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

Supporting documentation for the Third Report by the United Kingdom under Article 17

on the implementation of the Directive from January 2007 to December 2012
Conservation status assessment for

Species:

S1103 - Twaite shad (*Alosa fallax*)

IMPORTANT NOTE – PLEASE READ

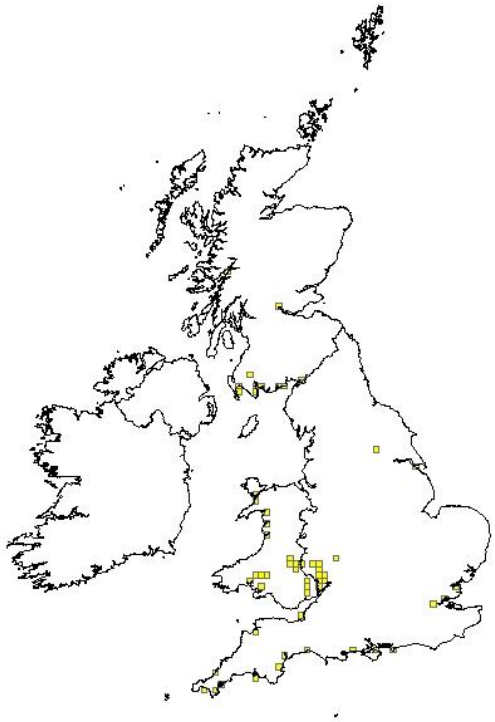
- The country-level reporting information contained in this document is a contribution to the Article 17 UK report for the habitat/species concerned.
- It has been provided by **Natural Resources Wales** and refers only to the state of the habitat/species in **Wales** - it does not constitute an assessment for the whole of the UK.
- The Article 17 UK Approach document provides details on how this information has been used and, combined with information supplied by other Statutory Nature Conservation Bodies
- The format of the document is closely aligned to that set out by the European Commission for Member State reporting – as a result, some of the fields are not applicable at a country-level and have deliberately been left blank – in addition, the content of most fields is constrained by the EC reporting categories.

As of 1 April 2013, the Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales became Natural Resources Wales/Cyfoeth Naturiol Cymru

Reporting format on the 'main results of the surveillance under Article 11' for Annex II, IV & V species

Field name	*Brief explanations*	
0.2 Species	**0.2.1 Species code**	**S1103**
	0.2.2 Species scientific name	***Alosa fallax***
	0.2.3 Alternative species scientific name Optional	
	0.2.4 Common name Optional	**gwangen / twaite shad**

1.1 Maps			
1.1.1 Distribution map		**Sensitive**	**False**
	Due to underreporting and difficulties identifying the species (see 0.2.3), the exact distribution of twaite shad in Wales is limited (see also the commentary in section 1.1 of JNCC (2007)). Spawning distribution is most likely to be focused around the larger rivers entering the Bristol Channel, especially the Usk, Wye and Tywi. Other (Welsh) records are likely to be stray individuals or marine / estuarine records.		



1.1.2 Method used - map	**Estimate based on partial data with some extrapolation and/or modelling**
1.1.3 Year or period	**1990-2012**
	See note 0.2.3

1.1.4 Additional distribution map	**False**
1.1.5 Range map	
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2.1 Biogeographical region & marine regions	**ATL** Due to the taxonomic issues with this species and A. alosa, only notes that differ substantially from A. alosa are included. For all other notes on this species please see the account for S1102 Alosa alosa.
2.2 Published sources	**"Alexandrino, P., R. Faria, D. Linhares, F. Castro, M. Le Corre, R. Sabatie, J.-L. Bagliniere, and S. Weiss. 2007. Interspecific differentiation and intraspecific substructure in two closely related clupeids with extensive hybridisation, Alosa alosa and Alosa fallax. Journal of Fish Biology 69 (Supplement B):242-259.** **Aprahamian, M. W., S. M. Lester, and C. D. Aprahamian. 1999. Shad Conservation in England and Wales.R & D Technical Report W110. Environment Agency, Bristol.** **Aprahamian, M. W., J.-L. Bagliniere, R. Sabatie, P. Alexandrino, and C. D. Aprahamian. 2002. Alosa alosa and Alosa fallax spp.: Literature Review and Bibliography.R&D Technical Report W1-014/TR. Environment Agency, Swindon.** **Alexandrino P, Faria R (2004) Population Genetic Structure of Shad in the UK. Report to the Environment Agency.** **Atkins Ltd. 2004. Assessment of Obstructions to Shad Migration on the River Usk.CCW RoC Report No. 16.** **Caswell, P. A., and M. W. Aprahamian. 2001. Use of River Habitat Survey to determine the spawning habitat characteristics of Twaite Shad (Alosa fallax fallax). Bulletin Francais de la Peche et de la Pisciculture 362/363:919-929.** **Davies, R. N., J. Davies, J. Griffiths, and P. Clabburn. 2011. Appraisal of the use of a DIDSON imaging sonar to quantify shad migration on the River Tywi.FAT/REP/11/FINAL DRAFT.** **Faria, R., A. N. Pinheiro, T. Gabaldon, S. Weiss, and P. Alexandrino. 2011. Molecular tools for species discrimination and detection of hybridization between two closely related Clupeid fishes Alosa alosa and A. fallax. Journal of Applied Ichthyology 27:16-20.** **Garrett H (2012) Afon Tywi SAC shad egg survey 2012. CCW Staff Science Report No. 12/8/4. CCW, Bangor.** **Hillman, R. J., I. G. Cowx, and J. P. Harvey. 2003. Monitoring Allis & Twaite Shad.Conserving Natura 2000 Rivers Monitoring Series 3. English Nature, Peterborough.**

	Joint Nature Conservation Committee. 2007. Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: JNCC. Available from: www.jncc.gov.uk/article17 **Thomas, Rh., and C. Dyson. 2011. River Usk shad egg survey 2010. CCW staff science report no. 10/8/1. Countryside Council for Wales, Bangor.** **Thomas, Rh., and C. Dyson. 2012a. River Wye Shad Egg Survey 2011. CCW Staff Science Report No. 11/8/4. Countryside Council for Wales, Bangor.** **Thomas, Rh., and C. Dyson. 2012b. River Usk Shad Egg Survey 2011. CCW Staff Science Report 11/8/3. Countryside Council for Wales, Bangor.** **Thomas Rh, Hatton-Ellis TW, Garrett H (in prep) Water Quality Assessments for River Special Areas of Conservation: Third Habitats Directive Reporting Round (2007-2012). CCW Staff Science Report No. 12/8/2. CCW, Bangor.** **Smith, V. (2005a). River Tywi cSAC: Potential Impacts of Abstraction and River Regulation on Shad, Alosa spp. Llandarcy: Environment Agency in Wales. EATW/05/01.1, 40pp.** **Smith, V. (2005b). Llyn Brianne Reservoir: Temperature Effects in the River Tywi and their Effects on Shad, Alosa spp. Llandarcy: Environment Agency in Wales. EATW/05/01.3, 40pp.** **West, R. (2006). Temperature issues, Llyn Brianne and Afon Tywi SAC features. EA Tech Memo No: TMW06_14."**

2.3 Range	
2.3.1 Surface area Range	
	There is considerable uncertainty regarding the range of this species in Wales, due to taxonomic issues (see 0.2.3). Thus, the range estimate based on records and tools is inaccurate. However, twaite shad are much commoner that allis shad in Wales, so most shad records probably refer to this species. Genetic evidence (Alexandrino & Faria 2004; Faria et al. 2011) indicates high frequency of A. alosa alleles in putative A. fallax populations in the UK.
2.3.2 Method used Surface area of Range	**Estimate based on partial data with some extrapolation and/or modelling**
2.3.3 Short-term trend Period	**1990-2012**
	See note 2.1

2.3.4 Short term trend Trend direction	**unknown**	
	See note 2.1	
2.3.5 Short-term trend Magnitude	**a) Minimum**	
	b) Maximum	
2.3.6 Long-term trend Period	**1950-2012**	
	Aprahamian et al. (1998) assessed A. fallax as having declined in range at a GB level. However, the timescale of this decline was not reported.	
2.3.7 Long-term trend Trend direction	**decrease 1% or less/year**	
	See note 2.1	
2.3.8 Long-term trend Magnitude Optional	**a) Minimum**	
	See note 2.1	
	b) Maximum	
	See note 2.1	
2.3.9 Favourable reference range	**a) Value in km²**	
	b) Operator for FRR	
	c) FRR is unknown (indicated by "true")	**False**
	d) Method used to set FRR	
2.3.10 Reason for change Is the difference between the reported value in 2.3.1 and the previous reporting round mainly due to…	**a) Genuine change?**	**False**
	See note 2.1	
	b) Improved knowledge/more accurate data?	**False**

	c) Use of different method (e.g. "Range tool")?	**False**

2.4 Population		
2.4.1 Population size estimation (using individuals or agreed exceptions where possible)	**a) Unit**	
	b) Minimum	
	c) Maximum	
2.4.2 Population size estimation (using population unit other than individuals) Optional *(if 2.4.1 filled in)*	**a) Unit**	**length of inhabited feature in km**
	We are unable to report using the number of spawning populations of shad with any certainty because (a) populations in the Wye, Usk and Severn show significant levels of hybridisation and may therefore consist of a single large population and (b) there is circumstantial evidence that small spawning populations may exist elsewhere in Wales.The parameter 'number of spawning populations' is therefore subject to considerable error and does not in our view provide a suitable basis against which to assess twaite shad populations. We have thereforereported on the length of river accessible to shad (Hatton-Ellis 2012).	
	b) Minimum	**122.5**
	Due to identification issues we are not able to confirm the species of shad eggs. We have submitted a research proposal to combine use of genetic markers (see Faria et al. 2011) with future shad egg sampling in order to address this issue. Anglers from the Wye, Usk and Tywi regularly catch twaite shad , indicating the presence of spawning populations in these rivers. Genetic data (Alexandrino & Faria 2004) indicate that shad populations in these rivers cannot reliably be seperated.	
	c) Maximum	**189**
2.4.3 Additional information on population estimates / conversion Optional	**a) Definition of "locality"**	**Length here refers to accessible river within which spawning has been detected as identified in Hatton-Ellis (2012).**
	b) Method to convert data	
	c) Problems encountered to provide population	**Other than using genetic analysis, it is not possible to distinguish between allis (S1102)and twaite (S1103) shad eggs.**

	size estimation	
2.4.4 Year or period	**2007-2012**	
	See note 2.1	
2.4.5 Method used Population size	**Complete survey/Complete survey or a statistically robust estimate**	
	See note 2.1	
2.4.6 Short-term trend Period	**1999-2012**	
	See note 2.1	
2.4.7 Short-term trend Trend direction	**increase**	
	See note 2.1	
2.4.8 Short-term trend Magnitude	**a) Minimum**	
	See note 2.1	
	b) Maximum	
	See note 2.1	
	c) Confidence interval	
	See note 2.1	
2.4.9 Short-term trend Method used	**Estimate based on partial data with some extrapolation and/or modelling**	
	See note 2.1	
2.4.10 Long-term trend – Period	**1989-2012**	
	See note 2.1	
2.4.11 Long-term trend Trend direction	**increase**	
	See note 2.4.7 and Hatton-Ellis (2012). The baseline maps collated by Aprahamian et al. (1999) reflect data collected in the early and mid 1990s. We are therefore confident that a long term positive trend has occurred in shad.	
2.4.12 Long-term trend Magnitude Optional	**a) Minimum**	
	See note 2.1	
	b) Maximum	
	See note 2.1	
	c) Confidence	

	interval	
	See note 2.1	
2.4.13 Long term trend Method used	**2**	
	See note 2.1	
2.4.14 Favourable reference population	**a) Number of individuals/agreed exceptions/other units**	**13**
	See note 2.1	
	b) Operator	
	c) FRP is unknown indicated by "true"	**False**
	d) Method used to set FRP	**GIS matching exercise identifying EA river water bodies where Aprahamian et al. (1999) considered twaite shad to have been formerly present.**
2.4.15 Reason for change Is the difference between the value reported at 2.4.1 or 2.4.2 and the previous reporting round mainly due to:	**a) Genuine change?**	**False**
	See note 2.1	
	b) Improved knowledge/more accurate data?	**True**
	c) Use of different method (e.g. "Range tool")?	**True**

2.5 Habitat for the species	
2.5.1 Area estimation	**5.06**
	Habitat extent is not an appropriate measure to describe FCS for shads, because they use multiple habitats at different stages of their life history, all of which are critical to survival. The most important factor is that all habitat types are accessible and of at least adequate quality. Construction of weirs in the 19th and 20th Century largely eradicated twaite shad from the Severn (Aprahamian et al. 1999, Maitland & Hatton-Ellis 2003). The figure cited here is therefore an estimate of

	accessible wetted area in Welsh rivers known to support shad, rather than an assessment of suitable shad habitat per se. For details see Hatton-Ellis (2012). Freshwater Habitat constitutes rivers with good water quality with unimpeded access to and from the sea. Clean, well-oxygenated gravels are required for spawning. Juveniles require slow flowing nursery areas in freshwater above the estuary. Caswell & Aprahamian (2001) describe these parameters in detail . However, this habitat is widespread in Britain and yet twaite shad are restricted in their distribution, so there are clearly factors that are inadequately understood. Since it is not possible to identify suitable freshwater habitat parameters for the species, it is likewise impossible to map its extent. Marine habitat: This aspect is poorly understood, but they seem to be mainly coastal and pelagic in habit. They have been reported from depths 10-150 m. A suitable estuarine habitat is likely to be very important for adults and juveniles (Maitland and Hatton-Ellis, 2003). There is thought to be a sufficient amount of habitat in the UK to support a viable population of the species.	
2.5.2 Year or period	**2012-**	
	See note 2.1	
2.5.3 Method used Habitat for the species	**Complete survey/Complete survey or a statistically robust estimate**	
	See note 2.1	
2.5.4 Quality of the habitat	**a) Habitat quality**	**Good**
	In general terms the water and habitat quality of accessible freshwater habitat in Welsh rivers is considered sufficient to support shad. See 2.6 for key pressures likely to restrict population.	
	b) Assessment method	**Data analysis of water quality against common standards monitoring targets (Thomas et al., in prep). A flow analysis was also planned but a partner organisation has been unable to deliver it to the agreed timetable.**
2.5.5 Short-term trend Period	**2001-2012**	
	See note 2.1	
2.5.6 Short-term trend Trend direction	**increase**	
	See note 2.1	
2.5.7 Long-term trend Period	**1989-2012**	
	See note 2.1	
2.5.8 Long-term trend Trend direction	**increase**	
	See note 2.1	
2.5.9 Area of suitable habitat for the species	**a) Value in km²**	**9.5**
	See note 2.1	
	b) Absence of data indicated as '0'	

2.5.10 Reason for change Is the difference between the value reported at 2.5.1 and the previous reporting round mainly due to	a) Genuine change?	True
	See note 2.1	
	b) Improved knowledge/more accurate data?	True
	c) Use of different method (e.g. "Range tool")?	False

2.6 Main pressures		
a) Pressure	b) Ranking	c) Pollution qualifier
	H = high importance M = medium importance L = low importance	
J02: human induced changes in hydraulic conditions	H	
J03: Other ecosystem modifications	H	
E06: Other urbanisation, industrial and similar activities	M	
H01: Pollution to surface waters (limnic & terrestrial, marine & brackish)	M	X
F02: Fishing and harvesting aquatic resources	L	

See note 2.1	
2.6.1 Method used – Pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources
	See note 2.1

2.7 Threats		
a) Threat	b) Ranking	c) Pollution qualifier
	H = high importance M = medium importance L = low importance	
C03: Renewable abiotic energy use	H	

E06: Other urbanisation, industrial and similar activities	H	
J02: human induced changes in hydraulic conditions	H	
J03: Other ecosystem modifications	H	
H01: Pollution to surface waters (limnic & terrestrial, marine & brackish)	M	X
I01: invasive non-native species	M	
M01: Changes in abiotic conditions	M	
F02: Fishing and harvesting aquatic resources	L	

See note 2.1	
2.7.1 Method used – Threats	**expert opinion**
	See note 2.1

2.8 Complementary information	
2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant information	**The decision on whether or not to progress with a Severn Barrage is critical to the future prospects of this species in Wales. Depending on the design favoured, construction of a barrage could cause a substantial decline or even extinction of this species.**
	This species and allis shad Alosa alosa are very closely related, and can only reliably be distinguished by counting gill rakers, which requires the fish to be killed (Aprahamian et al. 1999; Aprahamian et al. 2003). Therefore, monitoring of Alosa spp. in the UK does not involve identifying these fish to species level. Both species are protected by law, so on rivers where shad are abundant, anglers avoid fishing areas and at times where shad are likely to be caught, and tend not to record catches. Consequently, few records reach NBN and those that do tend to be disproportionately from rivers where anglers are unfamiliar with the species. Genetic work (Faria et al. 2004, 2011) indicates that Welsh twaite shad populations show significant levels of hybridisation, suggesting that allis

	shad regularly ascend Welsh rivers and spawn with twaite shad.
2.8.3 Trans-boundary assessment	

2.9 Conclusions *(assessment of conservation status at end of reporting period)*
Please refer to the United Kingdom assessment for this species.

3 Natura 2000 coverage & conservation measures - Annex II species
(only applies to species listed under Annex II of the Directive)

3.1 Population		
3.1.1 Population size Estimation of population size included in the SAC network	**a) Unit**	**length of inhabited feature in km**
	b) Minimum	**122.5**
	See note 2.1	
	c) Maximum	**189**
	See note 2.1	
3.1.2 Method used	**Complete survey/Complete survey or a statistically robust estimate**	
	See note 2.1	
3.1.3 Trend of population size within the network (short-term trend)	**increase**	
	See note 2.1	

3.2 Conservation measures

Conservation measures taken (i.e. already being implemented) within the reporting period and provided information about their importance, location and evaluation.

3.2.1 Measure	**3.2.2 Type**	**3.2.3 Ranking** H = high importance	**3.2.4 Location** where the measure is PRIMARILY applied	**3.2.5 Broad evaluation of the measure**

	a) Legal/statutory	b) Administrative	c) Contractual	d) Recurrent	e) One-off	M = medium importance L = low importance	a) Inside	b) Outside	c) Both inside & outside	a) Maintain	b) Enhance	c) Long term	d) No effect	e) Unknown	f) Not evaluated
1.2: Measures needed, but not implemented					Y	H	Y				Y	Y			
4.1: Restoring/improving water quality				Y		M			Y	Y					
4.2: Restoring/improving the hydrological regime	Y				Y	H			Y	Y	Y	Y			
4.3: Managing water abstraction	Y	Y		Y		H	Y			Y		Y			
7.2: Regulation/ Management of fishery in limnic systems	Y					L			Y					Y	

See note 2.1