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:

S1096 - Brook lamprey (*Lampetra planeri*)

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.

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NATIONAL LEVEL	
1. General information	
1.1 Member State	**UK (Wales information only)**
1.2 Species code	**1096**
1.3 Species scientific name	**Lampetra planeri**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Brook lamprey

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2007-2018
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	Angling Times. 2017. The best dead baits to use when angling for pike. Dead baiting is the number one pike tactic in the UK. https://www.anglingtimes.co.uk/advice/bait/articles/the-best-deadbaits-to-use-when-pike-fishing [Accessed 10 April 2018] Baxter E, McKenzie S, Jones C, Jones D. & Metcalfe P. 2017. Condition assessment using 2016 River Habitat Survey data and Common Standards Monitoring guidance for the Afon Teifi and Afon Eden - Cors Goch Trawsfynydd SACs. NRW Evidence Report No: 192, 92 pp. NRW, Bangor. Blank M, Jurss K, Bastrop E. 2008. A mitochondrial multigene approach contributing to the systematics of the brook and river lampreys and the phylogenetic position of Eudontomyzon mariae. Canadian Journal of Fisheries and Aquatic Sciences. 65(12): 2780-279. Bracken FSA, Hoelzel AR, Hume JB, Lucas MC. 2015. Contrasting population genetic structure among freshwater-resident and anadromous lampreys: the role of demographic history, differential dispersal and anthropogenic barriers to movement. Molecular Ecology, 24: 1188-1204. Campbell D, Williams E, APEM Aquatic Scientists. 2006. Lamprey Survey on the River Dee and Tributaries: Final Report - March 2006. Environment Agency Wales. Dawson H, Quintella B, Almeida P, Treble A, Jolley J. 2015. The Ecology of Larval and Metamorphosing Lampreys. In: Docker M. (eds) Lampreys: Biology, Conservation and Control. Fish & Fisheries Series, vol 37. Springer, Dordrecht. Espanhol R, Almeida P, Alves JM. 2007. Evolutionary history of lamprey paired species Lampetra fluviatilis (L.) and Lampetra planeri (Bloch) as inferred from mitochondrial DNA variation. Molecular Ecology,16. 1909-1924. Gardiner R. 2003. Identifying Lamprey. Conserving Natura 2000 Rivers

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Wilson L, McCall R, Astbury S, Bhogal A, Walmsley C. 2013.Climate Vulnerability Assessment of Designated Sites in Wales. CCW Contract Science Report No. 1017. CCW. Bangor.

5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period		
5.3 Short-term trend Direction	Stable (0)	
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	No change The change is mainly due to:	
5.12 Additional information		

6. Population

6.1 Year or period	2007-2018	
6.2 Population size (in reporting unit)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	1526
6.3 Type of estimate	Best estimate	

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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		
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	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)?	No
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	Unknown
7.2 Sufficiency of area and quality of occupied habitat Method used	Complete survey or a statistically robust estimate	
7.3 Short-term trend Period	2007-2018	
7.4 Short-term trend Direction	Unknown (x)	
7.5 Short-term trend Method used		
7.6 Long-term trend Period		
7.7 Long-term trend Direction		
7.8 Long-term trend Method used		

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8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Wind, wave and tidal power, including infrastructure (D01)	M
Mixed source pollution to surface and ground waters (limnic and terrestrial) (J01)	M
Change of habitat location, size, and / or quality due to climate change (N05)	M

Threat	Ranking
Wind, wave and tidal power, including infrastructure (D01)	H
Mixed source pollution to surface and ground waters (limnic and terrestrial) (J01)	M
Other climate related changes in abiotic conditions (N09)	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	Medium-term results (within the next two reporting periods, 2019-2030)

9.5 List of main conservation measures

Reduce impact of mixed source pollution (CJ01)

Restore habitats impacted by multi-purpose hydrological changes (CJ03)

Other measures related to mixed source pollution and multi-purpose human-induced changes in hydraulic conditions (CJ04)

9.6 Additional information

10. Future prospects

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

10.2 Additional information

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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	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	788
12.2 Type of estimate	Best estimate	
12.3 Population size inside the network Method used	Based mainly on extrapolation from a limited amount of data	
12.4 Short-term trend of population size within the network Direction	Stable (0)	
12.5 Short-term trend of population size within the network Method used	Complete survey or a statistically robust estimate	
12.6 Additional information		

13. Complementary information

13.1 Justification of % thresholds for trends	
13.2 Trans-boundary assessment	
13.3 Other relevant Information	

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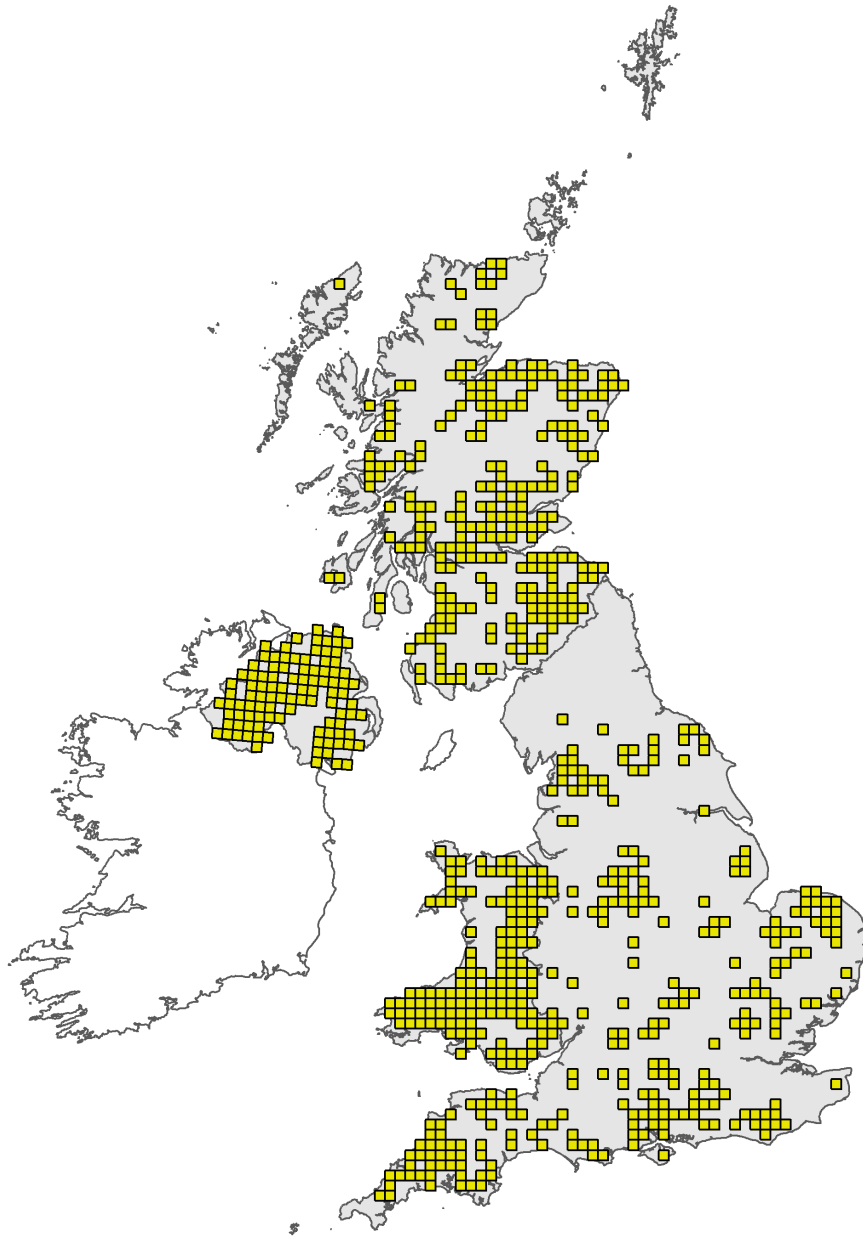
Distribution Map

Figure 1: UK distribution map for S1096 - Brook lamprey (*Lampetra planeri*). 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.
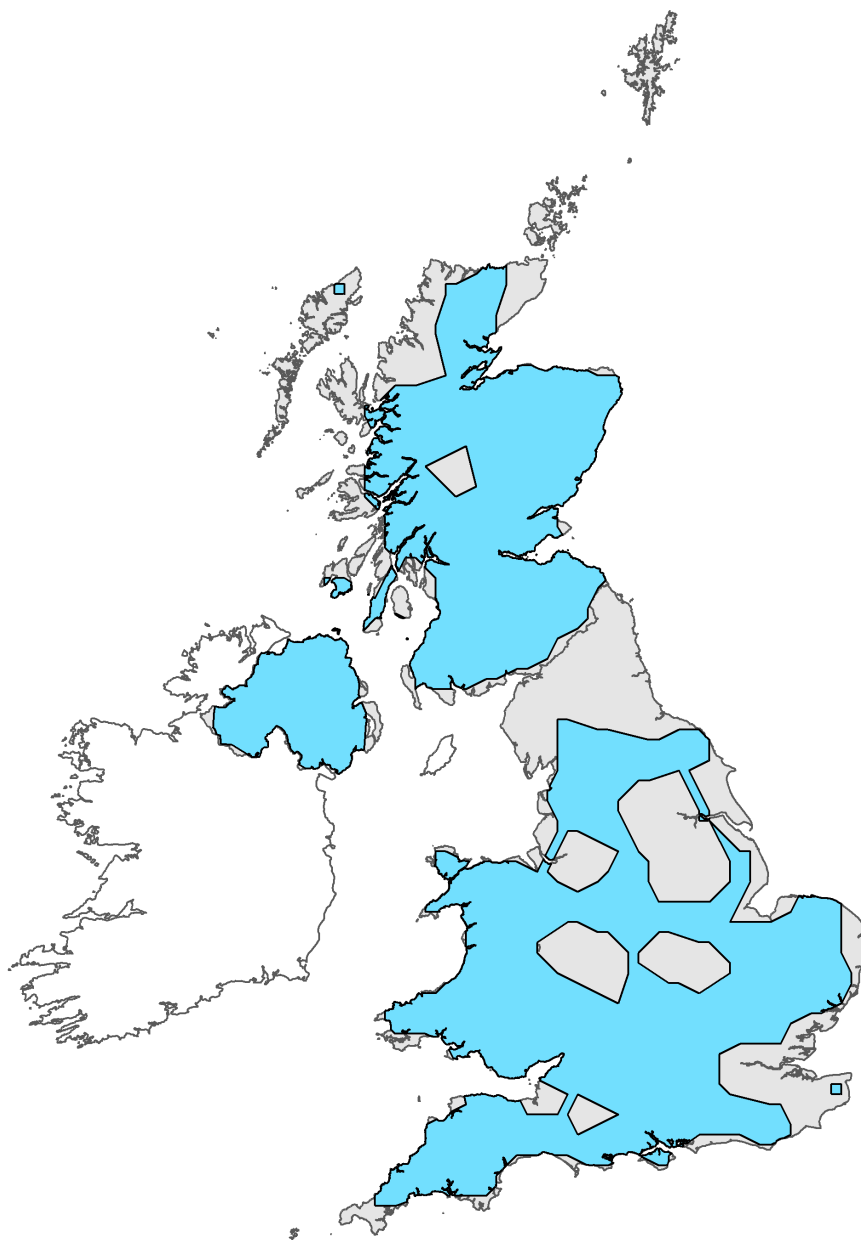
Range Map

Figure 2: UK range map for S1096 - Brook lamprey (*Lampetra planeri*). 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 applying a bespoke range mapping tool for Article 17 reporting (produced by JNCC) to the 10km grid square distribution map presented in Figure 1. The alpha value for this species was 25km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Species name: Lampetra planeri (1096)

Field label	Note
2.4 Distribution map; Method used	The 10 km square mapped range (see Fig. 3.) is based on a combination of records (NRW, 2017) and modelled distribution. This widespread species is expected to be present in the majority of water courses although it is expected that both Lampetra species would be naturally absent from upland streams. Records of both Lampetra planeri and Lampetra sp. have been used to generate this distribution (see Appendix 1). It is not possible to distinguish between river lamprey & brook lamprey at the larval life stage, however, larval records have been included in this assessment because very little other data is available. The larval stage lasts between 4 - 6 years and the morphology of each species becomes more distinguishable as they grow and metamorphose towards adulthood (Hardisty, 2006). These 'transformers' can often be identified in the field and these records confirm the presence of both brook and river lamprey. For example, in a River Dee lamprey survey 421 Lampetra larvae were caught of which five were 'transformers' identified as river lamprey and two as brook lamprey. (Teague et al, 2012). In a typical lamprey larvae survey the number of transformers is always relatively low (Garrett, pers obs).
3.1 Is the species take in the wild/ exploited	There is some evidence of fishermen using lamprey as dead bait when angling for pike, zander etc (Angling Times, 2017) but there is no commercial exploitation of lamprey in Wales for this market. All of the 'lamprey eel' bait used in the UK seem to be imported from mainland Europe (Maitland, 2003).

Species name: Lampetra planeri (1096) Region code: ATL

Field label	Note

5.2 Short term trend; Period	Appendix 1: Management of Lampetra species records in the context of reporting range and population for brook lamprey Lampetra fluviatilis and river lamprey Lampetra planeri. Due to the difficulty in reliably identifying Lampetra, especially at the juvenile stage, a high proportion of lamprey records in Wales are recorded only as Lampetra sp. This especially relates to structured electrofishing surveys, where overwhelmingly ammocoetes are recorded. This creates a dataset that is generally structured as follows: - A high proportion of records (about 70%) collected in a structured and consistent manner, but for which only genus-level identification is available; - A small number of records (about 10%) collected in a structured and consistent manner where species-level identification is available (these are lamprey transformers caught during electrofishing); - A small number of ad hoc observations (about 20%), where species level identification is usually available, but which have limited value for reporting due to their small number and unstructured approach to collection. This creates a problem when reporting for Article 17, because the way in which these records are used can have a significant impact when assessing the Range and Population parameters. We have used all species level records in making assessments. However, anecdotal evidence as well as evidence from previous monitoring cycles and genus level records indicate that these records are insufficient on their own to provide an accurate picture of Lampetra range and population in Wales. For this reason, we considered the following approaches: 1. Do not use Lampetra sp. records. This approach was seen as unnecessarily conservative, and resulted in an overall dataset that was too small and noisy to draw any conclusions. This approach was therefore discounted 2. Use Lampetra sp. records only for assessing L. planeri. This approach is justified on the grounds that L. planeri is much commoner in samples than L. fluviatilis, and samples containing L. fluviatilis invariably also contain L. planeri. 3. Use Lampetra sp. records only for assessing L. fluviatilis. This option has been excluded on the grounds that L. fluviatilis tends to penetrate less far into catchments than L. planeri even in the absence of barriers. Additionally, where barriers exist, these invariably exclude the anadromous L. fluviatilis, whereas L. planeri populations are able to persist. This approach would therefore greatly overestimate the range and population of L. fluviatilis and underestimate that of L. planeri. However, Lampetra sp. records could still be used in support of other data, provided species-level L. fluviatilis records were used to identify the upstream limit of migration. 4. Use Lampetra sp. records for both species. This approach is effectively a combination of Options 2 and 3. Whilst there are no significant issues in relation to L. planeri, the problems assessing L. fluviatilis outlined in 3. above remain. Accordingly, a conservative approach has been taken to using Lampetra sp. records for L. fluviatilis, with only records downstream of a species level L. fluviatilis record counting towards the total.
5.3 Short term trend; Direction	See 5.11
5.11 Change and reason for change in surface area of range	The evidence suggests that the range has not changed since the previous Article 17 reporting for Habitats Directive in 2013. A similar approach using a combination of records and modelled data was used in 2013 to calculate distribution (NRW, 2013; 2017).
6.2 Population size	Total 1km2 count for Wales = 1582 but includes 56 transboundary 1 km squares which JNCC have requested should be reported by NE). This estimate includes both squares containing confirmed larval and adult brook lamprey records, and squares along the river network that they have either accessed to reach these squares or are considered likely to use (IAFG 2018). The resulting count gives a reasonable estimate of the number of occupied 1km squares of brook lamprey in Wales (See section 2, map 1)
6.3 Type of estimate	Brook lamprey is under recorded in Wales and we therefore think it likely this is an underestimate.

6.6 Population size; Method used	Lamprey data were extracted from the National Fish Populations Database (NFPD) 2007 - 2017 which consists of data collected by Environment Agency Wales & its successor body Natural Resources Wales (NRW, 2017). Using Arc View GIS, the records were converted to 1 x 1 km squares. Counts of 1 x 1 km grids with positive records (occupied) & assumed occupation were completed to calculate the population size. This data was interpreted using guidance agreed with Inter-Agency Freshwater Group (IAFG, 2018).
6.8 Short term trend; Direction	Also see 6.16
6.9 Short term trend; Magnitude	There is insufficient data available to assess short term trend in Wales. There is no clear evidence of population decrease.
6.13 Long term trend; Magnitude	There is no clear evidence of population decrease.
6.15 Favourable reference population	1526 km2 as best single value. (Total 1km2 count for Wales = 1582 but includes 56 transboundary 1 km squares which JNCC have requested should be reported by NE).
6.16 Change and reason for change in population size	Presumed occupation was not calculated in 2013 so any apparent increase in population size in 2018 is mainly due to the change in method.
7.1 Sufficiency of area and quality of occupied habitat	there is also uncertainty about which habitat is unoccupied & also upland water bodies, where brook lamprey may be absent, were not removed from this analysis
7.2 Sufficiency of area and quality of occupied habitat; Method used	Habitat quality was assessed using WFD 2015 river classification data for Wales (NRW, 2015). Due to limited range data no attempt was made to remove upland water bodies where lamprey may be absent. The applicability of river habitat data to brook lamprey is uncertain but it was assumed that Good Ecological Status (GES) represented habitat quality sufficient to support the feature in favourable conservation status.
7.5 Short term trend; Method used	No repeat habitat survey datasets are available to analyse trends. We would not advocate comparison of changes in waterbody classification as a method for assessing changes to suitable habitat because of the uncertainty around presumed habitat occupation and whether 'Moderate' status provides suitable habitat.
8.3 Additional information	The main pressures on brook lamprey in Wales continues to include dams, weirs, abstractions, discharges and river modification. Brook lamprey migrate within the river from spawning to nursery grounds and need a clear migratory path. General water pollution may affect larval habitat & development although they are not thought to be particularly sensitive to water pollution (Dawson et al, 2015; Maitland, 2003). There is an increasing demand for water resources from water transfers and local abstractions. The impact of climate change on brook lamprey is uncertain, although altered flow regimes would negatively affect habitat quality e.g. wash out of silt beds with loss of larvae & habitat, habitat fragmentation due to drought etc Dawson et al, 2015; Hardisty, 2006; Wilson et al, 2013). The resulting lower flows could have a negative effect on brook lamprey life stages. Lamprey species are also known to become entrained in abstraction infrastructure if inappropriate screening is in-situ. (Hardisty, 2006; Garrett & Thomas, 2012). The impact of climate change on brook lamprey is uncertain, although altered flow regimes would negatively affect habitat quality e.g. wash out of silt beds with loss of larvae & habitat, habitat fragmentation due to drought etc Dawson et al, 2015; Hardisty, 2006; Wilson et al, 2013).

9.5 List of main conservation measures	Apart from clear migration routes from the nursery to spawning grounds, the critical habitat requirements of adults relate to the spawning & nursery habitats (CJ03 & CJ04). It is recognised that poor water quality, especially siltation, will affect spawning habitat so gravels should be oxic for burrowing larvae although they can survive anoxic conditions for short periods (CJ01, D02, J01, N05). Fish pass installation opportunities are identified in the annual Sustainable Fisheries Programme by each NRW Operational area. Where possible a fish pass will be designed to accommodate multi-fish species. Most schemes are realised through collaboration with local authorities & other agencies when wider projects arise (Charlesworth pers comm, 2018). Fish pass installation opportunities are identified in the annual Sustainable Fisheries Programme by each NRW Operational area. Where possible a fish pass will be designed to accommodate multi-fish species. Most schemes are realised through collaboration with local authorities & other agencies when wider projects arise (Charlesworth pers comm, 2018). Apart from actual barriers, any significant alteration or management of channels that removes too much cover or creates long stretches of very fast flow (> 2 m s-1) must be avoided all along the migration route. Both water abstraction and land drainage have negative effects on lamprey populations. They often lead to unstable habitats with variable water levels, which flood and disturb spawning gravels and nursery silts at times but leave them high and dry at others (K04) (Maitland, 2003). Appropriate conservation measures could be implemented during river restoration projects and as good practice for river management during other infrastructure development / maintenance projects.
10.1 Future prospects of parameters	Brook lamprey are a widespread species and not particularly sensitive species which does not appear to be under any immediate threat. The population seems to be stable in Wales.
10.2 Additional information	A widespread species that has remained stable and will probably remain so for the next decade. Although a relatively common species there are aspects of its ecology that would benefit from further research, for example, the role of lake sediments as nursery habitat (Maitland, 2003). The impact of climate change is uncertain although lower summer flows and potential droughts could affect the survival rate of larvae. Similarly, large flooding events could wash out silted habitat and the sedentary larvae (LWEC, 2018; Wilson et al, 2013). This assessment is based on the evidence from larvae surveys where it is not possible to distinguish between brook and river lamprey prior to transformation at approximately 3 - 4 years of age (Mateus et al, 2013). The same type of data was used in the previous reporting cycles and the range / distribution has not changed.
12.3 Population size inside the network; Method used	This estimation includes both squares containing confirmed larval & juvenile brook lamprey records*, and squares along the river network that they may have accessed to reach these squares. The resulting count gives a reasonable estimate of the number of occupied 1km squares of brook lamprey in Wales. (* see note about species identification in section 4.2)
12.4 Short term trend of the population size within the network; Direction	Population size within the boundary of the six SAC rivers where brook lamprey is a feature is stable. The short-term trend for the whole of Wales is 'unknown' because very few brook lamprey surveys are conducted outside of SAC rivers.

12.6 Additional information	Brook lamprey very often meet the CSM population criteria (JNCC, 2015) during condition assessments but the feature regularly fails on habitat structure & function attributes e.g. water chemistry, habitat structure etc.. On some SAC rivers only, the population attributes have been assessed but there has been no analysis of environmental factors (river habitat structure, water quality & flow) so the whole feature has not been assessed. Afonydd Cleddau SAC: In 2013 the water quality attributes passed but the flow attribute failed. The population attribute and river morphology were not assessed. Hence the overall assessment was Unfavourable - unclassified (Garrett et al, 2013a). River Dee & Bala lake SAC: Population targets were met for: age structure, distribution and density. No environmental attributes assessed to date so no overall feature assessment possible (Garrett, 2015). Afon Teifi SAC: In the third reporting cycle, brook lamprey. population extent, demographic and density met all the assessment targets. The Teifi failed most the river habitat targets and no environmental attributes assessed to date so no overall feature assessment possible (Garrett, 2016). Afon Tywi SAC: all the attribute targets were met for Lampetra spp. population & water quality but failed to meet flow requirements. Feature overall Unfavourable - unclassified (Garrett & Thomas, 2012). River Usk SAC: brook lamprey failed to meet the following targets: larval density, biological GQA, SRP, suspended solids & river flow. Overall Unfavourable - unclassified (Garrett et al, 2013b). River Wye SAC: In the third reporting cycle all the brook lamprey population attributes were met with the exception of the number of repeat sites where lamprey were present. Adult run size was not assessed because no data was collected. The Wye failed most the river habitat targets and no environmental attributes assessed to date so no overall feature assessment possible (Garrett, 2017).