National Unit Specification: general information

UNIT Aquatic Environments for Aquaculture (SCQF level 5)

CODE F6TG 11

SUMMARY

The Unit is designed to enable candidates to develop an understanding of selected aquatic environments, relating the environmental conditions to the environmental requirements of a specific aquaculture system. Candidates will develop the skills to measure those water characteristics of most significance to aquaculture, and will develop basic identification skills for relevant aquatic flora and fauna. By interpreting the field data collected and supplementary data provided for a range of key parameters relating to different water sources, candidates will reveal seasonal trends and evaluate the suitability of aquatic environments as aquaculture sites.

On completion, the candidate should understand how environmental conditions and seasonal fluctuations determine whether a specified aquaculture enterprise is feasible in a given location.

OUTCOMES

1 Describe water sources suitable for aquaculture.
2 Gather information on a local aquatic environment with aquaculture potential.
3 Evaluate the suitability of an aquatic environment for a specified aquaculture enterprise.

RECOMMENDED ENTRY

Entry is at the discretion of the centre.

CREDIT VALUE

1 credit at SCQF level 5 (6 SCQF credit points at SCQF level 5*).

**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.*

Administrative Information

Superclass: SJ

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Source: Scottish Qualifications Authority

Version: 01

National Unit Specification: general information (cont)

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CORE SKILLS

There is no automatic certification of Core Skills in this Unit.

There are opportunities for Core Skill development; these are highlighted in the Support Notes of this Unit Specification.

National Unit Specification: statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit Specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

OUTCOME 1

Describe water sources suitable for aquaculture.

Performance Criteria

(a) The hydrological cycle is described accurately.
(b) The water quality characteristics relevant to aquaculture are described accurately.

OUTCOME 2

Gather information on a local aquatic environment with aquaculture potential.

Performance Criteria

(a) The information abstracted from maps is accurate.
(b) The key water parameters are measured accurately.
(c) The measured water parameters are recorded accurately in the appropriate units.
(d) The local aquatic flora and fauna are identified and recorded accurately using common names.

OUTCOME 3

Evaluate the suitability of an aquatic environment for a specified aquaculture enterprise.

Performance Criteria

(a) The description of the topography and physical characteristics of the aquatic environment and its immediate surrounds is accurate.
(b) The graphical representation of the seasonal variations in the condition of the aquatic environment is accurate.
(c) The range of values for specified water characteristics is derived and recorded accurately.
(d) The implications of the recorded flora and fauna are considered.
(e) Produce a report on a local aquatic environment with aquaculture potential.

National Unit Specification: statement of standards (cont)

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EVIDENCE REQUIREMENTS FOR THIS UNIT

Evidence is required to demonstrate that candidates have achieved all Outcomes and Performance Criteria.

Outcome 1 — Written and/or recorded oral evidence

The candidate must describe a minimum of:

- four stages of the hydrological cycle
- four water quality characteristics for two different water sources

Outcomes 2 — Written and/or recorded oral evidence and Performance evidence

The candidate must:

- use maps to extract, interpret and record a minimum of three site characteristics
- measure and record a minimum of four water parameters
- identify a minimum of four common aquatic plants and a minimum of six aquatic animals

Outcome 3 — Written and/or recorded oral evidence

The candidate must:

Produce a written or verbal presentation of a short report of 600–800 words evaluating suitability of one potential aquaculture site for a specific aquaculture enterprise. The report should include:

- A minimum of two site characteristics
- Derive water data from given information, and compile it with data from the field for four parameters
- Seasonal profiles for four parameters
- The implications of the recorded flora and fauna

The Assessment Support Pack for this Unit provides appropriate instruments of assessment, assessor checklists and assessor guidance. Centres wishing to develop their own assessments should refer to the assessment support pack to ensure a comparable standard.

Centres must be satisfied that the evidence submitted is the work of individual candidates.

Assessor observation checklists and other assessment records should be maintained and kept up to date to keep track of candidate progress and to provide evidence for internal and external verification purposes.

National Unit Specification: support notes

UNIT Aquatic Environments for Aquaculture (SCQF level 5)

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

The Unit is a mandatory Unit in the NPA in Aquaculture at SCQF level 5, but is also available for candidates who wish to study the Unit as a stand-alone Unit.

This Unit is aligned to National Occupational Standard (NOS) Unit CU52, Maintain the Aquatic Production Environment (Lantra — Sector Skills Council).

The candidate could be introduced to the aquatic environments used for aquaculture in Northern Europe, illustrating the main differences between the water characteristics of each (marine, running freshwater and still freshwater). The water quality characteristics will be explored, developing an awareness of how water characteristics can be modified during different stages of the hydrological cycle.

The candidate could analyse the seasonal profiles of water characteristics for an aquatic environment and explain the differences with reference to information on the water catchments derived from maps.

The candidate could select a local aquatic environment with aquaculture potential and investigate the water's physical and chemical parameters (such as temperature, dissolved oxygen, salinity, pH and ammonia) and biological characteristics. The field data is gathered applying standard techniques for each parameter, supplemented by additional data, revealing typical seasonal changes in water characteristics. The candidate should determine the influence of physical factors such as depth and topography in the case of marine environments and fresh still water, and gradients, in the case of running fresh water, on water characteristics such as salinity, water currents/flows, water chemistry and the distribution of flora and fauna.

The field work should include an exploration of flora and flora common to the site, but with particular emphasis on species impacting on aquaculture, such as predator species, parasites, and fouling organisms, shellfish spat, and biological indicators of water quality.

The suitability of the aquatic environment investigated for a specific aquaculture enterprise is determined with reference to the species tolerance limits and the conditions of the environment, culminating in the production of a short report.

National Unit Specification: support notes (cont)

UNIT Aquatic Environments for Aquaculture (SCQF level 5)

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The Unit lends itself to a range of teaching and learning approaches. Tutor led knowledge development can be used effectively in the early stages, building an understanding of underpinning concepts, including the hydrological cycle, the factors influencing the water characteristics of different environments and the environmental requirements of North European Aquaculture enterprises.

There is scope for candidate centred learning exercises based on text references, web based resources and interactive IT based learning objects presented within a virtual learning environment (VLE). Interactive exercises and regular formative assessment, incorporating online multiple-choice is recommended, in order to develop the candidates understanding of the inter-relationships between the landscape, geology, land use and the aquatic environment. An awareness of the distribution of fish farm enterprises in Scotland could be established through candidate enquiry, with reference to Government statistics on the aquaculture industry.

It would be advantageous to have learning packages for each water type (marine, running freshwater, still freshwater) to allow independent study following the introduction of underpinning concepts.

Skills in using a wide range of paper based or on-line maps is required, including hydrological, geological, soil type and land use maps, in order to determine the influences on water characteristics in specific aquatic environments. Practical instruction must be included covering water sampling, water testing and map interpretation.

Field work can be either teacher led or, if it is practicable and safe, groups of candidates can plan and organise their own field work, thereby providing opportunities for team leadership, team work and communication.

The Unit could be enhanced considerably though site visits to a range of aquatic environments and aquaculture sites illustrating key concepts. Talks from aquaculture Unit managers, emphasising the influence that the conditions of the aquatic environment have on their aquaculture operation, are encouraged.

The candidate should be introduced to the concept of species ‘tolerance limits’ and optimum conditions, prior to evaluating the aquaculture potential of a chosen site. Integrating the delivery of the Unit with other Units in the NPA in Aquaculture that address aquaculture is recommended.

National Unit Specification: support notes (cont)

UNIT Aquatic Environments for Aquaculture (SCQF level 5)

OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

There are opportunities to develop aspects of all of the five Core Skills:

- *Communication*, through planning field work, preparing and writing a short report (600–00 words)
- *Numeracy*, through the analysis of data on water parameters and the interpretation of maps using scales
- *Information Technology*, supporting data analysis by spreadsheets, tabulation, graphical presentation of data, and word processing to produce reports in Outcomes 2 and 3
- *Problem Solving* can be covered through planning, organising, reviewing and evaluating in Outcomes 2 and 3
- W*orking with Others*, through field work and other group activities

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

A range of assessment approaches is envisaged, including restricted response, observation of practical tasks with accompanying checklists, and the completion of a short report to a given structure.

Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003), SQA Guidelines on e-assessment for Schools (BD2625, June 2005).*

There are opportunities for e- assessment, particularly regarding Outcome 1. The candidates knowledge could be effectively assessed though on line multiple choice questions, presented in a graphic form to satisfy Outcome 1 (PC a).

DISABLED CANDIDATES AND/OR THOSE WITH ADDITIONAL SUPPORT NEEDS

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**