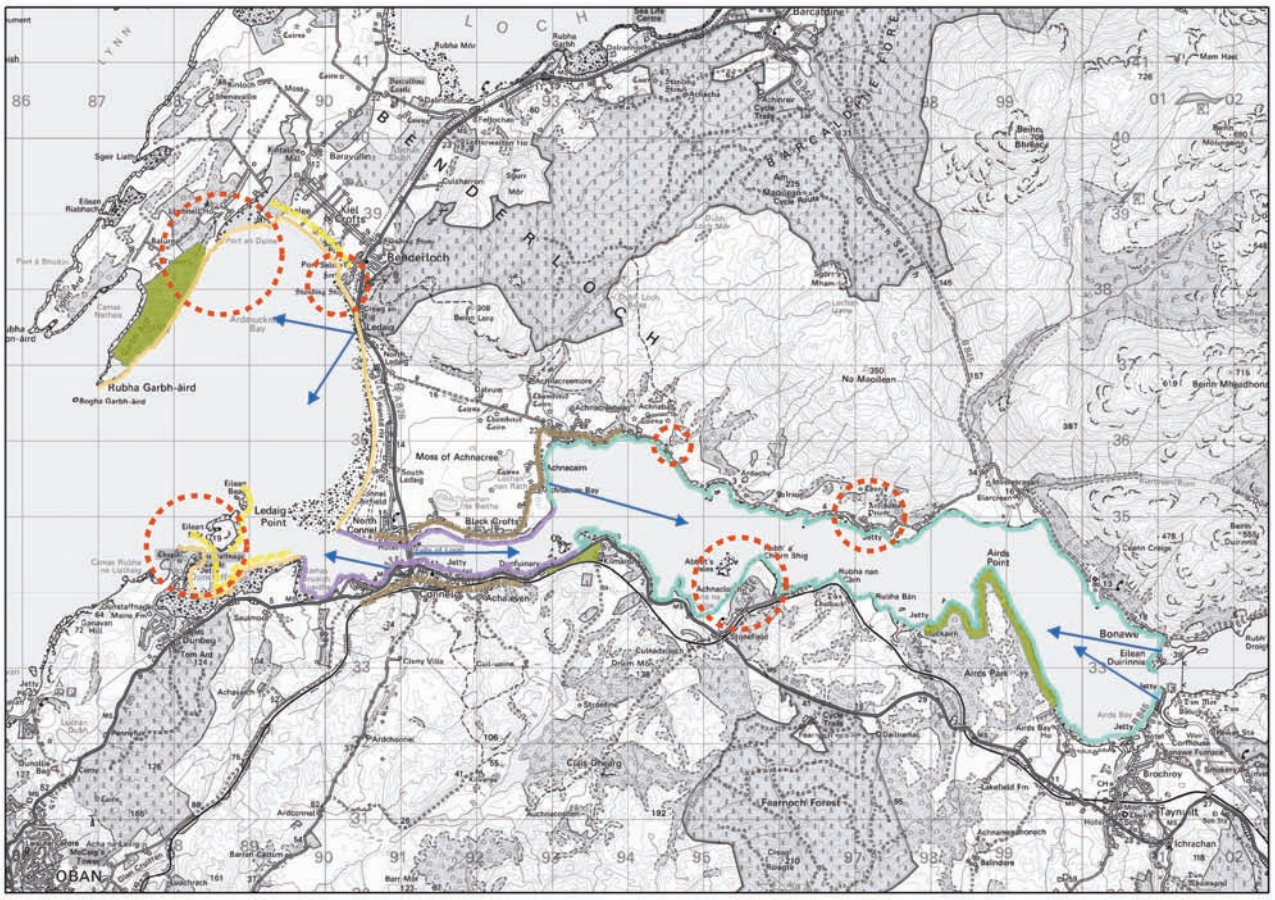
7.1.2.3 Lower Loch Etive

Landscape and visual opportunities for aquaculture development

- Wooded shores intensify dark shadows on loch, particularly along backlit southern shore
- Shoreline woodland limits visibility in some areas
- Onshore development could relate to existing infrastructure

Landscape and visual constraints for aquaculture development

- Small scale of bays can readily be 'filled up' with development
- Expanse of open water can be quickly narrowed by development encroaching from each shore
- Protect the settings of historic features at Ardchattan Priory, Achnacloich and the church at An Acarsaid from aquaculture development to maintain the integrity of their setting
- Abbot's Isles and Achnacloich of a relatively high aesthetic quality due to juxtaposition of expansive loch and more intimate pattern of islands, relative drama of verticality of slopes rising to Achnacloich and appearance of view as the first panorama of sea loch when travelling west along the A85
- Some coastline directly overlooked by settlement
- Avoid developing the majority of bays along the shoreline, as this will lead to an impact on sequential experience when travelling either along the public road or on the water
- Occasional elevated panoramic view, embracing dramatic contrast between mountain and loch: small scale development may be too small to really impact on this although the foreground should be avoided



Landscape Capacity Assessment for Aquaculture

Outer Loch Etive

FEATURE HIGHLIGHTED IN OPPORTUNITIES AND CONSTRAINTS

1:50 000

Local Coastal Character Areas

- Ardmucknish Bay
- Connel Narrows
- West Loch Etive
- Area of particular recreation interest
- Settlement overlooking coast
- Extensive shoreline woodland
- Significant viewpoints offering panoramas of loch and coast
- Indicative setting of historic or Landscape feature

Outer Loch Etive: Summary of the potential sensitivity of the local coastal character areas to aquaculture development

Potential sensitivity of the seascape to aquaculture development	Ardmucknish Bay	Connel Bridge	Lower Loch Etive
Maritime influences	Some sensitivity Development would not impact upon existing maritime influences, some of which, such as large scale of water surface and intense existing sea based activity, may make development easier to accommodate. But simplicity of open expanse of sea could be compromised by clutter	Some sensitivity Static structures would detract from the rapid movement of water and tidal flow through relatively narrow channel which reflects maritime dynamics. Narrow, uncluttered water surface contrasts with developed hinterland	Not sensitive Maritime influences very limited with no relationship to 'open sea', limited sense of maritime dynamics and relatively sheltered location
Character and experience of the coast	Low sensitivity Greatest negative effect likely to be the juxtaposition of complex structures relative to the regular coastline, although lines and cages could be aligned to reflect the shape of the edge. Extensively developed coast could absorb noise, light, activity and structures	Some Sensitivity Regular coastline offers little opportunity for development to be associated with promontories and bays. Narrow stretch of limited water surface could become quickly dominated by structures. Extensively developed coast could absorb noise, light, activity and structures	Some sensitivity Small scale bays could easily be 'filled up' with development. Larger bays and promontories should be the focus of any development, but extensive development already present in these areas
Setting of landmarks and features	Some sensitivity Setting of designated historic features, including Dunstaffnage castle, Lochmell house and the forts at Port Selma	High sensitivity Setting of Falls of Lora, a dramatic and variable water feature, occupies an extensive stretch of this straight	Some sensitivity Setting of key historic features, including Ardchattan priory, Achnacloich gardens and Achnaba church, all open to public and designated historic sites
Experience of wildness	Low sensitivity Degree of wildness limited by well developed, accessible coastline and intense marine activity therefore not affected by development. Relative peacefulness of Garbh Ard would be affected by development	Not sensitive Degree of wildness limited by well developed, accessible coastline, therefore not affected by development	Not sensitive Degree of wildness limited by accessible coastline, offshore activity and scattered settlement, therefore not affected by development. More remote areas along south shore already contain aquaculture development
Aesthetic qualities	Low sensitivity While the area contains no exceptional scenic qualities, the sense of space and openness of the sea is appealing and contrasts with the more enclosed character of the inner lochs	Some sensitivity While the area contains no exceptional scenic qualities, there is some sense of drama related to the fast moving water	Some sensitivity Interaction between mountain and loch creates visual drama of scale and contrasting form, often reflected in the calm sheltered loch surface. Attractive contrast between intimate islands, expanse of loch and rugged foreshore at Abbots Isle

Potential sensitivity of the seascape to aquaculture development	Ardmucknish Bay	Connel Bridge	Lower Loch Etive
Key viewpoints	Some sensitivity Avoid the foreground and island focal point of key viewpoints, as well as areas overlooked by houses and recreation facilities. Scale of bay could visually accommodate some development, especially if located against a backdrop	High sensitivity Views along the straits in both direction focus on the Falls of Lora, the Connel bridge and their setting: development on the water may detract from this. Extensive overlooking of the straits by houses	Some sensitivity Avoid foreground and focal points of key panoramic views of loch and mountains from the roads, and at Abbots Isle. Some overlook by houses. Greatest impact likely to be on sequential experience of travelling along loch shore: aim to ensure that undeveloped bays dominate over developed bays

7.1.3 Outer Loch Etive: conclusions

The conclusions from the capacity assessment are noted below and are accompanied by the following guidance:

7.1.3.1 Ardmucknish Bay

Some potential for the landscape to accommodate aquaculture development was identified in this local coastal character area.

- Development should be located away from the setting of key features and should avoid the foreground and focal points of key panoramic views, or views from settlements
- Development should avoid shorelines used for informal recreation
- Where possible, development should aim to use a wooded backdrop as an immediate setting
- Structures should be aligned to reflect the regular, linear character of the coastal edge
- Onshore development should be located within existing settled areas

7.1.3.2 Connel Narrows

No potential for the landscape to accommodate aquaculture was identified in this local coastal character area, largely due to the high sensitivities associated with the setting of the Falls of Lora, views to and from the Connel Bridge, extensive overlooking of the straits by houses and the contrast between the uncluttered, narrow, natural dynamic of the water surface relative to the developed and relatively cluttered hinterland.

7.1.3.3 Lower Loch Etive

No potential to accommodate further aquaculture development in this local coastal character area was identified, largely due to the large amount of existing development already in place. This development largely occupies the most appropriate locations for development, and generally avoids the key sensitivities identified in the assessment.

The trout fish farm in the bay adjacent to Ardchattan priory is the most prominent and visually intrusive existing development. It is located within the setting of the priory, close to the shore with no visual backdrop and where it is suddenly revealed after a bend in the road, all of which contribute to its conspicuousness. Should the opportunity arise to remove this farm, the visual amenity of the loch would be enhanced.

8. Appendix three: Glossary

Aesthetic quality
A value placed on the landscape, as part of the assessment process, which relates to its aesthetic appeal.

Aesthetic qualities
Those aspects of the landscape which, in the judgement of the assessors, contribute to the positive aesthetic appreciation of the landscape.

Experiential characteristics
Those aspects of landscape character which may be perceived visually, but are, like scale and space, often perceived through other senses also. In addition, these characteristics can often be enhanced by the movement of the observer, such as the drama experienced when arriving at the crest of a hill from where a panorama is suddenly revealed, or the sense of travelling up and down through an undulating landscape.

Landscape capacity
'The degree to which a particular landscape character type or area is able to accommodate change without significant effects on its character, or overall change of landscape character type' (Swanwick, C. and Land Use Consultants, 2002, page 53)

Landscape character
'A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another' (Swanwick, C. and Land Use Consultants, 2002, page 8)

Landscape unity
A landscape where elements create a pattern which is strongly related to the underlying physical capability of the landscape. This often results in a 'logical' landscape where the relationship between elements is easy to interpret, or at least can be understood with a bit of background knowledge. The resulting landscape is often seen as visually harmonious.

Scenic quality
In this report the term 'scenic quality' has been used as defined in SNH's Landscape Policy Framework[12] : 'the aesthetic value placed on the landscape, based primarily on the visual senses. This value is not absolute and tends to reflect prevailing ideas about which landscapes offer a particular aesthetic.'

Seascape
The visual and physical conjunction of land and sea which combines maritime, coast and hinterland character.

[12] SNH Policy Statement No 05/01 December 2005

9. Appendix four: Bibliography

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