



## Higher National Unit specification

### General information for centres

**Unit title:** Water Resources for Aquaculture and Fisheries

**Unit code:** F4N5 34

**Unit purpose:** This Unit is designed to enable candidates to gain knowledge and understanding of water characteristics and develop the skills to assess the fish farming potential of a water source.

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

- 1 Describe the physical and chemical characteristics of water.
- 2 Measure the physical and chemical characteristics of water.
- 3 Evaluate field data for a range of water types.

**Credit points and level:** 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7\*)

*\*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 the Unit is at the discretion of the centre however it would be beneficial if candidates have achieved the National Unit D854 11 *Fish Farming: Water Supply* or equivalent, or if they had water supply work experience.

**Core Skills:** There are opportunities to develop the Core Skills of *Numeracy* and *IT* at SCQF level 5 and the Core Skills components of *Written Communication* at SCQF level 5 and *Critical Thinking* and *Reviewing and Evaluating* 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:** It is recommended that this Unit is assessed by extended response questions for Outcome 1, practical performance evidence for Outcome 2 and case studies consisting of evaluations and reports for Outcome 3.

## **Higher National Unit specification: statement of standards**

**Unit title:** Water Resources for Aquaculture and Fisheries

**Unit code:** F4N5 34

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**

Describe the physical and chemical characteristics of water

#### **Knowledge and/or Skills**

- ◆ Physical characteristics of water
- ◆ Chemical characteristics of water
- ◆ Biotic factors
- ◆ Human activities
- ◆ Water sources for fish farming

#### **Evidence Requirements**

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

- ◆ two key effects on fish of each of the following: changes in temperature, pressure, density and suspended solids
- ◆ two key effects on fish of each of the following: dissolved oxygen and the presence of nitrogenous compounds
- ◆ two key effects on fish of each of the following: pH, hardness and dissolved solids
- ◆ two key effects on fish of each of the following: photosynthesis, respiration, decomposition, precipitation and weather
- ◆ two key effects on fish of each of the following: pollution, land use and human recreation
- ◆ one advantage and one disadvantage of each of the following water sources for fish farming: groundwater; still water; running water; estuarine or marine water

All of the above must be carried out in closed-book conditions.

#### **Assessment Guidelines**

This Outcome could be assessed using extended response questions.

## **Higher National Unit specification: statement of standards (cont)**

**Unit title:** Water Resources for Aquaculture and Fisheries

### **Outcome 2**

Measure the physical and chemical characteristics of water

#### **Knowledge and/or Skills**

- ◆ Measurement methods
- ◆ Units of measurement
- ◆ Data recording

#### **Evidence Requirements**

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

- ◆ measure, record and express in cubic metres per second ( $\text{m}^3 \cdot \text{s}^{-1}$ ) and litres per second ( $\text{l} \cdot \text{s}^{-1}$ ) the water flow rate at a given site on three separate occasions
- ◆ measure, record and express using the accepted units of measurement, temperature, suspended solids, oxygen concentration, pH, nitrogenous compounds, hardness and salinity of three different water types on three separate occasions

All of the above must be carried out under supervised conditions

#### **Assessment Guidelines**

This Outcome could be assessed using performance evidence generated during practical sessions.

## **Higher National Unit specification: statement of standards (cont)**

**Unit title:** Water Resources for Aquaculture and Fisheries

### **Outcome 3**

Evaluate field data for a range of water types

#### **Knowledge and/or Skills**

- ◆ Water quantity data
- ◆ Chemical and physical characteristics of water sources
- ◆ Natural and man made influences on water supplies
- ◆ Water sources for fish farming

#### **Evidence Requirements**

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

- ◆ evaluate the production potential of one named type of fish farming based on water quantity data of, and three possible natural and man-made influences upon, one running water source. The evaluation should be based on data produced from two visits to one site.
- ◆ evaluate the potential for one named type of fish farming based on five chemical and physical water characteristics of, and three possible natural and man-made influences upon, one still water source, one running water source and one estuarine or marine water source. Evaluations should be based on two visits to each site.

All of the above should be carried out in supervised conditions.

#### **Assessment Guidelines**

This Outcome could be assessed by case studies based on evaluations of field data and site visits to one still water source, one running water source and one estuarine or marine source.

## Administrative Information

**Unit code:** F4N5 34

**Unit title:** Water Resources for Aquaculture and Fisheries

**Superclass category:** RH

**Original date of publication:** August 2008

**Version:** 01

### History of changes:

Version	Description of change	Date

**Source:** SQA

© Scottish Qualifications Authority 2008

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

## **Higher National Unit specification: support notes**

### **Unit title:** Water Resources for Aquaculture and Fisheries

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 is intended for candidates who are working in or seeking a career in the fish farming industry or fisheries management industry.

The teaching and learning of this Unit should always be delivered in this context.

Health and safety procedures should always be followed especially in the practical components of this Unit.

Additional information relating to each Outcome is given below:

- 1 This Outcome covers the physical and chemical characteristics of water. Physical and chemical properties should be covered, as well as natural and man-made influences on water quality and the range of water types that can be used for fish farming.
- 2 This Outcome covers the measurement of physical and chemical characteristics of water. Measurement of water quantity, physical and chemical characteristics, data recording and presentation of data should be covered
- 3 This Outcome covers the evaluation of field data for a range of water types. Evaluation of water quantity, physical and chemical characteristics, natural and man made influences should be covered for a range of water sources such as river water, lake/loch water and brackish/sea water. The evaluation of water should be carried out with reference to use in fish farming.

### **Guidance on the delivery and assessment of this Unit**

This Unit is intended for candidates who are working in or seeking a career in the fish farming industry or fisheries management industry. It could also be a stand alone Unit for those wishing to improve their knowledge and understanding of the use of water resources for fish farming.

There is a practical component to this Unit. Candidates will have to measure water flow and also physical and chemical characteristics of water to ensure they have the practical skills to complement the theoretical knowledge gained in this Unit.

Visits to a SEPA office as well as showing slides, photographs and films of water sampling as well as natural and man-made influences will all enhance the delivery of this Unit.

Outcome 1 deals with the theory of the water resource for aquaculture and fish farming, Outcome 2 covers the relevant practical competences and Outcome 3 considers the evaluation of water resources using case studies relating to site visits and filed data.

## **Higher National Unit specification: support notes (cont)**

**Unit title:** Water Resources for Aquaculture and Fisheries

Outcome 1 could be assessed by a series of extended response questions.

The assessment for Outcome 2 could be based on the observation of performance supplemented by candidate records.

Outcome 3 could be assessed by case studies based on evaluations of site visits and field data and could be combined with Outcome 2. The data collected for Outcome 2 could be evaluated as part of Outcome 3.

### ***Opportunities for developing Core Skills***

This Unit provides the opportunity to develop the Core Skills of *Numeracy* and *IT* at SCQF level 5 in Outcomes 2 and 3 respectively; Outcome 3 provides the opportunity to develop the Core Skills components of *Written Communication* at SCQF level 5 and *Critical Thinking and Reviewing and Evaluating* at SCQF level 6.

### **Open learning**

If this Unit is delivered by open or distance learning methods, additional resources will be required for candidate support, assessment and quality assurance.

### **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. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* ([www.sqa.org.uk](http://www.sqa.org.uk)).

## General information for candidates

### Unit title: Water Resources for Aquaculture and Fisheries

The credit value of this Unit is 1 HN credit at SCQF level 7 (8 SCQF credit points at SCQF level 7).

This Unit is intended to prepare you for work in the salmonid aquaculture and fisheries management industries but is equally valuable if you have a particular interest in natural water sources as a fish farming resource.

In the first Outcome you will study the physical and chemical characteristics of water. The natural and man-made influences that can affect water quality will also be covered. The range of water sources that can be used in fish farming will be considered.

In the second Outcome you will have the opportunity to measure water flow with reference to use in fish farming. You will also measure physical characteristics such as temperature and suspended solids and measure chemical characteristics such as pH, ammonia level and salinity.

In the third Outcome you will evaluate data from three water types to assess the suitability of using it in the context of fish farming.

To complete this Unit successfully you will have to achieve a satisfactory level of performance in the theory and practical assessments. One of the theory assessments will be undertaken in closed-book conditions and the other will consist of open-book case studies.

There are opportunities to develop Core Skills in this Unit, as follows:

- the complete Core Skills of *Numeracy* and *IT* at SCQF level 5
- the Written Communication component of *Communication* at SCQF level 5
- the Critical Thinking and Reviewing and Evaluating components of *Problem Solving* at SCQF level 6.