



Higher National Unit Specification

General information for centres

Unit title: Marine Environments: Management and Protection

Unit code: F3SS 35

Unit purpose: This Unit develops candidates' understanding and knowledge of marine resources and ecosystems and the management and exploitation issues affecting them. The range of human impacts on marine environments is discussed. The legislative roles and remits of UK and international agencies responsible for overseeing the marine environment are described, along with the role of voluntary bodies. This would be a useful Unit for candidates wishing to enter the field of environmental management or ecology.

On completion of the Unit the candidate should be able to:

1. Explain the key processes and components of marine habitats and ecosystems
2. Explain the impact of human activities on marine environments
3. Evaluate the roles of UK and international bodies involved in managing marine environments.

Credit points and level: 1 HN Credit at SCQF level 8: (8 SCQF credit points at SCQF level 8*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre. No prior specialist knowledge is necessary although it would be beneficial if candidates had experience of studying ecology or environmental science subjects at SCQF level 5 or 6.

Core Skills: There are opportunities to develop the core Skill component 'Written Communication' of the Core Skill Communication at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment: Each Outcome could be assessed on its own or in combination with others. Outcomes 1 and 3 could be assessed by a mix of restricted response and extended response question. Outcome 2 lends itself to extended response answers or log book, possibly in response to a case study. All assessments are open book.

Higher National Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Explain the key processes and components of marine habitats and ecosystems

Knowledge and/or Skills

- ◆ Processes: tides, waves, currents
- ◆ Marine habitats
- ◆ Marine ecosystems

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ explain the tidal cycle process, and the formation of waves and currents, giving at least one global and one local example for each
- ◆ describe the main features of coastal, continental shelf and deep ocean habitats, in terms of:
 - physical
 - chemical
 - topographical characteristics
- ◆ For one named marine ecosystem, describe the main components of the biota and explain the relationships between them, referring to the source of biological production and explaining at least two potential ecological limiting factors

This is an open book assessment.

Assessment Guidelines

This Outcome could be assessed by a mix of restricted response and extended response questions. Assessment could be combined with the assessment for Outcome 3.

Higher National Unit specification: statement of standards (cont)

Unit title: Marine Environments: Management and Protection

Outcome 2

Explain the impact of human activities on marine environments

Knowledge and/or Skills

- ◆ Marine fisheries
- ◆ Marine aquaculture
- ◆ Shipping
- ◆ Recreation and tourism

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ explain four different impacts of marine fisheries on fish populations and marine environments,
- ◆ explain three potential impacts of marine aquaculture on marine environments and describe one possible mitigation measure for each of the three impacts
- ◆ explain three potential effects of pollution and ballast water from shipping on marine environments
- ◆ explain three potential impacts of recreational and tourism activities on the coastal zone

This is an open book assessment.

Assessment Guidelines

This Outcome lends itself to an extended response assessment, possibly based on a case study or taking the form of a log book or a report on site visits.

Outcome 3

Evaluate the roles of UK and international bodies involved in managing marine environments.

Knowledge and/or Skills

- International and UK statutory authorities
- International and UK non-statutory authorities bodies
- Scientific research bodies

Higher National Unit specification: statement of standards (cont)

Unit title: Marine Environments: Management and Protection

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ evaluate the roles of one international and two UK statutory authorities in providing advice and enforcing regulations within the marine environment, including fisheries
- ◆ evaluate the roles of one international and two UK non-statutory bodies in the management of marine environments
- ◆ evaluate the role of scientific research bodies in informing the management of marine environments, giving two working examples

This is an open book assessment.

Assessment Guidelines

This Outcome could be assessed by a mix of restricted response and extended response questions. The assessment could be combined with the assessment for Outcome 1.

Administrative Information

Unit code: F3SS 35

Unit title: Marine Environments: Management and Protection

Superclass category: QA

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Version	Description of change	Date

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Higher National Unit specification: support notes

Unit title: Marine Environments: Management and Protection

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit develops understanding and knowledge of marine environments and ecosystems, the threats and impacts affecting them and the management role of statutory, voluntary and scientific bodies.

An understanding of the key features of marine environments and ecosystems and the factors influencing them is essential in successfully considering their management. This includes an understanding of the basic processes giving rise to tides, waves and currents such as the Coriolis effect, Langmuir circulation, longshore currents and Ekman transport. Some of these processes operate on a global scale while others are more local; both global and local aspects should be covered. Coastal, continental shelf and deep ocean habitats should be discussed in terms of their physical, chemical and topographical characteristics. Chemical factors to be introduced could include salinity and oxygen levels but as no previous knowledge of chemistry or physics is assumed, explanations of these factors should be at a basic level. The importance of light as a limiting physical factor should be appreciated. Descriptions of marine environments should introduce the conventional terminology for the oceanic zones and the main features of seabed topography such as the abyssal plain, mid-ocean ridges and continental shelf.

A named marine ecosystem should be selected and the main components of the biota described. This will not be an exhaustive list but should include enough trophic levels to demonstrate the relationships between species, including production and limiting factors. The candidate should be encouraged to appreciate the differences between marine and terrestrial ecosystems in terms of diversity and productivity. The role of phytoplankton and invertebrates at the base of the food chain should be discussed, along with the reasons for the patchiness of production in the oceans. Distinctions between coastal, continental shelf and open ocean habitats should be emphasised, but it is likely that coastal habitats will be studied most closely, preferably including site visits where possible. Coastal habitats could include rocky shore, estuary or saltmarsh as appropriate.

The discussion of the impact of human activities on marine environments could take a case study approach, preferably with site visits if possible. Impacts of fisheries could be taken to include whaling and the four different impacts might include case studies of effects on wild stocks such as cod, herring or whales. Food chain effects of, for example, sandeel fisheries and impacts of trawling on the seabed should also be discussed. Aquaculture would probably be covered in the context of salmon farming but the candidate should be given an overview of the range of marine species farmed, including whitefish and invertebrates. The three potential impacts might be effects on wild stocks, water quality and the seabed, each of which should be discussed along with possible mitigation measures. Effects of shipping pollution should include oil, litter and the transport of alien species. The effects on the coastal zone of recreation and tourism might include the development of golf courses, marinas and resorts. Impacts on sensitive habitats such as sand dunes, saltmarsh and mud flats might be covered, along with the pollution effects of sewage and drainage water.

Higher National Unit specification: support notes (cont)

Unit title: Marine Environments: Management and Protection

The roles and activities of both regulatory authorities and voluntary bodies should be discussed. UK statutory authorities might be the statutory bodies responsible for environmental protection, fisheries protection and natural heritage protection. Candidates should be made aware of the current position with EU legislation, for example any current agreement relating to a common fisheries policy, as well as the more global context such as any international commission. Non-statutory bodies include current focus groups such as the Marine Conservation Society, Greenpeace and other local organisations. The role of both government and non-government research establishments, such as those involved in fisheries research or marine science could be placed in the context of providing advice to inform regulation of fisheries or aquaculture. The uncertainties of the science of the oceans should be discussed.

Guidance on the delivery and assessment of this Unit

It is anticipated that lectures and class discussion will be supplemented with site visits whenever possible. Each Outcome could be assessed separately in a mix of restricted response and extended response questions, but Outcomes 1 and 3 could be assessed by an in-class test if considered appropriate, while Outcome 2 lends itself to a series of short case studies perhaps based on local issues, or log book reports following site visits. To spread the assessment load, separate case studies or reports could be submitted at intervals throughout the delivery of the Unit.

Opportunities for developing Core Skills

Although the Unit is designed to provide candidates with the knowledge and skills related to their specific occupational area there are opportunities to develop skills in communication. The production of responses to a case study report which was well structured, logical, clear and properly referenced would contribute towards the Component 'Written Communication' of the Core Skill Communication at SCQF level 6.

Open learning

It would be possible to deliver this Unit by distance or blended learning methods, including internet-based material and directed reading.

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs*, which is available on SQA's website: www.sqa.org.uk.

General information for candidates

Unit title: Marine Environments: Management and Protection

This Unit will help you to develop understanding and knowledge of marine environments and ecosystems, the natural factors affecting them and the impacts and regulation of human activities on them.

An understanding of the key components of marine ecosystems is essential in successfully considering the management and exploitation of the marine environment. You will learn about the role of the plankton and invertebrates in supporting the marine food chain, and the limiting factors affecting them. The chemistry of seawater, the origins of tides and currents and the features of the ocean floor will all be studied. You will investigate a variety of marine habitats, coastal and oceanic, possibly including site visits.

You will investigate the impact of humans on marine environments, for example effects of fisheries on fish stocks and the sea bed. You will discuss the impacts of aquaculture, and methods to reduce harmful effects. The role of shipping and of coastal tourism in producing pollution and other harmful effects will be considered. You will see how the statutory authorities and voluntary bodies are involved in the management and exploitation of the oceans.

It is anticipated that lectures and class discussion will be supplemented with site visits whenever possible. Each Outcome may be assessed separately by a mix of restricted response and extended response questions. Outcomes 1 and 3 may be combined. Outcome 2 could be assessed in a series of short case studies or log books.

Over the course of this Unit, there may be opportunities for you to develop the Core Skill component 'Written Communication' of the Core Skill Communication at SCQF level 6, although there is no automatic certification of Core Skills or Core Skills components.