

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

2019-2024

Conservation status assessment for the species:

S1283 - Smooth snake

(*Coronella austriaca*)

England



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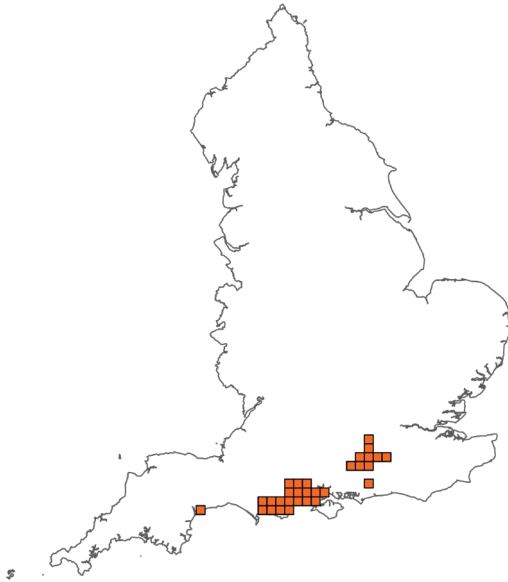
Important note - Please read

- The information in this document represents the England 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 England, 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: Smooth snake

Distribution Map



Range Map

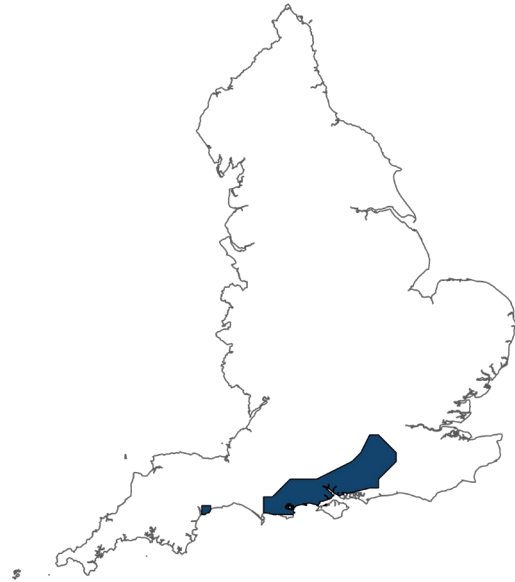


Figure 1: England distribution and range map for S1283 - Smooth snake (*Coronella austriaca*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority. 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 S1283 - Smooth snake (*Coronella austriaca*). 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)

Unfavourable-inadequate (U1)

Population (see section 6)

Unfavourable-inadequate (U1)

Habitat for the species (see section 7)

Unfavourable-inadequate (U1)

Future prospects (see section 10)

Unfavourable-inadequate (U1)

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National Level

1. General information

1.1 Country	England
1.2 Species code	S1283
1.3 Species scientific name	<i>Coronella austriaca</i>
1.4 Alternative species scientific name	
1.5 Common name	Smooth snake
Annex(es)	IV

2. Maps

2.1 Sensitive species	Yes
2.2 Year or period	2019-2024
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) 5,025.99

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

e) Type of estimate

f) Rate of decrease

5.5 Short-term trend; Method Complete survey or a statistically robust estimate used

5.6 Long-term trend; Period

5.7 Long-term trend; Direction

5.8 Long-term trend;
Magnitude

a) Minimum

b) Maximum

c) Rate of decrease

5.9 Long-term trend; Method used

5.10 Favourable Reference Range (FRR)

a) Area (km²)

b) Pre-defined increment Current range is between 2% and 10% smaller than the FRR

c) Unknown No

d) Method used Expert opinion

e) Quality of information moderate

5.11 Change and reason for change in surface area of range

a) Change No

b) Genuine change

c) Improved knowledge or more accurate data

d) Different method

e) No information

f) Other reason

g) Main reason

5.12 Additional information

Occupied Natural Range (unit = number of occupied 10km squares). The smooth snake is currently present in 32 10km squares in England and this number is steadily increasing as populations spread and new records are obtained or, in areas such as Devon, re-introductions are taking place. Excluding permanently lost habitats, nine additional 10km squares within the current natural range have some potential to support smooth snakes and work is currently underway by ARC to assess habitat potential and ensure the recovery of this species in these areas too. An operator has been set for FRR which is broadly equivalent to the FRR used in 2018, and is considered to be large enough to support a viable population. ARC have stated in that the favourable range should be 41 10km squares (pers. comm. ARC).

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

c) Maximum

d) Best single value 363

6.3 Type of estimate Minimum

6.4 Quality of extrapolation to reporting unit moderate

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

a) Unit

b) Minimum

c) Maximum

d) Best single value

e) Type of estimate

6.6 Population size; Method used Complete survey or a statistically robust estimate

6.7 Short-term trend; Period 2019-2024

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 Complete survey or a statistically robust estimate used

6.11 Long-term trend; Period

6.12 Long-term trend; Direction

6.13 Long-term trend; Magnitude

a) Minimum

b) Maximum

c) Confidence interval

d) Rate of decrease

6.14 Long-term trend; Method used

6.15 Favourable Reference Population (FRP)

a) Population size 1,117

aii) Unit number of map 1x1 km grid cells

b) Pre-defined increment

c) Unknown No

d) Method used Reference-based approach

e) Quality of information low

6.16 Change and reason for change in population size

a) Change No

b) Genuine change

c) Improved knowledge or more accurate data

d) Different method

e) No information

f) Other reason

g) Main reason

6.17 Additional information

Based on monitoring data collected between 2000 and 2019, the current value for the number of smooth snake populations in England is 363 occupied 1km squares. The distribution of smooth snake populations is strongly skewed towards a few 10km squares, especially in Dorset and the New Forest, that support significant areas of suitable habitat. However, only 8% is thought to be in good condition and only 8% of populations are considered to be fully viable and likely to persist in the long term (expert opinion and pers. comm ARC). Along with ARC's re-introduction programme (ARC 2020), habitat restoration and re-creation carried out by numerous organisations over the past 30 years, has allowed the natural spread of smooth snake populations. A minimum of 754 additional 1km squares in England have the potential to support smooth snakes in the future, although in reality the species is probably already present in a significant number of these squares but have yet to be recorded. The favourable value is that there are populations present in at least 1,117 1 km squares.

6.18 Age structure, mortality and reproduction deviation Unknown

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? Yes

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

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

a) Sufficiency of area of occupied habitat; Method used Complete survey or a statistically robust estimate

b) Sufficiency of quality of occupied habitat; Method used	Complete survey or a statistically robust estimate
7.3 Short-term trend; Period	2019-2024
7.4 Short-term trend; Direction	Stable
7.5 Short-term trend; Method used	Complete survey or a statistically robust estimate
7.6 Long-term trend; Period	
7.7 Long-term trend; Direction	
7.8 Long-term trend; Method used	

7.9 Additional information

Detailed figures for both the current and potential areas of lowland heathland habitats occupied by smooth snakes are lacking. Dry and humid heath in particular are inconsistently mapped across different counties, sometimes being mapped separately and sometimes being lumped together. The current area of all known occupied habitats is estimated to be 13,747 ha in England, although this figure will probably rise significantly higher as monitoring efforts increase. The extensive habitat restoration and re-creation work that has taken place in recent years, especially the large projects funded by agri-environment schemes and the National Lottery, has exposed many new areas of habitat. These occur either adjacent to existing smooth snake populations or on sites with re-introduction potential, and most have slowly developed a suitable structure for this species to thrive. In addition, extensive areas of potential habitat no doubt lie hidden beneath secondary woodland, conifer plantations, dense bracken stands and farmland in England. The figures for both the current and potential areas of habitat therefore urgently require updating so confidence in these values is currently low.

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
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PA07: Intensive grazing or overgrazing by livestock	Ongoing	High (H)
PA08: Extensive grazing or undergrazing by livestock	Ongoing	High (H)
PB01: Conversion to forest from other land uses, or afforestation (excluding drainage)	Ongoing	Medium (M)
PA01: Conversion into agricultural land (excluding drainage and burning)	Ongoing	Medium (M)
PB02: Conversion from one type of forestry land use to another	Ongoing	Medium (M)
PJ14: Other climate related changes in abiotic conditions	Only in future	Medium (M)
PF05: Sports, tourism and leisure activities	Ongoing	Medium (M)
PJ01: Temperature changes and extremes due to climate change	Ongoing and likely to be in the future	Medium (M)
PH08: Other human intrusions and disturbance not mentioned above	Ongoing	Medium (M)
PF02: Construction or modification (e.g. of housing and settlements) in existing built-up areas	Ongoing	Medium (M)
PM03: Natural wild fires	Ongoing	High (H)
PH04: Vandalism or arson (incl. human-introduced wild fire)	Ongoing	High (H)

8.2 Sources of information

See section 14 References

8.3 Additional information

PA07: Shifts in climatic conditions are impacting species globally (Pureswaran et al., 2018; Crick, 2004; Leech and Crick, 2007; Cleland et al. 2007). In England, it is anticipated by 2050, the average temperature may have risen between 2-4C when compared to data from 1981-2000 (Lowe et al., 2018). Current data states we are nearly 1.5C higher than pre-industrial levels in 2024 and are still projected to increase. For native herpetofauna, like many other species and their habitats, this will continue to

bring challenges. The effects of these are already being observed, with more frequent extreme weather events; hotter, drier summers with more frequent heatwaves, and warmer, wetter winters, together with increased frequency of storms and flooding events (Cook et al., 2005; Lowe et al., 2018). Research has shown that following exceptionally dry and hot spring weather, there was a dramatic decline in relative body mass and associated reduction in population size. The results showed that these negative impacts were due to a combination of low prey abundance and dehydration caused by the extreme climatic conditions during the previous summer (Madsen et al. 2022). Predicted climatic changes during winter may be reflected in the timing and duration of hibernation. Possibly related to these climatic threats is the emergence of Snake Fungal Disease (*Ophidiomyces ophiodiicola*). Together with the effects of climate change and infectious disease, populations have frequently become isolated leading to poor genetic diversity and viability (Foster et al, 2020).

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	Restore the habitat of the species (related to 'Habitat for the species')
9.3 Location of the measures taken	Both inside and outside National Site Network
9.4 Response to measures	Medium-term results (within the next two reporting periods, 2025–2036)

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
MA06: Stop mowing, grazing and other equivalent agricultural activities e.g. burning (incl. restore or improve habitats)	High (H)
MM02: Minimise/prevent impacts of geological and natural catastrophes	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)
MA01: Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land	High (H)
MB04: Adapt/manage reforestation and forest regeneration	High (H)
MF03: Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)	High (H)
MF01: Managing the impacts of converting land for construction and development of infrastructure	High (H)

9.6 Additional information

No additional information

10. Future prospects

10.1 a Future trends of parameters

ai) Range	Overall stable
bi) Population	Overall stable
ci) Habitat for the species	Overall stable

10.1 b Future prospects of parameters

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

10.2 Additional information

The priority conservation measures for this species remains to adapt mowing, grazing or other agricultural activity (e.g. burning) to allow restoration of habitat condition and population viability. Future trends for range and habitat extent remain stable. Future trends for habitat condition and population variability are thought to be ongoing decline.

11. Conclusions

11.1 Range	Unfavourable-inadequate (U1)
11.2 Population	Unfavourable-inadequate (U1)

11.3 Habitat for the species	Unfavourable-inadequate (U1)
11.4 Future prospects	Unfavourable-inadequate (U1)
11.5 Overall assessment of Conservation Status	Unfavourable-inadequate (U1)
11.6 Overall trend in Conservation Status	Stable

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

There are active nature conservation measures at many sites, but often these do not sufficiently incorporate the specific needs of the smooth snake. The main activities required are to adapt mowing, grazing or other agricultural activity (e.g. burning) to allow restoration of habitat condition and population viability. Also, management of predator threats and recreational disturbance; reducing the risk of fires. Alongside habitat requirements, sites need to provide high abundance of prey (other reptile species and small mammals). Reintroduction is currently limited e.g. loss of areas within Forestry landscapes to minerals, decline of donor populations viability and less availability of suitable sites, due to imbalanced heather management. If heather management can be resolved reintroduction options would increase. If these issues can be resolved, reintroductions would continue to play an important role in the recovery of this species, increasing the range and population size.

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

b) Minimum

c) Maximum

d) Best single value

12.2 Type of estimate

12.3 Population size inside the network; Method used

12.4 Short-term trend of population size within the network; Direction

12.5 Short-term trend of population size within the network; Method used

12.6 Short-term trend of habitat for the species inside the pSCIs, SCIs and SACs network; Direction

12.7 Short-term trend of habitat for the species inside the pSCIs, SCIs and SACs network; Method used

12.8 Additional information

No additional information

13. Complementary information

13.1 Justification of percentage thresholds for trends

No justification information

13.2 Trans-boundary assessment

No trans-boundary assessment information

13.2 Other relevant information

No other relevant information

14. References

Biogeographical and marine regions

4.2 Sources of information

Joint Nature Conservation Committee. 2019. Fourth Report by the United Kingdom under Article 17 on the implementation of the Habitats Directive from January 2013 to December 2018.

Foster, J., Driver, D., Ward, R. & Wilkinson, J. (2021). IUCN Red List assessment of amphibians and reptiles at Great Britain and country scale. Report to Natural England. ARC report. ARC, Bournemouth.

The Status of Great Britain's Amphibians and Reptiles, 2024. ARC report for Natural England.

Edgar, P. & Moulton, N. Definition of Favourable Conservation Status for the Smooth Snake *Coronella austriaca* in England. NE in prep, 2025

Bormpoudakis, D. & J. Tzanopoulos. 2016. Lidar-derived variable accurately predict habitat of a habitat-specialist reptile. Unpublished report by the Durrell Institute of Conservation & Ecology (University of Kent), for Amphibian & Reptile Conservation, Bournemouth

Reading, C.J. & G.M. Jofre. 2015. Habitat use by smooth snakes on lowland heathland managed using 'conservation grazing'. *Herpetological Journal* 25: 225- 231

ARC. 2020. Smooth Snake Translocation Plan. Unpublished report. Amphibian & Reptile Conservation, Bournemouth

Mousley, S. & Van Vliet, W. 2021. Defining favourable conservation status in England: Natural England approach. Natural England Evidence Information Note EIN062. Natural England, York <http://publications.naturalengland.org.uk/file/6113823347179520>

Main pressures

8.2 Sources of information

PA07: Pureswaran, D. S., Roques, A. & Battisti, A. (2018). Forest insects and climate change. *Current Forestry Reports*. 4 2 35-50.

PA08: Crick, H. Q. (2004). The impact of climate change on birds. *Ibis*. 146 48-56.

PB01: Leech, D. I. & Crick, H. Q. P. (2007). Influence of climate change on the abundance, distribution and phenology of woodland bird species in temperate regions. *Ibis*. 149 128-145.

PA01: Cleland, E. E., Chuine, I., Menzel, A., Mooney, H. A. & Schwartz, M. D. (2007). Shifting plant phenology in response to global change. *Trends in Ecology & Evolution*. 22 7 357-365.

PB02: The Status of Great Britain's Amphibians and Reptiles, 2024. ARC report for Natural England.

PJ14: Cook, B. I., Smith, T. M. & Mann, M. E. (2005). The North Atlantic Oscillation and regional phenology prediction over Europe. *Global Change Biology*. 11 6 919-926.

PF05: Lowe, J. A., Bernie, D., Bett, P., Bricheno, L., Brown, S., Calvert, D., Clark, R., Eagle, K., Edwards, T., Fosser, G., Fung, F., Gohar, L., Good, P., Gregory, J., Harris, G., Howard, T., Kaye, N., Kendon, E., Krijnen, J., Maisey, P., McDonald, R., McInnes, R., McSweeney, C., Mitchell, J. F. B., Murphy, J., Palmer, M., Roberts, C., Rostron, J., Sexton, D., Thornton, H., Tinker, J., Tucker, S., Yamazaki, K. & Belcher, S. (2018). UKCP18 Science Overview Report. Met Office Hadley Centre: Exeter, UK.

PJ01: Thomas Madsen, Jon Loman, Dirk Bauwens, Bo Stille, Håkan Anderberg, Lewis Anderberg, Beata Ujvari, The impact of an extreme climatic event on adder (*Vipera berus*) demography in southern Sweden, *Biological Journal of the Linnean Society*, Volume 138, Issue 3, March 2023, Pages 282–288, <https://doi.org/10.1093/biolinnean/blac147>

PH08: Foster, J, Driver, D, Ward, R & Wilkinson, J (2020). IUCN Red List assessment of amphibians and reptiles at Great Britain and country scale. Report to Natural England. ARC report. ARC, Bournemouth.

15. Explanatory Notes

Field label	Note
2.5: Additional information	The species remains present across its broad natural range in GB, in part due to conservation action in recent decades which has included reintroductions, most of which appear to be successful, to restore the range. Most populations now occur in protected areas, meaning that outright habitat destruction is largely prevented. However, habitat loss is expected to increase in Forest Landscapes, due to mineral extraction, with unsuccessful methods of soil and heather restoration, cannot support heather or reptile species and is considered permanent loss.
5.3: Short-term trend; Direction	Estimated to be stable based on limited data with some modelling.
6.3: Type of estimate	Best estimate from partial survey data provided by bespoke surveys and volunteer monitoring combined with limited modelling.
7.1: Sufficiency of area and quality of occupied habitat	Occupied habitat estimated to be approximately 73km ² , the quality of unoccupied habitat is thought to be of insufficient quality based on habitat assessments and partial modelling i.e. New Forest. While the overall area of lowland heathland hasn't declined, it's suitability for smooth snakes has seen a significant deterioration in recent years due to an increase in grazing pressure. This is mostly due to increasing livestock numbers in the New Forest (which includes over half of all known and potential smooth snake habitat in England). Recent species distribution modelling for the smooth snake in the New Forest, based on Lidar data, indicates that only about 25% of the heathland here now retains a suitable structure for smooth snakes whereas at least 50% would be considered favourable and where the heathland is in the mature stage or degenerate phase, which reflects the balance of successional stages that are required in most heathland areas to support the full range of typical flora and fauna (Bormpoudakis & Tzanopoulos 2016). In addition, there has also been an increase in conservation grazing pressure on many other heathland sites, especially where the practice of 'mob grazing' is being used (i.e. putting out large herds of livestock to reduce sward height quickly). Recent research (Reading & Jofre 2015) has shown that smooth snakes are adversely affected, and their preferred habitat structure damaged, by the sort of stocking densities increasingly

	being employed for heathland management purposes. This issue applies to both occupied habitat and to those sites where smooth snakes were known to formally occur, but where they are currently thought to be absent
7.5: Short-term trend; Method used	CSM habitat assessment of the SSSI series concluded a c.10% decline in quality habitat however, modelling is required for a more accurate assessment.
9.5: List of main conservation measures	Improving habitat management and maintenance, including burning and grazing, to provide adequate habitat condition and structure alongside fire prevention are key conservation aims for the species.
11.4: Future prospects	Habitat quality is thought to be suitable for the long term survival of the species. Population and range are unfavourable but within 10% of what is considered the FRVs for England, so are considered unfavourable-inadequate.
11.7: Change and reasons for change in conservation status and conservation status trend	Range and habitat extent as generally favourable. No new re-introductions have taken place during this current reporting period so there has been no significant increase in range, now considered to be broadly stable (although based on limited data). Population and habitat trends remain stable with no change in trend identified. However, habitat and condition is generally poor (only 8% favourable) with ongoing declines.
5.10: Favourable Reference Range (FRR)	The total area of smooth snake habitat in England has potential for further expansion above the current national total of 13,747 ha. Based on the habitat potential method (section 7.3 in Mousley & Van Vliet 2021), a further 48,963 ha of existing and potential habitat in England could support smooth snakes. The favourable level for the total extent of lowland heathland occupied by smooth snakes in England is therefore 62,710 ha. It should be noted that as habitat potential maps are incomplete or lacking in many areas for lowland heathland, this figure will almost certainly change in the future. The natural limits defined by soil types and recoverable habitat mean that achieving this favourable level is highly variable and depends on specific geographic areas where suitable soils and habitat re-creation potential still exist.

The smooth snake naturally occurs in five distinct National Character Areas in England. In the case of this metric, none of these areas are at a favourable level.