Competency Standard for Freshwater and Transitional Fish Survey, Assessment, Mitigation and Management

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Notes:
a) To achieve an overall level of 'Capable' requires achievement of all criteria for both 'Foundation' as well as 'Capable'; 'Proficient' requires achievement of all criteria for all levels
b) 'Experience' means that you have done so on numerous occasions

All practitioners should have knowledge and understanding of:	
Fish ecology and behaviour	High level of knowledge of the ecology, behaviour and life history of the main fish species in which the practitioner specialises/advises for both freshwater and estuarine (transitional) habitats. General all-round knowledge of ecology and behaviour of the majority of freshwater and transitional (defined for the purposes of this Competency Standard as anadromous and catadromous) fish species within the UK. Knowledge of habitat requirements for all life stages and life histories.
Distribution	Current distributions of freshwater and transitional fish species throughout the UK with specific knowledge on protected species and invasive non-native species (INNS).
Health and safety	Methods of best practice and organisational health and safety procedures. Specifically for fish surveys; selecting appropriate Personal Protective Equipment (PPE) (e.g., waders/dry suit, auto-inflating lifejackets, ranging pole, boats); safe working practices for use of specialist equipment (e.g. electric fishing, netting); aware of other potential safety issues associated with working in or near water (e.g., river flow and levels, soft sediment, waterborne diseases such as leptospirosis); knowledge of methods for reducing risk (e.g., observing water levels and flow and use of a ranging pole before entering watercourses, personal hygiene precautions for working near water and with animals); consideration of Control of Substances Hazardous to Health (COSHH) where required.
Biosecurity	Uses appropriate biosecurity measures during fish surveys, including cleaning and disinfecting equipment before attending site and disinfecting (where appropriate and using DEFRA-approved disinfectants), washing, cleaning and/or drying equipment and PPE before moving to another area or leaving site. Practitioners should also have knowledge of aquatic and riparian INNS, as well as any risks associated with their spread. Practitioners should be familiar with, and implement, the 'check, clean, dry' methodology: https://secure.fera.defra.gov.uk/nonnativespecies/checkcleandry/documents/check-clean-dry-england.pdf
Key references and reading list	See accompanying 'Core Resources, Guidance and Standards for Implementation of the Competency Standard for Freshwater and Transitional Fish Survey, Mitigation and Management' reference list and the relevant section of CIEEM's

	Good Practice Guidance for Habitats and Species V3 (May 2021) (https://cieem.net/resource/good-practice-guidance-for-habitats-and-species/).		
Competency Standards			
Activity	**Foundation**	**Capable**	**Proficient**
ENVIRONMENTAL ASSESSMENT			
Habitats Regulations Assessment (HRA) / Natura Impact Statement (NIS) (A2)	Awareness of key legislation and a basic understanding of the different stages of the HRA screening process. Understanding of when HRA is necessary (where a designated species or habitat may be impacted by a plan or project) via the HRA (Stage 1) screening process. Experience of supporting more senior ecologists in informing an HRA Appropriate Assessment (Stage 2).	Knowledge and understanding of the different stages of the HRA screening process, and the survey and assessment techniques that may be specific to Annex II species in the UK. Experience of undertaking Stage 1 (Screening) and Stage 2 (Appropriate Assessment) of the HRA process and of providing advice and recommendations to ensure adverse effects on site integrity are avoided through the design and incorporation of mitigation to safeguard qualifying fish species and the supporting processes on which the feature relies. Experience of consultation/feedback from the regulator (Natural England, NatureScot, or Natural Resources Wales).	Recipient of regular approaches for advice and may provide training to other ecologists on HRA and the legislation in respect to HRA of fish populations. In-depth knowledge and understanding of the HRA stages, including the less commonly applied Stage 3 (Consideration of Alternatives) and Stage 4 (Compensation). Experience of using complex data sets/modelling (e.g., fish populations, fluvial geomorphology or water quality modelling) to evidence and underpin the HRA of qualifying fish species. Ability to provide advice to other ecologists and to lead consultation with the regulator (Natural England, NatureScot, or Natural Resources Wales). May have experience of gaining consent for a project under HRA Stage 3: Derogation, including the Assessment of Alternative Solutions,

			consideration of Imperative Reasons of Overriding Public Interest (IROPI) and securing Compensatory Measures.
Environmental Impact Assessment (EIA) / Water Framework Directive (WFD) Assessment (A3)	Understanding of the purpose of, and the process involved, in an EIA and has assisted in some fisheries elements of that process.	Ability to contribute to EIAs of limited scope or complexity, and to contribute to the production of Environmental Statements covering fisheries. Ability to assess EIAs of limited scope and/or complexity.	Coordination of fisheries and/or aquatic ecology inputs for EIAs and ability to coordinate the production of Environmental Statements for more complex projects.
Ecological assessment including Preliminary Ecological Appraisal (PEA), Ecological Impact Assessment (EcIA) (A4)	Awareness of the key fisheries legislation (see P3) and a basic understanding of the implication of this legislation for the purposes of EcIA. Completion of basic assessment tasks such as desk studies for fish using various data sources (e.g. Local Environmental Records Centres, Environment Agency (EA) Ecology and Fish Data Explorer, and National Biodiversity Network). An understanding of the potential impacts of a proposed development on fish populations and possible mitigation measures.	Knowledge and understanding of the key fisheries legislation and a good understanding of the implication of this for the purposes of impact assessment. Experience of producing simple or standard EcIAs for fish and their habitats. Experience of using baseline data to inform EcIA and make appropriate recommendations to mitigate the impacts of a proposed development on fish populations and habitats.	Recipient of regular approaches as an authority on the legislation covering fish and able to advise and train others. Leads on the assessment of EcIAs for fish and their habitats, including for complex or non-standard projects and proposing measures to mitigate the potential impacts of a proposed development on fish populations and habitats.
ENVIRONMENTAL MANAGEMENT			
Providing specialist advice on ecological management and / or environmental schemes (M1) and Designing and preparing environmental	Awareness of basic habitat requirements for a range of fish species. Knowledge of simple small-scale techniques, including design and	Experience of providing advice and inputting into the design of medium, large-scale standard, or small-scale complex habitat/species specific management, mitigation, compensation, and enhancement projects (including	Able to provides specialist technical advice and design inputs on a wide range of complex, non-standard or large-scale habitat/species management, mitigation, compensation, and enhancement

management, mitigation, restoration and enhancement plans (M2)	implementation, for habitat/species management, mitigation, compensation, and enhancement, that can be used to manage and/or create habitats suitable for fish (e.g., adding riparian cover to riverbanks or installing eel climbing media at a weir). Awareness of necessary information required to inform evidence-based advice (e.g., knowledge of surveys required, timing, and where to find fish data such as contacting Fishery/Rivers Trusts). Understanding of standard mitigation techniques, including those required to ensure that watercourses are not subject to sedimentation and siltation, or other pollution events which could adversely impact on fish during works (e.g., timing of works, fish translocation, barriers, pump screening, silt mitigation).	barrier removal, fish passes, and screens) or habitat creation techniques for a range of fish species, including those designed to adapt to/mitigate climate change effects (e.g., river restoration). Experience of collating and examining information required to inform evidence-based advice (e.g., survey and population data). Knowledge of the climate change impacts affecting fish species and populations and how impacts can be mitigated.	techniques (including barrier removal, fish passes, and screens) for a range of fish species (e.g., catchment management). Regularly approached for advice and may provide training to other ecologists, groups, or members of the public on designing and preparing habitat/species management, mitigation, compensation and/or enhancement plans or projects.
Practical implementation of plans for ecological management and/or environmental schemes (M3)	Knowledge of the appropriate techniques and machinery used for standard projects and how they should be used (e.g., timing of works, fish translocation, pump screening in relation to dewatering). Awareness of biosecurity issues and able to apply control measures.	Experience of selecting the appropriate techniques and machinery for medium and large-scale straightforward, or small-scale complex, projects. Knowledge of the implementation of biosecurity measures and able to apply measures to control INNS.	Experience of selecting the appropriate techniques and machinery for large-scale and complex projects, with the knowledge and understanding to adjust the techniques and procedures of a project to achieve the targeted results.

	Knowledge of when a licence may be required (e.g., Environmental Permit, Marine Licence, Scottish Environment Protection Agency (SEPA) Controlled Activity Regulations (CAR) licence, permits to catch, remove and translocate fish). Awareness of considerations and risks that could present opportunities and constraints (e.g., land ownership, planning, and feasibility) in the design, preparation and implementation of plans or projects. Able to support an Ecological Clerk of Works (ECoW).	Ability to implement different techniques to ensure that watercourses are not subject to sedimentation and siltation, and other pollution events which would impact on fish during works. Ability to clearly explain the licensing requirements to others as well as experience of applying for relevant licences (e.g., Environmental Permit, Marine Licence, SEPA CAR licence, permits to catch, remove and translocate fish). Able to act as the ECoW, liaising with other professionals and contractors as appropriate.	Confident implementation of the highest standards of biosecurity across complex sites or projects. Experience of implementing licencing on complex sites (e.g., fish removals and health check requirements). Consideration of impacts of INNS when implementing project design and mitigation. Able to perform the ECoW role for large-scale or high-risk projects.
POLICY, LEGISLATION AND STANDARDS			
Advising on the requirements of legislation, policy and guidance or international standards (P3)	Demonstrates awareness of national, European and international environmental legislation, policy and guidance relating to fish, including knowledge of the conservation status of all freshwater and transitional species including specific drivers, legislation, policy, and guidance for their protection, such as the Salmon and Freshwater Fisheries Act, Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act, Fisheries Act (Northern Ireland), Eels (England	Demonstrates understanding of, and advises on, national, European and international environmental legislation, policy and guidance relating to fish in straightforward scenarios.	Demonstrates understanding of, and advises on, national, European and international environmental legislation, policy and guidance relating to fish in complex scenarios.

	and Wales) Regulations, Freshwater Fish Conservation (Prohibition on Fishing for Eels) (Scotland) Regulations, Water Framework Directive (WFD), Habitats Directive, Natural Environment and Rural Communities Act (Species of Principal Importance), Wildlife and Countryside Act, Invasive Species Regulations, International Union for Conservation of Nature. Assistance of others in providing advice.		
SURVEYING			
Habitat / species survey design, planning and fieldwork (S1) - General	Awareness of the principles of fish surveys, relevant best practice guidelines and industry standards. Can identify survey objectives for 'standard' surveys and select the most appropriate survey technique(s), understanding how they are applied. Ability to apply for relevant permits/authorisations to deliver survey work under supervision. Ability to work as part of a team to deliver survey work supervised by a technical lead. Awareness of, and follows, biosecurity protocols.	Confident in standard survey planning and fieldwork skills relevant to role(s). Communication with the local regulatory/fisheries officer to provide survey details and context to works for permitting purposes. Ability to advise on, and apply for, the relevant permits pertaining to fish capture, movements and health checks. Follows relevant biosecurity protocols and encourages/supports others to do the same.	Ability to design and lead all types of surveys including complex solutions, such as impingement/entrainment monitoring, fish pass assessment or the JNCC Common Standards Monitoring guidance for protected fish species. Regularly approached for advice, with larger teams working under their guidance. May provide training to other ecologists in respect to fish surveys. Ability to liaise with regulators to agree an accepted survey design to inform legislative compliance/permitting conditions (e.g., Eels Regulations,

	Awareness of close seasons for angling and potential seasonal limitations to survey work (e.g., key life stages of protected and notable species).		national/European site species condition assessment).
Habitat / species survey design, planning and fieldwork (S1) - 'Standard' fish survey methods)	Ability to use of commonly applied surveying techniques (e.g., electric fishing, netting) consistently and effectively whilst under supervision. Completion of an introductory electric fishing training course.	Ability to design fish surveys such as electric fishing and netting according to standard methods and industry-accepted best practice guidelines. Experienced in leading electric fishing and netting surveys with a small team working under them. May be accredited or have undertaken training in fisheries monitoring techniques by a relevant professional body. Certified electric fishing Team Leader with knowledge of appropriate equipment settings for prevailing environmental conditions.	Ability to deliver electric fishing training. Likely to be accredited or have undertaken training in fisheries monitoring techniques by a relevant professional body. Proficiency in planning, implementing and leading on a range of standard and complex survey types such as electric fishing and netting (fyke, seine, fry) surveys relevant to role(s).
Habitat / species survey design, planning and fieldwork (S1) – Unique, specialised, and modern survey methods	A basic understanding of environmental DNA (eDNA) surveys and how to collect and process samples using water sampling equipment and field kits under supervision. Awareness of other methods of surveying freshwater and transitional fisheries, e.g., sonar and optical imaging, mark-recapture using tagging or telemetry, genetic analysis.	Awareness of eDNA limitations, e.g., turbidity, rate of decay, number of kits required and DNA contamination risk, to confidently inform survey design. Awareness of and ability to advise on the different laboratory analysis types (e.g., metabarcoding or qPCR) to best inform survey objectives. Experience of using other recognised methods of surveying freshwater and transitional fisheries, e.g., sonar and	Ability to design bespoke eDNA surveys to inform the fish assemblage in complex systems (i.e., deep waterbodies where mixing does not occur). Awareness of advances in the field, i.e., ribosomal DNA (rDNA), automated samplers, mitochondrial eDNA analysis, and how this can be applied in a commercial setting.

		optical imaging, mark-recapture using tagging or telemetry, genetic analysis.	Competent in using other recognised methods of surveying freshwater and transitional fisheries, e.g., sonar and optical imaging, mark-recapture using tagging or telemetry and genetic analysis.
Species identification, handling and population size (S2)	A basic understanding of fish identification of common UK species but requiring supervision from the survey/technical lead for uncommon or juvenile/larval specimens. A basic understanding of the fish handling processes required to collect the necessary data to inform the survey objectives (i.e., fish lengths and weights) but requiring supervision. A basic knowledge of fish welfare and handling requirements during surveys and data collection (i.e., fish to be kept in shaded, appropriately aerated containers) but requiring supervision. Ability to undertake basic population assessment using standard survey data.	Ability to act as survey lead and proficient in species identification and handling of fish including invasive species and hybrids. A strong understanding and practical experience of fish handling and is able to process challenging species such as eel and lamprey sp. to gather the required bioinformatics. Understanding of fish welfare and handling for a range of species and how these may impact permitting (i.e., 18^{o}C and 20^{o}C water temperature survey cut off for salmonids and coarse fish respectively). Ability to assess population size and significance of common species to a standard where the data can be used in subsequent reporting. Understanding of how to collect larval fish samples (and the associated Health and Safety risks of preserving samples) where larval fish cannot be identified in	Reliable identification of all UK freshwater/transitional fish species to the taxonomic level required for surveys. Regularly approached for advice and/or provides training to other ecologists on the subject. Confident in welfare and handling techniques for all fish species including protected species and how this may influence licencing (i.e., the delicate nature of shad species, European eel mucus secretion, lamprey ammonia spikes). May hold a Personal Licence (PIL) under the Animal (Scientific Procedures) Act (ASPA) 1986 (e.g., for anaesthesia and surgery for telemetry studies) and be an authority in fish welfare with ability to provide advice in this area. Ability to accurately assess population size and structure for both common

		the field, and ability to collect fish scales for laboratory analysis. Ability to age fish from scales and identify larval fish in a laboratory following best practise and through professional keys respectively.	and rare species and able to apply these data to impact assessments and legislative compliance reports. Technical lead in scale reading and larval fish identification.
Habitat identification, classification and assessment (S3) and Physical environment survey and assessment (S4)	Undertakes fish habitat surveys and assessment under guidance using simple descriptive techniques. Use of common habitat classification techniques accurately and can identify general fish habitats.	Ability to complete fish habitat surveys following recognised methods (e.g., Hendry and Cragg-Hine [1997]; HABSCORE) and records findings in accordance with best practice guidelines where available. Undertakes accurate habitat assessments in accordance with recognised techniques and can identify key functional/essential habitats for a range of species and life stages. Can complete more complex assessments of the wider physical environment under guidance using best practice tools, such as WFD111 (2a) Coarse resolution rapid-assessment methods to assess obstacles to fish migration.	Proficiently carries out a range of standard and complex/bespoke habitat surveys and assessments, accurately assessing habitat condition. Is regularly approached for advice and may provide training to other ecologists.
SCIENTIFIC METHOD			
Scientific method design and implementation (SM1)	Awareness of a range of methodologies and technologies that can be used to investigate scientific questions, e.g., electric fishing, netting, eDNA, sonar and optical imaging, telemetry	Ability to formulate more complex scientific questions and design appropriate methodologies to test these.	Ability to formulate complex scientific questions and design appropriate investigative methodologies to test these based on methods of analysis, statistical principles and assumptions.

	(acoustic, radio, passive integrated transponder, satellite), modelling (hydraulic, behavioural), genetic analysis, laboratory observations. Formulates hypotheses and designs simple methodologies with the method of analysis in mind to test these under guidance.	Capable of implementing a simple scientific methodology independently with data analysis in mind, including consideration of basic statistical principles and assumptions. Ability to successfully implement more complex methodologies under guidance.	Supervises investigative design by others. Successfully implements all aspects of a scientific methodology. Able to adapt methodologies appropriately where required.
Analysis of environmental data and modelling (SM2)	Ability to carry out appropriate analyses of straightforward data sets with a basic understanding of the key outcomes. Familiarity with basic statistical analyses, principles and assumptions, including fish densities (Carle and Strub Maximum Weighted Likelihood method and Zippin Maximum Likelihood Model), biomass estimations and length frequency histograms, whilst requiring guidance to interpret the results.	Ability to determine what appropriate analyses to use, and independently undertake straightforward analyses of a range of data, including evidence from modelling. Successfully uses appropriate statistical or modelling software under supervision where required. Understanding of the importance of sensitivity analysis where appropriate. Ability to analyse more complex data under guidance, using more complex statistical analyses where required. Familiarity with data processing requirements for the methodologies implemented (e.g., for telemetry and sonar imaging). Ability to draw on multiple interdisciplinary datasets (e.g., flow, tide and water chemistry) to provide holistic	Ability to understand and carry out complex analyses. Makes sound use of ecological and/or environmental modelling. Ability to contribute sound statistical advice to the design of a scientific method and the data collected. Successfully uses appropriate statistical or modelling software where required. Proficiency in data processing requirements for the methods implemented (e.g., for telemetry and sonar imaging). Ability to supervise and interrogate data processing and analysis undertaken by others.

		assessments and strengthen statistical models.	
Interpretation (SM3)	Ability to interpret straightforward data and draw and present valid conclusions using appropriate presentation tools. Recognition of the importance of research and data collected by other sources during interpretation, including grey and peer-reviewed data and literature.	Interpretation of data and evidence, recognition of limitations in data or methodologies, and drawing and presenting valid conclusions. Use of appropriate presentation tools. Interpretation of complex data and evidence under guidance. Ability to critically review data collected via other sources.	Independent interpretation of data and production of accurate, factual and well written conclusions. Consideration of the context of other research, for scientific and technical audiences.
PROFESSIONAL STANDARDS			
PS1	Demonstration of a personal commitment to professional standards and personal development. Recognition of obligations to the environment. Awareness of ethical considerations, including ASPA 1986. Undertaking of Continuous Professional Development (CPD). Working impartially, honestly, and with scientific rigour.	Setting an example to others through demonstrable standards of good practice and appropriate behaviours. Making ethical decisions confidently and consistently with adherence to ASPA 1986 where required. Taking responsibility for own learning and development. Member of a relevant professional body.	Supporting and encouraging others to uphold professional standards. Making ethical decisions confidently and consistently and leads projects regulated by ASPA 1986 where required. Member or Chartered Member of a relevant professional body. Consistently setting an example and may contribute to the work of a professional body in promoting and maintaining standards.