

No.	Source	Conservation Objective / attribute target	Comment	Response
1	Email from John Lorking, KLCB and King's Lynn Advisory, 10 Aug 07	General comment	<p>Clarification requested on behalf of The Wash & North Norfolk Ports on how the updated conservation objectives will affect the following port activities:</p> <ul style="list-style-type: none"> i) Maintenance dredging and disposal of dredged material within site ii) Anchoring of commercial and leisure shipping within site iii) Commercial and leisure shipping activity within site iv) Provision of pilotage to commercial and leisure shipping activity through the site v) Marking of channels with fixed and moored navigational aids within the site vi) Surveying the approach channels within the site vii) Wreck removal within the site viii) Any other activities you may be aware of that may be affected. 	<p>Conservation objectives define the desired state of each site in terms of the features for which they have been designated. When these features are being managed in a way which maintains their nature conservation value, then they are said to be in 'favourable condition'. Conservation objectives are accompanied by one or more habitat extent and quality definition (or 'attribute') for each interest feature of the site. For the European site interest features these attributes are set out in the Favourable Condition Table of the Regulation 33 package published in 2000. Targets are set for each attribute and condition monitoring measures whether the targets are being met.</p> <p>The results of condition monitoring are used to inform the management of on-going activities through the Management Scheme for the EMS. In relation to ports, such on-going activities would probably include provision of pilotage and surveying approach channels.</p> <p>Conservation objectives are also fundamental to assessing plans or projects under Regulation 48 of the Conservation (Natural Habitats &c.) Regulations 1994 ('The Habitats Regulations'). Projects which are likely to have a significant effect on the site are subject to appropriate assessment which considers the implications of the proposal in view of the site's conservation objectives. Competent authorities must consult Natural England on their appropriate</p>

assessment and they can agree to a plan or project only after having ascertained that it will not adversely affect the integrity of the European site (subject to considerations of overriding public interest).

Port activities that are considered plan or projects would include activities such as wreck removal and also maintenance dredging and the disposal of maintenance dredging. With regard to the latter activity we understand that representatives of the ports and marine leisure industries do not endorse this interpretation of the law but have agreed to work in co-operation with Defra, DfT and Natural England to develop a protocol which allows the effect of maintenance dredging on European sites to be assessed through preparation of a 'baseline document'. We understand this protocol is due to be rolled out across European sites once a prioritised programme of delivery is agreed.

If there is any doubt as to whether a Port activity is likely to constitute a plan or project they should consult Natural England, who can provide further advice.

The favourable condition attributes are subject to periodic reassessment and may be updated to reflect new information or knowledge. This is the process we are undertaking at present since the favourable condition table in our Regulation 33 advice package published in 2000 did not include site-specific targets for each interest feature. In most cases there is now a measurable value (eg saltmarsh extent of 4,158 – 4,886ha in The Wash) against which the potential impact from an activity may be quantified. As such, they now provide a clearer, more quantifiable

					description of what Natural England considers the site to look like when in favourable condition and what standard it should be maintained at.
					Intertidal workshop 10 Aug 07 (see meeting note for summary of workshop held on 23 January)
2		Mussel distribution target. Appendix 2	Remove reference to 'developing mature beds' as already captured by target to maintain 15 beds in total		Done.
3		Mussel distribution target. Appendix 2	Beds becoming stable: Breast, Scotsmans, Trial bank		Noted in appendix.
4		Mussel distribution target. Appendix 2	Comment that loss of Daseley's due to natural factors (movement of channels)		Noted in appendix.
5		Appendix 2 & 3	Mussel and cockle attributes. Do these appendices just apply to Wash?		Appendices 2 & 3 just relate to the cockle and mussel biotopes in The Wash. There are or have been cockle beds in North Norfolk in the Brancaster and Stiffkey – Blakeney areas but there isn't the same quantity of information available for them since they are not targeted by large commercial fisheries as in The Wash and ESFJC don't survey them. Consequently it is difficult to set such detailed targets as for The Wash beds. However, cockle beds are covered within the conservation objective for North Norfolk intertidal flats under the following attributes: maintain variety of biotopes, maintain distribution of biotopes, maintain species composition of notable biotopes (no decline in biotope quality due to loss of particular species – including cockle), maintain presence of positive indicator species (including cockle).
6	Ron Jessop	Mussel extent target. Appendix 2	Most mussel settles within bed which doesn't increase extent. To increase extent need new beds. Mentioned new beds often ephemeral.		Noted in appendix.

7	Nigel Clarke, BTO	Mussel extent target. Appendix 2	<p>Since recovery began substantial new areas of beds have become re-established. [Need to be aware that] settlements occur from time to time and that recovery may continue with more beds becoming established. Queried what may limit the development of beds – is there sufficient food? Considerations are potential link with mussel lays, razorshell population, river inputs.</p> <p>On basis of on-going recovery majority of group proposed setting 500ha as a working target.</p>	<p>Agree that with continuing recovery more new beds may become established. For this reason a working target approach may be sensible to allow time for further monitoring and better understanding of what constitutes favourable condition for this attribute. Also recognise that other anthropogenic impacts on the site eg landclaim, climate change etc and also improved water quality, may affect capacity of site to support shellfish stocks that have been seen historically.</p>
8	Nigel Clarke, BTO	Mussel extent of individual beds. Appendix 2	<p>Look at range about mean. Should set target so that it doesn't consistently fall below this range.</p>	Done.
9		Mussel abundance target. Appendix 2.	<p>Le Strange fishery needs to be considered in addition to public fishery.</p>	<p>The abundance targets are based upon our understanding of i) trends in mussel stocks in The Wash and ii) the shellfish stocks (mussel and cockle) required to support the SPA interest.</p> <p>In relation to i), we don't have recent stock information for the Hunstanton mussel bed though it may have been included in historic surveys. We would like regular monitoring data from this bed to understand trends in this bed, it's contribution to the whole Wash stock and to gain a more complete understanding of mussel stocks at the whole site level.</p> <p>In relation to ii) the target sets out the amount of mussel and cockle required to support the oystercatcher interest of the site. This was based on modelling work which used cockle data collected from the le Strange beds throughout the 1990s and an estimate of stock on the Hunstanton mussel bed. As such this figure represents the shellfish resource from</p>

				<p>the entire Wash (public fishery and le Strange) required to support the SPA interest.</p> <p>Consequently we agree it is important to incorporate le Strange in the conservation objective. It is part of The Wash and – particularly for cockle – can support a substantial proportion of the shellfish interest of the site. Data collected on cockle from the 1990s and more recently means we have an understanding of it's contribution to these stocks and the SPA interest of the site. However we would like to improve understanding of the mussel beds.</p>
10	Mussel abundance target. Appendix 2.		<p>Total stock set at 12,000t, Just use SPA target to set SAC requirement. Atkinsons work indicates importance of mussel as a buffer for cockle stocks. Measurements are length not width. Revise target to total stock should exceed 12,000t of which 10,000t must be mussel >/= 45mm. For SPA target just say 40kg AFDM of cockle and mussel per bird rather than 26,000t required [as will vary depending on proportions of stocks available due to differing relative energy values of cockle and mussel]</p>	<p>Target incorporates abundance of mussel and cockle required to support the SPA interest – as identified in the modelling work undertaken by Stillman et al (2003). Since this SPA requirement relates to a combined shellfish stock it is also important to set individual targets for cockle and mussel abundance, which are part of the wildlife interest of the site in their own right – protected under the SAC (and SSSI). A specific target is particularly important for mussel where we are seeking to maintain stable beds since they are much less variable than cockle stocks and slower to recover from stock lows. The target specifies the stock measurement that it refers to (usually length). Mussel abundance target set at 12,000t total stock of which 7,000t must be mussel >/= 45mm (width). 7,000t value used following discussion with ESFJC – for explanation see response to comment 94 below. Wording of SPA target changed as suggested.</p>
11	Mussel abundance on individual beds		Set target based on understanding of variation around mean	Done.
12	Mussel		Group made a number of suggestions: All	Target set as 'each established bed should support a

		population measure target	beds should have 2-3 size classes. .Each mature bed should support 2-3 size classes. The 15 beds [identified under the distribution target] should have 2-3 size classes. Beds should support adult (>/=45mm) and juvenile (<45mm) stocks. Should be related to time frame eg over reporting period. Mention offshore banks	range of size classes over the reporting period'.
13		Cockle distribution target. Appendix 3	Mention offshore banks	Done.
14			Cockles present in North Norfolk? just keep attribute at biotope level or Wash level of detail.	See response to comment 5 above.
15		Cockle extent target	Should exceed 3,000ha (of cockle over 14mm width or 20mm length). Target should refer to time period ie be met over reporting cycle.	Done.
16			Check data – surveyed beds just fishable cockle or juveniles too.	Target based on analysis of ESFJC survey data which until recently targeted fishable sized cockle (14mm width, 20-21mm length). ESFJC have recently extended their surveys higher up the shore and survey all cockle that have survived their first winter ie from approx 15mm length. Consequently extent and resolution (in terms of cockle size) of the survey has increased in relation to past surveys. This is significant since the baseline is based upon the new higher resolution survey information. This must be taken into account in future condition assessments against the baseline
17		Cockle abundance target	Include le Strange beds in target. Should specify what 15,000t refers to (ie fishable stock)	See response to comment 9 above. Cockle target set at 1,000t ('total' stock). Stillman et al's (2003) modelling work set a minimum shellfish (mussel and cockle) stock required to support the bird interest of the site. The cockle abundance target reflects the minimum contribution of cockle needed to meet this

18	Ron Jessop, ESFJC			Include le Strange beds in target – if so target may be achieved otherwise if excluded target is very high Considerations that may affect previous high levels being reached – saltmarsh reclamation, saltmarsh encroachment onto intertidal – carrying capacity issues – massive reclamation since 1920s & 1930s affect cockle abundance	SPA requirement based upon the importance of maintaining mussel abundance at 12,000t (total stock) since the mussel population is a feature that is more stable / slower to recover. See response to comment 9 above.
19				Current abundance is capacity. Given considerations mentioned previously 10,000t is appropriate level for public fishery and can add figure for le Strange beds based on existing data. Make clear what target is based upon.	See response to comment 7 above.
20	Ron Jessop, ESFJC			Maintain size class structure over reporting cycle. At least 2 or 3 classes.	See response to comment 17 above.
21		Cockle population measure target		Maintain abundance of positive indicator species. The group considered it important to use this attribute [although it is not a mandatory attribute] since it is based on bird modelling research showing the habitat quality and invertebrate populations required to support the Wash bird populations. The group noted it is important to consider what sampling is needed to make the target meaningful / what transects need to be monitored. It is important that monitoring should ensure all biotopes are selected, Stratified sampling of biotopes could be	Done.
22		Intertidal mudflat and sandflats. Positive indicator species			Attribute retained.

			undertaken – do small amount of sampling if different from expected results do larger survey programme to determine whether one-off or consistent change.	
23	Intertidal mudflats and sandflats. Negative indicator species		Aliens include (but not necessarily limited to) <i>Ensis directus</i> (American razorshell), <i>Crassostrea gigas</i> (Pacific oyster), <i>Crepidula fornicata</i> (American slipper limpet)	Added to conservation objectives.
Waterbird Studies Group meeting, 28 Aug 07				
24	Wash SPA		Mediterranean gull is Annex 1 species	This is a discretionary interest feature for The Wash because the species was not recorded in the SSSI or SPA when designated or when the JNCC SPA review was undertaken. However, the current breeding population of this Annex 1 species in The Wash is of national importance and should be maintained.
25			Little tern. Jim Scott to query citation numbers with Paul Fisher. Michael Rooney to query with Nigel Clarke.	There is no site specific target for Little Tern for The Wash SSSI/SPA as it is evident that the species does not regularly breed within the site and was erroneously included in The Wash SPA citation.
26			Montagu's harrier is Annex 1 species.	Montagu's Harrier breeds sporadically within and outside The Wash SSSI and SPA. However, at current population levels it is very hard to determine if the breeding population is dependent upon habitat features within The Wash SSSI and SPA. Consequently, Montagu's Harrier has been excluded specifically from the Conservation Objectives for The Wash SSSI and SPA, although the interest features supporting the breeding harrier populations will be assessed separately under the conservation objectives for the saltmarsh habitat.
27			MoD commissioning CSL to do radar studies to look at gulls due to bird strike concerns	Noted
Email from Mark Randell, North Norfolk Advisory, 24 Sept 07				
28	General		Found difficult to comment because many	Noted. Generally, in the marine environment, there is

			attributes don't have [site-specific] content.	a lack of baseline data and consistent monitoring programs which has made setting site-specific targets difficult. For most features there is a target, but some key ones are missing such as extent of intertidal flats. We are working to fill these gaps at present, including investigating the potential for sharing data with Environment Agency monitoring programmes (Shoreline Monitoring, Water Framework Directive)..
29			Noted difficulty in distinguishing natural change from bad management / damage to a feature.	This is difficult. Key to understanding this is having good baselines of information on features. However as noted above generally little info on marine wildlife - but there are a few reasonably good baselines eg seals since the late 1980s, saltmarsh there have been a series of surveys since 1980s, wetland birds since 1960s /70s. The other key aspect is to ensure good information on new activities / management or changes to existing activities / management. This is where information from the Management & Advisory Groups is very important.
30			Noted easier to assess bird populations than other features which are equally as important.	Agree, birds benefit from being species that are popular to survey and for which there are long-running baselines. We are trying to ensure more consistent monitoring of other features while at the same time supporting these important existing baselines.
31			Concerns over increasing population of grey seals at Blakeney Point and queried impact this is having (25 breeding in 1999 to 300 breeding in 2007).	Noted. SMRU surveys indicate the common seal population is also increasing at Blakeney (possibly due to recent movement of adults out of The Wash) which would suggest significant competition is occurring with common seals here (& raises questions about what may be happening in The Wash).
32			Commented that he thought mussel beds are looked at separately in SAC conservation	Mussel lays are not considered to form part of the natural mussel bed interest of the site. This is

				objectives and that wild and farmed sites are considered separately.	because the structure of these beds differs from natural beds, characterised by fewer age classes, very few if any older mussel, much higher densities of mussel.
33				Critically important that local mussel societies such as Blakeney Harbour Mussel Society are included in this assessment and objective work.	Agree, we very much recognise the importance of including fishing industry representatives in developing these conservation objectives and have held a number of meetings with representatives from these groups (including North Norfolk) in doing this (eg meetings on 17 August, 5 October, 16 November last year) – notes of which are recorded here.
34				Noted difficulty in making assessment citing example of previously thriving oyster industry of Norfolk coast which has ceased to exist – due to natural die-off because historic fishing techniques less efficient than modern techniques	Agree, as noted above lack of consistent monitoring does often make interpreting change difficult. In the case of native oysters a number of factors have been implicated in their die-off including impact of non-natives eg competition from American slipper limpets, predation by oyster drill, severe storms but also high levels of exploitation (see Dipper, 2003. The Lincolnshire and North Norfolk Maritime Area – a review of past and present status of it's species and habitats. Research report 542 available from publications page of our website).
Email from John Badley, RSPB & Boston Advisory, 27 Sept 07					
35		Wash SPA	Mentioned 35 pairs of common tern breeding at Freiston. Data on little terns from Kev Wilson at Gibraltar Point. Jim Scott for data on Wash marsh harrier and Snettisham common tern.		Noted. Following text taken from Conservation objective: "SPA citation cites 220 pairs (data source unknown), while SPA Review (1999) cites 152 pairs (based on the 1993 survey of 88 pairs at Snettisham and 64 pairs on the Outer Trial Bank). It is likely that during The Wash's recent history, Common Terns have always struggled to breed on this SSSI/SPA. A census report dated 1978 noted 160 pairs, while The Wash Bulletin No. 10 (October

				<p>1972) reported Common Terns attempting to breed on at least five sites. However, it was concluded that more suitable habitats (<i>i.e.</i> undisturbed sites which were free from flooding) were needed to help the breeding colonies establish.</p> <p>The dynamic breeding status of this species is illustrated by the situation on the Outer Trial Bank at Terrington which supported a breeding colony of Common Terns from 1985 to 1997 with a peak of 187 pairs in 1990. The site is now unsuitable due to the establishment of a large gull colony on this site and as a result of habitat changes brought about by natural ecological succession.</p> <p>The only regular breeding colony within The Wash SSSI/SPA breeds in the Snettisham/Wolferton area. During the 1960s, up to 100 pairs bred on the saltmarsh at Wolferton but this colony subsequently moved to the Snettisham Nature Reserve, which in 1984 supported 97 pairs (5-year mean of actual breeding data for the period 1979 to 1983).</p> <p>In 2005, a new breeding colony established on islands within a saline lagoon at Freiston Nature Reserve directly adjacent to The Wash SSSI/SPA. In 2006, the Freiston colony supported 14 pairs which suggests that The Wash SSSI/SPA population could be larger if suitable habitat was made available.”</p>
36	Email from Stephen Sellers, FWA & King's Lynn Advisory, 30 Sept 07	Otter distribution, Wigeon	Noted that otter data at Wainfleet 10 years old and otter are not currently resident at Wainfleet on River Steeping. Also noted high levels of disturbance on River Babingley and so suggest that otter spraint found there are	There is more recent data available for the Wainfleet area - from the National Otter Survey undertaken from 2000-2002. This revealed otter presence at Wainfleet all Saints and Firsby Clough (3 and 4 miles respectively from the site), and also at the sluice gate

			<p>from an otter in transit rather than a resident animal.</p> <p>Suggested that explanatory notes should be used to clarify value of habitats external to the SAC / SPA that can directly or indirectly benefit the features of the SAC / SPA. In particular concern that wigeon could be classed as unfavourable in The Wash due to factors occurring within the site yet in North Norfolk there has been an increase in Wigeon due to improvements in grazing marsh habitat external to the site.</p>	<p>where the Babingley meets the sea wall at Vinegar Middle (0.5 miles from site).</p> <p>The data suggests otter are relatively few and far between in The Wash, with no on-going positive sites and most sites negative for otter presence, which contrasts with adjacent areas such as the Louth Coastal and Cam LEAP (Local Environment Agency Plan) areas. This has been noted in the otter distribution target and will be taken into account in assessing whether the target has been met.</p> <p>It is worth noting however, that there have been sightings in or close to the site, including in the most recent survey, which indicate otter can use habitat within the site. So the site may become more important as otter extend their range into suitable habitats as their population recovery continues.</p> <p>In relation to the wigeon question, condition of bird features are assessed in relation to targets set for i) their population size and ii) habitat extent - within the designated site.</p> <p>In The Wash wigeon forms part of the "assemblage of >20,000 waterfowl" interest feature in which it is identified as a locally significant component. The target for this feature is that the baseline population of this assemblage (ie the range of species listed in the conservation objective which includes wigeon) should not reduce by 50% or more. The baseline is 203,829 birds (based upon data from time of notification in 1984). The current assemblage is approximately 300,000 birds so it is meeting this target.</p> <p>The habitat target is consistent with the SAC habitat</p>
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				<p>extent target, namely 'subject to natural change there should be no decrease in extent of coastal saltmarsh, saline lagoons, coastal vegetated shingle and littoral sediment'. As such any decrease in habitat extent not due to natural change would be a cause of concern for both SPA and SAC interest features.</p>
Fishing Industry Meeting 5 Oct 07				
37	Roy Bagley	Mussel abundance target	Concern over 45mm aspect of target	Target now set at 7,000t (>/=45mm width). See response to comment 10 and 94 below.
38	Roy Bagley	Mussel abundance target	Need to include lays in target. Reduce pressure on wild stocks and birds feed on them.	We don't consider lays to form part of the SAC interest of the site given they differ in structure and function than a natural bed (see response to comment 32 above). We note lays contribute to bird feeding habitat in the site and make a contribution to replenishment of stocks (although since the oldest mussels are most fecund this contribution is likely to be less significant than from natural beds where these older mussel occur – and this emphasises the importance of protecting these areas). Also need to consider what impact lays are having on the site (eg smothering of other habitats) which is being assessed by ESFJC through their review of consents process.
39	Ken Bagley, Mat Mander	Cockle abundance target	Strong feeling from industry members and ESFJC officers that 1967 MAFF survey figures unreliable. Mat noted cyclical nature of stocks but expressed view that recent spatfall and recruitment has been exceptional. Mat suggested that changes in sea temperatures could result in conditions similar to the Thames fishery – which would likely mean more consistent recruitment and better survival.	This reflected in target notes (para 3.3)
Email from Kev Wilson, Lincs Wildlife Trust and Boston Advisory Group, 6 Oct 07				
40		Wash SPA	Just to confirm that Gibraltar Point waterbird	Thank you, noted.

41			data is not included with the figures. Also to confirm which of the years constitutes the baseline figures against which attributes will be measured (year of citation or review?)	Baseline based upon both the SPA citation and SPA review figures (these are detailed in the conservation objective).	
42			Little tern - the juveniles seen at Wainfleet could have come from the Gib colony a short distance to the north. Breeding little terns have not been recorded on the ridges here before or afterwards (although habitat looks quite good).	Natural England staff recorded up to 2 pairs breeding on these ridges in 2005.	
43			Avocet - does this qualify under nationally important?	Yes. They are an Annex 1 species which qualify for this SPA as a 'discretionary' interest feature because they attained nationally important numbers since site designation. These features can be individually condition assessed as these species contribute significantly to the biodiversity of The Wash. However, failure by these species to achieve site specific targets will not impact upon the condition of the designated site as this is only influenced by the 'mandatory' features.	
44			Waterbird assemblage - review figure - is there a source and date for this figure ? also current population mean is 335061 just to be completely accurate !	Avocet also from part of the assemblage of >20,000 waterfowl. The peak waterfowl population cited in the SPA citation cannot be traced to any credible published source. As a result, the baseline peak winter waterfowl population at the time of notification (<i>i.e.</i> 1984) was 203,829. This figure has been established from the original WeBS core count data for The Wash (as analysed by the BTO) and represents the mean 5-year peak winter count for the period 1979/80 to 1983/84. This peak winter waterfowl population increased to 314,851 at the time of the JNCC SPA review (based on the 5-year mean for 1991/92 – 1995/96). (This text is included in the conservation	

45				Oystercatcher - has undergone serious decline but numbers showing return to form at Gib in last couple of years - is this the case elsewhere in the Wash? Knot - numbers using Gib roost has increased significantly in recent years - could this partly explain less at core Wash sites ?	Oystercatcher still a concern. Although they don't trigger an unfavourable condition judgement they are still significantly below the citation baseline (c. 27%) and also the review baseline (c. 37%). Knot seem to be recovering in recent years based on the most recent Wash WeBS data. Levels are 8% less than the review baseline. However it should be noted that in the final three years of this baseline (1993-1996) the Wash knot population crashed dramatically – linked to the shellfish population crash occurring at the time. Levels are currently 40% higher than at time of designation. However, again caution should be used in interpreting this figure since the population was still recovering from the crash that occurred earlier in the 1970s due to extreme weather condition on their breeding grounds.
46					
47				Little grebe - where do these occur - Snettisham?	Yes
48				Cormorant - It is worthy of note that the British subspecies may be undergoing a decline, masked by the increased immigration of the European subspecies <i>P c sinensis</i> .	Noted
49				Gadwall - Snettisham?	Yes
50	Intertidal mudflat/sandflat			There appears to be a lack of some data for Gibraltar Point. I'm sure that Yates et al have done some surveys here in the late 80's or early 90's. Otherwise has anyone contacted David Robinson at LWT for the required info? Additionally, EA are collating information on biotope composition and sediment character as part of Lincshore scheme.	As far as I am aware CEH surveys only extended up to Wainfleet. Will follow up with Dave Robinson and have a look at the Lincshore data & how it relates to the site and if necessary add relevant data to baseline.
51				<i>Zostera</i> . Confirm no longer present at Gibraltar Point.	Noted.
52	Saltmarsh			vegetation structure - sward height - the text	There is no Wash saltmarsh that can be termed non-

		<p>here and associated attributes seem to relate more to 'managed' saltmarsh. Isn't 50% of Wash saltmarsh non-intervention?</p>	<p>intervention. The whole area is subject to management to some degree whether it be livestock grazing, livestock exclusion, seabank maintenance, managed retreat etc. The aim of a varied or heterogeneous vegetation structure is to optimise biodiversity. As a result we seek to achieve a mosaic of sward heights across The Wash at the micro- and macro-levels. Livestock grazing will help achieve this, particularly as grazing over the whole saltmarsh will not be achieved as some areas are inaccessible to livestock and some areas may support interest features which are vulnerable to livestock grazing. The target for sward height has been worded specifically with this in mind.</p> <p>The management objective for The Wash which states that 50% of the saltmarsh should be grazed (by livestock) and 50% un-grazed, was set when grazing of the saltmarsh was being abandoned. The 50% figure was set as a target for NCC/English Nature to encourage farmers back into grazing. It was based on realistic aspirations and a limited budget rather than to leave 50% of the marsh un-grazed. If the saltmarsh was not grazed then the sward structure would be more or less homogeneous for the main saltmarsh plants. Grazing changes this pattern and by manipulating livestock stocking levels from 0-1 LSU per hectare a range of sward heights can be achieved. A key issue is to ensure over-grazing does not occur.</p>
53		<p>Indicators - scarce inverts = sub-feature?</p>	<p>I think this comment refers to 'Indicators of local distinctiveness' attribute under the saltmarsh interest feature. The target here includes 'maintaining populations of nationally scarce invertebrates'. This is an attribute rather than a sub-feature. This attribute applies to the whole saltmarsh feature (ie all three of</p>

				the Annex 1 habitats) and sub-features.
54	Lagoons	Salinity range given is huge - from brackish to hyper-saline. Does this relate to one lagoon or a whole series in which case each lagoon would have its own desired range.	It is a huge range, ideally we would specify a narrower range for the lagoon based on the salinity readings actually taken from the lagoon. However, this is dependant on having sufficient time series of data. In many cases, as for Snettisham, we don't currently have this data so have had to set the target to encompass the full range. Water surface area.	
55		Extent of water - figure of 60% - does this relate to surface area ? or volume ?		
56		Distribution of biotopes - names abbreviated ?	Biotope codes are used (similar idea to NVC vegetation codes) which describe the benthic biological communities associated with particular substrate types and positions on the shore / subtidal. These are described in a more accessible way in Appendices 1 (for intertidal mud and sandflat feature) & 5 (for subtidal sandbank and large shallow inlet & bay).	
57		Species population measures - maintain presence or abundance - presume more detail will be added to confirm what level of monitoring required for key inverts.	Further detail is provided in Appendices 2 & 3 to the Wash conservation objective for mussel and cockle, and Appendix 4 for a range of invertebrate species. There is further detail on monitoring of negative indicator species within the conservation objective itself. This is currently focussed on the non-native razorshell <i>Ensis directus</i> as we have little information on the American slipper limpet and the Pacific Oyster.	
58	Common seal	Figure of 3000 seals given - does this combine grey and common or just common seal ?	Just common seal. Grey seal are not an interest feature of The Wash & North Norfolk Coast SAC.	
ESFJC written comments 15 Aug 07 & 22 Oct 07				
59	Cockle attributes appendix 3	Clarify geographic scope of Appendix 3 Wash cockle biotope targets	Inserted at top of document	
60	Cockle distribution target	Remove sediment description.	Done (Target)	

61		Cockle distribution target	Clarify figure 5.9.	Suggested clarification included in para 1.2, except reference to figure 5.10. This was not included as Fig 5.10 shows cockle distribution from 1992-1999 when cockle distribution not considered healthy.
62		Cockle extent target	Comment on need to consider recent frequency of good spatfalls compared to past rate..	Inserted (para 2.4)
63		Cockle extent target	Comment that ridging out of cockles suggests beds are at capacity and there have been changes in the site eg landclaim which will affect extent.	Inserted (para 2.5)
64		Cockle extent target	Comment on changes to ESFJC survey methodology	Inserted (para 2.2)
65		Cockle abundance target	Comment on need for information on le Strange fishery	Clarified data available (Baseline Info para).
66		Cockle abundance target	Proposed changing target to total rather than fishable stock and clarify that it relates to whole of The Wash (WFO & le Strange)	Done (Target)
67		Cockle abundance target	Comment querying how 40kg AFDM target to be met by mussel and cockle stocks	Clarity provided further down in text on how bird feeding requirements need to be met (para 3.10)
68		Cockle abundance target	Comment that 1967 survey data not considered reliable.	Inserted (para 3.3)
69		Cockle abundance target	Comment on need to consider recent frequency of good spatfalls compared to past rate.	Inserted (para 3.4)
70		Cockle abundance target	Clarification on comments relating to supporting bird interest	Inserted (paras 3.1, 3.5)
71		Cockle abundance target	Comment on importance of stable mussel beds being recognised in Shellfish policy	Importance of stable mussel beds reflected in text (para 3.10)
72		Cockle	Comment that CEH model does not include	Not inserted. CEH model includes data collected by

		abundance target	data from le Strange	CEFAS from Stubborn 1992-1995 & 1997-1999 (para 3.8).
73		Cockle abundance target	Suggested calculations on how bird food requirement met by target	Calculations set out in para 3.10.
74		Cockle size class target	Amend to apply over reporting cycle	Done (Target)
75		Cockle size class target	Justification for setting target at 2 years.	Inserted (para 4.2)
76		Mussel attributes appendix 2	Clarify geographic scope of Appendix 2 Wash mussel biotope target	Done
77		Mussel distribution target	Clarification on why Gat survived overfishing during 1990s	Inserted (para 1.4)
78		Mussel distribution target	Comment that notes relate to SAP considerations	The annex is written from a SSSI, SAC & SPA perspective so notes incorporate comments relating to the importance of mussel distribution both for the mussel attribute itself and as a feeding habitat for shellfish-eating birds.
79		Mussel distribution target	RAF No 2 bed no longer present	Removed (para 1.7)
80		Mussel distribution target	Reference to minimum bed density target in Shellfish Policy	Inserted (para 1.8)
81		Mussel distribution target	Advice from Ron that changes to bed distribution on Daseley's due to hydrographical changes	Inserted (para 1.9)
82		Mussel attributes appendix 2	Table 1. RAF No 2 bed no longer present	Clarified RAF No 2 bed no longer present (Table 1)
83		Mussel attributes appendix 2	Table 1. Add Hunstanton bed	Inserted (Table 1)

84	Mussel attributes appendix 2	Table 2. Identification of whole Gat bed as vulnerable to storm damage	Checked Fig 3.4 of CEFAS report and 2006 distribution of mussel beds and amended text to state Mid and East portions of bed vulnerable (Table 2).
85	Mussel attributes appendix 2	Table 2. Suggestion that Outer Westmark Knock should be in most risk area.	CEFAS figure indicates it is in an area subject to less frequent damage so left as it is. Not sure if other information is available upon which this comment is based (not presented with comment)?
86	Mussel attributes appendix 2	Table 2. Suggestion that Ferrier Sand be added to most risk area	Added, no mussel bed here at present although beds have occurred there in the past (1940s).
87	Mussel extent attribute	Mussel bed area should be set at 450ha	Have kept extent target at 500ha, for reasons set out in notes. However, may revise in future based on understanding gained from the on-going mussel surveys with sustainable Shellfish Management Policies in place (target 2a)
88	Mussel extent attribute	Suggest new work to define beds could lead to drop in extent as a reason for reducing extent target.	We support work to develop minimum bed density definitions. Once this work is further developed we can assess how the definition relates to the baseline of data already collected and if necessary set a more appropriate target. However in the meantime we consider the target should remain as it is. We note that the definition will be based upon the same data collection methodology that has been used since the 1990s.
89	Mussel extent attribute	Suggest changes that have occurred in the site (eg water quality improvements) mean target unrealistic.	Clarification provided in text (para 2.2). "Improvements in water quality are welcomed but it means it has been difficult to distinguish changes in bed extent that may be caused by these factors from the over-exploitation that occurred in the 1980s/1990s. With sustainable management measures in place we should gain a better understanding of the area of mussel bed that can be supported in The Wash under current environmental conditions through on-going survey work." We have noted that it may be necessary to review target in next

90	Mussel extent attribute	Comment that mussel recruitment occurring within bed and to increase extent will require new beds	monitoring cycle in light of this work. Inserted (para 2.3)
91	Mussel extent of individual beds attribute	Remove target baseline as 2002-2006 and add that target should be based on mean extent over a 'reporting cycle'.	Inserted suggest text to target. However have kept 2002-2006 baseline since target risks being meaningless without a defined baseline.
92	Mussel attributes appendix 2	Table 3. Added range about the mean to the mean area figures.	Inserted (table 3)
93	Mussel stock abundance	Stock should exceed 12,000 tonnes of which stock >/= to 45mm should exceed 7,000 tonnes.	Inserted (target)
94	Mussel stock abundance	Comment that 7,000 tonnes of fishable stock would provide the stability in stock that was historically present. Juvenile stock provide additional biomass.	Target incorporates these thresholds. We note that CEFAS, in their review of Wash Shellfish stocks (Dare et al, 2004), identified 7,000t as the previous lowest level of total mussel stock but this was based on historic stock assessments which were probably a minimum estimate of total stocks. As such we consider adult stock level must not drop below this level.
95	Mussel stock abundance	Comment that van Stralen's review suggested not useful to compare current post-crash dataset with earlier periods.	We note differences in survey methodologies post & pre-stock crashes. Provided that you are aware of the differences in survey methods – and CEFAS deal with this in their report – and take these into account these earlier datasets still provide very valuable information on stock levels and trends and shouldn't be discounted.
96	Mussel stock abundance	Comment that notes contradict each other.	We don't consider that the notes contradict themselves. The second note reflects the fact that changes in stocks due to improvements in quality of the site are difficult to distinguish from impacts of overfishing. With sustainable management measures in place we should gain a better understanding of the area of mussel bed that can be supported in The

					Wash under current environmental conditions through on-going survey work. We have noted that it may be necessary to review target in next monitoring cycle in light of this work. However, in the meantime it makes sense to make use of data on mussel abundance from the last period when stocks were considered healthy.
97		Mussel abundance	Comment that CEH model does not include data from le Strange		Not inserted. CEH model includes data collected by CEFAS from Stubborn 1992-1995 & 1997-1999 (para 3.8).
98		Mussel abundance on individual beds	Remove target baseline as 2002-2006 and add that target should be based on mean extent over a 'reporting cycle'.		Inserted suggest text to target. However have kept 2002-2006 baseline since target risks being meaningless without a defined baseline.
99		Mussel abundance on individual beds	Comment that Shellfish Policies incorporate a proposed minimum bed density target.		Inserted text to reflect work ESFJC are doing to develop minimum bed density thresholds (para 3.19)
100		Mussel age/size class structure	Target should apply to established beds and each bed should support a range of size classes over the reporting period.		Inserted (target)
Fishing Industry meeting 16 Nov 07					
101	Chris Everitt	Mussel distribution	Should state shore heights and how many beds at each level		Felt that this could make target overly prescriptive. Focus should be on ensuring beds can occur in areas that can support them based on our understanding
102	Chris Everitt		Relationship between policies and conservation objectives?		The Shellfish Policies and conservation objectives are consistent. The policies ensure sustainable fisheries can occur so that the conservation objectives of the site are met.
103	Ron Jessop	Mussel bed extent	Key to this is development of new beds, most recruitment occurs within beds		Noted, review after 6 years
104	Mat Mander	Mussel abundance	Should set 7,000t fishable stock only, ignore 12,000t total stock		Fishable (>/=45mm) component of target set at 7,000t.
105	Chris Everitt		Fishermen not given credit for contribution of mussel on lays		See response to comment 38 above.
106	Shane Bagley		After big settlements wild beds can look like lays. How will this be addressed.		Proportions not specified here, more of a focus on established beds. Targets revisable in light of better

107	Mat Mander / Ron Jessop / Chris Everitt	Cockle extent	Note of caution – 3 good spatfalls in recent years – unheard of in past. Target achievable if continue getting this frequency of spatfall – therefore advise working target. RJ noted fishing won't affect area more likely to be winter storm. CE concerned that target based on data from short successful period.	understanding of impact of natural changes. CE noted wouldn't want to clear old mussel as need older mussel to let new mussel settle. Noted, 6 year working target – review (para 2.6).
108	Mat Mander	Cockle abundance	ESFJC cockle surveys measure cockle 1yr+ equivalent to 15mm length+. Set target in relation to total stock rather than fishable (>/= 14mm width). 10K may not be appropriate – Working target – agree to review with ESFJC over reporting cycle in light of on-going better understanding of stocks & sustainable management.	Done (Abundance Target and para 2.6).
Comments previously received from the EA				
109	Environment Agency	Wash saltmarsh extent	<p><i>Additional surveys/data which could have been utilised?</i></p> <p>The use of Lidar (where available) to establish actual elevations could assist in the interpretation of the overall saltmarsh extent – elevation being all important for saltmarsh colonisation and zonation of course. The level of accuracy achievable with lidar could allow an assessment to be made independent of vegetation coverage, which as the text points out, will vary year to year, season to season etc. In conjunction with aerial photography it could be used to assess any areas which are not well defined within the photography. Lidar would tend to be flown at times of lowest</p>	This has been noted within the Wash saltmarsh conservation objective. We will use this data were it is shared with us.

		<p>vegetation coverage to give most accurate results in terms of actual bare earth elevations. Obviously there are data acquisition issues with Lidar, which EN are probably aware of.</p>		
110	Wash saltmarsh extent	<p><i>Audit trail - Rationale for habitat extent & interpretation of pioneer zone identification using aerial photos</i></p> <p>Again really the main point here relates to the use of vegetation extent to ascertain saltmarsh extent rather than topographic elevation values. If aerial photography is the principle data source being used then you would say that all future assessments made against the present baseline being established would have to utilise photography captured at the same time of year etc. And then there are still the year to year variations to factor in. It could be problematic to make a rational comparison of future habitat extents using topographic elevations extracted from Lidar or similar, against baselines established using photography.</p>		<p>Noted, these caveats / considerations are flagged up within the audit trail box for this interest feature.</p>
111	Wash saltmarsh and intertidal flats extent	<p><i>Audit trail - Interpretation of reduction in the extent of intertidal littoral sediment</i></p> <p>Which survey measurements are EN using to support the assumption that there has been a reduction in the extent of intertidal littoral sediments or is this purely anecdotal or observational evidence? The Wash itself is effectively a sink for sediment and more marine sediments are likely to be available to those saltmarsh areas closest to the mouth of</p>		<p>We would like better understanding of changes in the intertidal, including position of the low water mark and shore topography to better address the questions posed here. As we understand it in some areas the low water mark may be eroding (including on the offshore intertidal banks) which may be being deposited further upshore – hence the saltmarsh accretion. But as highlighted in your response, if deposition isn't occurring on the intertidal flats at some point shore steepening due to erosion will prevent further accretion of the marsh. Potentially this</p>

		<p>the Wash, given that sediment transport pathways enter the mouth to the north and south. Certainly the general opinion is that most saltmarsh areas are accreting in the Wash and there will be a certain amount of sediment re-working plus net sediment gain from offshore sources, plus accretion and stabilisation of sediments on the saltmarshes.</p> <p>It's true that Freiston shore was probably eroding/unstable and saltmarsh areas fronting the MR site were lower than those to either side of it. This is most likely attributed to the land claim in the eighties which forced the primary defence line too far seaward to be sustainable, resulting in deterioration of the fronting marsh.</p> <p>I think it important to clarify whether it is suggested that littoral sediment is being effectively removed from the intertidal for deposition on the expanding marsh as part of the process? This point needs clarification, i.e is it a loss of lower intertidal area, sediment volume or both? If sediment is being redistributed further up the intertidal area, representing net losses on the mudflats, eventually we would anticipate changes to the intertidal wave climate and increased wave activity reaching the pioneer zone of the saltmarsh, which would tend to inhibit deposition and increase erosion at the pioneer edge and possibly further into the marsh. Is any deposition thought to be occurring across the lower intertidal mudflats, as this would be expected if there is just a general net gain</p>	<p>could occur in these areas – we are keen to investigate this further through the SMP.</p>
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	<p>across the littoral zone. Accretion would have to be occurring on the lower mud flats to create the right conditions for deposition and expansion of the marsh seaward, I would have thought.</p> <p>In addition to the above, in Table 3b - Site-Specific definitions of Favourable Condition – the section relating to the physical attributes states that <i>‘There should be no alteration of existing creek patterns or loss of pans as determined at the time of notification as a result of anthropogenic factors’</i>. It may be a moot point but in areas where we hold the existing primary defensive line, if we do experience increasing rates of sea-level rise then the hydrodynamics and by association the creek networks and pans will inevitably experience some change. Unless sea level rise and holding the line is not counted as an anthropogenic factor of course! Obviously I realise this just constitutes coastal squeeze and therefore I guess it comes down to interpretation of ‘anthropogenic factors’ really.</p> <p>Also, again relating to the same section, an assessment of the fronting marsh where realignment takes place would need to be taken on a site by site basis. As Freiston has shown us, sizing and location of breaches will have a big influence on the creek morphology, particularly headward retreat and de-stabilization of the creek profiles.</p>	