

Core Resources, Guidance and Standards for Implementation of the Competency Framework for Aquatic Macroinvertebrate (Freshwater) Survey and Assessment

Core skill	Resources, Guidance and Standards
General	<p>The Competency Framework Self-Assessment Tool will help you to identify the areas of the CIEEM Competency Framework in which you are likely to be most competent and those where there is scope for personal development. https://cieem.net/i-am/continuing-professional-development/competency-framework/competency-framework-self-assessment-tool/</p>
Health & Safety Awareness	<ul style="list-style-type: none"> • CIEEM Competency Framework – HS1 https://cieem.net/wp-content/uploads/2019/02/Competency-Framework-web-FINAL.pdf • British Trust for Ornithology Health and Safety Awareness for Volunteers https://www.bto.org/how-you-can-help/take-part-project/health-safety • Health and Safety Executive https://www.hse.gov.uk/managing/resources.htm • Oxford-Boothe L (2019) Mental Health and Well-Being in the Ecology and Environmental Management Profession, CIEEM <i>In Practice</i> https://cieem.net/resource/mental-health-and-well-being-in-the-ecology-and-environmental-management-profession/ • Lawrence, P and Llewellyn C (2019) Improving Working Conditions for Early Career Ecologists CIEEM <i>In Practice</i> https://cieem.net/resource/improving-working-conditions-for-early-career-ecologists/ • Environment Agency Operational Instruction 52_05 Ecology Laboratory Safety
Biosecurity	<ul style="list-style-type: none"> • GB Non-Native Species Secretariat (NNS): (http://www.nonnativespecies.org//index.cfm?pageid=174) • Natural England Invasive non-native species http://publications.naturalengland.org.uk/category/47020 • House of Commons Invasive Species Report (2019) https://publications.parliament.uk/pa/cm201919/cmselect/cmenvaud/88/88.pdf • Wales non-native invasive species group https://www.biodiversitywales.org.uk/Invasive-Non-Native-Species-Group • Scotland https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-species/invasive-non-native-species/invasive-non-native-plants • Scotland https://www.invasivespecies.scot/ • Scotland Biosecurity and management of invasive non-native species https://www.sepa.org.uk/media/163480/biosecurity-and-management-of-invasive-non-native-species-construction-sites.pdf • Northern Ireland: NI invasive alien species https://www.daera-ni.gov.uk/articles/invasive-alien-species • Ireland: category of Ireland’s non-native species https://www.biodiversityireland.ie/projects/invasive-species/cins-2/ • Ireland’s Invasive and non-native species https://www.biodiversityireland.ie/wordpress/wp-content/uploads/Trends-Report-2013.pdf
Desk-study	<p>CIEEM has recently published revised Guidelines for Accessing, Using and Sharing Biodiversity Data in the UK and this document should be referred to for further information on the sources and applications for biodiversity data.</p> <p><u>General</u></p> <ul style="list-style-type: none"> • Aerial imagery https://www.getmapping.com/ • Britain from above aerial mapping https://www.britainfromabove.org.uk/ • Geology of Britain http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html • Side by Side OS and Aerial Where’s the Path imagery https://wtp2.appspot.com/wheresthepath.htm • Catchment Based Approach – A resource hub for river catchment management plans https://catchmentbasedapproach.org/learn/catchment-management-plans/ • Data.Gov.UK Data sets: ‘Data publisher’ https://ckan.publishing.service.gov.uk/dataset • Environment Agency Catchment Data Explorer https://environment.data.gov.uk/catchment-planning/ • Environment Agency Ecology and Fish Data Explorer https://environment.data.gov.uk/ecology/explorer/ <p><u>Statutory designations, habitats of principal importance (Priority Habitats) and other habitat datasets</u></p>

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	<ul style="list-style-type: none"> • England and partially Scotland and Wales: Multi-Agency Geographic Information for the Countryside MAGIC (https://magic.defra.gov.uk/) • England: Natural England’s Designated Sites https://designatedsites.naturalengland.org.uk/SearchCounty.aspx • England: Natural England’s Geoportal https://naturalengland-defra.opendata.arcgis.com/ • England: Natural England’s Habitat Network Maps https://data.gov.uk/dataset/0ef2ed26-2f04-4e0f-9493-ffbdbfaeb159/national-habitat-networks-england • England: Natural England’s Living Maps is due to be published in mid-2020, alongside existing NE spatial data: https://www.gov.uk/guidance/how-to-access-natural-englands-maps-and-data • Northern Ireland: Department of Agriculture, Environment and Rural Affairs (https://www.doeni.gov.uk/) • Northern Ireland: NIEA Natural Environment Map Viewer https://apps.dpera-ni.gov.uk/nedmapviewer/ • Republic of Ireland: National Parks and Wildlife Service (https://www.npws.ie/) • Scotland: National Library of Scotland mapping https://maps.nls.uk/geo/explore/#zoom=5&lat=55.78537&lon=-3.16449&layers=1&b=1 • Scotland: Scotland’s Environment Map - https://www.environment.gov.scot/maps/scotlands-environment-map/ • Wales: Natural Resources Wales environmental data portal https://naturalresources.wales/evidence-and-data/access-our-data/?lang=en • Wales: Geo Portal for Wales http://lle.gov.wales/catalogue/item/TerrestrialPhase1HabitatSurvey/?lang=en <p><u>Macroinvertebrate species distribution</u></p> <ul style="list-style-type: none"> • NBN Atlas (nbnatlas.org) https://nbn.org.uk/the-national-biodiversity-network/archive-information/nbn-gateway/ • Local Biological Records Centres (http://www.alerc.org.uk/) • Local Biodiversity Action Plans • Environment Agency Catchment Data Explorer: https://environment.data.gov.uk/catchment-planning/ • Environment Agency Ecology and Fish Data Explorer: https://environment.data.gov.uk/ecology/explorer/
Survey Guidance	<ul style="list-style-type: none"> • Water Framework directive – UK Technical Advisory Group, 2014. UKTAG River Assessment Method: Benthic Invertebrate Fauna. WFD UKTAG: Stirling. • Chadd, R. & Extence, C. (2004) The conservation of freshwater macroinvertebrate populations: a community-based classification scheme. <i>Aquatic Conservation: Marine and Freshwater Ecosystems</i> 14: 597-624. • Environment Agency (2014). Freshwater macro-invertebrate analysis of riverine samples Operational Instruction 024_08. Environment Agency, Bristol, UK. • Environment Agency (2017). Freshwater macro-invertebrate sampling in rivers Operational Instruction 018_08. Environment Agency, Bristol, UK. • Environment Agency (last issue: 2016) Incidents and their Classification: the Common Incident Classification Scheme (CICS). Operational Instructions 04_01. Environment Agency, Bristol, UK. • Natural England. 2007. Surveying terrestrial and freshwater invertebrates for conservation evaluation. Natural England Research Report NERR005. • Pond PSYM Manual: Pond Conservation and the Environment Agency. 2002. <i>A guide to monitoring the ecological quality of ponds and canals using PSYM</i>. Pond Action, Oxford. • Pond Rapid Assessment method: Pond Conservation. 2010. The development of the Big Pond Dip invertebrate survey method. Pond Conservation, Oxford. • National Pond Survey: Pond Action (1998). <i>A guide to the methods of the National Pond Survey</i>. Pond Action, Oxford. • Pond habitat survey method booklet, Freshwater Habitats Trust https://freshwaterhabitats.org.uk/wp-content/uploads/2015/03/HABITAT-MANUAL-FINAL.pdf

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	<ul style="list-style-type: none"> • PondNet. 2021. <i>PondNet survey options</i> [includes PondNet guidance: How to survey ponds for aquatic macroinvertebrate families, and PondNet Invertebrate Families Recording Form]. [Online] Available at: https://freshwaterhabitats.org.uk/projects/pondnet/survey-options/ (Accessed August 2021). • Geatches T., Gething, J. & Rutt G. (2014) 'Sewage fungus', a field and microscopic guide. Environment Agency & Natural Resources Wales. • STAR. 2004. <i>UK Invertebrate sampling and analysis procedure for STAR project</i>. [Online] Available at: http://www.eu-star.at/pdf/RivpacsMacroinvertebrateSamplingProtocol.pdf (Accessed August 2021). • Furse, M.T., J.F. Wright, P.D. Armitage & D. Moss (1981) An appraisal of pond-net samples for biological monitoring of lotic macro-invertebrates. <i>Water Research</i>, 15: 679-689. • Wright, J.F., D.W. Sutcliffe & M.T. Furse (2000). Assessing the biological quality of freshwaters. RIVPACS and similar techniques. Ambleside: Freshwater Biological Association. xxiv, 373 pp. • VIDEO: RIVPACS Sampling, Salmon & Trout Conservation's website https://salmon-trout.org/smart-rivers-resources/ <p><u>British Standards</u></p> <ul style="list-style-type: none"> • EN ISO 10870:2012 - Water quality — Guidelines for the selection of sampling methods and devices for benthic macroinvertebrates in fresh waters • EN 15196:2006 - Water quality — Guidance on sampling and processing of the pupal exuviae of Chironomidae (order Diptera) for ecological assessment • EN 16150:2012 - Water quality — Guidance on pro rata multi-habitat sampling of benthic macro-invertebrates from wadeable rivers • ISO 8689-1:2000 - Water quality — Biological classification of rivers — Part 1: Guidance on the interpretation of biological quality data from surveys of benthic macroinvertebrates • ISO 8689-2:2000 - Water quality – Biological classification of rivers – Part 2: Guidance on the presentation of biological quality data from surveys of benthic macroinvertebrates • EN 16772:2016 - Water quality – Guidance on methods for sampling invertebrates in the hyporheic zone of rivers • EN 16859:2017 - Water quality – Guidance standard on monitoring freshwater pearl mussel (<i>Margaritifera margaritifera</i>) populations and their environment
Legislation Policy & Conservation Status	<p>CIEEM Competency Framework – P4 Compliance and enforcement of environmental (and relevant other) legislation, policy and standards https://cieem.net/wp-content/uploads/2019/02/Competency-Framework-web-FINAL.pdf</p> <p><u>Legislation</u></p> <ul style="list-style-type: none"> • European: Habitats Directive 92/43/EEC: <ul style="list-style-type: none"> ○ Annex II – Species requiring designation of SAC ○ Annex IV – Strictly protected species ○ Annex V – Species whose taking from the wild can be restricted by European law. • European: Water Framework Directive 2000/60/EC; Consolidated version of WFD (incorporates daughter directives that have been incorporated into WFD): https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02000L0060-20141120 Includes: <ul style="list-style-type: none"> ○ minimum sampling frequencies; and, most importantly,

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	<ul style="list-style-type: none"> ○ the normative definitions for high, good and moderate status for invertebrates in rivers ● WFD Guidance documents: https://ec.europa.eu/environment/water/water-framework/facts_figures/guidance_docs_en.htm ● National: Conservation of Species and Habitats Regulations 2017 <ul style="list-style-type: none"> ○ EPS (Schedule 5) ● England: Wildlife and Countryside Act 1981 (as amended) (country equivalents): <ul style="list-style-type: none"> ○ Section 13 and Schedule 8 – protected species of plants ○ Section 14 and Schedule 9 – invasive plant species ○ SSSI designation ● England: Natural Environment and Rural Communities Act 2006. ● Northern Ireland: Wildlife and Natural Environment Act (Northern Ireland) 2011 ● Wales: Environment (Wales) Act 2016. ● Scotland: The Wildlife and Natural Environment (Scotland) Act 2011 ● Scotland: Nature Conservation (Scotland) Act 2004 ● Northern Ireland: Wildlife and Natural Environment Act (Northern Ireland) 2011 ● Ireland: The Wildlife Act 1976 ● England and Wales: Invasive Alien Species (Enforcement and Permitting) Order 2019 <p><u>National Planning Policy</u></p> <ul style="list-style-type: none"> ● England: National Planning Policy Framework (2019) https://www.gov.uk/government/publications/national-planning-policy-framework--2 ● England: Section 41 of Species of principal importance Natural Environment and Rural Communities Act 2006. ● Wales: Section 7 Species of principal importance Environment (Wales) Act 2016. ● Wales: Planning Policy Wales (2018) https://gov.wales/sites/default/files/publications/2018-12/planning-policy-wales-edition-10.pdf ● Scotland: Planning Policy Framework 3 (2014) https://www.gov.scot/publications/national-planning-framework-3/ (PPF4 in progress) ● Scotland: Section 2(4) of the Section 3(1) Species of principal importance Nature Conservation (Scotland) Act 2004 ● Northern Ireland: Strategic Planning Policy Statement (2015) https://www.planningni.gov.uk/spps ● Northern Ireland: Section 3(1) of the Wildlife and Natural Environment Act (Northern Ireland) 2011 ● Ireland: Planning Policy Statement (2015) https://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/DevelopmentandHousing/Planning/FileDownload%2C39991%2Cen.pdf <p><u>Local Planning Policy</u></p> <ul style="list-style-type: none"> ● Local: Local Plans ● Local Biodiversity Action Plans (LBAP) <p><u>Nature Conservation</u></p> <ul style="list-style-type: none"> ● International: The International Union for Conservation of Nature and Natural Resources (IUCN) (Version 2020-1) red list https://www.iucnredlist.org/ ● European: Red List (Bilz et al., 2011) ● Joint Nature Conservation Committee, 2020. Conservation Designations for UK Taxa. [Online] (Accessed: September 2021). Available at: https://hub.jncc.gov.uk/assets/478f7160-967b-4366-acdf-8941fd33850b. <p><u>Species Red Lists</u></p> <ul style="list-style-type: none"> ● JNCC. 2021. Red lists in Great Britain. [Online] Available at: https://jncc.gov.uk/our-work/red-lists-in-great-britain/ (Accessed August 2021).

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	<p><u>Aquatic Invertebrate Interest Groups</u></p> <ul style="list-style-type: none"> • The British Dragonfly Society https://british-dragonflies.org.uk/ • The Aquatic Coleoptera Conservation Trust https://www.latissimus.org/
Survey Planning	<p><u>Survey Planning see also Survey Guidance</u></p> <ul style="list-style-type: none"> • CIEEM Competency Framework – S1 Habitat/species survey design, planning and fieldwork https://cieem.net/wp-content/uploads/2019/02/Competency-Framework-web-FINAL.pdf • CIEEM Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes https://cieem.net/resource/ecological-surveying-techniques-for-protected-flora-and-fauna-during-the-planning-of-national-road-schemes/ • CIEEM Guide to Ecological surveys and their Purpose https://cieem.net/resource/guide-to-ecological-surveys-and-their-purpose/ • CIEEM Advice note on the Lifespan of Ecological Reports and Surveys https://cieem.net/resource/advice-note-on-the-lifespan-of-ecological-reports-and-surveys/ • National Roads Authority Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes https://www.tii.ie/technical-services/environment/planning/Ecological-Surveying-Techniques-for-Protected-Flora-and-Fauna-during-the-Planning-of-National-Road-Schemes.pdf • Ecological survey for design and construction https://www.designingbuildings.co.uk/wiki/Ecological_survey_for_design_and_construction Designing Building Wiki • BS 42020:2013 Biodiversity. Code of practice for planning and development https://shop.bsigroup.com/ProductDetail?pid=00000000030258704
Species identification	<p>CIEEM Competency Framework – S2 Species identification, handling and population assessment https://cieem.net/wp-content/uploads/2019/02/Competency-Framework-web-FINAL.pdf</p> <p><u>Macroinvertebrate Identification keys and guides:</u></p> <ul style="list-style-type: none"> • Bass, J., 1998. Last-instar Larvae and Pupae of the Simuliidae of Britain and Ireland. Freshwater Biological Association: Ambleside. Scientific Publication No. 55. • Cham, S., 2012. Field Guide to the Larvae and Exuviae of British Dragonflies. The British Dragonfly Society: Peterborough. • Constable, D. and Blackman, R. 2018. <i>Gammarus fossarum (Koch, 1836): an overlooked species new to the UK</i>. FBA News, No. 74 Summer-Autumn 2018. • Cranston, P., Ramsdale, C., Snow, K., & White, G. (1987). Adults, larvae and pupae of British mosquitoes (Culicidae). Freshwater Biological Association: Ambleside. Scientific Publication No. 48. • Disney, R. (1999). British Dixidae (Meniscus Midges) and Thaumaleidae (Trickle Midges). Freshwater Biological Association: Ambleside. Scientific Publication No. 56. • Dobson, M., Pawley, S., Fletcher, M. and Powell, A., 2012. Guide to Freshwater Invertebrates. Freshwater Biological Association: Ambleside. Scientific Publication No. 68. • Edington, J.M. and Hildrew, A.G., 1995. A Revised Key to the Caseless Caddis Larvae of the British Isles. Freshwater Biological Association: Ambleside. Scientific Publication No. 53. • Elliott, J. (1996). British freshwater Megaloptera and Neuroptera. Freshwater Biological Association: Ambleside. Scientific Publication No. 54. • Elliott, J.M. and Humpesch, U.H., 2010. Mayfly Larvae (Ephemeroptera) of Britain and Ireland. Freshwater Biological Association: Ambleside. Scientific Publication No. 66.

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	<ul style="list-style-type: none"> • Elliott, J.M. and Dobson, M., 2015. Freshwater Leeches of Britain and Ireland. Freshwater Biological Association: Ambleside. Scientific Publication No. 69. • Foster, G., & Friday, L. (2011). Keys to adults of the water beetles of Britain and Ireland (Part 1). Field Studies Council, Shrewsbury. • Foster, G., & Friday, L. (2014). Keys to adults of the water beetles of Britain and Ireland (Part 2). Field Studies Council, Shrewsbury. • Foster, G.N. 2010. A review of the scarce and threatened Coleoptera of Great Britain Part (3): Water beetles of Great Britain. Species Status 1. Joint Nature Conservation Committee: Peterborough. • Gledhill, T., Sutcliffe, D., & Williams, W. (1993). British Freshwater Crustacea Malacostrata: A key with ecological notes. Freshwater Biological Association: Ambleside. Scientific Publication No. 52. • Hammond, P., J.E., M., Cox, M., Jessop, L., Garner, B., & Barclay, M. (2019). British Coleoptera larvae: A guide to the families and major subfamilies. Field Studies Council, Shrewsbury. • Hynes, H.B.N., 1977. A Key to the Adults and Nymphs of British Stoneflies (Plecoptera). 3rd Edn. Freshwater Biological Association: Ambleside. Scientific Publication No. 17. • Killeen, I., Aldridge, D. and Oliver, G., 2004. Freshwater Bivalves in Britain and Ireland. Field Studies Council: Shrewsbury. Occasional Publication 82. • Macan, T.T., 1977. British Fresh- and Brackish-Water Gastropods. 4th Edn. Freshwater Biological Association: Ambleside. Scientific Publication No. 13. • MacAdam, C.R., Chadd, R.P., Pickwell, A. and Doe, J. 2018. A new British mayfly: <i>Baetis atlanticus</i> (Soldán & Godunko, 2006) (Ephemeroptera: Baetidae). <i>Entomologist's Monthly Magazine</i> 154: 263–265. • Nilsson, A., Ed., 2005. Aquatic Insects of North Europe: A Taxonomic Handbook. Stenstrup: Apollo Books. • Rowson, B., Powell, H., Willing, M., Dobson, M. and Shaw, H. 2021. Freshwater Snails of Britain and Ireland. Field Studies Council, Telford. • Reynoldson, T.B. and Young, J.O., 2000. A Key to the Freshwater Triclad of Britain and Ireland. Freshwater Biological Association: Ambleside. Scientific Publication No. 58. • Savage, A. (1989). Adults of the British aquatic Hemiptera Heteroptera: A key with ecological notes. Freshwater Biological Association: Ambleside. Scientific Publication No. 50. • Savage, A. (1999). Key to the larvae of British Corixidae. Freshwater Biological Association: Ambleside. Scientific Publication No. 57. • Wallace, I.D., Wallace, B. and Philipson, G.N., 2003. Keys to the Case-Bearing Caddis Larvae of Britain and Ireland. Freshwater Biological Association: Ambleside. Scientific Publication No. 61. <p><u>Invasive species</u></p> <ul style="list-style-type: none"> • GB Non-Native Species Secretariat (http://www.nonnativespecies.org/index.cfm?sectionid=47) <p><u>Quality Control</u></p> <ul style="list-style-type: none"> • Environment Agency Operational Instruction 118_05 (2017) Quality Assurance (AQC, Audit and Ring Test) programme for freshwater macro-invertebrate riverine sample analysis • Dijk, P.A.H. van (1994) Analytical quality control for macroinvertebrate enumeration. NRA R&D Note 331. Bristol: National Rivers Authority <p><u>DNA sequencing</u></p> <ul style="list-style-type: none"> • FreshBase - live summary of freshwater arthropod species preserved DNA barcoding or genome sequencing at the Natural History Museum https://docs.google.com/spreadsheets/d/1rshpvGr1HWlfeFR5nsHXshpBAOdiDFnIFnUK0b9dpcM/edit#gid=1380810362

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Habitat classification	<p>CIEEM Competency Framework – Habitat identification and evaluation https://cieem.net/wp-content/uploads/2019/02/Competency-Framework-web-FINAL.pdf</p> <p><u>RICT / RIVPACS</u></p> <ul style="list-style-type: none"> • RICT / RIVPACS web pages and User Guides: https://fba.org.uk/FBA/Public/Discover-and-Learn/Projects/RIVPACS_Landing.aspx RICT and RIVPACS User Guides page includes links to current ‘how to’ documents including the current Environment Agency Operational Instructions for sample collection and for sample analysis, as well as a link to the EA Ecology and Fish Data Explorer, which holds EA monitoring data. That page also has the user guide for RICT software and a copy of the data input file. RICT software is on the Applications page (as a web app and downloadable R programmes). The Reports page includes a copy of the RIVPACS reference database and some research reports. <p><u>Habitat Classification</u></p> <ul style="list-style-type: none"> • UK Biodiversity Action Plan broad habitat and priority habitat types https://hub.jncc.gov.uk/assets/2728792c-c8c6-4b8c-9ccd-a908cb0f1432 • Habitat Action Plans (HAPs) https://hub.jncc.gov.uk/assets/9c2e576a-31b7-4bae-a620-972d99177a1f#UKBAP-BiodivUKSGRep-Vol2-Tranche1-Annfg.pdf • Water Framework Directive – United Kingdom Advisory Group (WFD-UKTAG) (2014) UKTAG River Assessment Method (Benthic Invertebrate Fauna Invertebrates (General Degradation): Whalley, Hawkes, Paisley & Trigg (WHPT) metric in River Invertebrate Classification Tool (RICT) July 2014. • Hawkes H.A. (1997) Origin and Development of the Biological Monitoring Working Party Score System. Water Research 32 (3): 964-968.
Report writing and QA	<p><u>Reporting Guidelines</u> also see Survey Guidance and Planning</p> <ul style="list-style-type: none"> • CIEEM Preliminary Ecological Appraisal (2018) https://cieem.net/wp-content/uploads/2019/02/Guidelines-for-Preliminary-Ecological-Appraisal-Jan2018-1.pdf • CIEEM Guidelines For Ecological Report Writing (2017) https://cieem.net/wp-content/uploads/2019/02/Ecological-Report-Writing-Dec2017.pdf • BS 42020:2013 Biodiversity. Code of practice for planning and development https://shop.bsigroup.com/ProductDetail?pid=00000000030258704 • Ed Reeves, J. Standards in Survey and Report Writing (2007) <i>In Practice</i> No. 56, Jun 2007. ISSN 1754-4882 https://cieem.net/wp-content/uploads/2019/01/InPractice56jun2007.pdf <p><u>Quality Assurance (Organisation-specific standards for QA will apply)</u></p> <p>This may include, for example, a minimum number of people citing their Name, professional membership Status, Chartership and Qualifications:</p> <ul style="list-style-type: none"> • Author: Should be appropriately qualified to author the required technical content, and assert that the report is an accurate reflection of the site • Checker/Verifier: Should be capable or accomplished and can verify that the data is correct, and the report is written to the methods and standards stated – i.e. verify that the report satisfies the scope and specification, according to relevant standards, guidance, and legislation. • Approver: Should be capable or accomplished can verify this proves and also ensure that the report meets the site/client/development /activity/ requirements <p><u>Data Analysis</u></p> <ul style="list-style-type: none"> • Roger Green (1979) Sampling design and statistical methods for environmental biologists. New York, John Wiley & Sons • Calvin Dytham (2010) Choosing and Using Statistics: A Biologist’s Guide, 3rd Edition. Wiley-Blackwell.

Core skill	Resources, Guidance and Standards
Demonstration of Competency/ Training / CPD	<p><u>Courses, tests and accreditations</u></p> <p>Numerous are available including:</p> <ul style="list-style-type: none"> • CIEEM training https://cieem.net/i-am/continuing-professional-development/upcoming-training-and-events/ • CIEEM Competency framework https://cieem.net/resource/competency-framework/ • Field Study Councils Biological Surveying https://www.field-studies-council.org/biology-fieldwork/ • The Species Recovery Trust https://www.speciesrecoverytrust.org.uk/training • Linnaean Society of London https://www.linnean.org/learning/external-courses
Useful Links	<p>Freshwater Biological Association: https://www.fba.org.uk/</p> <p>Freshwater Habitats Trust: https://freshwaterhabitats.org.uk/</p> <p>GB Non-Native Species Secretariat (NNS): http://www.nonnativespecies.org/home/index.cfm</p> <p>National Biodiversity Network (NBN) Atlas:</p> <ul style="list-style-type: none"> • England: https://nbnatlas.org/ • Scotland: https://scotland.nbnatlas.org/ • Wales: https://wales.nbnatlas.org/ <p>Natural Resources Wales (NRW), Access our data, maps and reports: https://naturalresources.wales/evidence-and-data/accessing-our-data/access-our-data-maps-and-reports/?lang=en</p> <p>Scottish Environment Protection Agency (SEPA): https://www.sepa.org.uk/</p> <p>Water Framework Directive UK Transition Action Group (WFD UKTAG): https://www.wfduk.org/</p> <p>Natural History Museum (NHM) UK Species Inventory: https://www.nhm.ac.uk/our-science/data/uk-species/index</p> <p>Natural History Museum Open Repository: https://nhm.openrepository.com/</p>