



National Review of Statutory Habitat Compensation Associated with Flood and Coastal Risk Management Activity

Progress Report

January 2023

We are the Environment Agency. We protect and improve the environment.

Acting to reduce the impacts of a changing climate on people and wildlife is at the heart of everything we do.

We reduce the risks to people, properties and businesses from flooding and coastal erosion.

We protect and improve the quality of water, making sure there is enough for people, businesses, agriculture and the environment. Our work helps to ensure people can enjoy the water environment through angling and navigation.

We look after land quality, promote sustainable land management and help protect and enhance wildlife habitats. And we work closely with businesses to help them comply with environmental regulations.

We can't do this alone. We work with government, local councils, businesses, civil society groups and communities to make our environment a better place for people and wildlife.

Authors: Nick Hardiman, Expert Adviser (Coast)

Kevin House, Senior Adviser (Coastal Programme)

Flood and Coastal Risk Management Directorate

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Environment Agency
Horizon House, Deanery Road,
Bristol BS1 5AH
Email: enquiries@environment-agency.gov.uk
www.gov.uk/environment-agency

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Executive Summary

The Environment Agency uses a series of Habitat Compensation and Restoration Programmes (HCRPs) across England. These aim to fulfil our statutory duties to ensure that loss of protected habitat arising from flood and coastal erosion risk management (FCERM) activity is compensated in advance. This habitat loss can arise from both direct footprint of construction works over protected habitat or 'squeeze' of habitats between defences and rising seas over a longer period. Our HCRPs primarily focus on addressing the latter, as the former are usually addressed within construction project design.

We have produced two reports to summarise progress – in 2013 and 2018. The reports are complementary and the 2018 report forms our working baseline for this and future updates. We will continue to report progress to Defra, in close co-ordination with Natural England, at least every five years.

The HCRPs - covering both freshwater and intertidal habitats – have, overall, successfully kept pace with losses at internationally protected sites identified and projected within the first 20-year planning horizon (2005-2025) of Shoreline Management Plans (SMPs) and FCERM Strategies in most parts of England. These overall figures mask some shortfalls in certain habitats in particular places, meaning continued activity is essential. These mostly small outstanding commitments are being addressed now, and we are developing pipelines in each HCRP area for future work into the medium term.

Overall, we move towards the second planning horizon (to the 2050s) with a net surplus compensation habitat for inter-tidal (+117.5ha) and freshwater grazing marsh (+297ha), as well as for other coastal habitats overall (+31.5ha). This surplus reflects lower than expected habitat loss in the short term, the delivery of large multi-purpose realignments in the inner Humber Estuary in the early 2000s, and the need to anticipate the compensation requirements to the middle of this century.

Since our last report we have progressed a number of projects such as Outstrays to Skeffling managed realignment on the Humber, and mixed habitat creation on the Lower Otter Estuary in Devon. We have completed schemes on the Tamar in Devon and at Donna Nook on the Humber, as well as the Cumbria Coastal Strategy and Thames Estuary 2100 Ten-Year Review, which refine our projections of habitat change in those areas.

Since 2018, we have focussed heavily on improving our understanding of past and existing habitat change to better define and assess the scale and type of work we will need to do in the future. Given the long lead-in times for habitat creation projects, we use the HCRPs to take a precautionary approach to triggers for action to compensate for lost habitat. It is therefore important our triggers are based upon sound monitoring and evaluation. This report summarises our main achievements, and how they will support our work to progress actions for the natural environment in our [National FCERM Strategy Road Map to 2026](#).

Challenges remain, and we make several recommendations for onward work by the HCRPs, as well as reporting progress on recommendations made in 2018. Although monitoring in many areas has shown a pattern of sediment accretion – suggesting we have not been losing as much habitat overall as previously thought – this may be temporary and masks declining habitat condition in some locations. Land acquisition, finance and technical barriers compound this picture.

However, new mechanisms and initiatives are also evolving quickly to drive delivery and complement legal compensation with wider opportunities to restore the natural environment as we manage flooding and erosion risk. Habitat compensation described in this report is essential to maintain the ecological coherence of our protected site network. Restoration – the aim of the Government’s 25 Year Environment Plan – enhances, extends and links that network. FCERM has a role to play in habitat restoration and the HCRPs offer a useful strategic model for achieving it.

Our baseline 2018 assessment of progress on habitat compensation marked a major step forward in our understanding of the baseline statutory delivery environment. It clarified habitat area delivered and identified how compensation efforts and SMPs or Strategies related to each other. It improved the data and ensured we were not double-counting commitments to address earlier ‘historic’ losses with efforts to tackle future or ongoing coastal squeeze. It also established a consistent approach to monitoring progress, which this report takes forward.

Since then, the Environment Agency and Natural England have developed and agreed a set of joint guiding principles setting out how we will work together towards addressing future habitat needs at the coast. These principles will ensure that we approach site quality and condition with the coast’s natural dynamism and climate resilience in mind. They complement this report on what we have done and what is still needed, by setting out how we will approach habitat compensation and restoration work together.

1. Introduction

England has a wide range of internationally important habitats, particularly at the coast, which have been – or may in future be – affected by work to protect people and property from flooding or erosion. Coasts are dynamic, and this dynamism is part of what makes the coastal environment diverse and attractive to people and wildlife. Disrupting or interrupting this natural dynamism by building sea defences can have far reaching effects on coastal habitats and the wildlife they support. These effects will change with a changing climate.

Much of the coastal environment is protected under UK and English law, reflecting both its international ecological value, and the value we place on it for our nature, economy, and wellbeing. Where these protected sites are lost or damaged due to human activity, remedial action is required. This includes many areas requiring compensation for habitat lost due to ‘coastal squeeze’ – the gradual drowning of coastal habitats beneath rising sea levels where they run up against a barrier such as a sea defence. Saline inundation of freshwater habitats at the coast may also need addressing.

We therefore need to understand what changes to habitat have happened, and are happening now, and project what we might expect to change in the future as a result of Flood and Coastal Erosion Risk Management (FCERM) activity. This will enable us to compensate for those losses before they happen and maintain a coherent protected site network.

Shoreline Management Plans (SMPs) used specific assessments to set out projections of habitat change at or near the coast, where much of the habitat change resulting from FCERM can be observed. Our Habitat Compensation and Restoration Programmes around England monitor and help manage that change and ensure our compliance with associated legislation.

2. This report

This report demonstrates how we are complying with the UK legislation that protects our most important wildlife habitats¹ in the FCERM investment programme delivered by the Environment Agency and local authorities under the Environment Agency’s Strategic Overview. In it we will refer to the previous *National Review of Statutory Habitat Compensation Associated with Flood and Coastal Risk Management Activity*:

¹ Primarily the Conservation of Habitats and Species Regulations 2017, which translates into UK legislation the EEC Council Directive 92/43/EEC (The Conservation of Natural Habitats and of wild fauna and flora) known as the ‘Habitats Directive’. The Environment Act 2021, provides the legal framework for environmental governance in the UK, and provisions for the improvement of the environment in relation to waste, resource efficiency, air quality, water, nature and biodiversity, and conservation.

Progress Report, which we produced in January 2018, as the **baseline 2018 assessment**.

Rather than repeat the introductory and analytical information in that assessment, this report will build upon it. This report highlights the changes to our approach, knowledge and understanding of habitat change, and the action taken to deliver recommendations in the 2018 report. It retains the baseline assessment's format and approach to reporting area of habitat created, whilst not losing sight of the extent to which those areas are achieving their conservation objectives. The rationale and scope of the report are unchanged².

Work to address historic habitat loss since site designation but prior to habitat programmes being established alongside SMPs was reflected in the baseline 2018 assessment: Table 2 in Section 6 below summarises that work. This report focusses upon work by those programmes to address habitat change being experienced now or projected into the future.

To emphasise this forward-facing approach, the Environment Agency and Natural England have developed and agreed a set of joint guiding principles setting out how we will work together towards addressing future habitat needs at the coast. These principles will ensure that we approach site quality and condition with the coast's natural dynamism and climate resilience in mind. They complement this report by setting out how we will approach habitat compensation and restoration work together. For more information on this, please see Section 6 of this report

3. The Habitat Compensation and Restoration Programmes

Our HCRPs are led by experienced operational staff, in close cooperation with Natural England and a range of organisations interested in being part of their delivery. The Programmes operate to discrete geographical areas that best reflect administrative structures and sensible ecological units. For example, the South Wessex programme focusses upon the Poole and Wareham Strategy area, and the Severn, Thames and Humber each have a discrete Programme to match their respective FCRM Strategies. Other Programmes are driven by the requirements set out in the Habitats Regulations Assessments of SMPs - from which most of our current habitat compensation needs originally arose.

An overview of the Habitat Compensation Programmes around England, including their funding and accountability, is provided in the baseline 2018 assessment.

Since 2018, the Habitat Compensation Programmes have been re-named 'Habitat Compensation and Restoration Programmes' (HCRP) to reflect the growing

² We have agreed with Defra that these reports will be updated towards the end of each investment programme. The next will be in 2026.

Government agenda for *restoration* of the natural environment - including through how we manage flood and erosion risk - as well as basic compensation for loss.

'Restoration' may involve the ecological improvement of existing habitats and the creation of new habitat which can link, enhance, extend and improve the resilience of the protected site network. Restoration is distinguished here from legal responsibilities to replace internationally protected sites being lost due to activity in the FCERM investment programme. This restoration agenda is set out primarily in the Government's 25 Year Environment Plan and the Environment Agency's commitments to help deliver its ambition. The most relevant of these to the HCRP are:

- restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term
- creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits
- increasing the proportion of protected and well-managed seas, and better managing existing protected sites.

In turn, the [National Flood and Coastal Erosion Risk Management Strategy for England](#) firmly places adaptation and resilience to change alongside protective measures – which include a range of nature-based solutions. The [National FCERM Strategy Road Map to 2026](#) commits us to improving how our activity contributes to the condition of the protected site network, and how it enhances the natural environment beyond that network. In turn, these commitments will be captured in our SMPs, and the strategies and projects that deliver them – as well as in the development planning documents and decisions they inform.

During the six-year FCERM investment programme running from 2021-27, SMPs will have been thoroughly 'refreshed'. This exercise will make them clearer, easier to update and access, and better able to set out what is needed for both habitat compensation and restoration within their online action plans.

The evidence and drivers available to support habitat creation are also improving. A comprehensive [update](#) to the Environment Agency's mapped national [Salt Marsh Survey](#), based upon the most recent information from the National Network of Regional Coastal Monitoring Programmes, is informing estimates of habitat change and need. [Research](#) to better define 'coastal squeeze'³ and potential solutions to it for different coastal change situations has lent more consistency to those estimates.

The Environment Agency's '[ReMeMaRe](#)' (Restoring Meadows, Marshes and Reefs) initiative will result in increasingly well-defined habitat opportunity mapping to support

³ The definition and background work can be found in the report 'The loss of natural habitats or deterioration of their quality arising from anthropogenic structures or actions, preventing the landward transgression of those habitats that would otherwise naturally occur in response to sea level rise (SLR) in conjunction with other coastal processes. Coastal squeeze affects habitat on the seaward side of existing structures'

the targeting of our work at the coast. The HCRPs will be working in step with this project so that ambitions and opportunities can be best aligned.

The new emphasis on restoration within our Programmes should mean the many benefits of taking a strategic approach to habitat compensation can also be conferred upon our approach to habitat restoration in FCERM. As new mechanisms emerge for funding habitat restoration, such as Biodiversity Net Gain (BNG), this more co-ordinated approach presents a cost-effective way to encourage nature recovery. The Environment Agency has for example committed to provide BNG within its FCERM schemes over and above the mandatory 10% required of us. In many cases it will be difficult to deliver this within the footprint of the scheme, so a strategic approach to habitat creation will be essential.

However, this extension to the remit of our HCRPs to provide habitat restoration is in an early stage, and the enabling mechanisms are evolving. As such, this report retains the scope of the baseline 2018 assessment and focusses upon our work to fulfil statutory duties to deliver habitat compensation.

Appendix 1 provides the geographical boundaries of each HCRP area.

4. Habitat Account Assessment

The method used to assess and set out our achievement of statutory requirements is described in full in section 4 of the baseline 2018 assessment, and a guide to interpreting the figures is also provided at the beginning of Appendix 2 of this report.

Each HCRP area is represented by a table shown in **Appendix 2**, in hectares,

- Remaining habitat change anticipated within each Shoreline Management Plan epoch
- habitat creation achieved since 2018 (ascribed a confidence level)
- the cumulative habitat 'balance' we would expect to see without further action
- an estimate of the cumulative balance based upon pipeline projects – a figure that represents varying degrees of realisation, potential and timescale for delivery.

Table 1 below provides a summary of this information

Table 1: Summary of progress towards compensation by Habitat Compensation and Restoration Programme area for ongoing and future losses of coastal habitats in England January 2018 to December 2022.

Note cumulative balance incorporates projects completed prior to 2018. See Appendix 2 for guide to the tables.

HCRP area	Habitat type	Remaining within-epoch change since SMP approval (+/-)			Habitat creation since 2018			Cumulative balance			P
		c.2025	c.2050	c.2100	H	M	Total	c.2025	c.2050	c.2100	
North West	Saltmarsh/mudflat	-4.5	-34	-10	0	0	0	-4.5	-38.5	-48.5	41
Severn Estuary	Saltmarsh/Mudflat	-12	-318	-765	0	0	0	-12	-330	-1095	1697
Devon and Cornwall	Saltmarsh/Mudflat	-15	-11.5	0	82	0	82	+ 67	+55.5	+55.5	c.90
	Grazing Marsh	-13	0	0	0	0	0	-13	-13	-13	-29
South Wessex	Saltmarsh / Mudflat	-37	-86	-313	0	0	0	-37	-123	-436	92
	Grazing Marsh	-2	-3	-4	0	0	0	-2	-5	-9	12
	Other	-21	-11	-30	0	0	0	-21	-32	-62	62
Solent and South Downs	Saltmarsh/Mudflat	+23	-156	-292	0	0	0	+23	-133	-425	408
	Grazing Marsh	0	0	0	0	0	0	+69	+69	+69	-208
	Other	0	0	0	7	0	0	+17	+17	+17	-12
Kent, S London and East Sussex	Saltmarsh/Mudflat	-110	-135	-290	0	0	0	-110	-245	-535	201
	Grazing Marsh	0	0	0	0	0	0	+164	+164	+164	-386
	Other	-10	0	0	0	0	0	-3.5	-3.5	-3.5	0

Thames	Saltmarsh / Mudflat	-2	-45	-495	0	0	0	-2	- 47	-542	976
	Grazing Marsh	0	0	0	0	0	0	0	0	0	-779
East Anglia	Saltmarsh	0	tbc	tbc	0	0	0	0	-tbc	tbc	50
	Grazing Marsh	+59	-tbc	-tbc	0	20	20	+79	tbc	-tbc	100
	Other	+4	-32	tbc	0	35	35	+39	+7	tbc	32
Humber	Saltmarsh/mudflat	-11	-159	-	202	0	202	+191	+32	-	496
	Other	-25	0	0	6	19	25	0	0	-	-
North East	Saltmarsh/Mudflat	+2	-	-	0	-	0	+2	-	-	-

All Combined	Saltmarsh / Mudflat	-166.5	-944.5	-2,165	284	0	284	+117.5	-829	-3,026	4,051
	Grazing Marsh	44	-3	-4	0	20	20	+297	215	211	-1,290
	Other	-52	-43	-30	13	54	60	+31.5	-22.5	-48.5	82.5

5. Assessment of progress

Total epoch 1 predicted balance (Σ cumulative balance, epoch 1 Table 1): **+446ha.**

Total epoch 1 predicted balance (Σ cumulative balance **inter-tidal**, epoch 1, Table 1): **+117.5ha**

Total epoch 1 predicted balance (Σ cumulative balance **grazing marsh**, epoch 1, Table 1): **+297ha.**

Total epoch 1 predicted balance (Σ cumulative balance **reedbed and other coastal habitats**, epoch 1, Table 1): **+31.5ha.**

In this update report, our outlook for habitat change across the different broad habitat categories remains broadly the same as in our baseline 2018 assessment: we remain strongly 'in credit' regarding our habitat compensation obligations overall, based purely on hectares of habitat delivered. We also have a strong pipeline of potential projects in most areas, although securing landowner agreement to take these projects forward can be a major barrier to delivery.

The amount of this credit for inter-tidal habitat is slightly reduced from the baseline 2018 assessment due to:

1. Previous over-estimations of the amount of inter-tidal habitat that would be created at Outstrays to Skeffling and, to lesser extent, Donna Nook Phase 2, both on the Humber Estuary;
2. Slight increase in predicted losses in the mid-Humber Estuary sections;
3. New projections of habitat loss associated with the Cumbria Coastal Strategy;
4. Allocation of our investment in the DP World Saltfleet compensation project on the Thames to meeting our commitment in 2007 with Defra and Natural England towards the 2010 PSA target on SSSI condition and historic habitat loss.
5. Updated advice received from Natural England stating that predicted increases of intertidal mudflat in the Medway and Swale cannot be used to offset the predicted loss in saltmarsh, meaning these are not included in Table 1.

The HCRP summaries in Appendix 2 often give a summary progress report of 'no further compensation projects completed since 2018'. This partly reflects the fact that managed realignment takes time – sometimes a decade or more - to agree, plan, design, justify, fund, and deliver, even before beginning to achieve ecological functionality that enables it to compensate for ongoing losses. It is very important to recognise that this does not mean no work is being done to monitor and address habitat change relating to our FCERM activity. Progress with projects in their early stages in 2018 has been good, with important re-alignment sites on the Humber being completed (Donna Nook) and progressed (Skeffling) and projects in the South-West, South (Arne Moors) and East Anglian (Collimer Point and Benacre) also moving forward. Each HCRP is actively identifying a pipeline of sites for the future.

Also, having baselined our progress to date in 2018, we have since focussed heavily on improving our understanding of habitat change through the national initiatives outlined in Section 3 above, and through local bespoke studies associated with existing SMPs (e.g. in Essex and South Suffolk) and new or updated Strategies such as in Cumbria, the Thames and Humber. In particular, the ‘tipping points’ and associated triggers for action are being explored to understand how the current pattern of sediment accretion in many areas might change with sea level rise and other processes combined.

Given the lead-in time for the land-use change involved for many re-alignment projects, we will continue to take a precautionary approach to those triggers for compensation to avoid the risk of degradation to our best natural areas. We are also developing our understanding of what patterns of accretion as well as erosion mean for our coastal habitat balance *within* the overall habitat hectare count. This includes looking at relative zonation or mature vs emergent saltmarsh, the extent of creek erosion and cliffing within the saltmarsh extent, and how this affects the vegetation and other ecological features we are seeking in particular areas.

Despite good progress on delivery of habitat compensation projects, challenges that affect our wider FCERM work (and those of all RMAs) are likely to surface in the delivery of these projects too. These include human resources, skills, supply chain, and material cost inflation. Additionally, the market for carbon offsetting in relation to achieving ‘net zero’ carbon targets within and beyond government is likely to introduce competition for land and potentially affect land prices locally. With greater certainty surrounding the parameters of carbon offsetting (especially for inter-tidal areas), Biodiversity Net Gain (BNG) and the new Environmental Land Management System, we will be better able to address these challenges as we move into the second planning epoch of SMPs.

Although the overall picture in Table 1 for the short term is positive, there is likely to be much work to do ensure compensation prior to loss in the medium term, in addition to our evolving targets for BNG, habitat restoration and carbon offsetting. For example:

- In the North-West there are new short-term requirements in Morecambe Bay and medium-term action needed in the Solway Firth in relation to delivery of the Cumbria Coastal Strategy;
- The current projections of habitat loss in the Severn are large for the medium term, with 12ha of short-term target to carry over. The pressure and competition for land in the Severn may pose delivery challenges;
- The Arne Moors project in South Wessex will need complementary work in the medium term to address ongoing loss of mudflat in the system, which is outpacing small short-term gains in saltmarsh habitat;
- Conversely, in both the Solent and the Medway and Swale areas it is mudflat gain at the expense of saltmarsh that proves the challenge for maintaining a sustainable habitat balance of succession.

Appendix 2 provides more detail on progress and issues by HCRP Area.

6. Conclusions and recommendations

The overall conclusion of this update remains the same as for our baseline 2018 assessment. The Environment Agency has delivered or is on track to deliver its short term (SMP 'epoch 1') statutory obligations towards compensating ecologically functional habitat in advance of loss across the Natura 2000 network arising from the strategic FCRM plans and strategies we approve. Current shortfalls in specific areas are generally minor, have been recognised and are expected to be addressed prior to loss at the existing designated sites.

In the 2018 report we made a number of recommendations for further work. An update on progress is provided below, with some further additional recommendations.

2018 Recommendation 1: Agree scale of remaining commitment required to address historic losses to nationally and internationally designated sites with Natural England. COMPLETE.

Targets agreed between Defra, the Environment Agency and Natural England in 2007 to begin to address 'historic' losses of coastal habitat between the establishment of the existing European Site network (largely in the 1990s) and 2005 (the planning baseline for SMPs) have largely been met through the Habitat Compensation Programmes. Only a small area (2ha) is still to be provided in the Thames Estuary.

This work contributed towards Natural England's Public Service Agreement (PSA) to ensure 95% of Sites of Special Scientific Interest (SSSIs) were in 'favourable' or 'unfavourable-recovering' condition by 2010. As the SSSI network underpins most of the European Site network, delivery for SSSIs has also contributed to compensation for European sites.

Table 2 provides a summary of the agreed targets and work done to address them. Aside from small amounts of delivery potentially required in the Thames, we met all of these targets (where they existed) through our HCRPs.

Table 2: Targets to address ‘historic’ habitat losses due to coastal squeeze agreed in 2007, and work to meet them.

HCRP area	Location	Target (ha)	Site addressing target	Area (ha)
North East	n/a	None	n/a	n/a
Humber	Humber Estuary	Work Underway	Alkborough & Paul Holme Strays	n/a
East Anglia	Essex estuaries	100	Wallasea (Crouch/Roach)	75
	Suffolk – Hamford/Stour/Orwell	50	Fingringhoe (Colne)	22
	Suffolk - Blyth	20	Devereux Farm (Hamford Water)	15
	Suffolk - Alde-Ore	20	Blythburgh (Blyth)	c.29
	Suffolk - Deben	20	Hazelwood Marshes (Alde)	c.76
			Total	217
Thames	Thames	20	Saltfleet Flats	18
South-East	n/a	n/a	n/a	n/a
Solent and South Downs	Solent	100	Medmerry	79
			Lymington	21
South Wessex	n/a	n/a	n/a	n/a
Devon and Cornwall	n/a	n/a	n/a	n/a
Severn	Severn SMP	40	Stearr	40
North-West	n/a	n/a	n/a	n/a

We also agreed that these nominal targets, once met, might only begin to address site condition should monitoring data suggest historic habitat losses to coastal squeeze have been high. Further work to bring sites into ‘favourable’ condition might be required depending upon

1. habitat change trends shown by improved monitoring assessments such as the updated [Saltmarsh Inventory](#);
2. Natural England’s SSSI Future Reforms Programme, which is being undertaken now as part of the National FCERM Strategy Measure 1.4.1 and which will consider how site condition should be baselined and assessed in light of climate change.

New agreements about the work remaining for the HCRPs to address site condition will be informed by the outcome of 2) above, in 2024, but in the meantime the Environment Agency and Natural England will work together to understand and improve site condition locally.

2018 Recommendation 2: Use SMP and Coastal Strategy reviews to incorporate the latest research and monitoring into projections of habitat loss associated with long term FCRM management policies. ONGOING

There have been a number of developments since 2018 to meet this recommendation, including completed work for the Cumbria Coastal Strategy and TE2100, and ongoing work for the Severn, Tamar and Humber Strategies and Essex and South Suffolk SMP. Each of these has produced, or is producing, new or updated projections of habitat change using data from both bespoke studies and the National Network of Regional Coastal Monitoring Programmes. This data has informed the update to our saltmarsh inventory and is an important common resource to inform the HCRPs.

The current SMPs, developed between 2006 and 2012, are all being systematically ‘refreshed’ to ensure the Plans are technically reliable, accessible, more easily understood and coherent with national policy and strategy on adaptation and climate resilience. The updates now being made to SMP action plans – and, ultimately, management policies – will help ensure FCRM Risk Management Authorities and others are ready for managed transition from one approach to another as we move into ‘epoch 2’ between 2025-2055. They will also use opportunity mapping provided by the Environment Agency’s partnership ReMeMaRe project to inform how SMPs can help drive nature-based solutions for FCERM, use different mechanisms to restore habitat and support Local Nature Recovery Strategies and River Basin Management Plans. This project, and the related work on habitats, can be found in the National FCERM Strategy Measures 1.2.4, 1.4.5 and 1.4.4 respectively. It will involve mapping our HCRP compensation sites.

2018 Recommendation 3: Develop focus upon auditing the quality of compensation sites and setting out our delivery in the context of other RMAs and our wider environmental metrics. ONGOING

The 2018 Report marked a major step forward in our understanding of the baseline statutory delivery environment, clarifying habitat area delivered and identifying how compensation efforts and SMPs or Strategies related to each other. It improved habitat creation data and ensured we were not double-counting commitments to address earlier ‘historic’ losses with efforts to tackle future or ongoing coastal squeeze. It also established a consistent approach to monitoring progress, which this report takes forward.

Since then, the Environment Agency and Natural England have developed and agreed a set of joint guiding principles setting out how we will work together towards addressing future habitat needs at the coast by focussing on **site integrity and coherence of the network** and considering:

- the **future impacts** of climate change and sea level rise, looking at how protected sites adapt for the future, including triggers for management change and habitat creation need;
- the **relative impacts** (direct and indirect) on protected sites most likely caused by flood and coastal erosion risk management (FCERM) activity and other factors such as pollution, succession and grazing management;
- the opportunity to link the need to deliver legal FCERM habitat compensation requirements with **broader habitat restoration initiatives** that increase site size, quality, climate resilience and connectivity.

It highlights the various drivers, tools and evidence for habitat creation and our ambition to cost-effectively tie these together to ensure we get the best environmental outcome for our investment.

A key principle is that when we consider site condition and habitat quality at a coastal location (protected or otherwise), we cannot expect to preserve its existing features in perpetuity. Some coasts are more dynamic than others, but all involve some natural dynamism which is likely in turn to be modified or accelerated by climate change. Accepting change does not mean accepting further depletion of our biodiversity, but a pragmatic adaptation of how, and sometimes where, we intervene to help it adjust to change in a highly constrained environment, and thereby make species and ecosystems more resilient.

Beyond some brief considerations in the text associated with HCRP summaries in Appendix 2, this update report has not provided a systematic approach to capturing habitat quality or the degree to which compensation sites are providing the biodiversity outcomes we expect. To help understand this, on the Humber Estuary Natural England and the Environment Agency are trialling an approach to assessing whether a managed realignment site (Paull Holme Strays) has met its compensation objectives. Wider environmental metrics have only recently (or are still being) developed in relation to Biodiversity Net Gain or carbon capture, and a range of National FCERM Strategy actions to learn how our work can improve nature are now underway.

Our joint guiding principles with Natural England commit us to **developing a common strategy** for the HCRP to ensure that habitat compensation, SSSI remediation and wider habitat restoration work carried out through FCERM activity reflects the ambitions of the National FCERM Strategy and 25 Year Environment Plan (25YEP), and the importance of dynamism to the coastal zone's environmental value. Through this we can also build a more robust and accountable way to audit, report and celebrate what the hectares of habitat created are doing for nature, and where more intervention may be needed.

Summary of progress against actions highlighted by RHCP area in the baseline 2018 assessment:

Action	Status	Comment
<p>North West HCRP:</p> <p><i>Investigate compensation sites in the Solway in anticipation of projected losses identified in the Cumbria Coastal Strategy.</i></p> <p><i>Investigate if any habitat compensation is required for delivery of SMP22 in areas not covered by Cumbria Coastal Strategy. eg Dee, Mersey, Ribble, Wyre estuaries.</i></p>	<p>New</p> <p>New</p>	
<p>Severn Estuary HCRP:</p> <p>Agree the contribution of Welsh Government to compensation efforts on the Severn through loss/benefits apportionment, in order to finalise the SMP Strategy and associated HRA;</p> <p>Review the potential for managed realignment in the Severn Estuary and test scenarios associated with potential need arising from tidal lagoon power developments.</p>	<p>Complete</p> <p>Ongoing</p>	<p>Natural Resources Wales now runs its own habitat compensation programme. However, the Environment Agency and NRW co-operate to ensure a whole-estuary approach by sharing information and best practice. This report will focus on the delivery of English compensatory habitats.</p> <p>Currently refreshing SMP and using ReMeMaRe opportunity mapping to scope potential. Monitoring shows lower rates of current loss than predicted in SMP/Strategy.</p> <p>We continue to monitor proposals for tidal lagoon power locally although have not carried out a systematic analysis of scenarios. Pressure from this development now compounded by carbon offsetting market.</p>

<p><i>Update habitat change projections in the Severn Estuary in time for the next HCRP update report to inform future investment programmes, and ensure short-term deficit is carried into future habitat compensation project proposals.</i></p>	<p>New</p>	
<p>Devon and Cornwall HCRP:</p> <p>Resolve funding barriers to take forward identified managed realignment sites;</p> <p>Quantify European Site habitat losses in the Cornwall and Isles of Scilly SMP in order to justify any necessary compensation schemes.</p>	<p>Ongoing</p>	<p>The HCRP has brought in significant contribution from the European Regional Development Fund to support the Lower Otter project. Bids have been submitted to the Environmental Statutory Allowances Fund to support delivery on the Tamar.</p> <p>New FCERM projects will attract more funding for additional environmental outcomes embedded within them through the revised Outcome Measure system for allocating the national capital budget.</p>
	<p>Further progress needed</p>	<p>To be updated in the next report, especially regarding the Fal and Helford Estuaries.</p>
<p>South Wessex HCRP:</p> <p>Progress the Arne Moors partnership project.</p>	<p>Ongoing</p>	<p>Planning application submitted after detailed project design and business case completion.</p>

<p><i>Incorporate new projections of habitat change from the Christchurch Bay Strategy in time for the next HCRP update report to inform future investment programmes</i></p>	<p>New</p>	
<p>Solent and South Downs HCRP:</p> <p>Agree with Natural England any remaining work to be done to address historic losses of intertidal habitat affecting site condition.</p> <p>Identify potential grazing marsh compensation >50ha to accommodate potential losses arising from future realignments.</p> <p><i>Incorporate new projections of habitat change from the Hayling Island Strategy, Lymington to Hurst Spit Strategy, Farlington Marshes and other evidence updates in time for the next HCRP update report to inform future investment programmes</i></p>	<p>Complete</p>	<p>Targets originally agreed have been met, and discussions regarding the need for any further work on site condition connected with FCERM now look forward using our joint Guiding Principles approach.</p>
	<p>Further progress needed</p>	<p>The development of two new Coastal Strategies in this area and the evolving approach at Farlington Marshes has made this action more urgent. We are assessing options with Natural England.</p>
	<p>New</p>	
<p>Kent, S London and East Sussex HCP:</p> <p>Complete the Medway Estuary and Swale and Folkstone to Cliff End strategies that will refine understanding of the scale of losses and potential measures to address them.</p>	<p>Complete</p>	<p>See Appendix 2 for details on losses and pipeline schemes.</p>

<p><i>Investigate further opportunities to compensate losses of AVDL associated with FoCES</i></p>	<p>New</p>	
<p>Thames HCP:</p> <p>Agree with Natural England any remaining work to be done to address historic losses of intertidal habitat affecting site condition, and provisional projected losses of inter-tidal habitat in the Thames Estuary, considering new analysis associated with TE2100.</p> <p>Identify major grazing marsh creation sites to compensate for losses associated with potential realignments in the Thames Estuary.</p> <p><i>Build business case for habitat creation at St Mary's Marsh using combined justification of compensation alongside other drivers and economic case.</i></p>	<p>Complete</p>	<p>Agreement reached that work to address historic losses in the Thames Estuary prior to 2005 are minor (2ha) given site provision within the Saltfleet Flats project.</p>
	<p>Ongoing</p>	<p>This is being addressed as a key part of the working ongoing from the TE2100 ten year Review. Lower projections of inter-tidal loss have reduced the immediate statutory requirement for multiple large-scale re-alignments, although the combined economic case for St Mary's Marsh may yet involve grazing marsh compensation.</p> <p>As more managed re-alignments to address saltmarsh loss in the Medway and Swale come online, Great Bells Farm is likely to be required to account for resulting grazing marsh losses there.</p>
	<p>New</p>	

<p>East Anglia HCP:</p> <p>Agree with Natural England any remaining work to be done to address historic losses of intertidal habitat affecting site condition.</p> <p>Quantify projected losses of inter-tidal habitat in epoch 2 in order to justify any necessary compensation schemes.</p> <p>Depending on the outcome of this, identify major grazing marsh creation sites to compensate for losses associated with potential realignments in East Anglia.</p> <p>Monitor the habitat replacement requirements of the Ouse Washes with reference to the Ouse Washes Habitat Creation Project.</p>	<p>Complete</p>	<p>Targets originally agreed have been met, and discussions regarding the need for any further work on site condition connected with FCERM now look forward using our joint Guiding Principles approach.</p>
	<p>Ongoing</p>	<p>Analysis currently underway by Environment Agency Geomatics to produce projections for medium to long-term in the Essex and South Suffolk SMP.</p>
	<p>Ongoing</p>	<p>Although work to understand future habitat change is ongoing, we are working with the RSPB to explore adaptation options through the RSPB East Coast Wetlands Programme.</p>
	<p>Ongoing</p>	<p>Agreement was reached with Defra in 2016 that the project would create as much replacement wet grassland as possible whilst remaining within the agreed budget of £18M. Two suitable sites have been identified, Coveney(180ha) and Sutton (120ha). Coveney has been progressed with approx. 140ha delivered whilst Sutton remains in the early stages of project development.</p>
<p>Humber HCP:</p> <p>Complete the Donna Nook phase 2 and Skeffling managed realignment schemes.</p>	<p>Ongoing /Partially Complete</p>	<p>Donna Nook phase 2 was completed in 2021 totalling 106ha. The scheme is now in the monitoring and management phase.</p> <p>Skeffling is in construction with breaching planned for spring/summer 2024.</p>

List of abbreviations

Defra	Department for the Environment, Food and Rural Affairs
EMS	European Marine Site
FCERM	Flood and Coastal Erosion Risk Management
FoCES	Folkstone to Cliff End Strategy
HCRP	Habitat Compensation and Restoration Programme
HRA	Habitats Regulations Assessment
IROPI	Imperative Reasons of Over-riding Public Interest (in relation to HRA)
MEASS	Medway Estuary and Swale Strategy
OWHCP	Ouse Washes Habitat Creation Project
SMP	Shoreline Management Plan
TE2100	Thames Estuary 2100 Plan

Appendix 1: Boundaries of Habitat Compensation and Restoration Programmes

NORTH WEST HCRP: English component of the North West and North Wales SMP, incorporates Environment Agency Cumbria and Lancashire (CLA) and Greater Manchester, Merseyside and Cheshire (GMMC) Areas.

SEVERN ESTUARY HCRP: English coastline covered by the current Severn Estuary Strategy (to Hurlstone Point, nr Bossington, Somerset)

DEVON AND CORNWALL HCRP: Incorporates Environment Agency Devon, Cornwall and Isles of Scilly (DCS) Area.

SOUTH WESSEX HCRP: Coastline and inland area of Environment Agency Wessex (WSX) Area.

SOLENT and SOUTH DOWNS HCRP: Incorporates Environment Agency Solent and South Downs (SSD) Area, which includes the Isle of Wight.

KENT, S LONDON AND EAST SUSSEX HCRP: Incorporates Environment Agency Kent, South London and East Sussex (KSL) Area.

THAMES HCRP: Area covered by the TE2100 Plan.

EAST ANGLIA HCRP: Incorporates the Environment Agency East Anglia (EAN) and Lincolnshire and Northamptonshire (LNA) Areas to the boundary of the Humber Strategy.

HUMBER HCRP: Area covered by the Humber Strategy.

NORTH EAST HCRP: Incorporates Environment Agency North East (NEA) and Yorkshire (YOR) Areas to the boundary of the Humber Strategy.

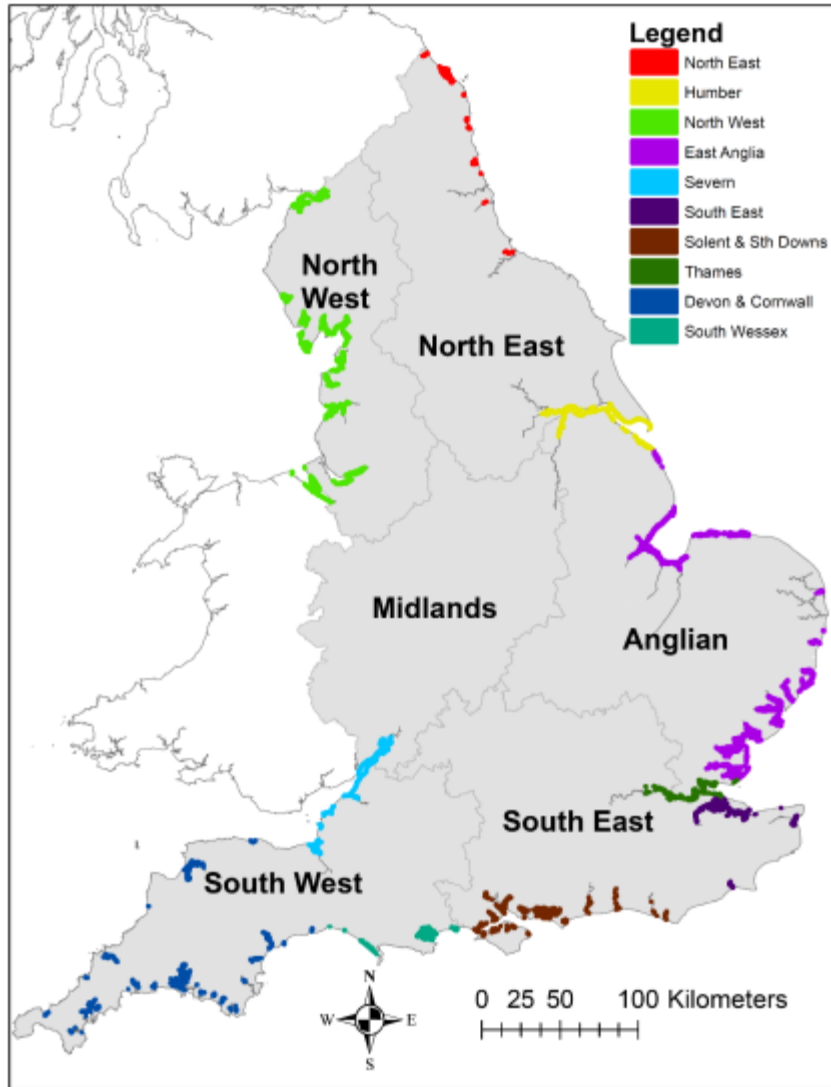


Fig. 3 Map showing key areas of focus for Habitat Compensation and Restoration Programmes

Appendix 2: Habitat account assessment by HCRP area

Guide to the tables:

This report provides a *forward look* of work in progress or yet to be done, complementing rather than repeating the 2018 report and using it as a baseline. It does not provide a retrospective run-through of all habitat compensation work done to date, although the **cumulative balance** figures do factor in all HCRP realignments since c.2005 – i.e. those detailed in Appendix 2 both here *and* in the 2018 report.

Habitat type: These may be aggregated where the relative proportion of habitats to be created is uncertain or dynamic.

Remaining within-epoch change since SMP approval (+/-): The baseline 2018 assessment provided figures for projected habitat change ('+' gain or '-' loss) roughly within each SMP epoch (i.e. to c.2025, c.2050 and c2100), and the habitat created to address losses. This assessment shows the *remaining* change to be accounted for once habitat creation completed by 2018 has been considered - and any new habitat change identified *since* 2018, for example through a new Coastal Strategy. Note that in some areas, epoch 1 projections are to c.2030 not 2025.

Example: in 2018 within the North-West, we reported an expected -162ha change (i.e. loss of 162ha) in the first epoch, and 162ha that has been created through managed realignments. This leaves a *remaining* balance of 0ha. However, new studies since have identified further expected losses associated with a strategy, which are therefore the new figures for projected change used in this report.

Example: in 2018 within the Severn Estuary, we reported an expected -300ha habitat change within the first SMP epoch, and also reported 288ha of habitat that has been created to address this. The *remaining* 'balance' is therefore -12ha, which is therefore the figure used for epoch 1 of this report. We still expect an *additional* 318ha loss in epoch 2 and a further *additional* 765ha loss within epoch 3.

Example: in 2018, we reported expected habitat losses in Devon and Cornwall, which have changed little. At the time, work was progressing to address these, but had not been completed. So we use the same figures for change but now report how that work has now addressed losses.

Habitat Creation since 2018: An update to our 2018 report to highlight habitat created or underway to high (H) or medium (M) delivery confidence, *since 2018*, in hectares.

Cumulative balance: The *cumulative* habitat change we are left with, epoch-upon-epoch, considering the *remaining* habitat change expected minus all habitat created *to date* (i.e. since c.2005, the baseline year for SMPs. Note that work to address 'historic' losses before 2005 are highlighted in the text but treated separately).

P: Provisional pipeline of sites (varying degrees of delivery security) in hectares.

Table A1: Habitat compensation to address projected losses: North-West HCRP

Relevant Plans/Strategies in HCRP Area	Habitat type	Remaining within-epoch change since SMP approval (+/-)			Habitat creation since 2018			Cumulative balance			P
		c.2030	c.2050	c.2100	H	M	Total	c.2030	c.2050	c.2100	
Cumbria Coastal Strategy	Saltmarsh/mudflat	-4.5	-44		0	0	0	-4.5	-48.5		41

SITE/AREA ADDRESSING LOSSES CAUSED BY FCRM ACTIVITY:

162ha short-term losses compensated by projects at Hesketh Out Marsh and East Lytham, as per baseline 2018 assessment.

No historic habitat loss commitments identified for this area, as per baseline 2018 assessment.

New projections of loss arising from Cumbria Coastal Strategy due to direct losses and losses caused by erosion.

No further compensation projects completed since 2018.

Anticipated changes to habitat extent

The assessments associated with the North West and North Wales SMP do not identify any compensation requirement arising from FCRM activity, but as the SMP Refresh concludes and potential changes to the SMP reflected in the action plan, this may change. Should this lead to changes in preferred management options within the SMP, the HRA will be revised to reflect this, and projections revised.

The Cumbria Coastal Strategy (CCS) was adopted in 2020 and provides the main basis for currently identified compensation requirements in the North West HCRP. The related assessments concluded potentially adverse effects on the integrity of the internationally designated sites in Morecambe Bay in the short, medium, and long term – the short-term is defined as c.2030, rather than c.2025 as per the SMP epoch. This short-term need is 4.5ha for the protected area losses in Morecambe Bay. In the Solway,

potentially adverse effects were not identified until the medium to long term, with some uncertainty over the timing of likely loss. An overall cumulative total of 48.5ha is required to cover both areas to c.2100.

Current activity and anticipated pipeline

The Cumbria Strategy has identified three sites that could recreate sufficient intertidal habitat to meet the short-term compensatory habitat requirement of 4.5 ha in Morecambe Bay:

- Bank Moor – up to c.9.2 ha of intertidal habitat.
- Arrad Foot – up to c.14.6 ha of intertidal habitat.
- Ashes Point – c.17.0 ha of intertidal habitat.

The Ashes Point site is currently the most promising short-term habitat creation site.

Further work is needed to progress the development of additional sites to reach the medium and long-term habitat compensation requirements in the Solway.

The compensation requirements for areas of the North West beyond Cumbria need to be informed by further work. A small compensation scheme is being planned to address direct loss of habitat from EA's Hambleton FRM scheme on the Wyre Estuary.

Table A2: Habitat compensation to address projected losses: Severn Estuary area HCRP

Relevant Plans/Strategies in HCRP Area	Habitat type	Remaining within-epoch change since SMP approval (+/-)			Habitat creation since 2018			Cumulative balance			P
		c.2030	c.2050	c.2100	H	M	Total	c.2030	c.2050	c.2100	
Working Draft Severn Estuary Strategy, Parrett Estuary Strategy	Saltmarsh/Mudflat	-12	-318	-765	0	0	0	-12	-330	-1095	1697

SITE/AREA ADDRESSING LOSSES CAUSED BY FCRM ACTIVITY:

300ha short-term losses largely compensated by projects at Steart, Congresbury and Alvington-Plusterwine, as per baseline 2018 assessment. 12ha deficit remains, compensation for which will be carried over to early epoch 2.

Historic habitat loss commitment of 40ha inter-tidal delivered within the wider Steart project, as per baseline 2018 assessment.

No further compensation projects completed since 2018.

The Severn Estuary Strategy has not been formally adopted and remains a working draft. The Strategy has so far projected losses of approximately 300ha of intertidal habitat by 2030 – the same provisional figure used by the SMP for epoch 1, ending 2025 – and 288ha of this has already been delivered through the projects at Plusterwine, Conglesbury and Steart, as reported in the baseline 2018 assessment. Natural Resources Wales has withdrawn from the partnership approach to addressing losses in the European Marine Site, and habitat compensation for the English Severn is therefore being co-ordinated by Environment Agency Wessex and West Midlands teams for the Severn Estuary HCRP.

Anticipated changes to habitat extent

There remains a 12ha shortfall in habitat delivery for that short term horizon. However, assessments of habitat loss in the Severn Estuary using data provided by the Regional Coastal Monitoring Programme at the Plymouth Coastal Observatory (and reflected in

our recent national report on saltmarsh extent) suggest we have observed smaller losses in the Severn than had been predicted to date. We are therefore currently revising our habitat compensatory 'balance' and depending upon the outcome may carry delivery of the remaining 12ha into the next epoch.

Current activity and anticipated pipeline

For the medium to long term, we will also re-visit the existing pipeline of potential compensation sites with reference to revised projections of loss and an improving appraisal of opportunities being provided through the national ReMeMaRe project. Our programme of adaptation pathway projects and the SMP Refresh has also been considering where the approach to coastal management may need to change in light of technical and affordability challenges, to one of realignment.

However, the Severn Estuary has a limited number potential managed realignment location options. The potential competition for suitable land may become a particular challenge – for example from the private sector banking land to address carbon sequestration responsibilities, or from large marine energy developers requiring their own compensation or mitigation projects. The HCRP is therefore working with a changing picture of evidence of projected and observed habitat loss change in an evolving investment environment, and the figures provided in this report for the Severn should be considered provisional.

Table A3: Habitat compensation to address projected losses: Devon and Cornwall HCRP

Relevant Plans/Strategies in HCRP Area	Habitat type	Remaining within-epoch change since SMP approval (+/-)			Habitat creation since 2018			Cumulative balance			P
		c.2025	c.2050	c.2100	H	M	Total	c.2025	c.2050	c.2100	
Cornwall and Isles of Scilly SMP, South Devon and Dorset SMP (part), Exe Estuary Strategy, Tamar Strategy	Saltmarsh/Mudflat	-15	-11.5	0	82	0	82	+ 67	+55.5	+55.5	c.90
	Grazing Marsh	-13	0	0	0	0	0	-13	-13	-13	-29

SITE/AREA ADDRESSING LOSSES CAUSED BY FCRM ACTIVITY:

Lower Otter managed re-alignment: c.55ha inter-tidal salt marsh and (mainly) mudflat, now ‘High’ delivery confidence.

Tamar managed re-alignment: 27ha inter-tidal salt marsh and mudflat now completed and therefore ‘High’ confidence.

No historic habitat loss commitments identified for this area, as per baseline 2018 assessment.

Anticipated changes to habitat extent

Projections associated with the Exe Estuary Strategy suggest approximately 15ha of inter-tidal area will be lost due to FCERM activity in epoch 1, with uncertainty beyond this regarding the extent and potential causes of habitat loss.

Projections associated with the Tamar Estuary Strategy, currently in development will improve with its completion in 2024 but interim projections suggest approximately 11.5ha of inter-tidal habitat will be lost in the 20-year period from a 2017 baseline, with uncertainty beyond the 2040s.

Losses anticipated in the Fal and Helford Estuaries within the Cornwall and Isles of Scilly SMP have not yet been quantified. Epoch 2 losses in the Exe Estuary are also yet to be determined. Our evolving understanding in these areas will be included in the next update to this report.

Current activity and anticipated pipeline

The Lower Otter Estuary project currently in construction will create up to 55ha, mainly mudflats, as compensatory habitat for losses anticipated in the Exe Estuary well into the second epoch of the Strategy. There are further opportunities for habitat creation that would 'bank' habitat against potential future losses as they become apparent. These include

1. Powderham Banks - an initial assessment suggests c.14ha of intertidal habitat, mostly mudflat, could be created here, although replacement of associated loss of grazing marsh within the Exe Estuary SPA would be required.
2. Bowling Green Marsh – up to 13ha of reedbed, accreting to saltmarsh in the longer term, could be created here, again at the expense of protected grazing marsh.

The change from freshwater grazing marsh to intertidal habitats at these two sites would require a total of 29ha of freshwater grazing marsh to compensate for the losses experienced within the Special Protection Area.

To address losses associated with the Tamar Estuary Strategy, 27ha of intertidal compensatory habitat has been delivered across a range of sites: Cotehele (2ha), Calstock (11ha) and South Hooe (14ha), together with 4ha of freshwater wetlands at South Hooe.

The following sites have been included within the current FCRM programme for delivery from 2026 onwards:

1. Haymarsh – up to c.14ha, likely to develop as predominantly reedbed with some salt marsh and mud flat, could be created here.
2. A number of smaller sites with opportunity for saltmarsh / intertidal habitat creation, amounting to < 50ha in total.

As with pipeline schemes in the Exe, these could either address further compensatory requirements as our understanding of these improves, or count towards carbon offsets, biodiversity net gain or restoration objectives. Note there are also larger sites being progressed by other organisations mainly in the Taw / Torridge estuary.

Table A4: Habitat compensation to address projected losses: South Wessex HCRP

Relevant Plans/Strategies in HCRP Area	Habitat type	Remaining within-epoch change since SMP approval (+/-)			Habitat creation since 2018			Cumulative balance			P
		c.2030	c.2050	c.2100	H	M	Total	c.2025	c.2050	c.2100	
Poole and Wareham Strategy	Saltmarsh / Reedbed	+7	-9	-234	0	0	0	+7	-2	-236	14
	Mudflat	-44	-77	-79	0	0	0	-44	-121	-200	78
	Grazing Marsh	-2	-3	-4	0	0	0	-2	-5	-9	0
	Freshwater and Woodland-Scrub	-6	-11	-30	0	0	0	-6	-17	-47	27
	Saline lagoons	-15	0	0	0	0	0	-15	-15	-15	35

SITE/AREA ADDRESSING LOSSES CAUSED BY FCRM ACTIVITY:

Moors at Arne Coastal Change Project: 78ha mudflat plus 14ha saltmarsh and 35ha saline lagoon. The planning application has been submitted but not yet determined. Works are planned to commence in Spring 2023 subject to a favourable outcome. No further compensation projects completed since 2018.

No historic habitat loss commitments identified for this area, as per baseline 2018 assessment.

Anticipated changes to habitat extent

Our understanding of projected habitat change relating to the Poole and Wareham Strategy currently remains unchanged. Under the approved Poole and Wareham FCERM strategy we have a commitment to create 44ha of intertidal mudflats, saltmarsh and reedbeds by 2030. A strategy is in progress for Christchurch Harbour which accommodates the estuaries of the Rivers Stour and Avon. To date there is no detailed assessment of habitat compensation requirements. The SMP does not identify any attributable

losses within the IROPI case for Christchurch Harbour, and we therefore await what the detailed assessment associated with the evolving Strategy identifies. There are sections of the harbour where grazing marsh could be allowed to transition to tidal inundation should the Strategy identify the drivers for change, and some 400ha of grazing marsh on the Rivers Frome and Piddle behind tidal embankments have similarly been identified for potential inter-tidal transition, although no plans are currently in place to take this forward.

Current activity and anticipated pipeline

The Moors at Arne Coastal Change Project planning application has been submitted but not yet determined. The Project will address immediate requirements and some of the ongoing losses of mudflat in the Strategy area into the second epoch of the SMP. Additional saline lagoon habitat addresses 15ha compensation requirements plus a further 20ha mitigation for on-site impacts for features under the Ramsar designation, as outlined in the baseline 2018 assessment.

Holes Bay saltmarsh regeneration project is a local authority scheme based on recycling marina dredging's to enhance existing mudflats and regenerate saltmarsh over an area of 4ha. The project is supported by Network Rail as an alternative to rock armouring to protect a vulnerable rail embankment. It is not included in Table A4 as it does not specifically address compensation requirements, but is an example of how habitat restoration for FCRM purposes is already attracting funding within the capital programme and appealing to important stakeholders.

A challenge for the South Wessex HCRP is the available area for freshwater and grazing marsh compensation where this might be required after transition of coastal sites to inter-tidal.

Table A5: Habitat compensation to compensate for projected losses: Solent and South Downs HCRP

Relevant Plans/Strategies in HCRP Area	Habitat type	Remaining within-epoch change since SMP approval (+/-)			Habitat creation since 2018			Cumulative balance			P
		c.2025	c.2050	c.2100	H	M	Total	c.2025	c.2050	c.2100	
Poole and Christchurch Bays SMP (Part), North Solent SMP, South Downs SMP, Isle of Wight SMP.	Saltmarsh	-20	-188	-184	0	0	0	-20	-208	-392	157
	Mudflat	+43	+32	-108	0	0	0	+43	+76	-32	251
	Grazing Marsh	0	0	-0	0	0	0	+69	+69	+69	-208
	Freshwater	0	0	0	7	0	0	+17	+17	+17	-7
	Saline lagoon	0	0	0	0	0	0	0	0	0	-5

SITE/AREA ADDRESSING LOSSES CAUSED BY FCRM ACTIVITY:

124ha short-term losses largely compensated by Medmerry (104ha apportionment) as per baseline 2018 assessment. 20ha saltmarsh deficit remains, compensation for which will be carried over to early epoch 2. Medium term 4ha grazing marsh loss largely compensated by Manor House Farm (reflected in cumulative balance above) as per baseline 2018 assessment.

Historic habitat loss commitment of 100ha inter-tidal delivered as part of the Medmerry project (79ha apportionment) and Lymington Water Level Management Plan, as per baseline 2018 assessment.

The 2018 report predicted that Manor House Farm would create 10 ha of Freshwater habitat. The more refined habitat estimates available since the management plan has been drafted and the scheme has been implemented indicate that 17 ha of freshwater habitats will be created. This additional 7 ha of predicted freshwater habitats has been included with a high (H) level of confidence in Table A5 above.

Anticipated changes to habitat extent

The intertidal habitat loss predictions have been revised from the 2018 report as a result of the Briels and Orleans case CJEU rulings (C – 521/12, C – 387/15 and C – 388/15) that habitat creation to offset habitat loss within a European site can no longer be considered as a mitigation measure. Therefore, habitat creation sites identified in the 2018 report as mitigation sites in the SMPs are now regarded as compensatory measures and included in the pipeline of projects.

The SMPs covering this area used sea level rise projections from 2003 and need to be revised in light of the latest projections and monitoring information, and a scope is currently being developed to update the Solent Dynamic Coast Project habitat calculations upon which the SMP's Habitats Regulations assessment was based.

Current activity and anticipated pipeline

The short-term habitat requirements for mudflat, coastal grazing marsh and freshwater habitats have been met, with a positive balance of habitats to help with tackling medium-term losses to c.2050. However, there is still a deficit of 20ha of saltmarsh, projected to significantly increase in the medium term, making saltmarsh provision a key focus for this HCRP.

A critical challenge is that the most likely saltmarsh creation sites would have significant impacts upon landward designated habitats, with the current pipeline indicating a need to provide c.208ha of coastal grazing marsh 7ha of freshwater and 5ha of saline lagoon habitat to ensure coherence of the site network in this area. Sites to address this need to be found with increasing urgency, as estimates of needs have increased. Available land in this area to meet both inter-tidal and landward habitat compensation requirements is very limited. Environment Agency and Natural England are therefore now discussing the best ways to approach this issue into the medium term.

During 2019 and 2020, studies commenced on two priority intertidal habitat compensation schemes at Marker Point, Thorney Island in Chichester Harbour and at Hook Lake, Warsash at the mouth of the Hamble Estuary. Both projects are currently at the options appraisal / preparing Outline Business Case (OBC) stage, and would provide 61ha of saltmarsh habitat and 42ha of mudflat to compensate for the remaining 20ha saltmarsh deficit for epoch 1 and contribute to epoch 2 requirements.

The following are opportunities that have also been included within the current FCRM capital programme for this HCRP:

1. West Chidham, Northney Farm, Bosham, and Conigar and Warblington, each in Chichester Harbour
2. Sites within the Hurst Spit to Lyminster Strategy and the Darkwater Valley, both in the Western Solent

Equally, further requirements are likely to emerge. There are currently two FCERM Strategies underway in this HCRP area – the Hayling Island Coastal Management Strategy and the Hurst Spit to Lymington Coastal Strategy. Both strategies are likely to require compensation for both intertidal and landward SAC, SPA and Ramsar habitats. There is also a proposed change in coastal management approach at Farlington Marshes from Hold the Line to Managed Realignment (potentially Regulated Tidal Exchange), which will require significant additional landward habitat compensation of grazing marsh, freshwater and saline lagoon.

Table A6: Habitat compensation to address projected losses: Kent, S London and East Sussex HCRP

Relevant Plans/Strategies in HCRP Area	Habitat type	Remaining within-epoch change since SMP approval (+/-)			Habitat creation since 2018			Cumulative balance			P
		c.2025	c.2050	c.2100	H	M	Total	c.2025	c.2050	c.2100	
Folkstone to Cliff End Strategy, Medway Estuary and Swale Strategy	Saltmarsh	-110	-135	-290	0	0	0	-110	-245	-535	201
	Mudflat *	+20	+51	+160	0	0	0	+20	+71	+231	
	Vegetated shingle	-10/10km	-	-	6.5/1.4km	0	0	-3.5	- 3.5	- 3.5	
	Freshwater/grazing marsh	0	0	0	0	0	0	+164	+164	+164	-386

* Not shown in Table 1: Natural England has advised that projected mudflat gains cannot offset projected saltmarsh loss by using an overall inter-tidal assessment.

SITE/AREA ADDRESSING LOSSES CAUSED BY FCRM ACTIVITY:

Short-term 8ha losses of saltmarsh associated with FoCES compensated by 16ha Rye Harbour Farm managed realignment, as per baseline 2018 assessment. Saltmarsh losses identified associated with the Medway and Swales Strategy means 110ha deficit (an increase from previous projections) remains, compensation for which will be addressed early in epoch 2.

Anticipated realignment over grazing marsh in pipeline projects compensated in anticipation by Great Bells Farm freshwater project plus 4ha at Rye Harbour Farm, as per baseline 2018 assessment. However, estimates of grazing marsh loss in the pipeline have increased substantially since 2018.

6ha vegetated shingle losses at Nook Point compensated by 6ha restoration at Rye Harbour Farm, as per baseline 2018 assessment. Compensation of Annual Vegetation of Drift Lines (1.4km at Brownsdown) and Perennial Vegetation of Stony Banks (6.75ha at Hythe) associated with FoCES has now been secured.

No historic habitat loss commitments identified for this area, as per baseline 2018 assessment.

No further compensation projects completed since 2018.

Anticipated changes to habitat extent

The assessment of ongoing habitat loss associated with the Medway and Swale Strategy (MEASS) continues to show saltmarsh loss outpacing the associated gain in mudflat approximately threefold due to coastal squeeze. The anticipated losses of inter-tidal habitat associated with the Folkstone to Cliff End Strategy (FoCES) have been compensated for at Rye Harbour Farm, but there remains 68ha saltmarsh deficit in this HCRP, principally in the MEASS area. Future realignments in this area are likely to involve significant loss of freshwater grazing marsh, with secondary compensation likely to be required.

Current activity and anticipated pipeline

Activity in the MEASS area is focussed on saltmarsh creation, with any associated mudflat free to be used for other needs such as Biodiversity Net Gain and carbon sequestration. Although there is a deficit, many projects are scheduled to begin before the end of epoch 1 or in very early epoch 2. The following sites, have been included within the current FCRM programme (figures primarily denote saltmarsh creation):

1. Elmley Rounds fields (c.81ha) programmed for 2024
2. Elmley Spit End Point (c.50ha) programmed for 2024
3. Danes Hill (c.5.5ha) programmed for 2024
4. Tailness Marsh (c.16ha) programmed for 2024
5. Kemsley (c.6.5ha) programmed for 2024
6. Abbots Court (c.42ha) programmed for 2029

A further two sites have been secured to meet the requirement to compensate for the loss of Annual Vegetation of Drift Lines (1.4km at Brownsdown) and Perennial Vegetation of Stony Banks (6.5ha at Hythe) associated with FoCES.

Table A7: Habitat compensation to address projected losses: Thames HCRP

Relevant Plans/Strategies in HCRP Area	Habitat type	Remaining within-epoch change since SMP approval (+/-)			Habitat creation since 2018			Cumulative balance			P
		c.2025	c.2050	c.2100	H	M	Total	c.2025	c.2050	c.2100	
TE2100, Isle of Grain to South Foreland SMP	Saltmarsh/Mudflat	-2	-45	-495	0	0	0	-2	-47	-542	976
	Grazing Marsh	0	0	0	0	0	0	0	0	0	-779

SITE/AREA ADDRESSING LOSSES CAUSED BY FCRM ACTIVITY:

58ha short term losses of saltmarsh and mudflat largely compensated for by Wallasea (56ha) projects as per baseline 2018 assessment. The 56ha of the Wallasea project currently being treated as compensation for nearby losses in the Thames will be kept under review as we complete ongoing work to better understand future projections in Essex.

Historic habitat loss commitment of 20ha inter-tidal delivered by 18ha of Saltfleet flats project, leaving a 2ha delivery commitment as part of future habitat creation.

No further compensation projects completed since 2018.

Anticipated changes to habitat extent

As noted in the baseline 2018 assessment, our understanding of habitat change in the Thames is evolving, and has been improved by monitoring to support the [TE2100 ten-year review](#). This monitoring has demonstrated that the area of inter-tidal habitat overall in the TE2100 area has increased naturally (i.e. over and above compensation projects) by c.2.5%, with saltmarsh increasing c.6%, between 2012 and 2018. This, alongside the outcomes of our recent national survey of saltmarsh, suggests a current pattern of accretion in the Thames overall, although this may vary within the estuary and may be temporary rather than long-term.

Projections of inter-tidal habitat change have also changed from -105ha to -45ha in the medium term, and from -615ha to -495ha in the long term. These new figures are reflected in Table A7 above, minus the habitat compensation already reported in the baseline 2018 assessment. The projections of grazing marsh loss – all associated with managed realignment that may be done to change these areas to inter-tidal – remain in the pipeline, as they are dependent upon such projects being taken forwards.

Current activity and anticipated pipeline

The TE2100 Plan's ten-year review notes that 56ha of habitat creation at Wallasea Island in south Essex, neighbouring the Thames, will currently be used to address compensation requirements in TE2100. This will be kept under review as we complete ongoing work to better understand future projections in Essex and the functionality of Wallasea in relation to the Thames.

There are two relatively large (c.300ha) potential sites St Marys Marshes and Grain Marshes. There is a good business case, on economic grounds, to deliver St Marys Marshes ahead of time as the defences are starting to degrade. Depending on agreement with Natural England, excess intertidal habitat at St Mary's or Grain Marshes might potentially contribute towards requirements for compensation habitat in the Medway and Swale Strategy (MEASS) or addressing wider site condition in the Thames.

Table A8: Habitat compensation to address projected losses: East Anglia HCRP

Relevant Plans/Strategies in HCRP Area	Habitat type	Remaining within-epoch change since SMP approval (+/-)			Habitat creation since 2018			Cumulative balance			P
		c.2025	c.2050	c.2100	H	M	Total	c.2025	c.2050	c.2100	
North Norfolk SMP, Suffolk SMP, Essex and South Suffolk SMP, Ouse Washes HCP	Saltmarsh	0	tbc	tbc	0	0	21	0	-tbc	tbc	50
	Grazing Marsh	+59	-tbc	-tbc	0	20	20	+79	tbc	-tbc	100
	Reedbed	+4	-32	tbc	0	35	35	+39	+7	tbc	32

SITE/AREA ADDRESSING LOSSES CAUSED BY FCRM ACTIVITY:

21ha short term losses of saltmarsh and mudflat compensated for by Wallasea (18ha apportionment) and Brandy Hole as per the baseline 2018 assessment.

91ha short term losses of grazing marsh compensated for by Snape, Frampton Marsh and Lady Fen Phase 1 as per baseline 2018 assessment, with a 59ha (temporary) surplus anticipating further losses in epoch 2.

212ha short term losses of reedbed compensated for by Snape, Hilgay, Methwold, Hickling Broad and Ouse Fen as per the baseline 2018 assessment, with a 4ha (temporary) surplus anticipating further losses in epoch 2.

Historic habitat loss commitments of 210ha inter-tidal delivered by Wallasea (100ha apportionment), Devereaux Farm, Fingringhoe and the breaches to defences on the Blyth Estuary and Hazelwood Marshes, as per the baseline 2018 assessment.

Lady Fen Phase 2: 20ha grazing marsh ongoing.

Hickling Potter Heigham: in Norfolk 35ha reedbed ongoing.

No further compensation projects completed since 2018.

Anticipated changes to habitat extent

A new Habitats Regulations Assessment is required for the Essex and South Suffolk SMP to ascertain compensation requirements in the medium and long-term. Environment Agency Geomatics is analysing monitoring data to inform this now, with evidence currently suggesting that every estuary in Essex is accreting sediment although in the Blackwater Estuary this is very marginal and within the boundaries of error.

Our understanding of freshwater reedbed and grazing marsh losses, partly contingent on future realignment options, remains unchanged from that set out in the baseline 2018 assessment. Unlike our assessment for the Thames (Table A7), the full anticipated extent of this grazing marsh loss is not shown in Table A8 as habitat change and associated project pipeline is too uncertain at this stage. However, we continue to take a pro-active approach to grazing marsh creation to ensure new sites are ecologically functional prior to anticipated transition of existing sites to inter-tidal.

Current activity and anticipated pipeline

Essex Wildlife Trust has identified managed realignment opportunities they wish to pursue in the Blackwater and Crouch estuaries, and Environment Agency and Natural England Area teams will continue to explore these opportunities with our partners. A managed realignment at Collimer Point on the Orwell Estuary is also an active managed realignment option which could provide c.50ha of inter-tidal habitat, and work currently being planned to realign the Benacre pumping station near Kessingland is likely to create further habitat.

Table A9: Habitat compensation to address projected losses: Humber HCRP

Relevant Plans/Strategies in HCRP Area	Habitat type	Remaining within-epoch change since SMP approval (+/-)			Habitat Creation since 2018			Cumulative Balance			P
		c.2025	c.2050	c.2100	H	M	Total	c.2025	c.2050	c.2100	
Humber Strategy (whole estuary)	Saltmarsh/mudflat	-11	-159	-	202	0	202	+191	+32	-	496
Outer north	Saline lagoon	-25		-	6	19	25	0		-	0
Inner estuary	Saltmarsh/mudflat	+260	+153	-	0	0	0	+260	+413	-	0
Middle estuary	Saltmarsh/mudflat	-191	-257	-	96	0	96	-95	-352	-	335.5
Outer North	Saltmarsh/mudflat	+13	+21	-	0	0	0	+13	+34	-	160.5
Outer south	Saltmarsh/mudflat	-93	-76	-	106	0	106	+13	-63	-	0

SITE/AREA ADDRESSING LOSSES CAUSED BY FCRM ACTIVITY:

89ha inter-tidal accretion expected in the short term in the inner estuary, with 171ha project at Alkborough (now significantly evolving from saltmarsh to reedbed) counted as compensation within the context of expectations of wider coastal squeeze in the whole estuary at the time. Tidal storage also a key driver for this project. Leaves 260ha surplus for inner estuary, although historic loss targets were not developed for the Humber and Estuary and the surplus provided by Alkborough Flats should be considered in that context. As per baseline 2018 assessment.

263ha short term middle estuary losses of saltmarsh and mudflat revised to 271ha, partly compensated for by Paull Holme Strays as per baseline 2018 assessment.

Outstrays to Skeffling managed realignment: 178ha saltmarsh and mudflat for middle estuary now at ‘High’ delivery confidence with work underway, leaving 13ha deficit to carry into epoch 2.

Donna Nook managed realignment: 106ha saltmarsh and mudflat now complete for outer estuary, although the site habitat matrix is still developing.

No historic habitat loss commitments identified for this area, as per baseline 2018 assessment.

Anticipated changes to habitat extent

The existing Humber Estuary Strategy (2008) took a detailed overview of inter-tidal habitat change over its first 50 years to c.2056, with modelled estuary dynamics giving precise projections of habitat change in this dynamic and complex environment. The inner, middle and outer portions of the estuary experience different rates of sedimentation and loss of mudflat and saltmarsh, so as with our 2013 and 2018 reports, figures for each portion are shown separately in Table A9 in addition to the total, although note that estimates have evolved slightly.

In developing our new H2100 + strategy, we are improving our understanding of coastal squeeze losses and reviewing our approach to their estimation. Our initial findings suggest that figures in the baseline 2018 assessment may require significant revision in future. This is because:

1. The current method for calculating coastal squeeze losses (which relied heavily upon extrapolating future projections from past losses, with the assumption that these were due to coastal squeeze) has not accurately predicted the observed changes in the intertidal habitat extent;
2. Most historic habitat change since 1946 appears to be caused by evolution of channel and bank positions rather than a simple relationship to sea level rise;
3. Instead of coastal squeeze, increases in vegetated intertidal habitat appear more widespread than previously thought.

These more recent assessments indicate that the intertidal habitat created by the existing strategy has left the Humber with a significant positive balance of habitat compensation required for losses due to FCRM works in the short term, but until these assessments are completed, we are still using similar projections against which to measure achievements – in fact with slightly

higher potential habitat loss in the Middle Estuary (where the greatest pressure exists) than in 2018. The HRA of the Humber 2100+ will identify whether any additional compensation is required based on expected rates of sea level rise, with considerations of habitat quality and zonation as well as extent.

Current activity and anticipated pipeline

Two major managed realignment schemes have been progressed on the Humber since 2018 to address short term losses of habitat in the middle and outer south parts of the Estuary. The second phase of re-aligning Donna Nook on the outer south bank completes the 106ha site, although the habitats there are developing and not yet fully functioning inter-tidal replacement. The first phase of the Outstrays to Skeffling realignment is creating a further 178ha of habitat to address middle estuary losses.

Table A10: Habitat compensation to address projected losses: North East area HCRP

Relevant Plans/Strategies in HCRP Area	Habitat type	Remaining within-epoch change since SMP approval (+/-)			Habitat Creation since 2018			Cumulative Balance			P
		c.2025	c.2050	c.2100	H	M	Total	c.2025	c.2050	c.2100	
Tees Tidal Strategy	Saltmarsh/Mudflat	+2	-	-	0	-	0	+2	-	-	-

SITE/AREA ADDRESSING LOSSES CAUSED BY FCRM ACTIVITY:

Short term losses of saltmarsh and mudflat compensated for by Greatham North as per the baseline 2018 assessment.

No historic habitat loss commitments identified for this area, as per baseline 2018 assessment.

No further compensation projects completed since 2018.

The assessments associated with the North East SMP itself do not identify any compensation requirement arising from FCRM activity, but as the SMP Refresh concludes and potential changes to the SMP reflected in the action plan, this may change. Should this lead to a change in preferred management option, the HRA will be revised to reflect this, and projections revised.