Report under The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A

2019-2024

Conservation status assessment for the species:

S6216 - Slender green feather- moss

(*Hamatocaulis vernicosus*)

Wales

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This report was produced by JNCC in collaboration with Natural Resources Wales.

This document should be cited as:

Natural Resources Wales and JNCC. (2026). Conservation status assessment for the species: S6216 Slender green feather- moss (*Hamatocaulis vernicosus*).

Important note - Please read

- The information in this document represents the Wales Report under The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A, for the period 2019-2024.
- It is based on supporting information provided by Natural Resources Wales, which is documented separately.
- The Habitats Regulations reporting 2019-2024 Approach Document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.
- Maps showing the distribution and range of the species are included.
- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the assessments. Further underpinning explanatory notes are available in the related country reports.
- 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; and/or (iii) the field was not relevant to this species (section 12 National Site Network coverage for Annex II species).

Further details on the approach to the Habitats Regulations Reporting 2019-2024 are available on the JNCC website.

Assessment Summary: Slender green feather- moss

Distribution Map

Range Map

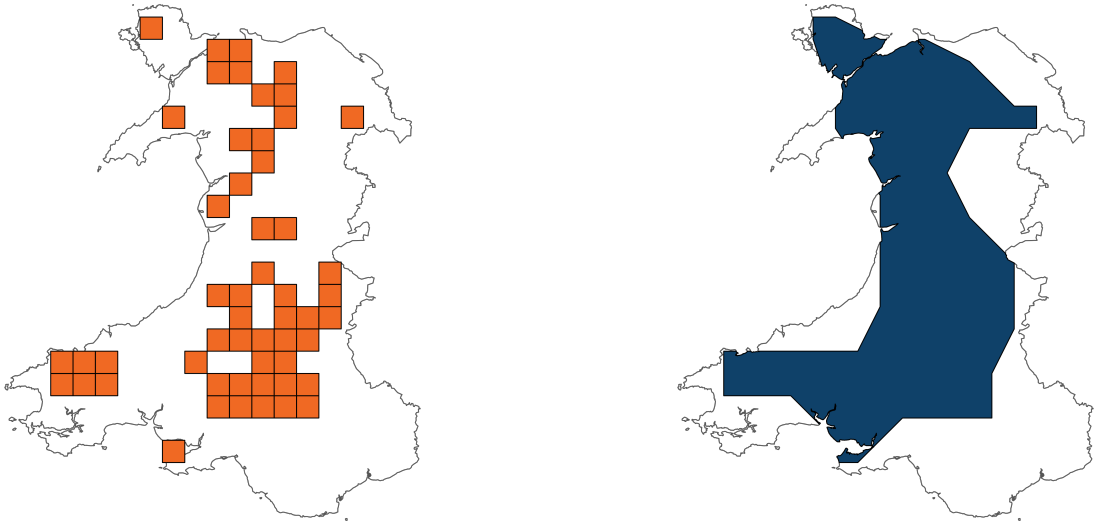

Figure 1: Wales distribution and range map for S6216 - Slender green feather- moss (*Hamatocaulis vernicosus*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority. The 10km grid square distribution map is based on available species records within the current reporting period.

Table 1: Table summarising the conservation status for S6216 - Slender green feather- moss (*Hamatocaulis vernicosus*). Overall conservation status for species is based on assessments of range, population, habitat for the species, and future prospects.

Overall Conservation Status (see section 11)

Unfavourable-inadequate (U1)

Breakdown of Overall Conservation Status

Range (see section 5)	**Favourable (FV)**
Population (see section 6)	**Favourable (FV)**
Habitat for the species (see section 7)	**Unknown (XX)**
Future prospects (see section 10)	**Unfavourable-inadequate (U1)**

List of Sections

National Level

1. General information

1.1 Country	Wales
1.2 Species code	S6216
1.3 Species scientific name	*Hamatocaulis vernicosus*
1.4 Alternative species scientific name	
1.5 Common name	Slender green feather- moss
Annex(es)	II

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2001-2024
2.3 Distribution map	Yes
2.4 Distribution map; Method used	Complete survey or a statistically robust estimate

2.5 Additional information

No additional information

3. Information related to Annex V Species

3.1 Is the species taken in the wild / exploited?

3.2 What measures have been taken?

a) Regulations regarding access to property
b) Temporary or local prohibition on the taking of specimens in the wild and exploitation
c) Regulation of the periods and/or methods of taking specimens
d) Application of hunting and fishing rules which take account of the conservation of such populations

e) Establishment of a system of licences for taking specimens or of quotas

f) Regulation of the purchase, sale, offering for sale, keeping for sale, or transport for sale of specimens

g) Breeding in captivity of animal species as well as artificial propagation of plant species

Other measures

Other measures description

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

a) Unit

Table 2: Quantity taken from the wild during the reporting period (see 3.3a for units). For species with defined hunting seasons, Season 1 refers to 2018/2019 (autumn 2018 to spring 2019), and Season 6 to 2023/2024. For species without hunting seasons, data are reported by calendar year: Year 1 is 2019, and Year 6 is 2024.

	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
b) Minimum	-	-	-	-	-	-
c) Maximum	-	-	-	-	-	-
d) Unknown	-	-	-	-	-	-

3.4: Hunting bag or quantity taken in the wild; Method used

3.5: Additional information

No additional information

Biogeographical Level

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs ATL

4.2 Sources of information

See section 14 References

5. Range

5.1 Surface area (km²)	11,527.11
5.2 Short-term trend; Period	2019-2024
5.3 Short-term trend; Direction	Stable
5.4 Short-term trend; Magnitude	
a) Estimated minimum	
b) Estimated maximum	
c) Pre-defined range	
d) Unknown	No
e) Type of estimate	Best estimate
f) Rate of decrease	
5.5 Short-term trend; Method used	Complete survey or a statistically robust estimate
5.6 Long-term trend; Period	2013-2024
5.7 Long-term trend; Direction	Stable
5.8 Long-term trend; Magnitude	
a) Minimum	
b) Maximum	
c) Rate of decrease	

5.9 Long-term trend; Method used	Complete survey or a statistically robust estimate

5.10 Favourable Reference Range (FRR)

a) Area (km²)	
b) Pre-defined increment	Current range is less than 2% smaller than the FRR
c) Unknown	No
d) Method used	Reference-based approach
e) Quality of information	moderate

5.11 Change and reason for change in surface area of range

a) Change	Yes
b) Genuine change	No
c) Improved knowledge or more accurate data	Yes
d) Different method	No
e) No information	No
f) Other reason	No
g) Main reason	Improved knowledge/more accurate data

5.12 Additional information

No additional information

6. Population

6.1 Year or period	2019-2024

6.2 Population size (in reporting unit)

a) Unit	number of map 1x1 km grid cells
b) Minimum	34
c) Maximum	162

d) Best single value	147
6.3 Type of estimate	Best estimate
6.4 Quality of extrapolation to reporting unit	moderate

6.5 Additional population size (using population unit other than reporting unit)

a) Unit	number of map 10x10 km grid cells
b) Minimum	16
c) Maximum	55
d) Best single value	52
e) Type of estimate	Best estimate
6.6 Population size; Method used	Complete survey or a statistically robust estimate
6.7 Short-term trend; Period	2013-2024
6.8 Short-term trend; Direction	Stable
6.9 Short-term trend; Magnitude	
a) Estimated minimum	
b) Estimated maximum	
c) Pre-defined range	
d) Unknown	
e) Type of estimate	
f) Rate of decrease	
6.10 Short-term trend; Method used	Based mainly on extrapolation from a limited amount of data
6.11 Long-term trend; Period	2001-2024
6.12 Long-term trend; Direction	Decreasing
6.13 Long-term trend; Magnitude	

a) Minimum	0.05
b) Maximum	0.72
c) Confidence interval	
d) Rate of decrease	Decreasing <=1% (one percent or less) per year on average
6.14 Long-term trend; Method used	Based mainly on extrapolation from a limited amount of data

6.15 Favourable Reference Population (FRP)

ai) Population size	
aii) Unit	
b) Pre-defined increment	Current population is less than 5% smaller than the FRP
c) Unknown	No
d) Method used	Reference-based approach
e) Quality of information	moderate

6.16 Change and reason for change in population size

a) Change	Yes
b) Genuine change	No
c) Improved knowledge or more accurate data	Yes
d) Different method	No
e) No information	No
f) Other reason	No
g) Main reason	Improved knowledge/more accurate data

6.17 Additional information

No additional information

6.18 Age structure, mortality and reproduction deviation	No deviation from normal

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat (for long-term survival)

a) Is area of occupied habitat sufficient?	Yes
b) Is quality of occupied habitat sufficient?	Unknown
c) If No or Unknown, is there a sufficiently large area of unoccupied habitat of suitable quality?	Unknown

7.2 Sufficiency of area and quality of occupied habitat; Method used

a) Sufficiency of area of occupied habitat; Method used	Based mainly on extrapolation from a limited amount of data
b) Sufficiency of quality of occupied habitat; Method used	Based mainly on extrapolation from a limited amount of data

7.3 Short-term trend; Period	2013-2024
7.4 Short-term trend; Direction	Decreasing
7.5 Short-term trend; Method used	Based mainly on expert opinion with very limited data

7.6 Long-term trend; Period	
7.7 Long-term trend; Direction	
7.8 Long-term trend; Method used	

7.9 Additional information

No additional information

8. Main pressures

8.1 Characterisation of pressures

Table 3: Pressures affecting the species, including timing and importance/impact ranking. Pressures are defined as factors acting currently and/or during the reporting period (2019–2024). Rankings are: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

Pressure	Timing	Ranking
PA05: Abandonment of management/use of grasslands and other agricultural and agroforestry systems (e.g. cessation of grazing, mowing or traditional farming)	Ongoing and likely to be in the future	High (H)
PA08: Extensive grazing or undergrazing by livestock	Ongoing and likely to be in the future	High (H)
PA17: Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	High (H)
PA18: Agricultural activities generating air pollution	Ongoing and likely to be in the future	Medium (M)
PA22: Drainage for use as agricultural land	Ongoing and likely to be in the future	Medium (M)
PB01: Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing and likely to be in the future	Medium (M)
PI03: Problematic native species	Ongoing and likely to be in the future	Medium (M)
PK04: Atmospheric N-deposition	Ongoing and likely to be in the future	Medium (M)
PJ10: Change of habitat location, size, and / or quality due to climate change	Only in future	Medium (M)

8.2 Sources of information

See section 14 References

8.3 Additional information

No 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 National Site Network
9.4 Response to measures	Short-term results (within the current reporting period, 2019–2024)

9.5 List of main conservation measures

Table 4: Key conservation measures addressing current pressures and/or anticipated threats during the next two reporting periods (2025–2036). Measures are ranked by importance/impact: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

Conservation measure	Ranking
MA01: Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land	High (H)
MA03: Maintain existing extensive agricultural practices and agricultural landscape features	High (H)
MA11: Reduce/eliminate air pollution from agricultural activities	High (H)
MB01: Prevent conversion of (semi-) natural habitats into forests and of (semi-) natural forests into intensive forest plantation	High (H)
MH01: Reduce impact of military installations and activities	Medium (M)
MI05: Management of problematic native species	Medium (M)
MK01: Reduce impact of mixed source pollution	Medium (M)
MM01: Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes that occur without direct or indirect influence from human activities or climate change	High (H)

9.6 Additional information

No additional information

10. Future prospects

10.1a Future trends of parameters

ai) Range	Overall stable
bi) Population	Negative - decreasing <=1% (one percent or less) per year on average
ci) Habitat for the species	Negative - slight/moderate deterioration

10.1b Future prospects of parameters

aii) Range	Good
bii) Population	Poor
cii) Habitat for the species	Poor

10.2 Additional information

No additional information

11. Conclusions

11.1 Range	Favourable (FV)
11.2 Population	Favourable (FV)
11.3 Habitat for the species	Unknown (XX)
11.4 Future prospects	Unfavourable-inadequate (U1)
11.5 Overall assessment of Conservation Status	Unfavourable-inadequate (U1)
11.6 Overall trend in Conservation Status	Deteriorating

11.7 Change and reason for change in conservation status

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

11.7 Change and reason for change in conservation status trend

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

11.8 Additional information

No additional information

12. UK National Site Network (pSCIs, SCIs, SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network

a) Unit	number of map 1x1 km grid cells
b) Minimum	16
c) Maximum	52
d) Best single value	46
12.2 Type of estimate	Best estimate
12.3 Population size inside the network; Method used	Complete survey or a statistically robust estimate
12.4 Short-term trend of population size within the network; Direction	Stable
12.5 Short-term trend of population size within the network; Method used	Based mainly on extrapolation from a limited amount of data
12.6 Short-term trend of habitat for the species inside the pSCIs, SCIs and SACs network; Direction	Decreasing
12.7 Short-term trend of habitat for the species inside the pSCIs, SCIs and SACs network; Method used	Based mainly on extrapolation from a limited amount of data

12.8 Additional information

There was no monitoring of Hamatocaulis vernicosus on Welsh SAC in 2019-24 because it was considered a low priority given limited resources. Most colonies in SAC are believed to be subject to similar management to when the species was last monitored. However, surveillance in Mynydd Preseli SAC (Bosanquet, 2023) showed significant deterioration of colonies there due to declines in cattle grazing. If other SAC have also suffered reduced grazing then it is possible that the population in SAC will have declined more than the current estimates suggest. Increased surveillance or monitoring in 2025-2030 is desirable.

13. Complementary information

13.1 Justification of percentage thresholds for trends

No justification information

13.2 Trans-boundary assessment

Modelling suggests that there are likely to be some impacts of Trans-boundary air pollution on Hamatocaulis vernicosus habitat, but that short- and medium-range agricultural and industrial N sources are the primary contributors to N deposition in the areas where Hamatocaulis grows. Direct impacts of N deposition on Hamatocaulis are likely to be minor compared with indirect impacts from enhanced vascular plant growth.

13.2 Other relevant information

No other relevant information

14. References

Biogeographical and marine regions

4.2 Sources of information

Aderyn database, accessed 14th February 2024.

Blockeel, T.L., Bosanquet, S.D.S., Hill, M.O. & Preston, C.D., 2014, Atlas of British and Irish bryophytes. Pisces Publications, Newbury.

Bosanquet, S.D.S., Hale, A.D., Motley, G.S. & Woods, R.G. 2006, Recent work on Hamatocaulis vernicosus in Mid and South Wales. Field Bryology.

British Bryological Society database, accessed 14th February 2024.

Hedenäs, L., Collart, F., Heras, P., Infante, M., Kooijman, A. & Kučera, J. 2022. Distributions and habitats of the two partly allopatric cryptic species of the vulnerable moss Hamatocaulis vernicosus (Bryophyta) in Europe. Bot. J. Linn. Soc. 200: 233-254.

Main pressures

8.2 Sources of information

No sources of information

15. Explanatory Notes

Field label	Note
2.4: Distribution map; Method used	The map covers the years 2001-2024 (in the last reporting round it was 1989-2018). Most colonies with records from 1989 to 2000 have been relocated more recently. However, only 16 of the 53 10x10km squares from which Hamatocaulis has been recorded since 2001 have actually been revisited during the current reporting period. The remainder are thought to be in similar condition to when they were last surveyed and are considered to be unlikely to have lost H. vernicosus.
5.11: Change and reason for change in surface area of range	Most data come from the British Bryological Society, as was the case in the last reporting period. However, one additional recorder from North Wales provided data to the Cofnod LERC during this reporting period and his data were included. He did not record during previous reporting periods, so inclusion of his data is a minor change in coverage and therefore overall accuracy.
6.1: Year or Period	The distribution map represents the population in the current reporting period (2019-2024) but includes records made between 2001 and 2024 because it is considered likely that most populations recorded in the 2000s are still present and that a map based solely on records made between 2019 and 2024 would very significantly under-represent the population.
6.6: Population size; Method used	The map and population estimate cover the years 2001 to 2024, updated slightly from the 1989 to 2018 period used in the last reporting round. Most sites with records from 2001 to 2017 have not been revisited during the reporting period: only nine sites were revisited in the current reporting period because H. vernicosus was considered a low priority for monitoring and surveillance. 25 new sites were discovered, mostly in north Wales, and these combine with the nine revisits to give an absolute minimum population of 34 1x1 km squares observed during the current reporting period. The majority of sites from which Hamatocaulis was recorded since 2001 are thought to be in similar condition

	to when they were surveyed and are considered to be unlikely to have lost H. vernicosus: the best estimate population is therefore the 147 occupied 1x1 km squares with records from 2001 to 2024. It is possible that some of the 1x1 km squares with records only from pre-2001 also retain Hamatocaulis, so the maximum possible population is 162 1x1 km squares.
6.8: Short-term trend; Direction	The overall short-term trend is considered stable though little recent monitoring or surveillance having been undertaken. The limited data suggests 34 recorded 1 km grid units 2019-24 compared with 41 recorded 1 km grid units 2013-2024. The difference between these figures is much smaller than during the last reporting round (7 vs 38 recorded 1 km grid units), highlighting how variable the data are and how relatively stable the population actually is.
6.13: Long-term trend; Magnitude	a) Min 5% (perhaps there has been some decline due to habitat loss) b) Max 72% (41 recorded 1 km grid units 2013-24 compared with 147 recorded 1 km grid units 2001-2024) Based on limited monitoring/surveillance data from previous rounds but not much in last two rounds.
6.14: Long-term trend; Method used	There was some limited surveillance of Hamatocaulis in the 2019-24 round, following no monitoring/surveillance in 2013-18 and limited monitoring in 2007-12. The species remains a low priority because it is widespread across much of the northern hemisphere. The mapping work that led to the discovery of most south Wales populations (Bosanquet et al., 2006) ceased in 2010 and most took place in the 2001-2006 round. The new colonies found in the 2013-18 period, all of which are outside the Natura 2000 series, were substantial and there is no reason to think that a significant decline has taken place anywhere in Wales. Previously unknown colonies at 25 sites, mostly in north Wales, reinforce the feeling that there has not been any significant decline.

6.16: Change and reason for change in population size	There has been less recording in south Wales during the last three reporting periods than in the early 2000s, but more recording in north Wales in the current period compared with before. The data in north Wales are therefore improved, although the overall picture remains based on records from a broad period (2001-2024) rather than on records from a single reporting round.
6.18: Age structure, mortality and reproduction	Sporophytes are very rare in Britain (Blockeel et al., 2014) and their absence in Wales appears to be typical of this dioicous species. There are no signs of unusual mortality in this species.
7.1: Sufficiency of area and quality of occupied habitat	Occupied area There are widespread colonies, although most are small. Occupied habitat quality Surveillance suggests most occupied sites are good quality, but deterioration was noted in Pembrokeshire. Unoccupied habitat There are many unoccupied flushes but they are assumed to be ecologically unsuitable. If ecological conditions are correct then Hamatocaulis tends to be present. Unoccupied habitat isn't really a relevant concept for this species.
7.4: Short-term trend; Direction	Surveillance in Mynydd Preseli SAC (Bosanquet, 2023) showed significant deterioration in the quality of the habitat at the colonies, with declines in shoot counts at all locations visited. This has not yet led to a decline in the population (as measured by occupied 1x1 km squares), so at present is best highlighted as decreasing quality of habitat for the species. This decreasing quality was not noted during surveillance of other colonies during the reporting period, especially in Bannau Brycheiniog National Park, and the quality of the habitat across the entire range of the species is largely unknown.

8.1: Characterisation of pressures	Undergrazing (PA08) and abandonment (PA05) are the primary observed cause of loss of quality of the Habitat for the Species in Pembrokeshire (Bosanquet, 2023). This is likely to be exacerbated by both agricultural water pollution (PA17) and air pollution (PA18 & PK04), encouraging the growth of bulky native species (PI03) such as Carex paniculata. One cluster of colonies is on an MOD range in mid Wales where military activity could cause damage to Hamatocaulis outside the relatively tightly circumscribed SSSI/SAC (PH01), whilst populations in north and mid Wales are known from flushes threatened by hydropower infrastructure (PD02), and one in eastern Wales grows in flushes threatened by windfarm infrastructure (PD01). Drainage (PA22) and afforestation (PB01) are plausible threats, but Hamatocaulis is so localised that these activities are rarely likely to impact on populations.
9.5: List of main conservation measures	Management on SSSIs (some of which are within the UK National Site Network, previously known as Natura 2000) is protecting much of the Hamatocaulis population (MI05 & MM01), although abandonment is a serious problem on some SSSI and additional management is sometimes urgently needed. Welsh Government agricultural policies prevent conversion of semi-natural habitats to agriculture (MA01, MA03) or forest (MB01). Agricultural (MA11) and non-agricultural (MK01) pollution are being controlled by EU, GB and Welsh policies. There is ongoing work with the military to protect one large Hamatocaulis population from damage during military activities (MH01).
11.1: Range	Conclusion on Range reached because: (i) the short-term trend direction in Range surface area is stable; and (ii) the current Range surface area is approximately equal to the Favourable Reference Range.
11.2: Population	Conclusion on Population reached because:(i) the short-term trend direction in Population size is stable; (ii) the current Population size is approximately equal to the Favourable Reference Population; and iii) reproduction, mortality and age structure not deviating from normal.

11.3: Habitat for the species	Conclusion on Habitat for the species reached because: i) the area of occupied habitat is sufficiently large for the long-term survival of the species (ii) it is unknown whether the quality of occupied habitat is suitable for the long-term survival of the species; iii) it is unknown whether there is a sufficiently large area of occupied and unoccupied habitat of suitable quality for long term survival; and (iv) the short-term trend in area of habitat is decreasing.
11.4: Future prospects	Conclusion on Future prospects reached because: (i) the Future prospects for Range are good; (ii) the Future prospects for Population are poor; and (iii) the Future prospects for Habitat for the species are poor.
11.5: Overall assessment of Conservation Status	Overall assessment of Conservation Status is Unfavourable-inadequate because one of the conclusions is Unfavourable-inadequate.
12.1: Population size inside the pSCIs, SCIs and SACs network	Best single value = 46 1x1 km grid units contain colonies of Hamatocaulis vernicosus that lie within the UK National Site Network (previously known as the Natura 2000 network). Despite no monitoring since 2012, the majority of SAC from which Hamatocaulis has been recorded since 2001 are thought to be in similar condition to when they were surveyed and are considered to be unlikely to have lost H. vernicosus. The best estimate population is therefore the 46 occupied 1x1 km squares with records in Natura 2000 sites from 2001 to 2024. It is possible that some of the 1x1 km squares with records only from pre-2001 also retain Hamatocaulis, so the maximum possible population in SAC is 52 1x1 km squares. It is just about conceivable that only the colonies actually seen during the reporting round are extant, so the minimum possible population in SACs in Wales is 16 1x1 km squares, although is considered highly unlikely to be the true situation.
6.15: Favourable Reference Population (FRP)	The UK-level FRV for population was developed by JNCC using an audit trail based on the year the FRV was first established and any changes made in subsequent reporting rounds. The audit may draw from any

	combination of the 2007, 2013, or 2019 Habitats Directive reports and reflects the full rationale used for the 2019 Article 17 reporting. This FRV was reviewed by Welsh experts and considered appropriate for use in Wales based on current population trends and abundance.
5.10: Favourable Reference Range (FRR)	The UK-level FRV for range was developed by JNCC using an audit trail based on the year the FRV was first established and any changes made in subsequent reporting rounds. The audit may draw from any combination of the 2007, 2013, or 2019 Habitats Directive reports and reflects the full rationale used for the 2019 Article 17 reporting. This FRV was reviewed by Welsh experts and considered appropriate for use in Wales based on current distribution and trends.