European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC)

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Supporting documentation for the conservation status assessment for the species:

S1323 - Bechstein's bat (*Myotis bechsteinii*)

WALES

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this species, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this species is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species) and/or (iv) the field was only relevant at UK-level (sections 9 Future prospects and 10 Conclusions).
- For technical reasons, the country-level future trends for Range, Population and Habitat for the species are only available in a separate spreadsheet that contains all the country-level supporting information.
- The country-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (Wales information only)**
1.2 Species code	**1323**
1.3 Species scientific name	**Myotis bechsteinii**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Bechstein's bat

2. Maps

2.1 Sensitive species	No
2.2 Year or period	1995-2016
2.3 Distribution map	Yes
2.4 Distribution map Method used	Based mainly on extrapolation from a limited amount of data
2.5 Additional maps	No

3. Information related to Annex V Species (Art. 14)

3.1 Is the species taken in the wild/exploited?	No	
3.2 Which of the measures in Art. 14 have been taken?	a) regulations regarding access to property	No
	b) temporary or local prohibition of the taking of specimens in the wild and exploitation	No
	c) regulation of the periods and/or methods of taking specimens	No
	d) application of hunting and fishing rules which take account of the conservation of such populations	No
	e) establishment of a system of licences for taking specimens or of quotas	No
	f) regulation of the purchase, sale, offering for sale, keeping for sale or transport for sale of specimens	No
	g) breeding in captivity of animal species as well as artificial propagation of plant species	No
	h) other measures	No

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3.3 Hunting bag or quantity taken in the wild for Mammals and Acipenseridae (Fish)

a) Unit

b) Statistics/ quantity taken	Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period					
	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
Min. (raw, ie. not rounded)						
Max. (raw, ie. not rounded)						
Unknown	No	No	No	No	No	No

3.4. Hunting bag or quantity taken in the wild Method used

3.5. Additional information

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Atlantic (ATL)

4.2 Sources of information

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5. Range

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5.1 Surface area (km²)		
5.2 Short-term trend Period		
5.3 Short-term trend Direction	Uncertain (u)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used		
5.6 Long-term trend Period		
5.7 Long-term trend Direction		
5.8 Long-term trend Magnitude	a) Minimum	b) Maximum
5.9 Long-term trend Method used		
5.10 Favourable reference range	a) Area (km²) b) Operator c) Unknown d) Method	
5.11 Change and reason for change in surface area of range	Use of different method The change is mainly due to:	Use of different method
5.12 Additional information		

6. Population

6.1 Year or period	2016-2017	
6.2 Population size (in reporting unit)	a) Unit b) Minimum c) Maximum d) Best single value	number of individuals (i) 120 630
6.3 Type of estimate	95% confidence interval	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit b) Minimum c) Maximum d) Best single value	
6.5 Type of estimate		
6.6 Population size Method used	Based mainly on extrapolation from a limited amount of data	
6.7 Short-term trend Period	2007-2018	
6.8 Short-term trend Direction	Unknown (x)	
6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval	
6.10 Short-term trend Method used	Insufficient or no data available	
6.11 Long-term trend Period		
6.12 Long-term trend Direction		

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6.13 Long-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval
6.14 Long-term trend Method used	
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size b) Operator c) Unknown d) Method
6.16 Change and reason for change in population size	Improved knowledge/more accurate data Use of different method The change is mainly due to: Use of different method
6.17 Additional information	

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)?	Unknown
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	
7.2 Sufficiency of area and quality of occupied habitat Method used	Insufficient or no data available	
7.3 Short-term trend Period	2007-2018	
7.4 Short-term trend Direction	Unknown (x)	
7.5 Short-term trend Method used	Insufficient or no data available	
7.6 Long-term trend Period		
7.7 Long-term trend Direction		
7.8 Long-term trend Method used		
7.9 Additional information		

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Conversion to other types of forests including monocultures (B02)	H
Logging (excluding clear cutting) of individual trees (B06)	H
Removal of dead and dying trees, including debris (B07)	H
Removal of old trees (excluding dead or dying trees) (B08)	H
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	M
Logging without replanting or natural regrowth (B05)	M

Application of synthetic fertilisers in forestry, including liming of forest soils (B19)	M
Other invasive alien species (other then species of Union concern) (I02)	M

Threat	Ranking
Conversion to other types of forests including monocultures (B02)	H
Logging (excluding clear cutting) of individual trees (B06)	H
Removal of dead and dying trees, including debris (B07)	H
Removal of old trees (excluding dead or dying trees) (B08)	H
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	M
Logging without replanting or natural regrowth (B05)	M
Application of synthetic fertilisers in forestry, including liming of forest soils (B19)	M
Other invasive alien species (other then species of Union concern) (I02)	M

8.2 Sources of information

8.3 Additional information

9. Conservation measures

9.1 Status of measures

a) Are measures needed? Yes

b) Indicate the status of measures Measures identified and taken

9.2 Main purpose of the measures taken: Maintain the current range, population and/or habitat for the species

9.3 Location of the measures taken: Both inside and outside Natura 2000

9.4 Response to the measures: Long-term results (after 2030)

9.5 List of main conservation measures

Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation (CB01)
Adapt/manage reforestation and forest regeneration (CB04)
Adapt/change forest management and exploitation practices (CB05)
Stop forest management and exploitation practices (CB06)
Manage the use of chemicals for fertilisation, liming and pest control in forestry (CB09)
Restore small landscape features on agricultural land (CA02)

9.6 Additional information

10. Future prospects

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10.1 Future prospects of parameters	a) Range b) Population c) Habitat of the species
10.2 Additional information	

11. Conclusions

11.1. Range	
11.2. Population	
11.3. Habitat for the species	
11.4. Future prospects	
11.5 Overall assessment of Conservation Status	
11.6 Overall trend in Conservation Status	
11.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status No change The change is mainly due to: b) Overall trend in conservation status No change The change is mainly due to:
11.8 Additional information	

12. Natura 2000 (pSCIs, SCIs and SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network (on the biogeographical/marine level including all sites where the species is present)	a) Unit b) Minimum c) Maximum d) Best single value
12.2 Type of estimate	
12.3 Population size inside the network Method used	Insufficient or no data available
12.4 Short-term trend of population size within the network Direction	Unknown (x)
12.5 Short-term trend of population size within the network Method used	Insufficient or no data available
12.6 Additional information	

13. Complementary information

13.1 Justification of % thresholds for trends	

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13.2 Trans-boundary assessment

13.3 Other relevant Information

Distribution Map

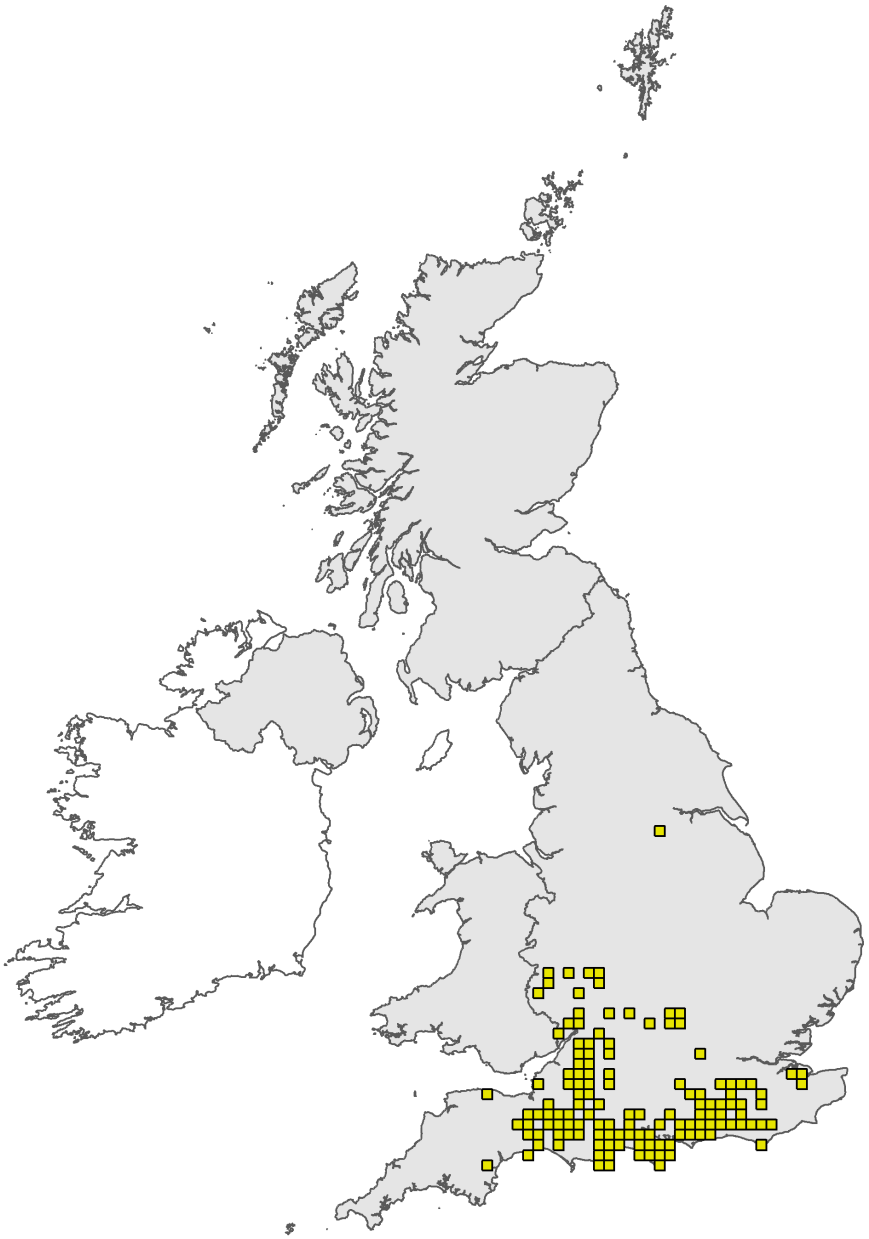

Figure 1: UK distribution map for S1323 - Bechstein's bat (*Myotis bechsteinii*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available species records within the current reporting period. For further details see the 2019 Article 17 UK Approach document.

Range Map

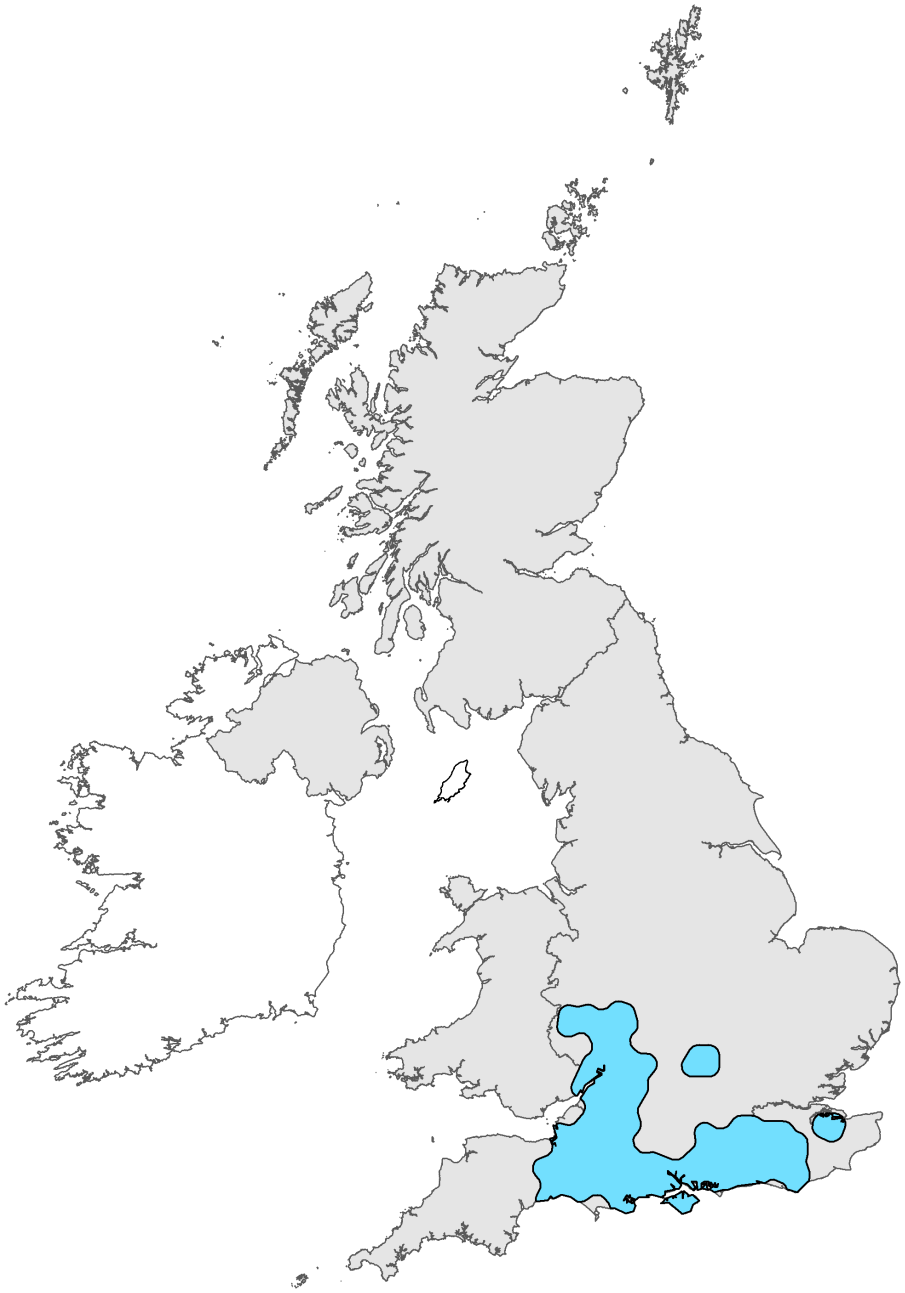

Figure 2: UK range map for S1323 - Bechstein's bat (*Myotis bechsteinii*).Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The range map has been produced by The Mammal Society applying a range mapping tool as outlined in Matthews et al. (2018), to the 10km grid square distribution map presented in Figure 1. The alpha value for this species was 20km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Species name: Myotis bechsteinii (1323)

Field label	Note
2.2 Year or Period	The time period has been selected as distribution has been calculated using data from Mathews et al. 2018.
2.4 Distribution map; Method used	Bechstein's bat is a rare and poorly-recorded species. A recent project has greatly improved our knowledge of the range of the species in England (Miller 2012), but there is very little information for Wales. The personal studies of a bat researcher undertaking trapping surveys close to the English border in southern Monmouthshire has recorded multiple individuals over several seasons. During the 2018 survey season a pregnant female was radio-tracked to a roost shared with a number of other individuals suggesting that this species should now be considered as breeding and resident within Wales (S. Davidson pers. comms.).Quiet echolocation calls with significant overlap in it call parameters with other Myotis species mean this species cannot be monitored with bat detectors. Roosts are difficult to detect. Catching surveys with lures have successfully located new populations in England, and now in Wales, but are resource intensive. Specifically targeted survey effort is required to further determine the status and distribution of the species in Wales.

Species name: Myotis bechsteinii (1323) Region code: ATL

Field label	Note
5.3 Short term trend; Direction	Given the significant change to the method for range determination we are uncertain of the nature and degree of change in short-term range trend for this species.
5.11 Change and reason for change in surface area of range	Area of land (including unsuitable habitat) contained within the Welsh range is given as 155 km2; habitable area within this is give as 29 km2 (Mathews et al. 2018). Range is based on presence data collected between 1995-2016. Areas that contain very isolated records may not have been included in the area of distribution. Range has been taken from Mathews et al. 2018, whereby an alpha hull value of 20km was drawn around the presence records, which represented the best balance between the inclusion of unoccupied sites (i.e. where records are sparse but close enough for inclusion) and the exclusion of occupied areas due to gaps in the data (i.e. where records exist but are too isolated for inclusion). An additional 10km buffer was added to the final hull polygon to provide smoothing to the hull and to ensure that the hull covered the areas recorded rather than intersecting them. Bechstein's bat is a rare and poorly-recorded species. A recent project has greatly improved our knowledge of the range of the species (Miller 2012) in England, but there is very little information for Wales other than individual's personal studies. Quiet echolocation calls with significant overlap in it call parameters with other Myotis species mean this species cannot be monitored with bat detectors. Roosts are difficult to detect. Catching surveys with lures have successfully located new populations in England but are resource intensive. Further specifically targeted survey effort is required to determine the status and distribution of the species in Wales. Mathews et al. 2018 states 'No breeding colonies are currently known in Wales ... However, expert opinion suggests that there are suitable areas of habitat in South Wales. Given the presence of breeding colonies in Herefordshire, Worcestershire and Gloucestershire, it is likely that the species also breeds in Wales.' Following the publication of Mathews et al. 2018, a probable materity roost for the species has been recorded in Wales and it should now be considered as breeding and resident within Wales (S. Davidson pers. comms.).

6.2 Population size	Mathews et al. 2018 population estimates were derived by first calculating the adult bat density (bats/km2) within poor, average and good habitat and then multiplying this with the total habitable area within their range to give lower, median and upper population estimates. Habitable area was here defined as only broadleaved woodland because of the very strong dependency of maternity colonies on roost locations within woodland, and is given as 29 km2. Details of calculations are as follows: Roost Size Median roost size = 42.5, Lower plausible size for typical roosts = 25, Upper plausible size for typical roosts = 90 Adult bat density (bats/km2) Median adult density (bats/km2) = ((median bats/roost[1]) * (propn. roost female) * (typical n roosts/typical km2 broadleaved woodland)) * 2 Lower limit = ((lowest plausible n. adults/typical roost) * (propn. roost female) * (plausible n. roosts /typical km2 poor quality broadleaved woodland))* 2 Upper limit = ((upper plausible n. adults/typical roost) * (propn. roost female) * (plausible n. roosts /typical km2 good quality broadleaved woodland))* 2 [1] 'roost' here means maternity roost in the pre-parturition period Population size Total Adult Population = Median adult density in mixed habitat (bats/km2) * total habitable area within range (km2) Lower Limit=Lower limit adult density in mixed habitat (bats/km2) * total habitable area within range (km2) Upper Limit=Upper limit adult density in mixed habitat (bats/km2) * total habitable area within range (km2)
6.6 Population size; Method used	The population estimate and the upper and lower limits associated with it are based in part on our current understanding of the species range in Wales. This is poorly understood currently and could change significantly in the future which would in turn have a significant impact on any estimated population size.
6.8 Short term trend; Direction	Insufficient data is availible to determine trend. Harris et al. 1995, gave a population estimate of 1,000 M. bechsteinii for England with unknown status for Wales.
6.17 Additional information	Whilst there have been studies on many areas of Bechstein's bat ecology, current information on all aspects of reproduction, mortality and age structure is not available.

7.1 Sufficiency of area and quality of occupied habitat	- area = Area of land (including unsuitable habitat) contained within the Welsh range is given as 155 km2; habitable area (defined as broadleaved woodland) within this is give as 29 km2 (Mathews et al. 2018). There has been no systematic ground-truthing of this figure. -quality = Unknown - No or insufficient reliable information available Overall = Unknown - The species has only recently been confirmed as breeding within Wales. Ground truthing of the estimated population and range from Mathews et. al. 2018 has not yet been undertaken and the quality of the indicated habitats have not been assessed. Therefore unknown has been selected. M. bechsteinii requires a complex mosaic of habitats to support foraging, roosting and commuting behaviour however the favoured habitat for maternity colonies is unevenly aged, ancient or semi-natural deciduous woodland with a high number of oaks in the species mix and a dense mixed species understorey. A minimum of 40-50 hectares of woodland is required to maintain an average maternity colony and very large continuous areas of high forest are less favoured than slightly fragmented structurally diverse woodlands. Small streams that have at least some water in the summer are an important requirement for most woodlands with maternity colonies, as is connectivity of woodland patches by hedgerows (Greenaway & Hill, 2004). Orchards with old trees also provide good foraging habitat, where they exist (Boye & Dietz 2005). The size of individual home ranges differs in relation to habitat quality: In optimal areas a home range might be smaller than 3 hectares (old oak forests or oak and beech forests), at other places its size is 15-30 hectares. However, in coniferous forests home ranges of more than 100 hectares have been recorded. Females of a maternity colony seem to use individual foraging areas exclusively for several years. Home ranges of neighbouring colonies are separated. The species shows a comparatively small range of movement around the summer roost, sometimes less than 1 kilometre. Main foraging areas are usually at distances of 500-1,500 metres from the roost, but can be nearly 4km and tend to be smaller in continuous woodlands than fragmented forests (Boye & Dietz 2005). Most summer roosts are in woodpecker holes, sometimes behind loose bark or in tree crevices. Maternity colonies also use bat boxes and move roost sites frequently throughout the season. Roosts are found at a height of 0.5-18 metres. An excellent woodland would provide in excess of a dozen large available roosts within the forage woodland and many other smaller holes (Greenaway & Hill, 2004). In winter the species is recorded roosting singly in underground hibernation sites (caves, mines, cellars), although its likely most of the population hibernate in tree holes or behind loose bark, but this is not proven. Usually distances between summer and winter roosts are quite small but can be as much as 39 km.
7.2 Sufficiency of area and quality of occupied habitat; Method used	Although the habitat requirmements for this species are fairly well established, it has only recently been confirmed as breeding within Wales. Ground truthing of the estimated population and range from Mathews et al. 2018 has not yet been undertaken and the quality of the indicated habitats have not been assessed.
7.4 Short term trend; Direction	There is insufficient data on any change in the level of suitable habitat or any change in the quality of habitat for the species.

8.1 Characterisation of pressures/ threats	Pressures: B02 - Conversion to other types of forests including monocultures, B05 - Logging without replanting or natural regrowth, B06 - Logging (excluding clear cutting) of individual trees, B07 - Removal of dead and dying trees, including debris, B08 - Removal of old trees (excluding dead or dying trees), B09 - Clear-cutting, removal of all trees, B19 - Application of synthetic fertilisers in forestry, including liming of forest soils: M. bechsteinii is strongly associated with woodland, both for roosting and foraging, though it also uses underground places for hibernation. Specialist habitat requirements, low population density and slow population growth are likely to have made this species particularly vulnerable to factors such as: loss and fragmentation of ancient deciduous woodland habitat; the loss, destruction and disturbance of roosts in trees and underground sites; and the reduction in numbers of insect prey. E01 - Roads, paths, railroads and related infrastructure: These pressures also act via construction of new, and widening/realignment of existing linear infrastructure projects. Road casualities have been reported in continental Europe. Lighting from urbanisation and infrastructure can sever commuting routes, impact foraging areas and delay emergence times. A05 - Removal of small landscape features: loss of foraging habitat, severance of commuting routes and isolation of colonies is a threat. I02 - Other invasive alien species (other then species of Union concern): This pressure best aligns to the recently established I05 category (plant and animal diseases, pathogens and pests) however this category isn't currently available for internal UK reporting purposes. This species is reliant on tree roosts and moves roosts frequently, requiring a large number of trees with suitable crevices. Loss of native broadleaf trees through new pathogens (such as Chalara fraxinea) could have a serious long term impact through reduction of resource. Threats: B02 - Conversion to other types of forests including monocultures, B05 - Logging without replanting or natural regrowth, B06 - Logging (excluding clear cutting) of individual trees, B07 - Removal of dead and dying trees, including debris, B08 - Removal of old trees (excluding dead or dying trees), B09 - Clear-cutting, removal of all trees, B19 - Application of synthetic fertilisers in forestry, including liming of forest soils: M. bechsteinii is strongly associated with woodland, both for roosting and foraging, though it also uses underground places for hibernation. Specialist habitat requirements, low population density and slow population growth will continue to make this species particularly vulnerable to factors such as: loss and fragmentation of ancient deciduous woodland habitat; the loss, destruction and disturbance of roosts in trees and underground sites; and the reduction in numbers of insect prey. E01 - Roads, paths, railroads and related infrastructure: Construction of new, and widening/realignment of existing linear infrastructure projects combined with lighting from urbanisation and infrastructure severing commuting routes, impact foraging areas and delay emergence times are all threats that are likey to continue into the future. A05 - Removal of small landscape features: loss of foraging habitat, severance of commuting routes and isolation of colonies is a threat that is likey to continue into the future. I02 - Other invasive alien species (other then species of Union concern): This pressure best aligns to the recently established I05 category (plant and animal diseases, pathogens and pests) however this category isn't currently available for internal UK reporting purposes. This species is reliant on tree roosts and moves roosts frequently, requiring a large number of trees with suitable crevices. Loss of native broadleaf trees through new pathogens (such as Chalara fraxinea) could have a serious long term impact through reduction of resource. Further pathogens are likely to emerge and this remains a future threat.

9.5 List of main conservation measures	CB01 - Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation, CB04 - Adapt/manage reforestation and forest regeneration, CB05 - Adapt/change forest management and exploitation practices, CB06 - Stop forest management and exploitation practices, CB09 - Manage the use of chemicals for fertilisation, liming and pest control in forestry, CA02 - Restore small landscape features on agricultural land: Low population density and slow population growth are likely to make this species particularly vulnerable to factors such as loss and fragmentation of ancient deciduous woodland habitat, trees and underground sites and the reduction in numbers of insect prey due to habitat simplification and factors such as fertiliser and pesticide use. The availability of large deciduous woodlands, containing dead and dying mature trees with features that can support roosting bats are major factors likely to affect the species status. Legal and administrative measures continue to be required to ensure that the protection provided by the legislation is effective. However, although some measures have been identified for the species, the list is likely to be incomplete as several knowledge gaps persist for this species and further research is needed to identify further measures and the practical implementation of those measures for this species.
10.1 Future prospects of parameters	The future prospects of range for this species in Wales is currently unknown. The rarity of the species and a lack of systematic survey leaves its current range poorly understood thus predicting future prospects is challenging. Should the species be recorded in new areas in the future it will be difficult to distinguish between recent range increase and simply the discovery of long existing populations outside of the currently predicted range, which is based on modelling of current data. The future prospects of population for this species in Wales is currently unknown. The species has only recently been confirmed as breeding within Wales and monitoring for population change of such an infrequently encountered bat would be extremely difficult. The future prospects of habitat of the species in Wales is currently unknown. Due to the rarity of the species and and their requirement for high value habitats including ancient and semi-natural deciduous woodland, managing habitats specifically for the species is difficult and habitat may be lost unknowingly.
12.1 Population size inside the pSCIs, SCIs and SACs network	Unknown. Insufficent data is available to make this assessment. Currently there are no SACs in Wales where M. bechsteinii are listed as a qualifying feature, although presence is now known within the Wye Valley Woodlands SAC. Further survey is required to assess the species status within this SAC.