

Bat Conservation Trust



Bat Conservation Trust

Professional Training Standards for Professional Ecologists Working
with Bats

Interim 2nd edition

June 2020

Using the Professional Training Standards

Who is this document aimed at?

- ✓ Individuals who are new to bat consultancy and training to work in this field
- ✓ Those assessing the competency of an individual working in this field
- ✓ Those who wish to check their own knowledge and skills against these standards
- ✓ Those wishing to understand the skills and knowledge required to advance to the next level of experience

How should this document be used?

The Professional Training Standards are not intended to be used as a check list to gain a licence for surveying (from the relevant SNCB) and are not an accredited system. Rather, the document is designed to raise standards in professional bat work and outline the knowledge (black text) and skills (red text) required to be a responsible ecological consultant. The information provided here is an outline of what a professional ecological consultant would be expected to know within each subject area.

Readers are encouraged to use this document as a starting point of what they need to know or be able to do and use additional resources (e.g. reference material, training courses) and practical experience to gain the required experience and knowledge.

These interim 2nd edition standards have been designed to complement the Bat Conservation Trust's (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). They will be updated to align with the 4th edition of the good practice guidelines, which we aim to publish in spring 2021. After that, the guidelines and standards will be updated in tandem.

BCT's training courses for professionals can provide some of the knowledge and skills outlined in this document. Details about BCT's training courses can be found on the BCT website.

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Descriptions of levels

BCT level	Equivalent CIEEM competency levels	Description
1	Basic	Some knowledge, experience and skills but always works under supervision
2	Capable	Has knowledge, experience and skills to carry out surveys independently (except for swarming and advanced licence bat survey techniques), lead and design simple surveys and mitigation and deal with simple planning/mitigation licensing. Assumes Level 1 NE licence – disturbance to bats using torches for survey.
3	Accomplished	Has knowledge, experience and skills to carry out and lead complex surveys, design surveys and mitigation and deal with planning/mitigation licensing. Assumes Level 2 NE licence – disturbance to bats using handling and endoscopes.
4	Authoritative	Has knowledge, experience and skills to lead complex projects such as those involving EIA or HRA
5	Specialist skills	Has knowledge, experience and skills in specialist bat survey techniques. Assumes Levels 3 and 4 NE licence – mist netting, acoustic lure, harp trapping.

NB. In the tables below the tick is shown at the lowest level that the knowledge/skill is appropriate. Assume that the knowledge/skill is also relevant to all higher levels.

Glossary

ASSI = Area of Special Scientific Interest

BAP = Biodiversity Action Plan

BiCCL = Bats in Churches Class Licence

BLICL = Bat Low Impact Class Licence

CSZ = Core Sustainance Zone

EBLV = European Bat Lyssavirus

EclA = Ecological Impact Assessment

EIA = Environmental Impact Assessment

EPS = European Protected Species

HRA = Habitats Regulations Assessment

JNCC = Joint Nature Conservation Committee

LERC = Local Environmental Records Centre

LPA = Local Planning Authority

NBMP = National Bat Monitoring Programme

PEA = Preliminary Ecological Appraisal

PGLRA = Preliminary Ground Level Roost Assessment (trees)

PRA = Preliminary Roost Assessment

PRF = Potential Roost Feature

SAC = Special Area of Conservation

SNCB = Statutory Nature Conservation Body

SSSI = Site of Special Scientific Interest

Unit 1: Legislation, Licensing and Planning

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
Good Practice Guidelines	Apply good practice guidelines or rationalise departures from guidelines as appropriate	that guidelines do not override or replace professional judgement		√			
		that departures from the guidelines may be appropriate but should always be fully rationalised in ecological reports		√			
Legislation	Explain the international context of UK wildlife legislation concerning bats	the essential provisions/objectives of the EC Habitats Directive – Annex II and IV species		√			
		the relationship between UK domestic legislation and the EC Habitats Directive		√			
		the general objectives of international agreements such as the Bern and Bonn conventions			√		
	Describe the legal protection afforded to bats across the UK or in the country in which the work is taking place	the main protection afforded to bats and their roosts	√				
		the defence/exception relating to the capturing and tending of a disabled bat to restore it to health and mercy killing of severely injured bats		√			
		the defence/exception relating to disturbance in a dwelling house or as an incidental result of an otherwise lawful operation in England and Wales		√			
		the differences in the legislation in the UK countries in which the ecologist works		√			
		the application of the law to bat crime cases			√		
		the three tests under the Habitats Directive		√			
	Describe the legal protection afforded to sites designated for their bat interest	how a Special Area of Conservation (SAC) designated for bats is protected and the relevant associated legislation			√		
		for which species a site may be designated as a SAC and why			√		
		the Habitats Regulations Assessment process			√		
		how a Site of Special Scientific Interest (SSSI) or Area of Special Scientific Interest (ASSI in Northern Ireland) designated for bats is protected and the relevant associated legislation			√		
	Explain how the law regarding bats is	how SNCBs operate regarding bats in the UK countries in which the ecologist works		√			

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S	
	administered in the UK	the conservation aims of European Protected Species (EPS) licences (pros and cons, short-term and long-term)		√				
	Explain enforcement procedures in the country in which the work is taking place	the role of enforcement bodies: the Police, wildlife crime officers and SNCBs		√				
		reporting of licence infringements: - the role of the UK SNCBs - the role of the Police		√				
		the broad requirements for evidence gathering		√				
	Outline the advantages and disadvantages of prosecution	the advantages and methods of early intervention and preventative action				√		
		key cases that have informed the implementation of legislation over recent years				√		
		the degrees of seriousness of possible offences				√		
		the types of offences that have been successfully brought before the courts				√		
		the levels of punishment applied in key cases				√		
	Describe other relevant pieces of legislation	alternative methods of dealing with issues not involving the courts					√	
		the relevant planning legislation relating to biodiversity duty (e.g. Natural Environment and Rural Communities Act, 2006)		√				
		the relevant animal welfare legislation linked to capturing and releasing bats				√		
		Licensing	Differentiate between licensed and unlicensed activities	how otherwise illegal activities are licensed		√		
those illegal activities that can be licensed and under which pieces of legislation these fall				√				
the Reasonable Avoidance Measures that can be applied to avoid the need for a licence				√				
Recognise who is responsible for what in licensing	who is responsible for granting the different types of licences in the UK countries in which the ecologist works		√					
	who is responsible for judging the three tests in a mitigation licence application		√					
Describe the purposes of the different licences relating to bats	that there are different types of licences, covering science, education and conservation		√					

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
		the role/purpose of different licences in different situations		√			
		the differences in licences and licensing processes in the UK countries in which the ecologist works		√			
	Apply for a licence (not mitigation)	the training process and skills/experience required for each licence type		√			
		where to obtain guidance and application forms		√			
		the process for validation, e.g. referees, trainer		√			
		the renewal process and importance of updating skills		√			
		the conditions placed on licences (including reporting requirements)		√			
	Decide when it is appropriate to apply for a mitigation licence	identify whether an offence will be committed		√			
		the consideration of suitable alternatives for carrying out development that will avoid the need for a licence		√			
		the three tests and their interpretation		√			
		recent case law relating to this interpretation			√		
	Apply for a mitigation licence	the most recent guidance on interpretation of 'disturbance'			√		
		the training process and skills/experience required to apply for a mitigation licence		√			
		where to obtain guidance and application forms		√			
		the role and responsibilities of the ecologist/developer in the licence application process		√			
		the difference between the application form, licence method statement, reasoned statement and supplementary information, what is required for each and who is responsible for completing each		√			
		when to include a reasoned statement		√			
	Describe the purposes and principles of the Natural England Bat Low Impact Class Licence (BLICL), become a registered consultant and register a site, as applicable to the ecologist's geographical remit	reporting under terms and conditions of the licence		√			
		the criteria to become a registered consultant under the BLICL			√		
		the training and assessment process to become registered to use the BLICL			√		
		the role and responsibilities of the ecologist/developer in relation to a BLICL			√		
		how to register a site for a BLICL			√		
	Describe the purposes and principles of the	the reporting requirements in relation to the BLICL			√		
the criteria to become a registered consultant under the BiCCL						√	
	the training and assessment process to become registered to use the BiCCL					√	

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
	Natural England Bats in Churches Class Licence (BiCCL), become a registered consultant and register a site, as applicable to the ecologist's geographical remit	the role and responsibilities of the ecologist/developer in relation to a BiCCL					√
		how to register a site for a BiCCL					√
		the reporting requirements in relation to the BiCCL					√
Planning process - development control	Explain the process used to control development in the UK or in the country where the work is taking place	the basic planning application process and who administers it		√			
		where development may require planning permission and the various types of planning permissions		√			
		the planning requirements for building demolition			√		
		the planning requirements for permitted development			√		
	Describe legislation, policy and guidance relating to protected species and planning in the UK or in the country where the work is taking place	the provisions for conserving and enhancing biodiversity during the planning process contained in relevant national legislation, policy and guidance		√			
		the relevant planning and legal case law relating to protected species and planning and its implications			√		
		the guidance available in British Standard 42020:2013 Biodiversity. Code of practice for planning and development		√			
		how planning and licensing integrate		√			
		that the planning authority has a responsibility to consider the three tests		√			
		that legislation protecting species is still relevant even if planning permission has been granted without their consideration		√			
		the importance of seeking out and understanding local planning policy requirements e.g. Local Plans, local validation checklists		√			
	Recognise the value of submitting sufficient ecological information with an application	why ecological information on protected species must be submitted with the planning application		√			
		identify whether an application is of a type and/or at a location where it is likely to affect bats		√			
Prepare information for a planning	identify and collate all relevant information required to complete an Ecological Impact Assessment (EcIA) for bats for planning purposes, including surveys, an impact assessment and a strategy to avoid, mitigate or compensate for impacts on bats		√				

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
	application where bats are impacted	identify and collate all relevant information required to complete the relevant parts of an Environmental Impact Assessment (EIA) for bats (e.g. for large-scale infrastructure projects), identifying and addressing significant impacts, including consultation with relevant organisations			√		
		prepare information to inform a Habitats Regulations Assessment (HRA) in relation to a SAC site designated for bats, including consultation with relevant organisations			√		
		carry out an assessment of impacts on a SSSI site designated for bats, including consultation with relevant organisations			√		
	Explain development with regard to churches	how works on churches are planned and agreed/permitted					√
		where professional advice is required		√			
UK and Local Biodiversity Policy	Describe current UK Biodiversity Policy	the UK Post-2010 Biodiversity Framework		√			
		the ongoing relevance of the UK's Biodiversity Action Plan (BAP) bat species		√			
		the bat species currently listed as UK BAP species, the reason for their inclusion and how populations of these species can be conserved and enhanced		√			
		sources of data on conservation status of bats such as Joint Nature Conservation Committee (JCNN) Article 17 reporting and National Bat Monitoring Programme (NBMP) data		√			
		the role of ecological consultants in bat work and bat conservation and the opportunity for consultants to contribute to UK and local BAP targets		√			

Unit 2: Considerations for Bat Surveys

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
Assessing the need for a bat survey	Assess the circumstances when a bat survey is necessary/required	the different circumstances under which a client may be requesting a bat survey and the types of surveys that will be appropriate for the project		✓			
		communicate with a client effectively so that the bat surveys that are commissioned are most appropriate to their needs		✓			
Elements that influence survey design	Recognise the influences on the choice of survey area, methods, equipment and surveyors	the importance of talking to a developer about their survey needs in detail and providing guidance where necessary		✓			
		the importance of understanding the specific nature of the site and the potential impacts on bats from the proposed activities		✓			
		how impacts could be avoided and the survey design altered accordingly		✓			
		how to identify and subsequently refine the zone of influence		✓			
		the difference between the red line boundary and the blue line boundary for planning purposes		✓			
		how to define aims and objectives for bat surveys		✓			
		the principle of proportionality in ecological survey work		✓			
		how data from different types of surveys can be collated and analysed		✓			
		the principles of the mitigation hierarchy	✓				
		how to access and use best/good practice guidelines	✓				
		design bat surveys according to the considerations listed above		✓			
Bat surveys for development	Understand the process for bat surveys for development	how to guide clients through the development process with respect to bats from development site selection through to post-development monitoring		✓			
		communicate regularly with a client regarding the different steps involved in a project and the implications of survey results and consultations as they become available		✓			
Survey timing	Understand the importance of seasonality for different types of bat surveys	the pros and cons of carrying out different types of surveys (emergence and re-entry, mating, hibernation, tree, activity, swarming, backtracking, trapping and radio tracking surveys) during different months of the year and when it is appropriate to use particular bat survey methods		✓			
		design a timetable for bat surveys that is appropriate to the bat interest of the site and the predicted impacts of the project		✓			
Resources for surveys	Understand the appropriate resources required for a project	that all bat surveys require a specific level of training and it is important that staff deployed on a job are trained in the relevant skills required and have the correct level of knowledge and experience		✓			
		that the choice of equipment is essential to the success of a survey	✓				
		assign ecologists, according to their skills and experience, to carry out different types of bat surveys		✓			

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
		deploy the most appropriate equipment for different types of bat surveys		√			
Dealing with survey limitations	Identify, understand and account for all relevant survey limitations and constraints	the influence of weather conditions on bat survey results	√				
		the importance of seasonality in carrying out bat surveys	√				
		how to adapt surveys in circumstances where there are access restrictions			√		
		the animal welfare issues associated with surveys		√			
		identify the relative value of older survey data and when surveys need to be repeated		√			
		the limitations that equipment use places on bat activity surveys (manual and automated)		√			
		how results of observations are biased by detection methods		√			
		safely overcome difficult or unsafe access		√			
		work within approved survey guidelines		√			
		recognise when evidence of bats may have been removed, and the implications		√			
		implement additional survey techniques to address equipment limitations		√			
		define all survey limitations, their influence on the resulting data and how this has been taken into account in interpreting the survey results		√			
Health & Safety	Explain why health and safety issues are important	the importance of H&S issues	√				
		the relevant legislation relating to oneself and third party safety	√				
		your own and your employers' H&S responsibilities and liabilities	√				
		the need to consider biosecurity e.g. rabies (see below), <i>Pseudogymnoascus destructans</i> (the fungus that causes white-nose syndrome), bat parasites, etc.	√				
	Recognise the need for risk assessments	why risk assessments are necessary	√				
		complete risk assessments for bat surveys		√			
		assess and respond appropriately to unexpected risks encountered during a survey		√			
	Apply health and safety appropriate to the circumstances	the safety training required for different types of underground sites/working at height/working in confined spaces		√			
		the importance of health and safety when working with members of the public or other volunteers	√				
		the range of health and safety risks to consider for different groups and individuals		√			
	Recognise the risks associated with European Bat Lyssaviruses (EBLV)	the small risk posed to humans by British bats and EBLV	√				
		the need to follow best practice with regards to gloves and vaccinations	√				
		the processes to follow if a bat bite incident occurs, or a bat is suspected of carrying EBLV	√				
Insurance	Understand the types of insurance that are	the nature of professional indemnity insurance		√			
		the nature of public liability insurance		√			

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
	necessary to carry out bat surveys	the nature of employers liability insurance			√		

Unit 3: Ecological Considerations for Bat Surveys

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
Bat Life Cycle	Describe the life cycle of a bat in the UK	the generic annual life cycle of UK bats	√				
		species-specific and regional differences in annual life cycles for the species present in the relevant region			√		
	Describe the optimum conditions needed for maternity roosts	the optimum temperature and humidity for maternity roosts				√	
		the variations in maternity roost requirements for different species where known				√	
	Describe gestational delay strategies	what gestational delay is and why it occurs					√
		what sperm storage is					√
		what delayed implantation is					√
	Explain what triggers breeding	the physiological and environmental factors that trigger breeding					√
	Explain the maternal cycle	the length of gestation in bats					√
		the size and condition of pup at birth					√
		mother-pup interactions and activities					√
	List the key phases in pup development	approximate birth dates for the species present in the relevant region					√
		approximate age of young at first flight and weaning					√
	Explain sexual maturity in bats	approximate age of first mating in males and females for the species present in the relevant region					√
	Describe mating strategies	why mating strategies are necessary					√
		different types of mating strategies e.g. swarming, lekking, harems, song flight					√
		which species groups use which types of mating strategy					√
Describe hibernation strategies	the meaning of torpor and hibernation, why they occur and the physiological changes observed		√				
Describe the optimum conditions needed for hibernation roosts	the optimum temperature and humidity for hibernation roosts				√		
	variations in hibernation roost requirements for different species where known				√		
Bat Roost Types	Identify the different types and locations of bat roosts	the definition of a bat roost		√			
		the different types of bat roosts		√			
		the variety of roosting places and conditions required		√			
	Explain roost composition	the usual composition in terms of age and sex of a maternity roost		√			
		natal philopatry displayed by females		√			
		post-natal dispersal of females in most species		√			
		composition and location of other types of roosts		√			
	the variety of underground sites and structures available		√				

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S	
	Describe the use, role and conditions of underground sites	how these sites are used at different times of the year		√				
		the terminology used to describe parts of these natural features and manmade structures		√				
		the factors that can affect conditions in underground sites		√				
	Describe the use, role and conditions of trees as roosting sites	the places in a tree that bats may use to roost		√				
		how natural roosting places develop in trees		√				
		the locations where trees are likely to have most damage		√				
		how trimming branches can impact splits lower down the branch		√				
	Describe the use, role, design and effects of bat boxes	the role of bat boxes		√				
		the necessity of bat box maintenance		√				
		how bats use boxes at different times of year		√				
		the most successful places to erect bat boxes		√				
		the limitations of bat boxes as artificial roosts		√				
		the need for systematic monitoring of bat box schemes		√				
	Describe buildings, their construction and usage	the role of bat boxes as part of mitigation schemes for development		√				
		building construction and the available spaces within a building's fabric that may be used by bats	building construction and the available spaces within a building's fabric that may be used by bats		√			
			the factors that may influence site selection		√			
			the different types of use of a building by bats		√			
			the types and locations of entry points used by bats		√			
	Describe other built structures, their construction and usage	the different materials that favour roosting		√				
		other types of sites with potential for roosting bats e.g. bridges, walls with crevices etc.		√				
the construction and terminology used to describe these structures and how they are used by bats			√					
Species Roosting Preferences	Describe different species roosting preferences	the difference in roosting site selection of the UK bat species		√				
		the effect of the size and location of access holes on the species that use a site		√				
		species specific maternity roost requirements			√			
		species variations in maternity roost composition			√			
		species specific hibernation roost requirements			√			
		the species associated with particular features of a tree		√				
Species Emergence Times	Describe different species emergence times	the designs and construction of bat boxes for different species and different purposes		√				
		species specific emergence times		√				
		the reason that different species emerge at different times		√				
		adaptations for surveys according to different species emergence times		√				
		when and how often bats need to feed for the species present in the relevant region		√				

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
Species Foraging Habitat Preferences	Explain the need of bats to feed	the difference between male and female feeding requirements and foraging behaviour					√
	Describe adaptations of bats to flight	simple aerodynamics		√			
		how bats' physical adaptations to flight differ from those of birds		√			
		wing morphology		√			
		species variation in wing shape according to foraging style		√			
		wing loading and aspect ratio in relation to foraging style		√			
		the problems experienced by a nocturnal flying mammal and the ways in which UK bats overcome these		√			
		the energy costs of flight		√			
	Describe echolocation	basic principles of echolocation and simple call terminology		√			
		reasons for use of echolocation and reasons for its success		√			
		the difference between frequency modulated calls and constant frequency calls and awareness that many calls are more complex		√			
		harmonics and their importance to bats		√			
		adaptive variations in echolocation in response to environment and behaviour		√			
		how the physics of sound operate on bat echolocation calls		√			
		use of passive hearing and sight by some bat species		√			
	Describe the types of food taken by bats	the types of invertebrates that bats feed on		√			
		the effect of environmental factors on invertebrate availability		√			
	Describe where bat feeding takes place	the importance of diverse habitats and invertebrate density on bat activity levels		√			
		which species are closely linked to specific habitats		√			
	Recall that bats produce a feeding buzz when attempting to catch some invertebrates	how a feeding buzz works		√			
		how the number of feeding buzzes relates to the catch rate of the bats		√			
		why some invertebrates are caught without the bat using a feeding buzz		√			
	Describe different species foraging habitat preferences, recognising that certain species of bats have favourite feeding habitats linked to food or physical design	the difference in foraging site selection of the UK bat species		√			
		the invertebrate species preference of the UK bat species where known					√
		the winter feeding preferences of the UK bat species where known					√

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
	Recall the feeding techniques used by bats	the most common feeding strategies		√			
		species-specific feeding strategies		√			
	Describe changing feeding patterns of female bats from pregnancy through to locations	variability of feeding locations and prey composition of female bats during the summer period					√
		species specific examples of changing feeding patterns from pregnancy through to lactation					√
Species Core Sustenance Zones	Describe what a core sustenance zone is and differences in these between species	what a core sustenance zone is		√			
		species specific differences in core sustenance zone		√			
		why there are differences between species		√			
Species Populations Estimates, Distribution and Status	Describe factors influencing species populations, distribution and status and where to find information on these	the evidence and potential reasons for suspected longer-term declines in UK bat populations		√			
		the generic threats to all bats in the UK		√			
		specific threats to some UK species		√			
		the distribution of all species in the UK and how that relates to Europe		√			
		the different factors that affect the range of species		√			
	where to find information on species population estimates, distribution and status		√				
Species-Specific Considerations	Describe the considerations for surveys of different species	the impact of species ecology on detectability		√			
		how to adjust survey methods accordingly		√			
		the impact of number of surveys on detectability		√			

Unit 4: Preliminary Ecological Appraisal for Bats

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
Preliminary ecological appraisal (PEA)	Understand the principles of PEA	why surveys are required – legislation, planning, licensing, conservation		√			
		what the generic aims and objectives of these surveys are		√			
		what data is required to meet survey objectives and how it should be recorded		√			
		the generic health and safety issues		√			
		the locations of and how to access different sources of data about a site, including photos and descriptions, maps, aerial photos, records of statutory and non-statutory designated sites and bat species, previous surveys and licences		√			
		the role of the National Biodiversity Network (NBN) and Local Environmental Records Centres (LERC - or bat groups in those areas where they hold bat records rather than the LERC)		√			
		the licences attributed to data sets and when it can/cannot be used for consultancy purposes		√			
		the importance of checking the terms and conditions from ecological data providers before using the data in reporting		√			
		the importance of searching for designated sites		√			
		the importance of searching for species records and the differing importance of those records		√			
		the importance of identifying potential roosting, commuting and foraging habitats		√			
		the relative value of those habitats to bats		√			
		the importance of habitat connectivity to bats		√			
		the types of impacts predicted and whether certain species may be particularly vulnerable				√	
Undertake a PEA desk study		decide on the geographical extent of the background data search		√			
		request the appropriate background data search from an appropriate source		√			
Plan PEA fieldwork		state the specific aims and objectives of the survey		√			
		identify the survey area/zone of influence		√			
		gain access permission for all relevant areas of the site		√			
		carry out a site specific risk assessment		√			
		schedule the survey		√			
		ensure that enough time is allowed for the survey to be completed		√			
		identify and deploy an appropriate team to carry out the survey		√			
		identify and deploy suitable equipment for the survey		√			
Undertake PEA fieldwork		identify site specific health and safety risks and respond appropriately, add these to risk assessment		√			

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
		carry out a walkover survey		√			
		identify and assess the suitability of the habitats present for bat roosting, commuting, foraging and migrating within the survey area		√			
		make a record using standard survey forms and maps		√			
		predict the types of impacts that are likely		√			
		identify opportunities to avoid impacts		√			
		identify opportunities for enhancements on site		√			
	Identify when further surveys are/are not necessary and plan them	national guidance on bat surveys	√				
		the different types of survey methods available and which ones are appropriate in different structures and habitats		√			
		the importance of obtaining information from non-invasive detector surveys (manual and automated) before considering implementing any invasive techniques		√			
		how survey effort is dependent on: ○ type and scale of the proposed activity or project and its potential impacts on bats ○ size, nature and complexity of the development ○ proximity of designated sites ○ value of surrounding habitats for bats ○ known bat populations in the area		√			
		how the number of surveyors is dependent on: ○ the area of development ○ the bat potential of the site ○ the objective(s) of the survey		√			
		why single survey methods are rarely used in isolation		√			
		the principle of proportionality		√			
		what data is likely to be required to meet survey aims and objectives		√			
		how this data will be analysed		√			
		consider what further surveys will be appropriate (methods, timing) and what resources (human, equipment) will be needed accounting for the size, nature and complexity of the site		√			
		develop statistically robust surveys to assess the seasonal relative abundance and distribution of bats across the site				√	
		identify when further surveys will not be necessary and provide a rationale		√			

Unit 5: Bat Roost Inspection Surveys – buildings, built structures and underground sites

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S		
Preliminary Roost Assessment (PRA) – buildings and structures	Understand the principles behind PRA	what the generic aims and objectives of these surveys are		√					
		what data is required to meet the survey objectives and how it should be recorded		√					
		the generic health and safety issues	√						
		the times of year when roosting bats are particularly sensitive to disturbance and the need for a precautionary approach to surveys at such times		√					
		the survey effort required for buildings and structures of different sizes and complexity what licences (and therefore personnel) are required to complete a survey lawfully (and safely)		√					
		what equipment is necessary to carry out a thorough and effective survey		√					
		the types of places bats use for external roosting or access into the interior of a building or structure		√					
		the types of places bats use for internal roosting		√					
		the types of signs that may be present on the exterior or interior of a building or structure indicating a bat roost, where these are likely to be and whether these are likely to persist in poor weather		√					
		factors that may persuade / dissuade bats from a structure i.e. the quality of the surrounding habitat / commuting links, the presence of artificial lighting etc.		√					
		the limitations of identifying bats to species level from droppings and the importance of DNA analysis unless identification can be confirmed by other means		√					
		adaptations to survey methods that need to be made in different types of buildings and structures (e.g. timber-framed barns, churches, bridges, etc.)		√					
		the importance of assessing all features that could be used by bats and how to do this safely		√					
		Plan a PRA		state the specific aims and objectives of the survey		√			
				identify the survey area/zone of influence		√			
gain access permission for all relevant areas of the site	√								
carry out a site specific risk assessment				√					
schedule the survey for an appropriate time of year				√					
ensure that enough time is allowed for the survey to be completed				√					
identify and deploy an appropriate team to carry out the survey				√					
identify and deploy suitable equipment for a survey		√							
Carry out an external and internal inspection		assess how safe it will be to access all areas for external and internal (e.g. upper floors and attics) inspection		√					

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
	of a building or structure	identify site specific health and safety risks (e.g. unsafe floors, asbestos, wasps nests) and respond appropriately, add these to risk assessment		√			
		safely use ladders, torches and endoscopes	√				
		where there are areas that cannot be safely accessed with ladders, identify whether the use of supplementary equipment (e.g. scaffold tower or cherry picker) is appropriate and proportionate, or whether an alternative approach (e.g. presence/absence surveys) will need to be employed		√			
		carry out a systematic search of the exterior and interior of a building or structure to identify potential or actual bat roosting places and access points		√			
		identify live bats and dead bats to species level where possible without handling		√			
		safely extract live bats for identification and processing and replace them afterwards (see also handling and identification)				√	
		identify bat droppings, urine stains, grease marks, worn/clean areas, scratch marks, squeaking, smell, feeding remains; and which of these are diagnostic of bat use and which may be due to other factors (e.g. other organisms)			√		
		identify roosting and access points and interpret likely bat behaviour from location of signs listed above			√		
		identify the main characteristics of bat droppings and appreciate the limitations in using this to identify likely species			√		
		apply a protocol to collect and send off droppings for DNA analysis where appropriate			√		
		use static bat detectors to gain more information about use and activity patterns			√		
		categorise the suitability of the building or structure for roosting bats			√		
record all necessary information on pre-prepared survey sheets and site plans			√				
Bat Box Surveys	Survey bat boxes safely	the construction and how the box works		√			
		when bats are vulnerable to disturbance and the impact of bat box checking at these times		√			
		gain safe access and security (e.g. using a cherry picker, scaffold tower or ladder/ropes) to use both hands to safely open and close the box			√		
		identify live bats and dead bats to species level without handling			√		
		safely extract live bats for identification and processing and replace them afterwards (see also handling and identification)				√	
		distinguish between bat evidence and evidence of other organisms such as birds and rodents in a box			√		
		identify the main characteristics of bat droppings and appreciate the limitations in using this to identify likely species			√		
		apply a protocol to send off droppings for DNA analysis where appropriate			√		

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S	
		record all necessary information on pre-prepared survey sheets and site plans		√				
Winter hibernation surveys – buildings, structures and underground sites	Understand the principles behind hibernation surveys	what the generic aims and objectives of these surveys are		√				
		what data is required to meet the survey objectives and how it should be recorded		√				
		the generic health and safety issues	√					
		what licences (and therefore personnel) are required to complete a survey lawfully		√				
		what equipment is necessary to carry out a thorough and effective survey		√				
		what times of year are suitable to survey for hibernating bats		√				
		the disturbance potential to bats at hibernation sites and the possible effects this could have on bat populations		√				
		how to minimise disturbance to hibernating bats whilst carrying out the survey		√				
		the survey effort required for buildings, structures and underground sites of different sizes and complexity		√				
		likely positions where bats will be located		√				
		likely uses made by bats of such sites throughout the year		√				
		the optimum timings and effort for carrying out surveys in order to locate bats		√				
		that a degree of uncertainty is acceptable when identifying bats in hibernation		√				
		the importance of biosecurity		√				
	Plan hibernation surveys	state the specific aims and objectives of the surveys			√			
		identify the survey area/zone of influence			√			
		gain access permission for all relevant areas of the site	√					
		carry out a site specific risk assessment			√			
		schedule surveys for an appropriate time of year			√			
		ensure that enough time is allowed for the surveys to be completed			√			
		identify and deploy an appropriate team to carry out the surveys			√			
	Carry out a hibernation survey in a building, built structure or underground site (cellars, mines, ice-houses, lime-kilns, tunnels, caves etc.)	identify site specific health and safety risks and respond appropriately, add these to risk assessment			√			
		apply appropriate techniques to avoid the spread of white-nose syndrome			√			
		survey the site carefully and effectively with appropriate equipment			√			
		locate obvious exposed bats			√			
		locate hibernating bats deep in a structure where little is visible			√			
		identify hibernating bats in situ to a likely species or species group, if possible bearing in mind the identification features that are visible			√			
		use static bat detectors to gain more information about use and activity patterns			√			
			record all necessary information on pre-prepared survey sheets and site plans		√			

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
Bat handling	Assess the risks involved in handling the bat	the sensitive times of a bat's year when extra care needs to be taken during handling			√		
		the importance of an up to date rabies vaccination and post-exposure treatment if bitten by a bat			√		
		assess whether the handling of a bat is necessary			√		
		assess the risk to the potential handler (from disease or injury)			√		
		move a grounded bat without directly handling it			√		
	Recognise the legal basis for handling bats	the relevant bat and animal welfare legislation, and how it relates to the situation			√		
	Wear the necessary protective clothing	that protective gloves appropriate to the task must be worn			√		
		why these should be worn			√		
	Use suitable handling methods	the basic anatomy of the bat and how it can be damaged			√		
		the appropriate techniques of handling for the species, situation and age of bat concerned			√		
		the welfare issues to be aware of such as bats becoming torpid			√		
		your own responsibility under health and safety legislation			√		
		the protocols for handling bats according to your employer/organisation's requirements			√		
		the appropriate techniques of handling for specific purposes e.g. marking			√		
		use a basic method of handling that is appropriate for all bats, which minimises stress to the bat and the likelihood of being bitten			√		
		hold a bat securely so it can be seen by others			√		
		manipulate and examine a bat to determine likely species, age and sex			√		
	Demonstrate safe collection and transportation of a bat to a carer	weigh and measure a bat			√		
		transport a bat (to a rehabilitator if required)			√		
		Demonstrate safe working procedures	work safely, without endangering the health of yourself, members of the public or other bats			√	
Bat identification visually and in the hand	Identify a live or dead bat from its physical characteristics	basic bat anatomy		√			
		recognise that there is variation in the physical characteristic of individual bats		√			
		that a degree of uncertainty is acceptable		√			
		identify and measure criteria required by a key on a complete bat			√		
		identify to a likely species (with the exception of whiskered/Brandt's/alcaho)			√		
		identify whiskered/Brandt's/alcaho					√
		identify when the bat is not a native species			√		

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
		examine teeth in a live bat			√		
		identify cryptic species using teeth, size and skull shape					√
	Identify a bat when in a crevice or crevice bat box	key identification features for different species		√			
		identify a bat to a likely species (with the exception of whiskered/Brandt's/alcahoie) with minimum disturbance, without handling		√			
		estimate the number of individuals in a bat box with minimum disturbance		√			
	Differentiate between sexes	difference in males and females			√		
		changes in fur and skin colours during the year between sexes			√		
		sex a live bat			√		
	Differentiate between age classes	differences between adults and young flying bats			√		
		the difficulty of this technique in the latter part of the season			√		
		changes in fur and skin colours with age			√		
		differentiate between adult and juvenile bats			√		
	Assess the reproductive status of an individual	the reproductive cycle and how this will affect the signs used to assess reproductive status throughout the season			√		
		categorise a female as pregnant, lactating, post-lactating or non-breeding			√		
		identify a sexually active male			√		
Interpretation of data	Interpret use of a site by bats and next steps	identify any constraints that may have affected the results of the preliminary roost assessment or hibernation survey (e.g. areas not accessed)		√			
		in the absence of signs of bats, categorise the site according to its potential to support roosting bats		√			
		where there are signs of bats, identify likely use of site including species, likely numbers, likely roost type and entrance points from all evidence available from internal and external inspections, underground site inspections and bat box surveys		√			
		identify if further surveys are likely to be necessary, even in the absence of signs of roosting bats		√			
		identify the logistics (personnel, equipment, timing) for further surveys		√			
		identify and address any necessary health and safety considerations for further surveys		√			

Unit 6: Bat Roost Inspection Surveys – trees (apply where relevant to ecologist’s remit)

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S	
Preliminary Ground Level Roost Assessment (PGLRA) - trees	Understand the principles behind PGLRA of a tree/trees	what the generic aims and objectives of these surveys are		√				
		what data is required to meet the survey objectives and how it should be recorded		√				
		the generic health and safety issues	√					
		the times of year, times of day and weather conditions when preliminary ground level roost assessments are most effective		√				
		the survey effort required for trees of different sizes, ages and complexity		√				
		what equipment is necessary to carry out a thorough and effective survey		√				
		the types of features bats use for roosting in trees		√				
		the types of signs that may be present on or in trees, where these are likely to be and whether these are likely to persist		√				
	Effectively plan a PGLRA of a tree/trees	the importance of accessing all sides of the tree both close to the trunk and beyond the extent of the canopy to be able to view all possible features that could be used		√				
		state the specific aims and objectives of the survey		√				
		identify the survey area/zone of influence		√				
		gain access permission for all relevant areas of the site	√					
		carry out a site specific risk assessment		√				
		schedule the survey for an appropriate time of year		√				
		ensure that enough time is allowed for the survey to be completed		√				
		identify and deploy an appropriate team to carry out the survey		√				
	Effectively carry out a PGLRA of a tree/trees	identify and deploy suitable equipment for a survey		√				
		identify site specific health and safety risks and respond appropriately, add these to risk assessment		√				
		carry out a systematic search of the tree to identify potential or actual bat roosting places		√				
		identify any obvious bat droppings, grease marks, worn/clean areas, scratch marks, squeaking, smell and which of these are diagnostic of bat use and which may be due to other factors (e.g. other organisms)		√				
		identify potential roosting features		√				
		record all necessary information on pre-prepared survey sheets and site plans		√				
		mark trees where appropriate and where permission has been sought		√				
		categorise the suitability of each tree for roosting bats		√				
	Potential Roost Feature (PRF)	Understand the principles behind PRF	record all necessary information on pre-prepared survey sheets and site plans		√			
			what the generic aims and objectives of these surveys are		√			
			what data is required to meet the survey objectives and how it should be recorded		√			

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
Inspection Surveys – trees	inspection surveys of a tree/trees	the generic health and safety issues		√			
		the times of year, times of day and weather conditions when these surveys are most effective		√			
		the times of year when roosting bats are particularly sensitive to disturbance and the need for a precautionary approach to surveys at such times		√			
		the survey effort required for trees of different ages/sizes		√			
		what expertise and licences (and therefore personnel) are required to complete a survey lawfully		√			
		what equipment (e.g. rope access, cherry picker, mobile elevated work platform or scaffold tower) is necessary to carry out a thorough and effective survey		√			
		assess the appropriateness of this type of survey technique where there are large numbers of trees		√			
		the types of signs that may be present on or in trees, where these are likely to be and whether these are likely to persist		√			
		the limitations of identifying bats to species level from droppings and the importance of DNA analysis unless identification can be confirmed by other means		√			
		that DNA of droppings from tree roosts can be less reliable and why		√			
		the importance of accessing all features that could be used and how to do this safely		√			
		Plan a PRF inspection survey of a tree/trees	state the specific aims and objectives of the survey		√		
	identify the survey area/zone of influence			√			
	gain access permission for all relevant areas of the site		√				
	carry out a site specific risk assessment			√			
	schedule the survey for an appropriate time of year			√			
	ensure that enough time is allowed for the survey to be completed			√			
	identify and deploy an appropriate team to carry out the survey			√			
	Carry out a PRF inspection survey of a tree/trees	identify and deploy suitable equipment for the survey		√			
		identify site specific health and safety risks (e.g. lifted root plates, rot, bees nests, adjacent roads, livestock in fields) and respond appropriately		√			
		safely use ladders, torches but not endoscopes		√			
		safely use endoscopes			√		
		safely use climbing equipment – ropes and harnesses – to access tree features					√
		carry out a systematic search of all potential roost features in the tree to clarify their value and search for evidence of roosting bats		√			
		identify roosting places		√			
	identify live bats and dead bats to species level where possible without handling		√				

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
		identify bat droppings, grease marks, feeding remains, worn/clean areas, scratch marks, squeaking, smell and which of these are diagnostic of bat use and which may be due to other factors (e.g. other organisms)		√			
		identify the main characteristics of bat droppings and appreciate the limitations in using this to identify likely species		√			
		apply a protocol to send off droppings for DNA analysis where appropriate		√			
		re-categorise potential roosting features		√			
		record all necessary information on pre-prepared survey sheets and site plans		√			

Unit 7: Emergence/Re-entry Surveys – structures and trees

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
Bat emergence and re-entry surveys	Understand the principles behind presence/absence and roost characterisation surveys	what the generic aims and objectives are		√			
		what data is required to meet the survey objectives and how it should be recorded		√			
		the generic health and safety issues	√				
		the times of year, times of day and weather conditions when these surveys are most effective		√			
		the difference between presence/absence and roost characterisation surveys		√			
		the relative pros and cons of emergence vs re-entry surveys		√			
		the level of survey effort required for structures and trees to be reasonably confident that bats are absent		√			
		the level of survey effort required if bats are present in order to carry out a roost characterisation survey		√			
		how many surveyors are required and how to deploy them to effectively cover all areas where bats may emerge or return		√			
		what equipment is necessary to carry out a thorough and effective survey		√			
		the different types of bat detectors available, their relative pros and cons and how/when to use them, e.g. heterodyne, frequency division, time expansion, full spectrum sampling		√			
		the complementary equipment that can be deployed, it's relative pros and cons and how/when to use it e.g. night vision, infrared and thermal imaging cameras, static detectors		√			
		the other information that needs to be recorded during a roost characterisation survey e.g. size/nature of roost, roosting surfaces, aspect, orientation, temperature, humidity, lighting, surrounding habitat		√			
		assess the appropriateness of this type of survey technique where there are large numbers of tree		√			
	Plan presence/absence and roost characterisation surveys	state the specific aims and objectives of the surveys		√			
		gain access permission for all relevant areas of the site	√				
		carry out a site specific risk assessment		√			
		decide on an appropriate number of surveys		√			
		schedule the surveys for an appropriate time of year and day, deciding on the balance of emergence and re-entry surveys		√			
		check on weather conditions and proceed/cancel as appropriate		√			
ensure that enough time is allowed for the surveys to be completed			√				
identify an appropriate team to carry out the surveys			√				
identify suitable equipment for the surveys		√					

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S	
	Carry out presence/absence and roost characterisation surveys	identify site specific health and safety risks and respond appropriately, add these to risk assessment		√				
		deploy a team of surveyors around a building or structure for an emergence or re-entry survey		√				
		undertake surveys with a broadband detector, recording echolocation calls for later analysis		√				
		set up appropriate complementary equipment such as night vision, infrared or thermal imaging cameras to record bat activity		√				
		set up appropriate complementary equipment such as static detectors to record bat activity		√				
		record weather conditions at appropriate points during the survey		√				
		use equipment to determine presence/absence of bats in a structure or tree		√				
		identify the emergence or re-entry of bats from a structure or tree		√				
		record emerging or returning bats, number of bats, echolocation calls, access points, time of observations		√				
		record size/nature of roost, roosting surfaces, aspect, orientation, temperature, humidity, lighting, surrounding habitat		√				
		analyse echolocation calls recorded in the field using appropriate sound analysis software		√				
		use the results of each survey to inform the next		√				
		make an assessment of species, numbers and roosts present		√				
	Effectively and safely capture bats using a hand net with acceptable levels of disturbance	when it is appropriate to use a hand net to identify bats and assess breeding status				√		
		the welfare implications for both the ecologist and the bat				√		
		the relevant licences required to be able to carry out hand netting				√		
		how long should be spent catching with a hand net				√		
		safely capture and handle bats using a hand net				√		
	Identify situations where hand net use is appropriate	identify species and breeding status of bats in the hand (see also handling and identification)				√		
		when capture of bats is necessary and appropriate using a hand net				√		
	Justify the purpose of catching bats with a hand net, i.e. why do it, is there an	the necessary licence and data returns required to use a hand net				√		
		the need to justify the reasoning for hand net use at a specific site				√		
		the need to catch the minimum number of bats with minimum disturbance for the purpose				√		
eliminate alternative methods					√			
	judge the number of bats that need to be captured				√			

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
	alternative, sample sizes						

Unit 8: Bat Activity and Back-tracking Surveys

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
Bat Activity Surveys	Understand the principles behind bat activity surveys	when bat activity surveys are appropriate		✓			
		what the aims and objectives of these surveys are		✓			
		what data is required to meet the survey objectives and how it should be recorded		✓			
		how this data will be analysed		✓			
		the relative pros and cons of transect vs static surveys		✓			
		how to design transect surveys		✓			
		the relative pros and cons of carrying out transect surveys from a bike, car or boat		✓			
		how to design static surveys		✓			
		the different complementary methods that are available (such as spot counts, timed searches and vantage point surveys), their relative pros and cons and how/when to use them		✓			
		how many surveyors are required and how to deploy them to effectively cover all areas where bats may be active		✓			
		the different types of bat detectors available, their relative pros and cons and how/when to use them, e.g. heterodyne, frequency division, time expansion, full spectrum sampling, static		✓			
		the complementary equipment that can be deployed, its relative pros and cons and how/when to use it e.g. night vision, infrared and thermal imaging cameras		✓			
		the times of year and times of day when activity surveys are most effective		✓			
		the relative pros and cons of all night vs dusk and dawn activity surveys		✓			
		the level of survey effort required for different types of sites		✓			
	the health and safety risks associated with activity surveys		✓				
	Effectively plan bat activity surveys	state the specific aims and objectives of the surveys		✓			
		identify the survey area/zone of influence		✓			
		gain access permission for all relevant areas of the site		✓			
		carry out a site specific risk assessment		✓			
		decide on an appropriate number of transects and/or static points for the site		✓			
		decide on an appropriate number of surveys for the site		✓			
		devise a detailed activity survey schedule for large-scale sites				✓	
schedule the surveys for an appropriate time of year and day, deciding on the balance of dusk/dawn/all night surveys			✓				
check on weather conditions and proceed/cancel as appropriate		✓					
ensure that enough time is allowed for the surveys to be completed		✓					

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
	Effectively carry out bat activity surveys	identify an appropriate team to carry out the surveys		√			
		identify suitable equipment for the surveys		√			
		identify site specific health and safety risks and respond appropriately, add these to risk assessment		√			
		deploy a team of surveyors around a site for an activity survey		√			
		undertake activity surveys with a broadband detector, recording echolocation calls for later analysis		√			
		undertake activity surveys with static detectors, recording calls for later analysis		√			
		use GPS to accurately plot activity locations on a map		√			
		record weather conditions at appropriate points during the survey		√			
		use equipment to determine presence/absence of bats		√			
		record number of bats, echolocation calls, time of observations, behaviour, flight height		√			
		determine whether bats are commuting, foraging, swarming, songflighting		√			
		analyse echolocation calls recorded in the field using appropriate sound analysis software		√			
		use the results of each survey to inform the next		√			
make an assessment of species and relative abundance		√					
Autumn Swarming Surveys	Understand the principles behind autumn swarming surveys (acoustic)	what the generic aims and objectives of these surveys are		√			
		what data is required to meet the survey objectives and how it will be recorded					√
		how this data will be analysed					√
		the generic health and safety risks associated with swarming surveys					√
		the importance of swarming sites to bat populations					√
		the time of year and time of night that swarming takes place					√
		the possible functions of swarming for bats					√
		the species that are known to swarm					√
		when swarming surveys are an appropriate method to deploy		√			
		the methods and equipment that can be used for swarming surveys					√
		how to design swarming surveys					√
		the level of survey effort required to identify if bats are swarming at a site					√
		the influence of weather on swarming bats					√
	when trapping bats at swarming sites is appropriate					√	
	Effectively plan autumn swarming surveys (acoustic)	state the specific aims and objectives of the surveys					√
identify the survey area/zone of influence						√	
gain access permission for all relevant areas of the site		√					

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S	
		carry out a site specific risk assessment					√	
		decide on an appropriate number of surveys					√	
		schedule the surveys for an appropriate time of year and day					√	
		check on weather conditions and proceed/cancel as appropriate					√	
		ensure that enough time is allowed for the surveys to be completed					√	
		identify an appropriate team to carry out the surveys					√	
		identify suitable equipment for the surveys					√	
	Effectively carry out swarming surveys (acoustic)	deploy static detectors for a swarming survey						√
		deploy equipment to record weather conditions during swarming surveys						√
		undertake swarming surveys with static detectors, recording calls for later analysis						√
		analyse echolocation calls recorded in the field using appropriate sound analysis software, as appropriate						√
use the results of each survey to inform the next							√	
	make an assessment of species present and if the bats are swarming						√	
Backtracking Surveys	Understand the principles behind backtracking surveys	what the generic aims and objectives of these surveys are		√				
		what data is required to meet the survey objectives and how it will be recorded		√				
		the generic health and safety risks		√				
		the theory behind backtracking surveys		√				
		the time of year and time of night when these surveys are effective		√				
		when these surveys are an appropriate method to deploy		√				
		what data is required to meet the survey objectives		√				
		the equipment that can be used for backtracking surveys		√				
		how to design backtracking surveys		√				
	the influence of weather on backtracking surveys		√					
	Effectively plan backtracking surveys	state the specific aims and objectives of the surveys			√			
		identify the survey area/zone of influence			√			
		gain access permission for all relevant areas of the site	√					
		carry out a site specific risk assessment		√				
		decide on an appropriate number of surveyors and appropriate starting points		√				
		schedule the surveys for an appropriate time of year and day		√				
		check on weather conditions and proceed/cancel as appropriate		√				
		ensure that enough time is allowed for the surveys to be completed		√				
identify an appropriate team to carry out the surveys			√					
identify suitable equipment for the surveys		√						

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/ You must be able to:	1	2	3	4	S
	Effectively carry out backtracking surveys	identify site specific health and safety risks and respond appropriately, add these to risk assessment		√			
		deploy a team of surveyors around a site for a backtracking survey		√			
		undertake backtracking surveys with a broadband detector, recording echolocation calls for later analysis		√			
		record weather conditions at appropriate points during the survey		√			
		use equipment to determine presence/absence of bats		√			
		record number of bats, echolocation calls, time of observations, behaviour, flight height		√			
		analyse echolocation calls recorded in the field using appropriate sound analysis software		√			
		use the results of each survey to inform the next		√			
		make an assessment of species and approximate numbers present		√			

Unit 9: Advanced Licence Bat Surveys

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S	
Trapping surveys	Understand the principles behind trapping surveys	when capture of bats is necessary, appropriate and proportionate		√				
		harp trap/mist net placement relative to bats' flightlines to maximise capture efficiency					√	
		what the alternatives to trapping are and why they have been eliminated		√				
		what the generic aims and objectives of these surveys are		√				
		what data is required to meet the survey objectives and how it will be recorded					√	
		how this data will be analysed					√	
		the generic health and safety issues		√				
		the times of year when bats are particularly vulnerable and the need to avoid trapping at these times						√
		the need to catch the minimum number of bats with minimum disturbance						√
		limitations of harp traps and mist nets for certain species						√
		the need to minimise the time spent processing an individual, especially in colder temperatures						√
		bats' use of habitat			√			
		the likely capture frequency in different habitats and with different equipment						√
		the weather conditions when these surveys are appropriate						√
		what survey effort is required for different sites and different aims						√
		what skills, experience and licences are required			√			
		what equipment is required to carry out a thorough and effective survey						√
		available net/trap manufacturers						√
		different sizes and shapes of traps and their suitability to different situations						√
		optimum frequency of checking of mist nets for bats as opposed to harp traps						√
	the potential welfare risks to bats when using nets						√	
	the potential welfare risks to bats when using traps						√	
	the impacts of different types of nets/traps on bats						√	
	how long should be spent catching and with how many harp traps/mist nets						√	
	where to find relevant guidance on this subject						√	
	Understand the principles behind trapping surveys (with a lure)	bats' social calls and social interactions						√
		relevant licence requirements for the use of a lure						√
safe and appropriate use of lures							√	
the limitations in our knowledge about the impact of lures							√	
the difference between active (with a lure) and passive trapping and the different relative siting of nets accordingly							√	

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S
	Plan trapping surveys	the need to keep up-to-date with new developments in this technology					√
		justify why the action is proportionate to the potential impacts of the project					√
		state the specific aims and objectives of the survey					√
		gain access permission for all areas of the site	√				
		carry out a site specific risk assessment		√			
		schedule the surveys for the appropriate time of year					√
		ensure that enough time is allowed for the surveys to be completed					√
		identify and deploy an appropriate team to carry out the surveys					√
		identify and deploy suitable equipment for the surveys					√
		justify the reason for the choice of equipment					√
		judge the number of bats that need to be captured					√
		identify the likely flightlines used by bats in different habitats					√
	justify why the use of a lure is proportionate to the impacts of the project					√	
	Effectively and safely carry out trapping surveys	use a mist net/harp trap in a variety of situations					√
		use a lure in a variety of situations					√
use a mist net/harp trap to capture and release bats without causing them damage						√	
identify species and breeding status of bats in the hand (see also handling and identification)						√	
Radio tagging/telemetry surveys	Understand the principles behind radio tagging/telemetry surveys	the purpose of radio-tracking			√		
		when tagging/tracking of bats is necessary, appropriate and proportionate			√		
		what the alternatives to tagging are and why they have been eliminated			√		
		what the aims and objectives of these surveys are			√		
		what data is required to meet the survey objectives and how it should be recorded					√
		how this data will be analysed					√
		the generic health and safety issues					√
		the times of year when bats are particularly vulnerable and the need to avoid tagging at these times					√
		the need to minimise the time spent processing an individual, especially in colder temperatures					√
		the need to tag and track the minimum number of bats with minimum disturbance for the purpose					√
		the equipment that is available					√
		how different equipment works and how it could be used					√
		limitations of this technique including how radio waves travel					√
what can be achieved during the short life of the transmitter					√		

Section	Performance Criteria	Knowledge and skills	1	2	3	4	S
	You must be able to:	You must know and understand/You must be able to:					
		aerial design for accuracy of pin-pointing roosting place					√
		the different methods that are appropriate for the survey objectives					√
		what skills, experience and licences are required					√
		how to read maps and navigate quickly					√
		different methods used to establish home ranges					√
		how to establish core areas					√
		how to carry out compositional analysis of the data to understand how bats preferentially select the habitats that are available to them					√
	Plan radio tagging/telemetry surveys	choose appropriate equipment for the task					√
		judge the number of bats that need to be tagged for the purpose (i.e. sample size)					√
	Carry out radio tagging/telemetry surveys	use equipment to tag bats without causing them damage					√
		use the close approach and triangulation methods of radio-tracking					√
		use radio-tracking equipment effectively to pin-point exact roosting places					√
		use radio-tracking equipment effectively to collect data on foraging areas used by tagged bats					√
		use radio-tracking equipment effectively to collect data on commuting routes used by tagged bats					√
		judge how long to radio-track individual bats for					√

Unit 10: Data Analysis and Interpretation

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S
Bat Echolocation Call Analysis	Analyse bat echolocation calls	the difference between a pulse and a pass		√			
		the importance of clarity and consistency in defining a bat pass		√			
		that bat pulses or passes are an index of bat activity rather than a measure of number of individuals		√			
		the different sound analysis software options that are available and their individual limitations		√			
		key settings in the software and how adjusting these affects the clarity of the sonograms		√			
		the difference between sonogram and spectrogram, oscillogram and power spectrum		√			
		the difference between full spectrum and zero crossing recordings		√			
		data storage and transfer issues		√			
		the importance of verification of accuracy when using automated sound analysis software		√			
		the plasticity of bat calls in different habitats		√			
		how to measure frequency, call duration and interpulse interval		√			
		how to identify different species using sonograms		√			
		which species can be more easily identified		√			
		which species are more difficult to identify		√			
		when it is necessary to group species according to genus or functional group		√			
		how to distinguish echolocation calls from social calls		√			
		define a bat pass		√			
		use manual sound analysis software to analyse bat calls		√			
		use automated sound analysis software to analyse bat calls		√			
		measure call parameters		√			
separate echolocation and social calls		√					
identify bat calls to species, genus, group or unidentified as appropriate		√					
understand the limitations of call analysis		√					
Analysis of Bat Activity Survey Data	Apply simple methods of analysis to bat activity survey data	how to store and manage bat activity data		√			
		the importance of statistical analysis in extracting meaning from large amounts of bat activity data in a transparent and authoritative way		√			
		the importance of deciding how the data will be analysed prior to carrying out the surveys		√			

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S
		methods to transform, visualize and model data			√		
		store and manage bat activity data			√		
		transform, visualize and model data			√		
		perform some basic statistical tests as appropriate			√		
Analysis of Bat Radiotelemetry Survey Data	Apply simple methods of analysis to radiotelemetry survey data	how to store and manage bat radiotelemetry data					√
		the concept of core foraging areas					√
		the concept of home ranges					√
		different methods to estimate core area and home range and when it is appropriate to use one rather than another					√
		what habitat data is needed for analysis					√
		methods to estimate habitats used versus habitats available within the home range					√
		store and manage bat radiotelemetry data					√
		carry out analysis using minimum convex polygons, cluster analysis and kernel contours					√
		carry out compositional analysis of habitats used versus habitats available					√

Unit 11: Writing Bat Reports

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S	
Reporting	Understand the principles behind good report writing	the importance of a good executive summary		√				
		that reports should be accurate, clear and concise and serve the purpose for which they were intended		√				
		that reports should be written specifically for the required audience		√				
		that the sections of a report should be clearly and consistently structured		√				
		the importance of following standard guidance on report writing		√				
		the importance of peer review		√				
		the importance of submitting bat records to the relevant LERC, Local Bat Group or NBN		√				
	Produce competent reports	produce an executive summary that can stand alone if necessary		√				
		produce accurate, clear and concise written documents		√				
		write reports that are fit for purpose		√				
		write reports that are appropriate to the audience		√				
		include an assessment of the limitations and constraints on surveys		√				
		add illustrative material, e.g. photos, aerial photos, graphs, charts etc. where appropriate		√				
		write reports that follow standard guidance		√				
		write reports for PEA desk studies		√				
		write reports for PEA fieldwork		√				
		write reports for roost inspection and emergence/re-entry surveys		√				
		write reports for bat activity surveys		√				
		write bat survey reports for trapping and radio telemetry surveys						√
		write licence applications, including mitigation strategies		√				
		write chapters for an EIA				√		
		write up a HRA				√		
		check spelling and grammar			√			
submit bat records to the relevant organisation			√					

Unit 12: Bat Roost Mitigation

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S
Bat Roost Mitigation/Compensation	Recognise the principles involved in designing and implementing measures for impact avoidance, mitigation and compensation for bat roosts	the difference between impact avoidance, mitigation and compensation		√			
		the difference between the above and enhancement		√			
		the principles of the mitigation hierarchy		√			
		the principle of continued ecological functionality		√			
		the potential impact of energy-saving initiatives on bat roosting opportunities		√			
		what work can be carried out with a non-licensed method statement rather than a European Protected Species Licence		√			
	Design and implement a strategy to avoid or minimise short-term disturbance impacts to bats in roosts (in structures and trees)	the ways in which roosting bats may be affected by short-term disturbance		√			
		the optimum season for works in different types of roosts		√			
		working methods that would avoid or minimise disturbance		√			
		produce a licence or non-licensed method statement describing how disturbance will be avoided or minimised, suitable for planners, planning consultants, LPA ecologists, architects, contractors and/or licensing bodies as appropriate		√			
		brief or oversee contractors applying a licence or non-licensed method statement		√			
	Design and implement a strategy to minimise impacts arising from roost modification (structures only)	the ways in which roosting bats may be affected by modifications to the conditions within their roost (lighting, temperature, air flow, noise levels, vibration)		√			
		the ways in which roosting bats may be affected by modifications to the physical aspects of their roost (size, area, construction materials, entrance points)		√			
		the ways in which roosting bats may be affected by modifications to the habitat and lighting regime surrounding the roost		√			
		the importance of ongoing management and maintenance and identifying who is responsible		√			
		identify features that are critical to the ongoing use of a roost by bats, and which should be retained		√			
		identify the extent to which these features could be modified		√			
		produce a licence or non-licensed method statement describing how impacts on bats will be avoided or minimised during modification works, suitable for planners, planning		√			

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S
		consultants, LPA ecologists, architects, contractors and/or licensing bodies as appropriate					
		brief or oversee contractors applying a licence or non-licensed method statement		√			
		prepare a management and maintenance plan and ensure there is a mechanism for its implementation		√			
	Design and implement a strategy to minimise impacts arising from roost modification (trees only)	the ways in which tree roosting bats may be affected by modifications to the conditions within their roost (temperature, noise levels, vibration)		√			
		the ways in which tree roosting bats may be affected if their roost is removed from the host tree and re-erected in an adjacent tree		√			
		the ways in which tree roosting bats may be affected by modifications to the habitat and lighting regime surrounding the roost		√			
		the importance of ongoing management and maintenance and identifying who is responsible		√			
		identify how tree roosts could be impacted by modification to the host tree (e.g. tree pruning, increased noise or vibration) or the surrounding trees/habitat (e.g. tree felling, increased lighting)		√			
		protect a roost by reduction, propping or strapping		√			
		mark and sign a tree to protect it		√			
		design selective felling schemes around known roosts		√			
		produce a licence or non-licensed method statement describing how impacts on tree roosting bats will be avoided or minimised during or after modification works, suitable for planners, planning consultants, LPA ecologists, architects, contractors and/or licensing bodies as appropriate		√			
		brief or oversee contractors applying a licence or non-licensed method statement during host tree pruning or tree felling around the host tree		√			
		prepare a management and maintenance plan and ensure there is a mechanism for its implementation		√			

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S
	Design and implement a strategy to compensate for impacts arising from roost loss (structures only)	that there are differences between species in terms of their roosting requirements		√			
		the ways in which roosting bats of different species may be affected by complete loss and replacement of their roost		√			
		the benefits and limitations of bat boxes as a temporary or permanent compensatory feature		√			
		ways to incorporate new roosts into existing buildings		√			
		ways to incorporate new roosts into new buildings		√			
		different types of purpose built bat roosts and when it is appropriate to use them		√			
		the importance of the surrounding habitat and lighting regime in attracting bats to a replacement roost		√			
		the importance of ongoing management and maintenance and identifying who is responsible		√			
		identify features that are critical to the uptake of a new roost by bats, and which should be included		√			
		liaise with architects regarding technical specifications for new roosts in structures at the design stage		√			
		liaise with landscape architects and lighting engineers regarding technical specifications for surrounding habitats and lighting		√			
		produce a licence method statement describing how impacts on bats will be compensated by the provision of new roosts, suitable for planners, planning consultants, LPA ecologists, architects, contractors and/or licensing bodies as appropriate		√			
		brief or oversee contractors applying a licence method statement		√			
		prepare a management and maintenance plan and ensure there is a mechanism for its implementation		√			
	Design and implement a strategy to compensate for impacts arising from roost loss (trees only)	that there are differences between species in terms of their roosting requirements		√			
		the ways in which tree roosting bats of different species may be affected by complete loss and replacement of their roost		√			
		the benefits and limitations of bat boxes as a temporary or permanent compensatory feature for the loss of tree roosts		√			
		ways to create new roosting sites for bats in trees		√			
		the importance of the surrounding habitat and lighting regime in attracting bats to a replacement roost		√			

Section	Performance Criteria	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S	
	You must be able to:							
		the importance of ongoing management and maintenance and identifying who is responsible		√				
		identify what is important in a replacement tree roost using a bat box or a new tree feature		√				
		liaise with arborists regarding how to create a new tree feature		√				
		liaise with landscape architects and lighting engineers regarding technical specifications for habitats and lighting surrounding a tree roost		√				
		produce a licence method statement describing how impacts on bats will be compensated by the provision of new roosts, suitable for planners, planning consultants, LPA ecologists, architects, contractors and/or licensing bodies as appropriate		√				
		brief or oversee contractors applying a licence method statement		√				
		prepare a management and maintenance plan and ensure there is a mechanism for its implementation		√				
Bat Habitat Mitigation/Compensation	Recognise the principles involved in designing and implementing measures for impact avoidance, mitigation and compensation for bat habitats	how habitat fragmentation affects bat populations		√				
		how lighting can affect bat activity		√				
		the general principles concerning habitat management for bats		√				
		how habitats can be enhanced for bats		√				
		how some impacts are detrimental to some bat species, but are good for other bats or other animal species		√				
		the nature of cumulative impacts of habitat change		√				
	Design and implement a strategy to compensate for impacts arising from habitat loss	liaise with landscape architects to devise mitigation schemes to avoid habitat fragmentation both on site and in the surrounding landscape		√				
		liaise with lighting engineers to ensure that bat habitats are not impacted by lighting		√				
		produce generic habitat management measures to benefit most British bat species		√				
		use experience and survey results to devise schemes to benefit specific species		√				
		promote site-specific habitat management measures		√				
		promote species-specific habitat management measures		√				
		produce detailed management plans for sites with important bat populations (including designated sites) and balance the needs of bats against other conservation priorities				√		
Post-construction monitoring	Recognise the principles involved in post-construction monitoring	the importance of defining success in a bat roost mitigation and compensation project		√				
		the difference between implementation and efficacy of mitigation and compensation measures		√				
		when post-construction monitoring is appropriate		√				

Section	Performance Criteria You must be able to:	Knowledge and skills You must know and understand/You must be able to:	1	2	3	4	S
		the importance of post-construction monitoring in assessing implementation, applying adaptive management and assessing effectiveness		√			
		the importance of using a methodology in post-construction monitoring that allows comparison with pre-construction survey results		√			
		where to send your data		√			
		how bat data is used by different recipients and issues surrounding confidentiality		√			
		how bat data contribute to bat conservation		√			
		the legal and conservation importance of bat monitoring as part of the mitigation licence application process		√			
	Design and implement an appropriate post-construction monitoring strategy and submit data via appropriate channels	what methods of monitoring are most appropriate for any given site		√			
		define what you consider to be the desired outcome in a bat roost mitigation and compensation project		√			
		define the aims and objectives of post-construction monitoring		√			
		design and implement a post-construction monitoring strategy as part of the mitigation licence process		√			
		secure site access and fees to ensure that post-construction monitoring can go ahead		√			
		report on the results of post-construction monitoring		√			
		submit data to the Local Environmental Records Centre either directly or using Ecobat		√			