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:

S1166 - Great crested newt (*Triturus cristatus*)

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	**1166**
1.3 Species scientific name	**Triturus cristatus**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Great crested newt

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2013-2018
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

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assessment of non-native freshwater fishes: concepts and perspectives on protocols for the UK. CEFAS Science series
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GOZLAN, R.E., BRITTON, J.R., COWX, I. & COPP, G.H 2010. Current knowledge on non-native freshwater fish introductions. Journal of Fish Biology. 76 (4) p.751-786.
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COFNOD DATABASE: https://www.cofnod.org.uk/LinkInfo?ID=7

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	Improved knowledge/more accurate data The change is mainly due to:	Improved knowledge/more accurate data
5.12 Additional information		

6. Population

6.1 Year or period	1989-2018	
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	244

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6.3 Type of estimate	Minimum	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit	number of localities (localities)
	b) Minimum	
	c) Maximum	
	d) Best single value	3271
6.5 Type of estimate	Best 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	Uncertain (u)	
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	1994-2018	
6.12 Long-term trend Direction	Decreasing (-)	
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	No change	
	The change is mainly due to:	
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	Based mainly on extrapolation from a limited amount of data	
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		

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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
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	H
Use of plant protection chemicals in agriculture (A21)	H
Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell) (C01)	H
Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions) (F01)	H
Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02)	H
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	M
Mixed source pollution to surface and ground waters (limnic and terrestrial) (J01)	M
Interspecific relations (competition, predation, parasitism, pathogens) (L06)	M
Other invasive alien species (other then species of Union concern) (I02)	M
Other modification of hydrological conditions for residential or recreational development (F31)	M

Threat	Ranking
Removal of small landscape features for agricultural land parcel consolidation (hedges, stone walls, rushes, open ditches, springs, solitary trees, etc.) (A05)	H
Use of plant protection chemicals in agriculture (A21)	H
Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell) (C01)	H
Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary and coastal conditions) (F01)	H
Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02)	M
Roads, paths, railroads and related infrastructure (e.g. bridges, viaducts, tunnels) (E01)	M

Mixed source pollution to surface and ground waters (limnic and terrestrial) (J01)	M
Interspecific relations (competition, predation, parasitism, pathogens) (L06)	H
Other invasive alien species (other then species of Union concern) (I02)	M
Conversion to forest from other land uses, or afforestation (excluding drainage) (B01)	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: Expand the current range of the species (related to 'Range')

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

Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land (CA01)
Restore small landscape features on agricultural land (CA02)
Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation (CB01)
Reduce diffuse pollution to surface or ground waters from agricultural activities (CA11)
Reduce/eliminate point pollution to surface or ground waters from agricultural activities (CA10)
Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes (CL01)
Management, control or eradication of other invasive alien species (CI03)
Habitat restoration/creation from resources, exploitation areas or areas damaged due to installation of renewable energy infrastructure (CC07)
Reduce impact of transport operation and infrastructure (CE01)
Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities (CF02)

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	62
12.2 Type of estimate	Minimum	
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	Unknown (x)	
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 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

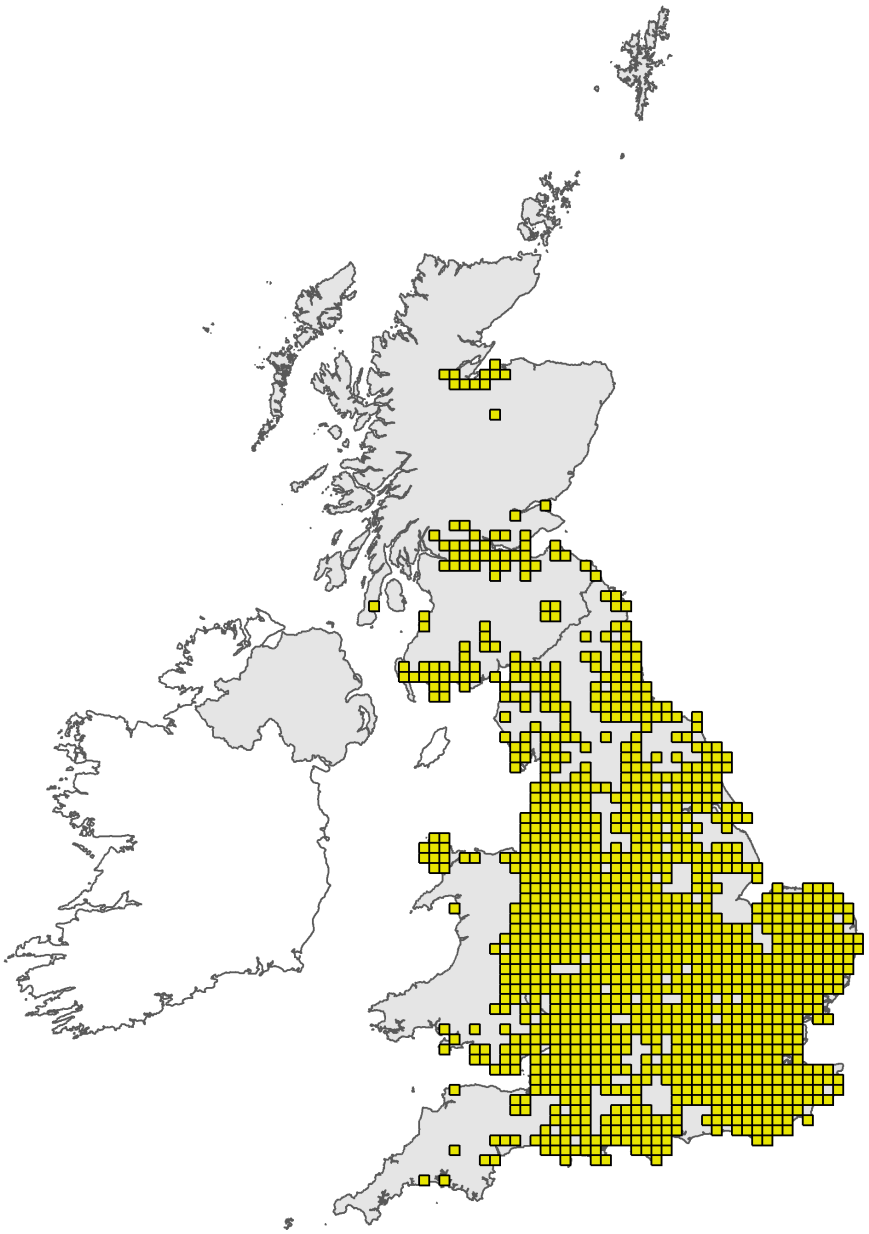

Figure 1: UK distribution map for S1166 - Great crested newt (*Triturus cristatus*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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 S1166 - Great crested newt (*Triturus cristatus*). 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 34km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Species name: Triturus cristatus (1166)

Field label	Note
2.4 Distribution map; Method used	Up to date and comprehensive locality data is not available for this widespread species. Blanket surveys have been very restricted and negative survey results are scarce. New data points come from licence returns relating to development led surveys (often eDNA) which may bias the distribution of records to the edge of urban areas, post-industrial activity, road schemes, pipelines and utility improvement schemes, where populations are being lost or moved. Occupancy data for herpetofauna is based on data held internally by Amphibian and Reptile Conservation, combining a variety of data sources (ARC, 2010; Haysom et al, 2018; Wilkinson and Arnell, 2011; Wilkinson et al, 2011).

Species name: Triturus cristatus (1166) Region code: ATL

Field label	Note
5.3 Short term trend; Direction	Whilst local loss and gain may be apparent, the overall short-term trend in range is assumed to be stable.
5.11 Change and reason for change in surface area of range	The range has not changed substantially but there are a few 'new' 10km square records in south Wales due to recent development-led survey data. The species is still present across the parts of Wales previously reported where there is suitable habitat. Local losses may have occurred as well as gains, but the general pattern of distribution across Wales remains the same.
6.2 Population size	244 1km squares minimum in Wales (best single value) This is a minimum because there may be ponds in adjacent 1km squares that do not currently have records. It is not possible to give any confidence limits. This figure is based on mapping 1km records (Occupancy data for herpetofauna is based on data held internally by Amphibian and Reptile Conservation, combining a variety of data sources). Note that 4 of these squares are cross-border with England and it is not possible to determine for this exercise if crested newts are present both sides of the border or not. Wilkinson et al. (2011) produced a figure of almost 1,800 occupied 1km squares by use of modelling techniques.
6.4 Additional population size	The 2013 report used 'localities' as a population measure- this was interpretted as 'occupied ponds' with a minimum of 3,161 and a maximum of 29,275. This has been recently re-modelled for Wales and a figure of 3,271 occupied ponds estimated (French et al., 2014, Haysom et al., 2018) based on a 11% pond occupancy rate.
6.6 Population size; Method used	This is based on modelling data (French et al., 2014, Haysom et al., 2018)
6.8 Short term trend; Direction	The population values given above in 6.4 for the 2013 report and this one are comparable. It could be argued that the trend could be slightly increasing because new populations are being found through development-led surveys, however, the loss of populations is not so easily recorded and therefore it could be decreasing without us being aware of declines. One example of this is the result of development mitigation projects which do not always deliver maintenance or population gains (Lewis et al,2007). Results from SAC monitoring in Wales also suggest that populations are unfavourable. Because of these uncertainties, we have chosen to record this metric as 'uncertain'.

6.11 Long term trend; Period	The long term trend period suggested (1994-2018) comes well after what is considered to be the period of major losses to great crested newt populations, ie during the time of greatest agricultural intensification in the post war years. See Langton et al., 2001; Nicholson and Oldham, 1986, for comments on historical status and Gleed-Owen, 2007 for a study of historic pond losses in part of north east Wales.
6.12 Long term trend; Direction	Decreasing. Changes in populations at the local level generally take place over short time periods when pond and terrestrial habitat loss occurs. In addition, this species operates in a metapopulation structure and populations can 'naturally' rise and fall as pond habitats become suitable and fall into senescence. Positive conservation management over the period has resulted in some local gains in population size, which may parallel losses to development and pond senescence for example. Positive habitat management through agri-environment schemes in the wider countryside should also increase population sizes, but data on the effectiveness of such schemes is not available for Wales. However, information from the last Countryside Survey (Carey et al., 2008) revealed that despite a 12.5% increase in the number of ponds in GB between 1998 and 2007, the plant species richness within them had declined with only 8% in good condition and their ecological quality showed significant declines from moderate to good condition from 40 to 28% and an increase in poor or very poor condition from 60 to 72%. Without long term and statistically robust sampling schemes, it is not possible to accurately determine the trend in population numbers with any certainty, but there does appear to have been a decrease. The recent Pondnet project in England (Ewald, et al. 2018) used eDNA sampling in a stratified sample of squares to generate 1km square estimates. (Wilkinson et al., 2011 and Arnell & Wilkinson, 2011a, French et al., 2014, Haysom et al., 2018)
6.16 Change and reason for change in population size	Change remains unknown
7.1 Sufficiency of area and quality of occupied habitat	Area Various recent modelling projects have given us estimated values for the amount of suitable habitat for crested newts in Wales. Wilkinson et al. (2011) modelled 1989km2 (95% limits are 1,322 to 12,247km2). This was refined by French et al. (2014) to 2170km2 which is approximately 10.5% of the total area of Wales and 29.7% of the species' range (Haysom et al., 2018). On this basis there is thought to be a sufficient amount of habitat in Wales to support a viable population of the species. Quality There is no comprehensive data on the quality of crested newt habitat in Wales. Habitat Suitability Index scores exist for a very few populations and any SAC monitoring reports (all unfavourable) relate to a very small part of the species range in Wales. The most recent Countryside Survey (Carey et al., 2008) revealed that despite a 12.5% increase in the number of ponds in GB between 1998 and 2007, the plant species richness within them had declined with only 8% in good condition and their ecological quality showed significant declines from moderate to good condition from 40 to 28% and an increase in poor or very poor condition from 60 to 72%. However, the sample size of ponds in Wales which contributed to this study was small, so we can only report unknown for this attribute. Overall despite the area being thought to be sufficient, I have reported this as unknown because we have very little information on habitat quality (see above). This could result in a gradual decline in populations as ponds become unsuitable or terrestrial habitat becomes more fragmented.
7.2 Sufficiency of area and quality of occupied habitat; Method used	Area estimated using MaxEnt modelling at 25m resolution which takes account of presence and absence data, pond density, precipitation, soils, habitat, topography and climate (Haysom et al., 2018).
7.4 Short term trend; Direction	Using the guidance supplied - area is adequate but quality is unknown, but with some evidence of decline (Carey et al., 2008).

8.1 Characterisation of pressures/ threats

These pressures and threats all relate to great crested newt in Wales and can be generally referenced to Baker et al., 2011; Glazon, 2010; Gleed-Owen, 2007; Langton et al., 1993, 2001; Nicholson and Oldham, 1996; Nicolet et al., 2007; Williams and Biggs, 2012. It should be noted that such a geographically and ecologically widespread animal is going to be subject to a wide range of pressures and threats by that very reason. The restriction of the list to 10 items is therefore not truly representative of the range of issues involved and excludes climate change as it is applicable to all species. Pressures A05: Restructuring farmland includes the removal of field boundaries, scrub, draining ponds and culverting open ditches, all of which impact on newt habitat causing direct losses and also reduce connectivity of breeding and non-breeding habitats and increases fragmentation of suitable habitat. A21: Biocides affect the aquatic environment causing direct impacts on tadpoles or aquatic invertebrates and also on terrestrial prey items (Baker et al., 2011). C01: Many crested newts occupy post-industrial sites such as flooded quarries and coal subsidence areas, particularly in north-east and south Wales. These sites are the locations for many developments or are often associated with further extraction of materials and then subsequent restoration and housing development which impact on the newt population either directly (requiring translocations) or by changing/reducing the habitat available. Opencast mining has impacted on several populations in the south Wales coalfield. F01: Urbanisation (both housing and industrial) encroach on semi-natural and other ecosystems, thus directly reducing available habitats for newts. There is also the impact of fragmentation, water quality and quantity issues and pressures from recreation (and see L06). L02: Succession of breeding ponds reduces habitat quality and availability. It generally arises from abandonment of active pond management for agricultural purposes, or overgrowth on peri-urban sites. Siltation or drying out results in the loss of the pond. E01: Roads and other linear transport features cause severance and fragmentation of breeding and terrestrial habitat areas and if newly located next to breeding ponds cause direct mortality during the migrating seasons. Additional problems can be caused by run off from road surfaces into ponds and ditches and the impact of road salt has been noted (Baker et al., 2011). Road drainage systems- gully pots- act as traps for newts (subject to monitoring at Johnstown SAC) whilst SUDS schemes can provide additional habitat (reed beds). J01: Pollution to surface and ground waters from adjacent land affects aquatic habitat causing enrichment and more rapid succession of vegetation in the ponds and direct addition of toxic pollutants which impact on both newts and their prey. L06: this broad category includes interspecific predation and disease and has been used in this report for both pressures and threats from these sectors. This includes direct and indirect predation of crested newt eggs and larvae by fish. The latter has been a pressure at Johnstown SAC. There are a number of factors which increase the likelihood of illegal fish introduction including, proximity to human population centres, proximity to roads, footpaths, car parks, proximity to commercial sources of fish (fish farms, garden centres and pet shops), larger ponds (especially for non-native fish species) and ponds subject to recent restoration (Copp et al., 2010, Gozlan et al., 2010). The presence of Chytrid fungus Batrachochytrium dendrobatidis has been confirmed at Welsh amphibian sites (Cunningham & Minting, 2008), but as yet there do not appear to be any detrimental effects on any populations. 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. I02: Invasive non-native plants (Crassula, in particular) have contributed to the physical reduction of aquatic habitat by overgrowth, but also impacts habitat management schemes, due to the biosecurity risks it raises (Baker et al., 2011). F31: Human induced changes to water levels in ponds and terrestrial habitat due to development can be due to many factors, so I have chosen this general one. Water bodies can be deliberately infilled for health and safety reasons or to provide building sites. Reduction in the water table or surface water inputs can be due to domestic or agricultural drainage or infrastructure construction (Gleed-Owen, 2007).

Threats A05: There is an ongoing threat from changing agricultural practices in the form of intensification, habitat modification, structural change which causes terrestrial and aquatic habitat loss, degradation and connectivity loss. This could accelerate due to future demands for increased food production or other changes to the current agri-environment regime. A21: The continuing threat from biocides is especially relevant in the aquatic environment causing direct impacts on tadpoles or aquatic invertebrates but also on terrestrial prey items (Baker et al., 2011). C01: The increasing use of brownfield sites for development make this a continuing and high threat. Crested newts occupy post-industrial sites such as flooded quarries and coal subsidence areas, particularly in north-east and south Wales. These sites are the locations for many developments, often associated with further extraction of materials then subsequent restoration or housing which threaten the newt population either directly (requiring translocations) or by changing/reducing the habitat available. F01: The threat of urbanisation (both housing and industrial units) is likely to increase due to new targets for housing and associated services encroaching on rural habitats directly reducing available habitats for newts. There is also the impact of fragmentation and water quality issues that arise from such development. L02: The threat of succession continues in the current agricultural climate and indeed can increase with continued nitrogen enrichment promoting vegetation growth in aquatic and terrestrial habitats. This leads to siltation and drying out and ultimately loss of the pond. E01: Roads continue to threaten newt populations by causing severance of breeding and terrestrial habitat areas and if newly located next to breeding ponds can cause direct mortality during the migrating seasons. Additional problems can be caused by run off from road surfaces into ponds and ditches and the impact of road salt has been noted (Baker et al., 2011). Road drainage systems- gully pots- act as traps for newts whilst SUDS schemes can provide additional habitat (reed beds). J01: The threat from pollution of surface and ground water from adjacent land remains significant in some areas causing enrichment and more rapid succession of vegetation in the ponds and direct addition of toxic pollutants which impact on both newts and their prey. L06: Invasive non-natives, both plants and animals, threaten crested newt populations by direct predation by aliens, competition for food and egg laying sites, or modification of the aquatic environment. Transmission of the devastating new disease, Batrachochytrium salamandrivorans which is present in newts in western Europe is a high threat as it has been found in captive amphibians in Britain (see section 6). There is currently no plan of action to protect native amphibians if this disease spreads to the wild. The presence of another Chytrid fungus (B. dendrobatidis) has been confirmed at Welsh amphibian sites and is known to infect crested newts (Baker et al., 2011), it may have arrived in the UK via non-native species. 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. There is also a continued and increased threat to crested newt populations from deliberate fish introduction as ponds become more urban and part of recreational areas within large scale developments (see pressures above). I02: There are some invasive non-native plant species which are currently limited by winter temperatures. Climatic changes could result in an increased threat to breeding ponds from species such as Azolla and water hyacinth Eichhornia crassipes. B01: This is a new threat in Wales arising from the target for increasing woodland cover by 100,000 ha. Open habitats used by crested newts, particularly in the farmed landscape, are often targeted for tree planting which could result in shaded ponds and thus a decline in the suitability of breeding sites.

9.2 Main purpose of the measures taken	Indicate the main purpose of measures taken: a) Maintain the current range, population and/or habitat for the species or b) Expand the current range of the species (related to 'Range') or c) Increase the population size and/or improve population dynamics (improve reproduction success, reduce mortality, improve age/sex structure) (related to 'Population') or d) Restore the habitat of the species (related to 'Habitat for the species') b is the main measure, but c and d are also purposes of measures undertaken.
9.5 List of main conservation measures	CA01, CA02: Targeted agri-environment prescriptions for semi-natural habitat, boundary features and pond management (including restoration as well as creation of new ponds) are needed in areas where crested newts are present and in the surrounding areas, both within and outside SACs, in Wales. These should maintain and enhance FCS and would require long term application and surveillance. It is very important to ensure that any agri-environment scheme has the capacity to ensure habitat management of newly created or restored ponds in the long term. CB01: For ponds that lie within afforested areas, the thinning or removal of trees adjacent to ponds would improve their status for newt breeding. Current tree planting schemes require technical screening to prevent inappropriate locations including habitats supporting crested newt ponds due to the need to prevent shading of ponds, however this needs to be monitored for compliance. CA10, CA11: Good water quality (as well as quantity) is essential for improving crested newt status in SACs and the wider countryside. Run-off from agricultural land and development/housing areas can accelerate successional change in breeding ponds as well as impacting directly on prey items and newt tadpole survival. CL01: Habitat management of both terrestrial and pond habitats outside agricultural situations is important for those parts of the population that occupy other semi-natural habitats such as sand dunes or post-industrial sites. Successional change, in the absence of grazing or cutting results in pond shading and senescence and thus a decline in the FCS of the population. CI03: Invasive non-native species, plant and animal, can impact crested newt populations via direct competition (alpine newt, goldfish), damaging or reducing habitats suitability (Crassula) or spreading disease. Note that native fish species such as sticklebacks introduced to ponds also predate newt eggs. Measures to control or limit the impacts of these species include biosecurity protocols for surveyors and monitoring. CC07: There are a large number of crested newt populations that inhabit 'quarry' locations across a wide range of substrate types. Restoration of such sites after extraction or consequential land fill and restoration needs to take into account crested newt and other amphibian requirements by provision of suitable habitat along with adequately funded long term habitat management. CF02, CE01: Roads and development can particularly impact crested newt populations in the urban fringe, severing connectivity of metapopulations as well as causing habitat loss, increased recreation pressure and the threat of INNS (including fish, plants and diseases) releases. Drains associated with roads also result in direct death of trapped amphibians. Better planning of locations, design and green infrastructure through the use of spatial conservation plans should minimise the impacts and provide positive benefits for crested newts.

10.1 Future prospects of parameters	10.1a Future prospects of -range. As noted in section 5.11, the values for this metric have changed between reporting periods due to some changes in distribution data and methods of modelling range. However, it is not possible to reliably report on definitive changes due to the lack of a comprehensive survey or monitoring scheme at the Welsh level. 10.1b Future prospects of -Population As noted in section 6, we are not certain of the population size of crested newts. Due to the lack of a comprehensive survey and monitoring system, we only have scattered and sporadic information on individual occupied ponds/1km squares. 1km squares can have 1 crested newt pond, or many, so the loss of one pond could be reflected by a whole 1km square loss, or there could be no change. Some information of new localities is provided through pre-development survey requirements, but as noted, this is often geographically biased and does not provided information on pond loss. We do have some records from monitoring long-term mitigation and designated sites where species specific, funded habitat management is undertaken. However, Lewis et al, (2007) have noted that mitigation schemes can often fail to maintain or improve population numbers. The vast majority of crested newt populations are sited in the wider countryside, where agri-environment measures are relied on to deliver crested newt FCS. The uncertainty of agricultural policy and the inability to target action mean that the future prospects for population should be reported as unknown. Protected sites also require active conservation management if their populations are to be maintained. In addition, the threat now posed from B. salamandrivorans (see 6.18) is such that the future prospects for population could be considered to be at risk of being negative. 10.1c Future prospects of -Habitat of the species As noted in section 7, whilst it is felt that there is generally sufficient potential habitat for crested newts from habitat modelling techniques, the important issue of the quality of that habitat is unknown, so an overall allocation of unknown is provided for this section.
12.1 Population size inside the pSCIs, SCIs and SACs network	Unit: 1km squares Number of 1km squares with great crested newt records that intersect with SACs where great crested newt is a feature: Deeside and Buckley Newt Sites: 15 Johnstown Newt Sites: 7 Halkyn Mountain: 11 Granllyn: 1 Glantraeth: 1 Total 35 1km squares. On SACs where great crested newt occurs but is not a feature, there are a further 27 1km squares with records NB Some of these 1km squares will intersect with only a part of the SAC and these may not actually contain any crested newt ponds or terrestrial habitat. Therefore: Minimum = 62 1km squares (best single value) Maximum = unknown Records of 1km squares have come from ARC database (see section 4.2). Note that this is a minimum value because there is not comprehensive coverage of crested newt surveys. It should also be noted that using the 1km square as a measure of population, rather than occupied ponds, will underestimate the actual population as each 1km square may have one pond or many.
12.4 Short term trend of the population size within the network; Direction	Whilst we have annual torch counts for parts of each great crested newt SAC (Cofnod database, see section 4.2), there is no comprehensive coverage. In addition, crested newt populations will occupy some ponds every year, whilst others are used intermittently as the number of water bodies available changes depending on water supplies. Haysom et al (2018) commented on the differences in methodology used at SACs. The number of ponds available to crested newts on several of the SACs has increased due to pond creation/restoration. However, on other sites, ponds have become unsuitable due to fish introduction, vegetation growth or changes in water availability, so the number of occupied ponds has gone down. Thus it is not possible to make a definitive statement about trends (based on Cofnod database).