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 habitat:

H1330 - Atlantic salt meadows
(*Glauco-Puccinellietalia maritimae*)

ENGLAND

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this habitat, 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 habitat 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; and/or (iii) the field was only relevant at UK-level (sections 10 Future prospects and 11 Conclusions).
- For technical reasons, the country-level future trends for Range, Area covered by habitat and Structure and functions 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.

Report on the main results of the surveillance under Article 17 for Annex I habitat types (Annex D)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (England information only)**
1.2 Habitat code	**1330 - Atlantic salt meadows (Glauco-Puccinellietalia maritimae)**

2. Maps

2.1 Year or period	2013-
2.3 Distribution map	Yes
2.3 Distribution map Method used	Based mainly on extrapolation from a limited amount of data
2.4 Additional maps	No

BIOGEOGRAPHICAL LEVEL

3. Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	**Atlantic (ATL)**
3.2 Sources of information	EA. 2016. SKIPPER: Saltmarsh Key Indicators Processed Precisely and Estimated Robustly (V1.1) provides data on 39 WFD surveillance water bodies in England. Janssen, J.A.M.. Rodwell, J.S Garcia M Criado, S. Gubbay, S. Haynes, T, A. Nieto, A., Sanders, N Landucci,F . Loidi,J Ssymank,A. Tahvanainen, T. Valderrabano,M Acosta, A Aronsson, M. Arts,G Attorre, F. Bergmeier, E Bijlsma, R-J. Bioret,F. Bita-Nicolae, C. Biurrun, I. Calix, M. Capelo, J. Carni,A Chytry, M. Dengler, J. Dimopoulos, P. Essl, F. Gardfjell, H. Gigante,D Giusso del Galdo, G. Hajek, M. Jansen, F. Jansen, J. Kapfer, J. Mickolajczak, A Molina, J A. Molnar,Z. Paternoster, D. Piernik, A. Poulin, B. Renaux, B Schaminee,JHJ. Sumberova, K Toivonen, H. Tonteri, T. Tsiripidis, I. Tzonev R and Valachovic, M. 2016 European Red List of Habitats: Part 2 Terrestrial & Freshwater Habitats. European Commission, DG Environment http://ec.europa.eu/environment/nature/knowledge/pdf/terrestrial_EU_red_list_report.pdf Natural England. 2015. Coastal management theme plan (IPENS TP019) http://publications.naturalengland.org.uk/publication/6371629661683712?category=5605910663659520 Miles. R and Richardson. N. 2018. Sustainable Shores Technical Report. Royal Society for the Protection of Birds. Mossman, H, Grant, A, Davy, A. 2013. Implications of climate change for coastal and intertidal habitats in the UK. http://www.lwec.org.uk/sites/default/files/Coastal habitats.pdf Brew, D. 2016. Healthy Estuaries 2020: Towards Addressing Coastal Squeeze in Estuaries. Improvement Programme for England's Natura 2000 Sites (IPENS) - Planning for the Future IPENS002 http://publications.naturalengland.org.uk/publication/4734703644966912?category=6337991412809728 Lush, M. J. , Haynes T. A. and Lush C. E. 2016. Spartina anglica and its management in estuarine Natura 2000 sites: an update of its status and monitoring future change in England. Improvement Programme for England's Natura 2000 Sites (IPENS) - Planning for the Future IPENS041 http://publications.naturalengland.org.uk/publication/5109184527859712?category=43007 Abrehart, T. R. and Jackson, R. L. 2013. An NVC of the Alde-Ore Estuary SSSI,

Suffolk. An ecological survey including flora and fauna observations undertaken for Natural England by Abrehart Ecology.: Abrehart Ecology
C. Hambidge, N. Phelan 2014. Saltmarsh mapping standardisation for the Water Framework Directive. NMBAQCS. http://www.nmbaqcs.org/qa-standards/
Beaumont, N. J., Jones, L., Garbutt, A., Hansom, J. D., and Toberman, M. 2014. The value of carbon sequestration and storage in coastal habitats. Estuarine, Coastal and Shelf Science, 137, 32-40.
Best, M., Massey, A & Prior, A .2007. Developing a saltmarsh classification tool for the European water framework directive, Marine Pollution Bulletin, Volume 55, 205-214
Phelan, N., Shaw, A., Baylis, A. 2011. The extent of saltmarsh in England and Wales: 2006-2009. Environment Agency.
Natural England. 2015. Atmospheric nitrogen theme plan: Developing a strategic approach for England's Natura 2000 sites (IPENSTP013)
http://publications.naturalengland.org.uk/publication/6140185886588928?category=5605910663659520
Natural England. 2015.Climate change theme plan: Developing a strategic approach to climate change adaptation (IPENSTP014)

http://publications.naturalengland.org.uk/publication/4954594591375360?category=5605910663659520
Natural England. 2015. Diffuse water pollution theme plan: Developing a strategic approach to diffuse water pollution for England's Natura 2000 sites (IPENSTP015)
http://publications.naturalengland.org.uk/publication/5848526737113088?category=5605910663659520
Natural England. 2015. Grazing Theme Plan: Developing a strategic approach for England's Natura 2000 sites. (IPENSTP016)
http://publications.naturalengland.org.uk/publication/4839898496368640?category=5605910663659520
Natural England. 2015. Hydrological functioning theme plan : Restoring the hydrology of Natura 2000 terrestrial wetlands (IPENSTP018)
http://publications.naturalengland.org.uk/publication/6400975361277952?category=5605910663659520
Natural England. 2015. Invasive species theme plan: Strategic principles for the management of invasive species on Natura 2000 sites (IPENSTP020)
http://publications.naturalengland.org.uk/publication/6130001713823744?category=5605910663659520
Natural England. 2015.Public access and disturbance theme plan: A strategic approach to identifying and addressing significant effects on the features of Natura 2000 sites (IPENSTP022)
http://publications.naturalengland.org.uk/publication/6621454219083776?category=5605910663659520
Natural England. 2015. Improvement Programme for England's Natura 2000 sites (IPENS): Planning for the future Programme Report - a summary of the programme findings. (NE601). Natural England.
http://publications.naturalengland.org.uk/publication/5757712073752576?category=4878851540779008
Jones L, Garbutt A and Angus S. 2013. Impacts of climate change on coastal habitats, MCCIP Science Review, 4
http://www.mccip.org.uk/media/13315/2013arc_backingpapers_18_chab.pdf
JNCC. 2013. Third report by the United Kingdom under article 17 on the implementation of the directive from January 2007 to December 2012

Report on the main results of the surveillance under Article 17 for Annex I habitat types (Annex D)

H1330 Atlantic salt meadows (Glauco-Puccinellitalia maritimae)
Harkin, C. 2016. Ecological interactions of an invading insect: the planthopper Prokelisia marginata. Doctoral thesis (PhD), University of Sussex. http://sro.sussex.ac.uk/65533/

4. Range

4.1 Surface area (in km²)			
4.2 Short-term trend Period			
4.3 Short-term trend Direction	Stable (0)		
4.4 Short-term trend Magnitude	a) Minimum	b) Maximum	
4.5 Short-term trend Method used			
4.6 Long-term trend Period			
4.7 Long-term trend Direction			
4.8 Long-term trend Magnitude	a) Minimum	b) Maximum	
4.9 Long-term trend Method used			
4.10 Favourable reference range	a) Area (km²) b) Operator c) Unknown No d) Method		
4.11 Change and reason for change in surface area of range	No change The change is mainly due to:		
4.12 Additional information			

5. Area covered by habitat

5.1 Year or period	2006-2009		
5.2 Surface area (in km²)	a) Minimum 201	b) Maximum 215	c) Best single value 208
5.3 Type of estimate	Best estimate		
5.4 Surface area Method used	Based mainly on extrapolation from a limited amount of data		
5.5 Short-term trend Period	2007-2018		
5.6 Short-term trend Direction	Decreasing (-)		
5.7 Short-term trend Magnitude	a) Minimum	b) Maximum	c) Confidence interval
5.8 Short-term trend Method used	Based mainly on extrapolation from a limited amount of data		
5.9 Long-term trend Period			
5.10 Long-term trend Direction			
5.11 Long-term trend Magnitude	a) Minimum	b) Maximum	c) Confidence interval
5.12 Long-term trend Method used			
5.13 Favourable reference area	a) Area (km²) b) Operator c) Unknown No d) Method		
5.14 Change and reason for change in surface area of range	No change The change is mainly due to:		
5.15 Additional information			

Report on the main results of the surveillance under Article 17 for Annex I habitat types (Annex D)

6. Structure and functions

6.1 Condition of habitat	a) Area in good condition (km^2)	Minimum	42.6	Maximum 43
	b) Area in not-good condition (km^2)	Minimum	41.89	Maximum 42
	c) Area where condition is not known (km^2)	Minimum	116.51	Maximum 130
6.2 Condition of habitat Method used	Based mainly on extrapolation from a limited amount of data			
6.3 Short-term trend of habitat area in good condition Period	2007-2018			
6.4 Short-term trend of habitat area in good condition Direction	Decreasing (-)			
6.5 Short-term trend of habitat area in good condition Method used	Based mainly on expert opinion with very limited data			
6.6 Typical species	Has the list of typical species changed in comparison to the previous reporting period?		No	
6.7 Typical species Method used				
6.8 Additional information				

7. Main pressures and threats

7.1 Characterisation of pressures/threats

Pressure	Ranking
Intensive grazing or overgrazing by livestock (A09)	M
Mixed source air pollution, air-borne pollutants (J03)	M
Other invasive alien species (other then species of Union concern) (I02)	M
Wind, wave and tidal power, including infrastructure (D01)	H
Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging) (E03)	H
Physical alteration of water bodies (K05)	M
Drainage, land reclamation or conversion of wetlands, marshes, bogs, etc. to industrial/commercial areas (F27)	M
Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defences or coastal protection works and infrastructures) (F08)	H
Sea-level and wave exposure changes due to climate change (N04)	M
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	M

Threat	Ranking
Intensive grazing or overgrazing by livestock (A09)	M
Mixed source air pollution, air-borne pollutants (J03)	M

Other invasive alien species (other then species of Union concern) (I02)	M
Wind, wave and tidal power, including infrastructure (D01)	H
Shipping lanes, ferry lanes and anchorage infrastructure (e.g. canalisation, dredging) (E03)	H
Physical alteration of water bodies (K05)	M
Drainage, land reclamation or conversion of wetlands, marshes, bogs, etc. to industrial/commercial areas (F27)	M
Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defences or coastal protection works and infrastructures) (F08)	H
Sea-level and wave exposure changes due to climate change (N04)	H
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	M

7.2 Sources of information

7.3 Additional information

8. Conservation measures

8.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified and taken
8.2 Main purpose of the measures taken		Restore the habitat of the species (related to 'Habitat for the species')
8.3 Location of the measures taken		Both inside and outside Natura 2000
8.4 Response to the measures		Medium-term results (within the next two reporting periods, 2019-2030)
8.5 List of main conservation measures		

Reduce/eliminate point pollution to surface or ground waters from agricultural activities (CA10)
Maintain existing extensive agricultural practices and agricultural landscape features (CA03)
Implement climate change adaptation measures (CN02)
Manage changes in hydrological and coastal systems and regimes for construction and development (CF10)
Other measures related to extraction and energy exploitation activities (CC14)
Management, control or eradication of other invasive alien species (CI03)

8.6 Additional information

9. Future prospects

9.1 Future prospects of parameters	a) Range	
	b) Area	
	c) Structure and functions	
9.2 Additional information		One of the greatest threats to this habitat is the prospect of coastal squeeze as sea levels rise so efforts are now being made to implement a programme of

managed realignment. Improvements in the evidence base coupled with implementation of Shoreline Management Plans and estuary strategies should help to deliver habitat creation, however there is still a high level of social resistance to managed realignment projects, and they can be costly, which delays delivery during which time there is ongoing deterioration. The amount of evidence about this deterioration is increasing but more information is needed in time to reduce the risk of increasing rates of change. The 2018 review by RSPB recommends that ' A pipeline of potential projects needs to be developed and investigated that cover all relevant parts of the UK to help bring coastal habitats into favourable condition at the same time as preparing for future changes and allowing habitats and species to adapt to those changes'. there is currently a risk that not all the predicted losses will be accounted for by 2025 if any of the potential projects with only a medium confidence level of being delivered do not get completed. Projected losses to 2025 are >1000 ha in England - potential for planned work to address most of these but could still be a shortfall in some areas and risk of loss of funding. Beaumont et al 2014 provide a simple linear project of declines giving a figure of 3777ha of saltmarsh loss by 2060

10. Conclusions

10.1. Range	
10.2. Area	
10.3. Specific structure and functions (incl. typical species)	
10.4. Future prospects	
10.5 Overall assessment of Conservation Status	
10.6 Overall trend in Conservation Status	
10.7 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:
10.8 Additional information	

11. Natura 2000 (pSCIs, SCIs, SACs) coverage for Annex I habitat types

11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network (in km² in biogeographical/ marine region)	a) Minimum b) Maximum c) Best single value 187.82
11.2 Type of estimate	Best estimate
11.3 Surface area of the habitat type inside the network Method used	Based mainly on extrapolation from a limited amount of data
11.4 Short-term trend of habitat area in good condition within the network Direction	Decreasing (-)

11.5 Short-term trend of habitat area in good condition within network Method used	Based mainly on extrapolation from a limited amount of data
11.6 Additional information	Area used is taken from JNCC SAC data, derived from Standard Data Forms.

12. Complementary information

12.1 Justification of % thresholds for trends	
12.2 Other relevant information	

Distribution Map

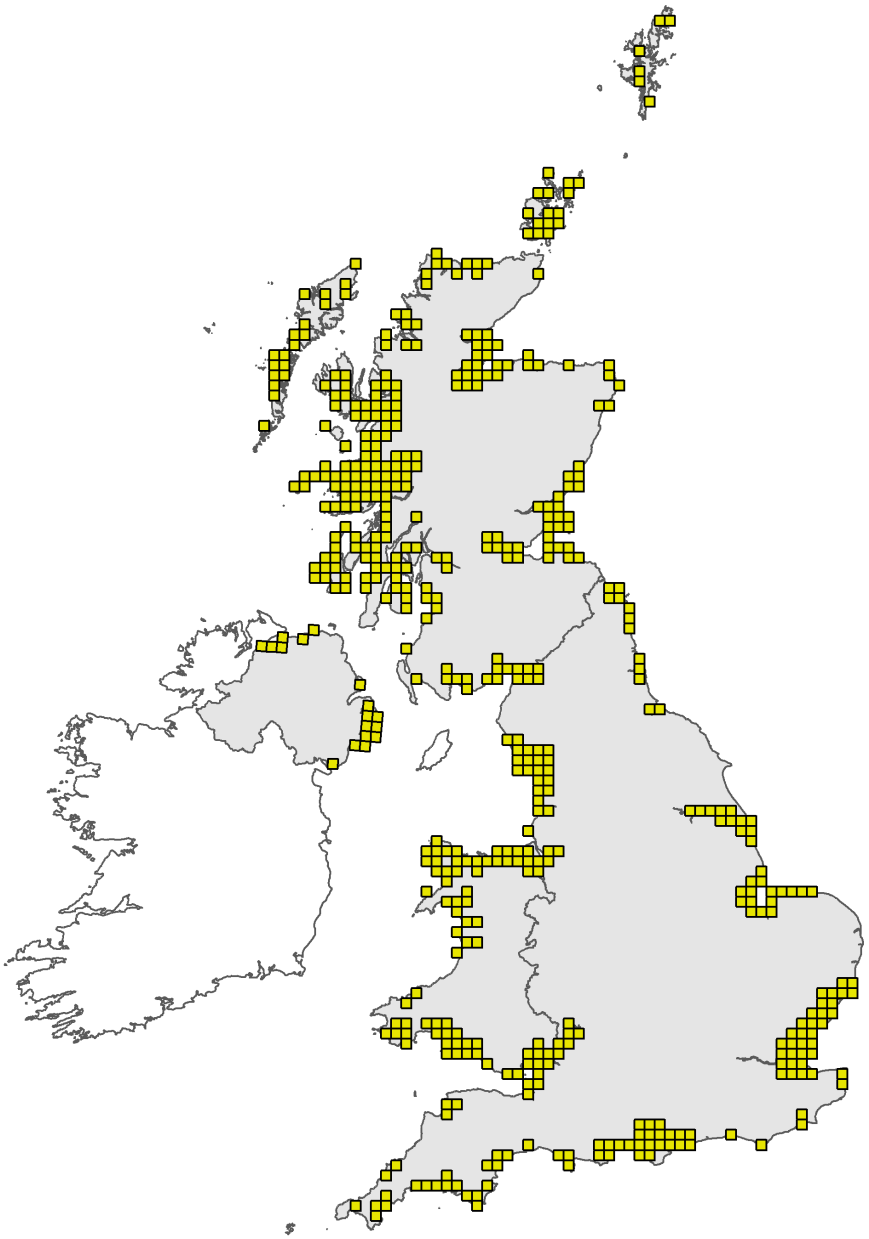

Figure 1: UK distribution map for H1330 - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available habitat records which are considered to be representative of the distribution within the current reporting period. For further details see the 2019 Article17 UK Approach document.

Range Map

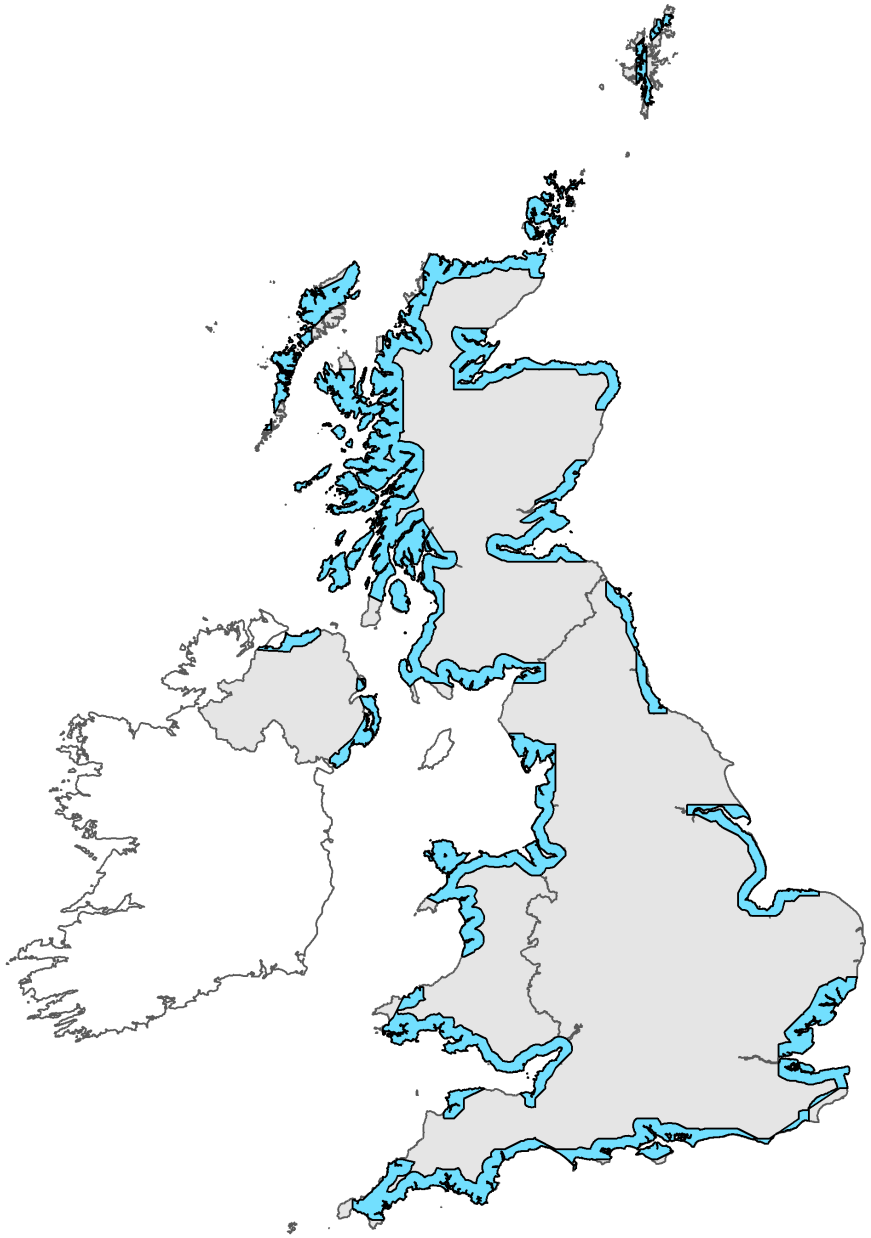

Figure 2: UK range map for H1330 - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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 habitat was 25km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Habitat code: 1330

Field label	Note
2.3 Distribution map; Method used	Map derived from data provided by JNCC Terrestrial Habitat 10-km Square Distribution Map Data and Sources. No new locations have been recorded since 2013.

Habitat code: 1330 Region code: ATL

Field label	Note
3.2 Sources of information	Key sources of information on Annex I habitats in relation to site issues, pressures and threats and approaches to management measures include the material collated for the IPENS programme. Key published SIPS, evidence projects and Theme Plans are referenced which provide a range of information relevant to this Annex I habitat and other habitats and species within Natura 2000 sites. Only new sources are included - for previous reports see the 2nd and 3rd Article 17 reports and audit trails.
4.3 Short term trend; Direction	The EA saltmarsh inventory 2006-2009 (Phelan & Shaw 2011) provides an overall estimate of national saltmarsh area but does not distinguish between H1330 and H1310 or other saltmarsh Annex I features. This study also masks the variation between different regions: some areas are experiencing expansion of lower level saltmarsh (NW England) while other regions are still experiencing losses of upper level saltmarsh. more evidence is needed. A rolling programme of updates using a standardised method (to derive extent from air photography is in place, based on a combination of automated feature extraction from aerial photography and manual digitizing and with limited ground-truthing. The 10m spacing grid point method is then used to select out the saltmarsh zonation for Water Framework Directive classification and monitoring within surveillance bodies only, but the Environment Agency has not issued a national update of the overall extent. EA January 2013. SKIPPER: Saltmarsh Key Indicators Processed Precisely and Estimated Robustly (V1.0 updated to V1.1 2016) provides data on 39 WFD surveillance water bodies in England. gives a total saltmarsh area of between 20405.2 ha to 20661.63 ha measured by remote sensing between 2008 to 2015. Despite apparent increases in saltmarsh extent on many sites (which could be a factor of the method and limited ground-truthing), no water bodies were classed as 'High' status, 15 were classed as 'Good' (slight signs of disturbance), 23 'moderate' (moderate disturbance) and 1 'poor'(high disturbance) This index indicates the importance of assessing quality of saltmarsh, not just extent and the need to understand how changes in the frequency and duration of tidal inundation as sea levels rise affect the range of habitats present. Site-specific studies (ABPmer 2016.) using LIDAR validated by air photos and site knowledge showed between 2008-2015, 12ha of saltmarsh was eroded. The ABPmer report for the Blackwater Estuary noted that, for this site, the EA layer contained inaccuracies, potentially 30-50 ha over-estimated due to mapping algae as saltmarsh. A further complication at national level is that saltmarsh has developed on a number of managed/unmanaged habitat creation sites, potentially up to 1000ha, hence a maximum area is also provided, although a combination of H1330/H1310 and other saltmarsh types including stands of Spartina anglica. Field-based surveys of Scottish saltmarshes (Haynes, T.A. 2016. Scottish saltmarsh survey national report. Scottish Natural Heritage Commissioned Report No. 786.) suggest that the 1989 saltmarsh survey of GB may have under-estimated area of saltmarsh and associated habitats.

5.6 Short term trend; Direction	for 5.7d) the short term trend magnitude has been judged to be loss of<1% per year based on expert judgement, the previous 2013 and 2007 reports and a limited amount of data. Some areas may be experiencing greater losses than others, with erosion in some areas, accretion in others, or as aresult of realignment projects. However the accretion of new marshes and habitat creation will need to progress over time so is not an exact replacement at the same
5.14 Change and reason for change in surface area	Data for this habitat cannot be distinguished from overall information on saltmarsh and mapping may not be detailed enough to identify changes in extent within the saltmarsh such as fragmentation and creek widening. A range of 201-215 km2 is given for the area which encompasses the 2013 area of 210km2, but without more detailed information it is not possible to give an accurate figure of extent.
6.1 Condition of habitat	The minimum value given in 6.1 c i) is based partly on information from key SSSIs supporting this feature within 10 English SACs.Of these 60km2 reported as 'not assessed' at the SAC feature level. Whilst a few sites have had some repeat survey, for example on monitoring transects, full assessments of many sites have not been repeated within the last 6 years. The minimum figure for area where condition is not known is an estimate in the absence of more accurate information
7.1 Characterisation of pressures/ threats	One unknown issue is whether the non-native species Prokelisia marginata (INNS factsheet 2015) could affect the hybrid Spartina anglica which is now widespread in English saltmarshes (Lush et la 2015) and may be acting as a pioneer species. The Ph.D by Harkin (2016) shows that this invertebrate attacks all species of Spartina which could have implications for Atlantic salt meadows if there is a rapid loss of Spartina anglica.
7.1 Characterisation of pressures/ threats	MCCIP are carrying out some further reviews on climate change impacts on UK saltmarsh habitats -underway in 2018. Whilst there is still come concern about the impacts of Spartina anglica on English saltmarsh and intertidal habitats, this has not been recently quantified. A study for Natural England as part of the IPENS programme (Lush et al 2016) highlighted the need for clear evidence about change to inform any measures to be taken.
7.2 Sources of information	Pressures and threats information is largely derived from a range of information produced by the IPENS programme, including SIPs, Theme Plans and the overall programme report which are available at http://publications.naturalengland.org.uk/category/4878851540779008 or other sources listed in the 'habitat sources' tab, or expert knowledge
11.4 Short term trend of habitat area in good condition within the network; Direction	A greater area of habitat in the network has not been assessed compared to the area that has been assessed as 'recovering'. This has been indicated as a short term trend of decline as recovery appears less likely.

12.2 Other relevant information	One of the greatest threats to this habitat is the prospect of coastal squeeze as sea levels rise so efforts are now being made to implement a programme of managed realignment. Improvements in the evidence base coupled with implementation of Shoreline Management Plans and estuary strategies should help to deliver habitat creation, however there is still a high level of social resistance to managed realignment projects, and they can be costly, which delays delivery during which time there is ongoing deterioration. The amount of evidence about this deterioration is increasing but more information is needed in time to reduce the risk of increasing rates of change. The 2018 review by RSPB recommends that ' A pipeline of potential projects needs to be developed and investigated that cover all relevant parts of the UK to help bring coastal habitats into favourable condition at the same time as preparing for future changes and allowing habitats and species to adapt to those changes'. there is currently a risk that not all the predicted losses will be accounted for by 2025 if any of the potential projects with only a medium confidence level of being delivered do not get completed. Projected losses to 2025 are >1000 ha in England - potential for planned work to address most of these but could still be a shortfall in some areas and risk of loss of funding. Beaumont et al 2014 provide a simple linear project of declines giving a figure of 3777ha of saltmarsh loss by 2060