Unit 25: Understanding River Fishery Creation and Management

Unit code: M/600/9256

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

This unit aims to introduce learners to river fisheries creation and management skills and knowledge and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

Unit introduction

Rivers are among the UK's most valuable and fragile habitats and it is essential that they are managed for future generations to enjoy. This unit focuses on the ecology of rivers, the factors that impact on plants and animals inhabiting riverine environments and the methods used to protect and enhance those environments. Finally, the unit considers management options for recreational river fishing.

Learners will explore the ecology of different types of river fisheries and their associated habitats. Learners will be expected to use various survey techniques to develop their practical survey skills and gain a broader understanding of river systems. In addition, they will look at river habitats to develop species identification skills and an understanding of the requirements of different aquatic organisms.

They will look at historical and current causes of river degradation and how river habitats can be improved for angling and wildlife. The organisations involved in river management, and the roles they play in managing rivers today and for the future, are investigated.

Learners will develop their understanding of the nature of coarse and game river fisheries across the UK. They will investigate the geographic location of the UK's major coarse and game river fisheries and look at the value of these fisheries to the rural economy. The facilities, rules and legislation associated with each type of river fishery will also be considered.

Learners will look at how rivers are managed and maintained for coarse and game angling. Learners will identify the work required to create, improve or develop rivers for angling purposes. Learning outcomes

On completion of this unit a learner should:

1 Understand the ecology of different rivers

2 Understand the causes of river degradation and the methods used to improve riverine habitats

3 Know the types of river fisheries available in the UK and the factors that allow them to succeed

4 Be able to plan the creation and management of a riverine fishery.

Unit content

1 Understand the ecology of different rivers

Physical properties: channel characteristics eg length, depth and width; river zonation; river characteristics eg pool, riffle, glide; methods used to assess physical characteristics

Habitats and flora and fauna: water quality and potential sources of contamination; biological and chemical indicators and indices; methods used to assess existing aquatic and bankside flora and fauna; typical native and non-native bankside, marginal and channel vegetation; typical bird, mammal and aquatic invertebrate species associated with rivers and their preferred habitats; typical lotic fish species and their preferred habitats; riverine fish lifecycles; food webs; current status of riverine coarse and game fish stocks

2 Understand the causes of river degradation and the methods used to improve riverine habitats

River degradation: sources and effects of pollution eg agriculture, industry, eutrophication, afforestation and deforestation; sources and effects of over and under shading; water abstraction; dredging; channelisation; siltation; impoundments and dams; recreation; fishery management practices; relevant current legislation and codes of practice

River rehabilitation: bank top methods eg fencing, buffer strips; bankside methods eg revetment, faggots; channel enhancement eg large woody debris, wing deflectors, boulder emplacement; organisations involved in river rehabilitation eg state, private groups, trusts and foundations; funding available for rehabilitation projects; relevant current legislation and codes of practice; health and safety; environmental issues

3 Know the types of river fisheries available in the UK and the factors that allow them to succeed

Nature of UK coarse and game fisheries: types of fishery eg game, coarse, wild, stocked, private, syndicated, species related, catch and release; geographical areas and reasons for geographical differences; significant fisheries; numbers of anglers; value to economy; trends in fishing and fisheries; threats and opportunities eg disease, sustainability; fishery rules; fishing rights and riparian ownership; differences in legislation between different countries in the UK; use of bylaws; relevant current legislation and codes of practice

4 Be able to plan the creation and management of a riverine fishery

Create and devise plans: objectives of the river fishery and the requirements of the fish species; issues relating to the development, improvement or creation of coarse or game river sport fisheries eg legislation, planning requirements, access; needs of the angler eg access, facilities; financial viability of coarse and game fisheries; fishing rights and riparian ownership; relevant current legislation

Managing and maintaining river sport fisheries: wild stock management and promotion; stocking eg need for stocking, increasing natural food supplies, suitability of species for stocking, timing and methods of stocking, prices and availability of stock; legal predator control eg piscivorous birds and mammals; fish population management eg electric fishing, netting operations; relevant current legislation and codes of practice; animal welfare issues; environmental issues

The role of employees within river fishery management: duties of the state agency fishery officer, river keeper, ghillie, angling guide or instructor; promotion of the fishery; fishery rules and regulations; dealing with anglers and poachers; relevant current legislation and codes of practice; health and safety

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P1 explain the characteristics of the typical habitats found in selected river fisheries [IE]	**M1** explain the ecological roles of selected aquatic species within a given river fishery	**D1** explain how biological and chemical characteristics can be used to determine water quality
P2 explain the habitat requirements of a range of riverine fish species [IE]		
P3 explain the major causes of river degradation at a selected site [CT]	**M2** explain the roles of major organisations within restoration and management of a selected river	**D2** discuss current and future threats to river fisheries in the UK at a local and national level
P4 assess different methods to improve one situation of river degradation at a selected site [CT]		
P5 identify the types of coarse and game fisheries available in the UK [SM]	**M3** explain the geographical reasons for differences in UK river fishery types	
P6 create a plan for the management of a selected river fishery over a given period. [IE]	**M4** discuss the typical duties of a given river fishery member of personnel in relation to the management of river fisheries and the angler.	**D3** explain the methods of managing selected species of wild stock in river fisheries, including the potential impacts of fish stocking.

PLTS: This summary references where applicable in the pass criteria, in the square brackets, the elements of the personal, learning and thinking skills. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key			
	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

Tutors delivering this unit have opportunities to use as wide a range of techniques as possible. Lectures, discussions, seminar presentations, site visits, supervised river fishery practicals, research using the internet and/or library resources and the use of personal and/or industrial experience would all be suitable. Delivery should stimulate, motivate, educate and enthuse learners.

Work placements should be monitored regularly in order to ensure the quality of the learning experience. It would be beneficial if learners and supervisors were made aware of the requirements of this unit before any work-related activities are undertaken so that naturally occurring evidence can be collected at the time. For example, learners may have the opportunity to undertake river survey or habitat improvement work and they should ask for observation records and/or witness statements to be provided as evidence of this. Guidance on the use of observation records and witness statements is provided on the Edexcel website.

Whichever delivery methods are used, it is essential that tutors stress the importance of animal welfare, sound environmental management and the need to manage the resource using legal methods.

Health and safety issues relating to working in and around water must be stressed and reinforced regularly and risk assessments must be undertaken before any practical activities. Adequate personal protective equipment (PPE) must be provided and used following the production of suitable risk assessments. Learners undertaking survey work and practicals in moving water must be suitably dressed with waders and floatation aids in line with the outcomes of the risk assessment. Wading sticks must be used where appropriate. In addition, tutors must ensure that rescue equipment is available on the bankside.

Learning outcome 1 looks at understanding the ecology of river fisheries and can be delivered through lectures, discussions, learner presentations and independent research. However, the emphasis should be on practical river survey work and therefore supervised access to rivers is essential. This learning outcome should develop learners' practical survey and identification skills (using techniques such as river habitat surveys and chemical and biological tests).

Learners should be encouraged to develop analytical and interpretation skills in order to explain the data found within their surveys. The Environment Agency River Habitat Survey, chemical and biological surveys and flora and fauna surveys should be used to develop learners' practical and identification skills.

Learning outcome 2 focuses on river degradation and rehabilitation. The initial emphasis should be on the reasons why rivers may degrade and the measures used to improve them. Learners should also investigate the roles played by the different river management organisations, looking in particular at funding available for projects and possible conflicts. This learning outcome is likely to be delivered through formal lectures, independent learner research (using, in particular, the internet and specialist magazines) and learner presentations and discussion. Where appropriate, site visits to river fisheries could develop learner understanding. The rivers investigated in learning outcome 3 could be used as case studies.

Learning outcome 3 covers the different types of river sport fisheries in the UK and how they are run and managed for angling. This is likely to be delivered through formal lectures, independent learner research (using, in particular, the internet and specialist magazines), learner presentations and discussion and site visits to river fisheries. Learners will be aware of the facilities required for and provided by each fishery and make comparisons between each one. Learners will develop an understanding of fishery legislation and the rules associated with each fishery and why they are required. This will include national legislation, such as close seasons, down to specific fishery rules relating to the method of angling.

Learning outcome 4 looks at management and maintenance techniques for river fisheries (including those required for creating new fisheries). It aims to give learners knowledge of the typical tasks involved in

managing river fisheries. It can be linked to learning outcomes 1 and 2. Learners should be encouraged to devise annotated plans with written summaries to either develop or improve a river sport fishery. Learners should then be encouraged to focus on how river fisheries are managed, looking at the typical tasks undertaken during the course of a year. Building on this, learners should be familiar with the roles of the different people employed in the river fishery industry. This learning outcome should be delivered through formal lectures, practical river work, independent learner research, group discussions, site visits and talks from guest speakers.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value.**

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction and overview of the unit.
Assignment 1: River Habitats (P1, P2, M1, D1) Tutor introduces the assignment brief.
Lecture:. different habitats found in riverine systems and why they are important to fish, flora and fauna.
River habitats for fish. Learner research and discuss the habitat needs of different species of fish at different times of the year. Lecture and question and answer session.
Practical identification. Site visits to a local river fishery to identify river habitats and map the habitats using a suitable river map.
River habitat survey. Learners to undertake Environment Agency (EA) river habitat surveys along a 200 m section of river. Record, review and feed back on survey data.
Biological river surveys. Kick sampling, flora and fauna identification using appropriate keys/guides with information recorded. Results compared to EA data using EA website.
Chemical river surveys. pH, nitrates, nitrites, dissolved oxygen, phosphates, turbidity, velocity. Results compared to EA data using EA website.
Assignment 2: River Degradation and Rehabilitation (P3, P4, M2, D2) Tutor introduces the assignment brief.
Theory session on river degradation. Lecture on the main causes of river degradation in the UK with case study examples.
Theory session on river rehabilitation. Lecture on the practical methods used to restore UK rivers from the effects of river degradation.
Theory session on the organisations involved in restoration work. Learner internet research with case study examples.
Discussion on the threats to UK rivers on a local and national level. Lecture and independent learner research.
Study tour/site visit to see examples of river degredation and rehabilitation.
Guest speaker from the EA to talk about their work within river. Management.
Assignment 3: The UK River Fisheries (P5, M3) Tutor introduces the assignment brief.
Learner research on the game river fisheries in the UK. Guided worksheets and learner feedback. Lecture on UK game fisheries.

Topic and suggested assignments/activities and/assessment
Lecture on UK chalk streams to include geographical distribution, costs to fish, fishing rights, rules, legislation.
Lecture on UK Salmon and sea trout river fisheries to include geographical distribution, costs to fish, fishing rights, rules, legislation.
Theory session on UK brown trout, rainbow trout and grayling fisheries to include geographical distribution, costs to fish, fishing rights, rules, legislation.
Learner research on UK coarse river fisheries. Guided worksheets and learner feedback. Lecture on UK coarse river fisheries.
Lecture on UK's main coarse river fisheries focusing on the barble, chub, pike and roach to include geographical distribution, costs to fish, fishing rights, rules, legislation.
Assignment 4: River Fishery Management Plan (P6, M4, D3) Tutor introduces the assignment brief.
Site visit to a local stretch river to map and plan a section of river to turn into a new river fishery. Learner feedback and discussion.
Lecture on the roles of those employed in river management. Learner independent research and feedback.
Site visit to local river fishery to look at how river fisheries are managed and the duties of the river keeper. Learners to make notes, feed back and discuss.
Lecture on managing river fisheries for a sustainable natural population of wild fish. Question and answer session. Case study examples.
Lecture on stocking river fisheries: the advantages and disadvantages of doing this. Initial discussion and class feedback.
Unit review.

Assessment

P1 and P2 require learners to identify and describe the typical habitats found in a selected river fishery and their physical characteristics and then explain how these benefit the plants and animals that inhabit the river. Tutors should identify the river fishery or agree it through discussion with learners. Where possible, to ensure assessment is fair, the size and complexity of the fishery should be the same for all learners. The fishery may be the same as that used to provide evidence for other grading criteria. This could be assessed directly through an assignment or presentation about a particular stretch of river. Alternatively, an annotated river plan, poster or interpretation panel could be used.

For P3 and P4, learners must identify and explain the major causes of river degradation at a selected site and the methods used to improve one situation. Tutors should identify the river site or agree it through discussion with learners.

For P5, learners must explain the types of coarse and game river fisheries in the UK. It is expected that learners will cover the different species that are fished for, the different ownership types and the different management methods used. Evidence for this could take the form of a PowerPoint presentation with notes (possibly using appropriate software or an overhead projector), or an annotated poster or leaflet, or a project.

Finally, for P6, learners are to devise plans for creating or managing a selected river sport fishery over a given period of time to meet specified objectives. Tutors should identify the river fishery and objectives or agree them through discussion with learners. Where possible, to ensure assessment is fair, the size and complexity of the fishery and its objectives should be the same for all learners. Learners' plans to manage a fishery should be devised for a calendar year to ensure that essential annual maintenance tasks are included. Evidence for this could take the form of a PowerPoint presentation with notes (possibly using appropriate software or an overhead projector) or a project.

For M1, learners must identify the main aquatic and bankside vegetation, invertebrate, fish, bird and mammal species associated with a selected river fishery and explain their ecological roles within the fishery. Tutors should identify the river fishery or agree it through discussion with learners. Where possible, to ensure assessment is fair, the size and complexity of the fishery should be the same for all learners. Evidence could be in the same form as for P1 and P2.

M2 requires learners to identify the major organisations involved in the restoration and management of a selected river and explain their roles. Tutors should identify the river or agree it through discussion with learners. Where possible, to ensure assessment is fair, the size and complexity of the fishery should be the same for all learners. Evidence could be in the same form as for P3 and P4.

For M3, learners must explain the geographical reasons for differences between river fishery types in the UK, considering aspects such as latitude, altitude and gradient, climate, geology and local topography. Learners should consider all UK countries in their evidence. Evidence could be in the same form as for P5.

For M4, learners must discuss the typical duties of the state agency fishery officer, river keeper, ghillie and angling guide or instructor in relation to the management of river fisheries and the angler. Evidence could be linked to that for P6. Learners could give examples of duties that they have seen being carried out or have been involved in. Evidence could be in the same form as for P6.

D1 requires learners to identify the biological and chemical characteristics of a selected river fishery and explain how these can be used to determine water quality. Evidence should ideally come from the practical surveys and tests learners have carried out. This could be compared with any Environment Agency data for the river surveyed and to the 'ideal' chemical and biological requirements for river fisheries. Learners should try and explain the reasons for their results. Evidence should be a written report or project.

D2 requires learners to discuss the current and future threats to our river fisheries and the fish that inhabit them. Learners should take into account the issues covered in P3 and expand on these and other issues such as predation, non native species pollution etc. Evidence should be in the same format as P3 and P4.

D3 requires learners to explain the methods of managing selected species of wild stock in river fisheries, including the role and potential impacts of fish stocking. Tutors should identify the species or agree this through discussion with learners. Where possible, to ensure assessment is fair, the size and complexity of the methods should be the same for all learners. Evidence could be in the same form as for P6.

Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, M1, D1	River Habitats	You are to undertake a variety of river surveys such as biological, chemical, species identification and river mapping to gather information on a specific stretch of river. From this you are to produce a report which describes the habitats found and explains their value to fish, includes a table of the flora and fauna species found and explains their function within the riverine system, and uses chemical and biological data collected from the survey and data from the EA to describe the quality of water in the river and explain how such data is used to identify the quality of water.	Report.

Criteria covered	Assignment title	Scenario	Assessment method
P3, P4, M2, D2	River Degradation and Rehabilitation	Following the site visit/study tour to River X you are to produce a report which identifies and describes the factors which have led to this river being degraded. Following this you are to identify the methods used to combat one problem. Identify the organisations involved in the restoration and management of the river and explain the role they have played. For the river studied identify the future threats to the river and its fish stocks.	Report.
P5, M3	The UK River Systems	Produce an assignment about the UK river systems identifying the major coarse and game species and the rivers in which they can be found. Explain the geographical distribution of these rivers and identify the differences across the UK. For both coarse and game river fisheries explain how these fisheries are run and the rules and legislation which are associated with the method of angling and the species of fish.	Assignment.
P6, M4, D3	River Fishery Management Plan	Create a seasonal management plan for river X for a 12-month period which identifies the work required to turn it into a viable river fishery. For this stretch of river identify the role of the local state fishery officer, river keeper and ghillie/angling guide and explain their duties in managing this stretch of river and the visiting angler. Finally, explain how the fish stocks within this stretch should be managed and the role of stocking.	

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Introduction to Game Management	Understanding Fishery Management
	Understanding Stillwater Fishery Creation and Management

Essential resources

Learners will need supervised access to a range of river fisheries to allow them to develop a realistic understanding of the theory and the essential practical survey and identification skills.

Site visits should be encouraged. This will enable learners to see river degradation and rehabilitation projects and the facilities of river fisheries at first hand. Resources for survey work should include waders, wading sticks, buoyancy aids and throw ropes for safety purposes, sampling equipment for undertaking biological and water quality surveys and appropriate identification guides on aquatic plants, aquatic invertebrates, fish,

birds and mammals. Flow meters and turbidity meters would also enhance learners' skills and understanding. Access to hand tools to undertake practical river management work is essential.

Tutors delivering this unit should be competent and experienced sport fishery managers.

Employer engagement and vocational contexts

This unit focuses on practical and theoretical aspects of river management and will give learners the background knowledge to manage a range of river fisheries. Centres are encouraged to create and develop links with local river fisheries, river trusts, the Environment Agency and conservation groups and organisations to enhance learning. This could be through guest lectures by Environment Agency fisheries officers, site visits and guided tours by river keepers, site visits and talks from officers of the Wildlife Trust and presentations from members of the various river trusts. Learners who are undertaking work experience with river keepers should be encouraged to share their experiences with other learners in the classroom.

Indicative reading for learners

Textbooks

CEFAS Annual Assessment of Salmon Stocks and Fisheries in England and Wales (CEFAS, annual publication)

Cowx I and Wellcomme R – *Rehabilitation of Rivers For Fish* (Food and Agriculture Organization of the UN, 1998) ISBN 9251040184

Holmes N – *Rivers and Wildlife Handbook* (A and C Black Publishers, 1994) ISBN 0903138700

Templeton R – *Freshwater Fisheries Management, 2nd Edition* (Blackwell Science, 1995) ISBN 085238209X

Wild Trout Trust, Environment Agency, River restoration Centre – *The Wild Trout Survival Guide* (WTT, 2008)

Journals and magazines

Gamefisher The Salmon and Trout Association magazine

Salmo Trutta Wild Trout Trust magazine

Other publications

National trout and grayling fisheries strategy

The State of England's Chalk Rivers EA and English Nature

Websites

www.associationofriverstrusts.org.uk	Association of Rivers Trusts
www.atlanticsalmontrust.org	Atlantic Salmon Trust
www.defra.gov.uk	Department for Environment, Food and Rural Affairs
www.environment-agency.gov.uk	Environment Agency
www.gct.org.uk	The Game Conservation Trust
www.graylingsociety.org	Grayling Society
www.salmon-trout.org	Salmon and Trout Association
www.thebarbelsociety.co.uk	The Barbel Society
www.therrc.co.uk	The River Restoration Centre
www.wildtrout.org	The Wild Trout Trust

Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
Independent enquirers	identifying suitable questions to answer when looking at different river habitats creating plans for developing a new river fishery
Creative thinkers	generating ideas and exploring the possibilities for river rehabilitation discussing the future threats to river fisheries
Self-managers	researching new information on different river fisheries showing initiative and prioritising tasks.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	debating the ethics behind stocking trout in river fisheries
Creative thinkers	finding new solutions and alternatives to river restoration work
Reflective learners	reviewing and evaluating data collected from various river survey work.

Functional Skills – Level 2

Skill	When learners are ...
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	Using the internet to research water quality data
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	collecting information on different river fisheries across the UK
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	producing a report based on the data collected from the river surveys producing a report on river degradation and improvement producing a river management plan
Bring together information to suit content and purpose	brining together water quality data from various sources
Present information in ways that are fit for purpose and audience	producing a river management plan producing a river survey report
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	making contact with the various river trusts across the UK
Mathematics	
Identify the situation or problem and the mathematical methods needed to tackle it	undertaking BMWP scoring and the average score per taxa for invertebrate surveys
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	feeding back information collected on different river fisheries across the UK presenting information on invertebrates and flora and fauna found in and along the river
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	researching the different river fisheries across the UK investigating EA data on rivers within a certain area
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	producing a report on river degradation and rehabilitation producing a river management plan writing an assignment on UK river fisheries.