

Core Resources, Guidance and Standards for Implementation of the Competency Framework for Phase 1 habitat survey

| Core skill | Resources, Guidance and Standards |
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| <p>General Demonstration of Competency/ Training / CPD</p> | <p><u>Courses , tests and accreditations</u> 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> <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 Identification Skills Certificate (FISC) https://bsbi.org/field-skills • Field Study Councils Biological Surveying https://www.field-studies-council.org/biology-fieldwork/ • The Species Recovery Trust https://www.speciesrecoverytrust.org.uk/training • Botanical Society of Britain and Ireland https://bsbi.org/training • Linnean Society of London https://www.linnean.org/learning/external-courses |
| <p>Health & Safety Awareness</p> | <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/ |
| <p>Biosecurity</p> | <ul style="list-style-type: none"> • GB Non-Native Species Secretariat (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 https://www.sepa.org.uk/media/154142/onsite_mangaement_of_-japanese_knotweed_associated_soils.pdf • 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 |
| <p>Desk-study</p> | <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> |

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| | <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 • Land cover Map 2015 CEH https://www.ceh.ac.uk/sites/default/files/LCM2015_Dataset_Documentation.pdf • Side by Side OS and Aerial Where's the Path imagery https://wtp2.appspot.com/wheresthepath.htm • Soil Maps http://www.landis.org.uk/soilscapes/ • CEH Countryside Survey https://countrysidesurvey.org.uk/content/uk-results-2007 • CEH Hedge Boundaries and Tree lines https://www.ceh.ac.uk/services/woody-linear-features-framework • Old Maps https://www.old-maps.co.uk/#/ and https://www.oldmapsonline.org/ • Topographical Mapping https://en-gb.topographic-map.com/ • Catchment Based Approach – A resource hub for river catchment management plans https://catchmentbasedapproach.org/learn/catchment-management-plans/ • Data.Gov.UK Data sets https://ckan.publishing.service.gov.uk/dataset • Environment Agency Catchment Data https://environment.data.gov.uk/catchment-planning/ • Environment Agency SC150005 (2018) Working with Natural Processes – Evidence Directory https://www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk • Remote Sensing Data https://www.neodaas.ac.uk/Home and https://sentinel.esa.int/web/sentinel/sentinel-data-access <p><u>Statutory designations, habitats of principal importance, ancient woodland, and other habitat datasets</u></p> <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.d.aera-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>Plant species distribution</u></p> <ul style="list-style-type: none"> • Ancient Tree Inventory https://www.woodlandtrust.org.uk/visiting-woods/things-to-do/ancient-tree-inventory/ • The Plant Atlas (https://www.brc.ac.uk/plantatlas/) |

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| | <ul style="list-style-type: none"> • Ecological Flora of the British Isles (www.ecoflora.org.uk) • NBN Atlas (nbnatlas.org) https://nbn.org.uk/the-national-biodiversity-network/archive-information/nbn-gateway/ • Botanical Society of Britain and Ireland (BSBI) https://bsbi.org/maps • Local Biological Records Centres (http://www.alerc.org.uk/) • Local Biodiversity Action Plans |
| Survey Guidance | <ul style="list-style-type: none"> • CIEEM (2017) Guidelines for Preliminary Ecological Appraisal (GPEA) https://cieem.net/resource/guidance-on-preliminary-ecological-appraisal-gpea/ • Breyer, J., Pike, S., Medcalf, K. and Parker J. (2016) Making Earth Observation Work (MEOW) for UK Biodiversity Monitoring and Surveillance, Phase 4: Testing applications in habitat condition assessment. A report to the Department for Environment, Food and Rural Affairs, prepared by Environment Systems, Ltd. • JNCC (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit. JNCC; Peterborough. Available at https://hub.jncc.gov.uk/assets/9578d07b-e018-4c66-9c1b-47110f14df2a (Accessed 25/02/2020). • Integrated Habitat System, Somerset Environmental Records Centre (2007) https://www.somerc.com/products-services/integrated-habitat-system-ihf/ • Defra (2007). Hedgerow Survey Handbook. A standard procedure for local surveys in the UK. Defra; London. (Online). Available at http://www.hedgelinek.org.uk/cms/cms_content/files/89_hedgerow-survey-handbook.pdf (Accessed 25/02/2020). • UK Habitat Classification https://ecountability.co.uk/ukhabworkinggroup-ukhab/ • Rodwell, J.S (1991 – 2000). Details available from: http://jncc.defra.gov.uk/page-4259 • Rodwell, J.S. (2006) <i>NVC Users' Handbook</i>, JNCC, Peterborough https://hub.jncc.gov.uk/assets/a407ebfc-2859-49cf-9710-1bde9c8e28c7 • Hawthorne W.D. & Marshall C.A.M. (2016) <i>Rapid Botanic Survey (RBS) and measurement of vegetation bioquality</i>: https://herbaria.plants.ox.ac.uk/bol/Content/Projects/oxford/resources/Rapid_Botanic_Survey_manual_2016.pdf • Peter Glaves, Ian D. Rotherham, Barry Wright, Christine Handley, & John Birbeck. <i>A Survey of the Coverage, Use and Application of Ancient Woodland Indicator Lists in the UK</i> https://core.ac.uk/download/pdf/4149223.pdf |
| 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 • 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. |

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| | <ul style="list-style-type: none"> • 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 Wales and Scotland: Environmental Protection Act 1990 (Japanese knotweed) • England and Wales: Hedgerow Regulations 1997 • England and Wales: Invasive Alien Species (Enforcement and Permitting) Order 2019 • England: Weeds Act 1959 and Ragwort Act 2003 <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. • England: Ancient woodland and veteran trees: The standing advice for ancient woodland and veteran trees makes clear that these are irreplaceable habitats. Such habitats receive special protection under the National Planning Policy Framework. https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications • 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 <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) • Britain and Ireland: BSBI checklists of the above lists for vascular plants in Britain and Ireland, https://bsbi.org/county-floras • Britain and Ireland: BSBI Rare plant registers (RPR) https://bsbi.org/rare-plant-registers • Great Britain: Cheffings, C. and Farrell, L. (Eds.) (2005 updated 2019). The Vascular Plant Red Data List for Great Britain. Joint Nature Conservation Committee; Peterborough. https://hub.jncc.gov.uk/assets/cc1e96f8-b105-4dd0-bd87-4a4f60449907 • Britain: Hodgetts (2011) A revised Red List of bryophytes in Britain https://rbg-web2.rbge.org.uk/bbs/Activities/field%20bryology/FB103/FB103%20Conservation%20News.pdf • Britain and Ireland: Red Data Book of British and Irish Stoneworts (Stewart and Church, 1992) • Great Britain: The Vascular Plant Red Data List for Great Britain (Species Status No. 7) Great Britain – Cheffings and Farrell (2005), updated 2019 |

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| | <ul style="list-style-type: none"> UK: Conservation Designations for UK taxa https://jncc.gov.uk/our-work/conservation-designations-for-uk-taxa/ England: Priority Habitats https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england England: Stroh, Peter & Leach, S.J. & August, Tom & Walker, Kevin & Pearman, David & Rumsey, Fred & Harrower, Colin & Fay, Michael & Martin, J.P. & Pankhurst, Tim & Preston, Chris & Taylor, I.. (2014). A Vascular Plant Red List for England. Botanical Society of Britain and Ireland; Bristol. (Online). Available at https://bsbi.org/wp-content/uploads/dlm_uploads/England_Red_List_1.pdf . Wales: Dines, T. (2008). A Vascular Plant Red Data List for Wales (Online). Available at file:///C:/Users/hod56642/AppData/Local/Packages/Microsoft.MicrosoftEdge_8wekyb3d8bbwe/TempState/Downloads/a%20vascular%20plant%20red%20data%20list%20for%20wales%20(1).pdf Ireland: Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. and Wright, M. (2016). Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland. (Online). Available at https://www.npws.ie/sites/default/files/publications/pdf/RL10%20VascularPlants.pdf |
| <p>Survey Planning</p> <p>Habitat survey design, planning and fieldwork, including a detailed knowledge of the seasonality and conditions required for a range of floral species and habitats</p> | <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 |
| <p>Species identification</p> | <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>Floras of Britain and Ireland</u></p> <p><u>Vascular</u></p> <ul style="list-style-type: none"> Field Identification Skills Certificate Whild, S & Townsend, S. (2007). <i>The Botanical Field Skills Pyramid</i>. University of Birmingham: Birmingham. https://bsbi.org/field-skills Field Studies Council: have a huge range of user friendly botanical guides https://www.field-studies-council.org/product-category/publications/ Stace, C.A. (2019). <i>New Flora of the British Isles</i>. 4th edition. C&M Floristics Middlewood Green, Suffolk. Sell, P.D., Murrell, G. (1997-2018). <i>Flora of Great Britain and Ireland</i>. Cambridge University Press. Rose, F. (2006). <i>The wild flower key</i>, 2nd edition revised and expanded by C. Riley. Frederick Warne, London. Rose, F. (1989). <i>Colour identification guide to the grasses, sedges, rushes and ferns of the British Isles and north-western Europe</i>. London: Viking. |

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| | <ul style="list-style-type: none"> • Parnell, J. & Curtis, T. (2011). <i>An Irish Flora</i>. 8th edition. University of Cork Press, Cork. • Poland, J. & Clement, E. J. (2020). <i>The vegetative key to the British flora</i>. 2nd edition. John Poland, Southampton. • Poland, J. and Wells, R (2018) <i>The Field Key to Winter Twigs: A Guide to Native and Planted Deciduous Trees, Shrubs and Woody Climbers (Xylophytes) Found in the British Isles</i> • BSBI Plant Crib – T. C. G. Rich & A. C. Jermy. 1998, reprinted 2012 (with corrigenda included). 400 pp. An expertly written identification guide for some 325 difficult taxonomic groups, with explanations, keys and illustrations of plant details. A4 paperback. https://bsbi.org/plant-crib • BSBI handbooks (20 in series, each dealing with a difficult group of plants) https://bsbi.org/bsbi-handbooks • Price, D. (2017). <i>A Field Guide to Grasses, Sedges and Rushes</i>. The Species Recovery Trust. • Sterry P (2008) <i>A complete Guide to British Trees</i> Collins • Woodland Trust A to Z of British Trees https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/british-trees/a-z-of-british-trees/ <p><u>Bryophytes</u></p> <ul style="list-style-type: none"> • Atherton, I., Bosanquet, S. and Llawley, M. (Eds.) (2010). <i>Mosses and Liverworts of Britain and Ireland: A Field Guide</i>. British Bryological Society. • Jahns H.M (1983) <i>Guide to the Ferns, Mosses and Lichens of Britain and North and Central Europe</i>, London, Collins • Paton, J. (1999). <i>The Liverwort Flora of the British Isles</i>, Brill • Smith, A. (2010). <i>The Moss Flora of Britain and Ireland</i>. Cambridge University Press. • Smith, A. (1991). <i>The Liverwort Flora of Britain and Ireland</i>. Cambridge University Press. • Crawford (2001) <i>Bryophytes of Native Woods</i> The Natural Resource Consultancy <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) • Alien Plants of the British Isles – E. J. Clement & M. C. Foster. 1994. 616 pp. A list of 3,586 recorded non-native species (of which 885 are established), with English names, frequency, status, origin, references to descriptions and illustrations, and selected synonyms. Paperback. • Alien Grasses of the British Isles – T. B. Ryves, E. J. Clement & M. C. Foster. 1996, reprinted with addenda 2008. 234 pp. A companion volume to the last, listing over 700 non-native grasses; includes keys to bamboos and eight of the larger and more difficult genera and 29 pp. of drawings by G. M. S. Easy. Paperback. • Illustrations of Alien Plants of the British Isles – E. J. Clement, D. P. J. Smith & I. R. Thirlwell. 2005. 480 pp., including 444 full-page line drawings of introduced, naturalised and casually occurring alien plants in Britain and Ireland. The drawings are largely from a collection put together by the late D. McClintock, originally for publication in his planned Volume 3 of <i>A New Illustrated British Flora</i>. A5 paperback. <p><u>Apps</u></p> <ul style="list-style-type: none"> • We are unable to recommend any Apps; a review by Hamlyn Jones found on average they correctly identified 44% (range 35-57) to species and 56% (range 49-70) to genus (BSBI News 144: 34-40, April 2020). |
| Habitat classification knowledge | <p>CIEEM Competency Framework – Habitat identification and evaluation https://cieem.net/wp-content/uploads/2019/02/Competency-Framework-web-FINAL.pdf</p> <p><u>See also desk-study and Survey</u></p> <ul style="list-style-type: none"> • EUNIS Habitat Classification http://www.eea.europa.eu/themes/biodiversity/eunis/eunis-habitat-classification/habitats/eunis-habitats-complete-with-descriptions.xls • Natural England (2020). Ancient Woodland Inventory (England) (Online). Available at https://data.gov.uk/dataset/9461f463-c363-4309-ae77-fdcd7e9df7d3/ancient-woodland-england or https://magic.defra.gov.uk/. • UK Habitat Classification https://ecountability.co.uk/ukhabworkinggroup-ukhab/ |

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| | <ul style="list-style-type: none"> • JNCC (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit. JNCC; Peterborough. Available at https://hub.jncc.gov.uk/assets/9578d07b-e018-4c66-9c1b-47110f14df2a (Accessed 25/02/2020). • 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 • The National Vegetation Classification (NVC) https://jncc.gov.uk/our-work/nvc/ • Save our Magnificent Meadows Grasslands typologies http://www.magnificentmeadows.org.uk/advice-guidance/section/what-type-of-meadow-do-i-have • Rodwell, J.S. (2006) NVC Users' Handbook, JNCC, Peterborough https://hub.jncc.gov.uk/assets/a407ebfc-2859-49cf-9710-1bde9c8e28c7 • Duigan, C., Kovach, W. & Palmer, M. 2007. Vegetation communities of British lakes: a revised classification scheme for conservation. Aquatic Conservation: Marine and Freshwater Ecosystems, 17, 147–173. • Duigan, C., Kovach, W. & Palmer, M. 2008. Aquatic macrophyte classification, distribution, and traits in British lakes. Verh. Internat. Verein. Limnol, 30, 477–481. • Palmer, M. 1992. A botanical classification of standing waters in Great Britain and a method for the use of macrophyte flora in assessing changes in water quality. Peterborough, Joint Nature Conservation Committee. (Research and Survey in Nature Conservation, No. 19.)* • Palmer, M.A., Bell, S.A. & Butterfield, I. 1992. A botanical classification of standing waters in Britain: applications for conservation and monitoring. Aquatic Conservation: Marine and Freshwater Ecosystems, 2, 125–143.* • Vegetation Communities of British Rivers – a Revised Classification 1999 https://hub.jncc.gov.uk/assets/a974944a-3cd4-4574-9c1a-c977d482c0ed • Lake, S., Liley, D., Still, D. & Swash, A. (2020) A field guide to the habitats of Great Britain & Ireland. Princeton University Press • Fossitt, J (2000) A Guide to Habitats in Ireland. Heritage Council • Stevens, D.P., Smith, S.L.N., Blackstock, T.H., Bosanquet, S.D.S. & Stevens, J.P. (2010) Grasslands of Wales: A Survey of Lowland Species-rich Grasslands, 1987–2004. University of Wales Press, Cardiff, UK. • Wallace H. and Prosser A. (2017) A review of the National Vegetation Classification for the Calthion group of plant communities in England and Wales. Natural England Joint Publication JP021 • Hall, J. & Kirby, K. (2019) Woodland Survey Handbook: Collecting Data for Conservation in British Woodland. Pelagic Publishing, Exeter. • Rothero, E., Lake, S. & Gowing, D.J.G. (2016) Floodplain Meadows – beauty and utility: a technical handbook. Floodplain Meadows Partnership, Milton Keynes. • McBride, A; Diack, I; Droy, N; Hamill, B; Jones, P; Schutten, J; Skinner, A. and Street, M. (Editors) (2011) The Fen Management Handbook, Scottish Natural Heritage (now NatureScot), Perth. • Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. & Smith G. (2014) Raised Bog Monitoring and Assessment Survey 2013. Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland • Martin, J.R., Daly, O.H. and Devaney F.M. (2017) Survey and assessment of vegetated shingle and associated habitats at 30 coastal sites in Ireland. Irish Wildlife Manuals, No. 98. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Ireland. • Crick, H. Q. P., Crosher, I. E., Mainstone, C. P., Taylor S. D., Wharton, A., Langford, P., Larwood, J., Lusardi, J., Appleton, D., Brotherton, P. N. M., Duffield, S. J. & Macgregor N. A. (2020) Nature Networks Evidence Handbook. Natural England Research Report NERR081. Natural England, York • Perrin, P.M., Barron, S.J., Roche, J.R. & O’Hanrahan, B. (2014) Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland |

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| | <ul style="list-style-type: none"> • Lyons, M.D. & Kelly, D.L. (2016) Monitoring guidelines for the assessment of petrifying springs in Ireland. Irish Wildlife Manuals, No. 94. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Ireland • Muldoon, C.S., Waldren, S. & Lynn, D. (2015) Monitoring recommendations for Marsh Saxifrage (<i>Saxifraga hirculus</i> L.) in the Republic of Ireland. Irish Wildlife Manuals, No. 88. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland. • Smyth, N., Nienhuis, C., Muldoon, C. & Lynn, D. (2015) Conservation assessment and monitoring methods for the Annex V Clubmoss group (<i>Lycopodium</i> spp.) in Ireland. Irish Wildlife Manuals, No. 86. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Ireland • Ní Dhúill, E., Smyth, N., Waldren, S. & Lynn, D. (2015) Monitoring methods for the Killarney Fern (<i>Trichomanes speciosum</i> Willd.) in Ireland. Irish Wildlife Manuals, No. 82. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland. <p>*these two publications relate to the original 1992 JNCC Classification of Lake Vegetation Communities.</p> |
| Biodiversity Metric Baseline Data Collection | <ul style="list-style-type: none"> • Ian Crosher A, Susannah Gold B , Max Heaver D, Matt Heydon A , Lauren Moore D , Stephen Panks A , Sarah Scott C , Dave Stone A & Nick White A . 2019. The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. User guide (Beta Version, July 2019). Natural England Natural England Joint Publication JP029 file:///C:/Users/mga76974/Downloads/Biodiversity%20metric%202.0%20User%20Guide%20-%20Beta%20Test%20Final%20(4).pdf • The Biodiversity Metric 2.0 Calculator and multiple associated documents http://publications.naturalengland.org.uk/publication/5850908674228224 • Business and Biodiversity Offsets Programme (BBOP). 2012. Resource Paper: No-net-loss and Loss-Gain Calculations in Biodiversity Offsets. • Treweek, J., Butcher, B. (2010) Biodiversity offsets: possible methods for measuring biodiversity losses and gains for use in the UK • BREEAM New Construction 2018 https://www.breeam.com/discover/technical-standards/newconstruction/ • Urban Greening Factor https://www.london.gov.uk/what-we-do/environment/parks-green-spaces-and-biodiversity/urban-greening |
| Mapping | <p><u>Key guidance</u></p> <ul style="list-style-type: none"> • Hill, D., Fasham, M., Tucker, G., Shewry, M. & Shaw, P., editors (2005). <i>Handbook of Biodiversity Methods. Survey, evaluation and monitoring</i>. Cambridge University Press, Cambridge. • Ireland: George F. Smith, Paul O’Donoghue, Katie O’Hora and Eamonn Delaney (2011) Best practice for Habitat Surveying and mapping https://www.heritagecouncil.ie/content/files/best_practice_guidance_habitat_survey_mapping_onscreen_version_2011_8mb.pdf Heritage Council • JNCC (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit. JNCC; Peterborough. Available at https://hub.jncc.gov.uk/assets/9578d07b-e018-4c66-9c1b-47110f14df2a (Accessed 25/02/2020). • Smith, G. F., O’Donoghue, P., O’Hara, K., Delaney, E (2011). Best Practice and Guidance for Habitat Surveying and Mapping. Heritage Council • Phase 1 mapping palette https://hub.jncc.gov.uk/assets/9578d07b-e018-4c66-9c1b-47110f14df2a#Phase1-ArcMap-palette.zip <p><u>Limitations and biases of mapping surveys</u></p> <ul style="list-style-type: none"> • Cherrill, A., McClean, C. (1999). <i>The reliability of ‘Phase 1’ habitat mapping in the UK: the extent and types of observer bias</i>. Landscape and Urban Planning 45 131-143. • Stevens, J.P., Blackstock, T.H., Howe, E.A. and Stevens, D.P. 2004. Repeatability of Phase 1 habitat survey. Journal of Environmental Management, 73, 53–9. <p><u>Mapping Resources</u> (See also desk-study resources)</p> <ul style="list-style-type: none"> • UK: Open source mapping https://www.ordnancesurvey.co.uk/business-government https://www.ordnancesurvey.co.uk/business-government/products/mastermap-water https://www.streetmap.co.uk/ • Wales: Wales environmental information https://naturalresources.wales/evidence-and-data/maps/wales-environmental-information/?lang=en |

| Core skill | Resources, Guidance and Standards |
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| | <ul style="list-style-type: none"> • Scotland: National Library of Scotland https://maps.nls.uk/ • Northern Ireland: Ordnance Survey Northern Ireland OSNI https://maps.spatialni.gov.uk/ • Ireland: Ordnance Survey Ireland OSI https://www.osi.ie/resources/ |
| Field Validation and Verification Notes | <p>Field verification notes are contextual information gathered to supplement habitat mapping, collected to:</p> <ul style="list-style-type: none"> • provide confidence in results and enable comparison between surveyors, sites and companies • provide information additional to habitat type • identify specific features of interest, including ‘Target Notes’ as strictly defined by the JNCC Phase 1 habitat survey handbook. <p>The Field verification notes should include the following:</p> <ul style="list-style-type: none"> • Dates of surveys and names and accreditations of surveyors • Photographs at various proximities to allow the identification of habitats and species, particularly those that are uncommon • Geographical locations of habitats, species or areas of interest • The presence of indicator species where habitat classifications are reliant • The relative abundance of species where habitat classifications may be reliant |
| Scoping Phase 2 Habitats, Vegetation and Targeted Botanical Surveys | <ul style="list-style-type: none"> • Hill, D., Fasham, M., Tucker, G., Shewry, M. & Shaw, P., editors (2005). <i>Handbook of Biodiversity Methods. Survey, evaluation and monitoring.</i> Cambridge University Press, Cambridge. • Rodwell, J.S. (2006) NVC Users' Handbook, JNCC, Peterborough https://hub.jncc.gov.uk/assets/a407ebfc-2859-49cf-9710-1bde9c8e28c7 • Defra (2007). Hedgerow Survey Handbook. A standard procedure for local surveys in the UK. Defra; London. (Online). Available at http://www.hedgelinek.org.uk/cms/cms_content/files/89_hedgerow-survey-handbook.pdf (Accessed 25/02/2020). |
| Report writing and QA | <p><u>Reporting Guidelines also see Survey Guidance and Planning</u></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>In addition to the guidance provided by CIEEM, Phase 1 habitat survey reporting should include the following key elements:</p> <ul style="list-style-type: none"> • Summary: a concise summary of baseline, potential effects, mitigation and further surveys is advised • Introduction: <ul style="list-style-type: none"> ○ Survey area description and study purpose, i.e. rationale, proposed development/activity ○ To include overview of level of detail investigated, making reference to e.g. taxonomic detail, spatial scale of survey, priority habitats • Methods: <ul style="list-style-type: none"> ○ The reported survey methods should be proportionate to the scale and nature of the project and aim to make the work undertaken as transparent and repeatable as possible, and describe processes taken to minimize bias, including using the right people for both desk and field elements. ○ Where undertaking tasks outside of cited methodology, for example, the Phase 1 habitat survey handbook has omissions (e.g. mapping hedgerows) the methods section should clearly describe and justify the method/s used. ○ Methods section should report at least the following elements: |

| Core skill | Resources, Guidance and Standards |
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| | <ul style="list-style-type: none"> ○ Desk study: <ul style="list-style-type: none"> ▪ Desk study sources ▪ Taxonomic scope ▪ Search distances/ zones of influence ▪ Other elements, e.g. pre-survey mapping ▪ Use of professional judgement ○ Field survey: <ul style="list-style-type: none"> ▪ Survey area /zones of influence ▪ Use of desk study information ▪ Survey dates and effort ▪ Surveyors and qualifications ▪ Survey design: ○ Limitations: <ul style="list-style-type: none"> ▪ Seasonal limitations ▪ Spatial limitations (e.g. land access, dangerous areas) ▪ Other limitations (e.g. limitations of desk study data) ● Results: <ul style="list-style-type: none"> ○ Overview of the habitat/area to provide a descriptive narrative ○ Reference to and a map of the survey area ○ Habitats in detail by habitat type and their protected and or priority status potential consideration of the ecosystem services they deliver ○ Fauna and their protected and or priority status ○ Invasive species ○ Field verification notes ○ Indicative species list ○ Biodiversity Metric 2.0 baseline calculations ● Further Surveys and or planning condition requirements ● Development/Activity Constraints <ul style="list-style-type: none"> ○ Legislative and/or policy constraints, potential to consider any ecosystem service that may be affected ● Mitigation and Enhancement <ul style="list-style-type: none"> ○ Follow the mitigation hierarchy (avoid, minimise, restore, compensate) ● Legislation and Policy Compliance ● Discussions <p><u>Quality Assurance</u></p> <p>This should include as a minimum three different people citing their Name, CIEEM Status and Qualifications:</p> <ul style="list-style-type: none"> ● Author: Should be capable with assistance of basic who can assert that the report is an accurate reflection of the site ● Checker: Should be capable and can verify that the data is correct, and the report is written to the methods and standards stated ● Approver: Should be capable or accomplished can verify this proves and also ensure that the report meets the site/ client/development /activity/ requirements |

| Core skill | Resources, Guidance and Standards |
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| 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"><li>• CIEEM training https://cieem.net/i-am/continuing-professional-development/upcoming-training-and-events/<li>• CIEEM Competency framework https://cieem.net/resource/competency-framework/<li>• Field Identification Skills Certificate (FISC) https://bsbi.org/field-skills<li>• Field Study Councils Biological Surveying https://www.field-studies-council.org/biology-fieldwork/<li>• The Species Recovery Trust https://www.speciesrecoverytrust.org.uk/training<li>• Botanical Society of Britain and Ireland https://bsbi.org/training<li>• Linnaean Society of London https://www.linnean.org/learning/external-courses |