Severn Estuary Commission

APPENDIX C

Legislation, Policy and Compensation Frameworks

RPT2
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Legislation, Policy and Compensation Frameworks

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CONTENTS

TABLES

1 INTRODUCTION

1.1.1. This Appendix covers the frameworks associated with legislation and policy relevant to the environmental assessment, consenting and risks associated with tidal range power generation in the Severn Estuary and provides additional details to those points covered in the main report.

1.1.2. Of specific policy relevance to the generation of renewable energy from Tidal Power are the Habitats Regulations (2017) and particularly the drivers and factors associated with the provision of compensatory habitats (ecological compensation) recognising those which may potentially be lost from development of a tidal range scheme in the Severn Estuary.

1.1.3. This Appendix is therefore split into two sections:

- Section 2: A general review of the legislative, policy and consenting frameworks of relevance; and
- Section 3: Identification of policy and legislative drivers for ecological compensation relating to a future tidal energy project in the Severn Estuary, highlighting the differences between drivers.

2 TIDAL POWER CONSENTING FRAMEWORKS

KEY CONSENTS FOR TIDAL POWER[1]:

- Development Consent Order (DCO) required from Secretary of State, following a recommendation from the National Infrastructure Planning Inspector (required by the Planning Act 2008).
  An allowance of a minimum of three years should be made for the DCO pre-application period for a complex project[2]. It can take a further 1.5 years for determination, there is also potential for Judicial Review following consent[3].
- Marine Licence (under the Marine and Coastal Access Act 2009) can be deemed as part of the DCO by the Secretary of State or developers can opt to apply for a separate license from NRW/MMO (these organisations also play a role in deemed licenses).
  There is no statutory period for determining marine license applications, online advice states a maximum of 25 months for offshore renewables[4].

KEY ASSESSMENTS TO SUPPORT CONSENTING:

- Environmental Impact Assessment (EIA) under the Infrastructure Planning (EIA) Regulations 2017/ Marine Works (Environmental Impact Assessment Regulations 2007)
- Habitats Regulations Assessment (HRA) under the Conservation of Habitats and Species Regulations 2017 and The Conservation of Offshore Marine Habitats and Species Regulations 2017.
- Water Framework Directive Assessment5 (WFD) under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.
- The key risks associated with these assessments and associated consenting are listed in Table 1 below. Note that there is some overlap between risks and these may apply to multiple assessments.

[1] https://www.gov.wales/sites/default/files/publications/2023-09/marine-renewable-consenting-process-infographic.pdf

[2] The EIA (Scoping) process for Tidal Lagoon Swansea Bay started in early 2011 and application made in Feb 2014. This fits with other complex DCO projects.

[3] Approx 3 months review of application, statutory 6 months examination and 6 months decision.

[4] https://naturalresources.wales/permits-and-permissions/marine-licensing/applying-for-a-marine-licence/?lang=en. Note that in England the MMO aim to determine license applications within 13 weeks, but this is also unlikely.

[5] https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters

Table 2-1 - Key Environmental Risks for Consenting of Tidal Power

Risk	Description of issue	Potential mitigation
Gap in environmental evidence/ assessment knowledge.	A number of gaps have been identified in projects to date and summarised in the ORJIP 2017 Ocean Energy Look Forward Research[6]. Main topics areas comprise physical processes, fish, birds, marine mammals and habitats. This should also include scenarios under climate change.	A number of research priorities have been identified and varying progress has been made in some areas. Early discussion with stakeholders helps to identify gaps and actions needed.
Acceptability of environmental mitigation and monitoring	Acceptable use of long-term monitoring and adaptive management plans to mitigate impacts where outcomes are unknown, particularly with fixed engineered structures, where scope for changes may be limited.	Legal agreements can secure long-term commitment to monitoring and action. Early discussion with regulatory bodies to develop acceptable plans.
Legal compliance with Habitats Regulations	Where an adverse effect on the integrity of a European Site cannot be ruled out, and no alternative solutions can be identified, then the project can only proceed if there are imperative reasons of over-riding public interest and if the necessary compensation measures can be secured (see Figure 1 below). It may	Separate flowchart below.

[6] Table 5.1: http://www.orjip.org.uk/sites/default/files/ORJIP%20Ocean%20Energy%20Forward%20Look%203%20FINAL.pdf

	not be possible to meet required derogations.	
Legal compliance with Water Environment Regulations	Where an assessment of a waterbody under the Regulations shows there is a risk of deterioration, and/or the achievement of good status/potential, then the project can only proceed if evidence is provided to meet tests under Article 4.7 (Regulation 19) relating to mitigation, incorporation into the River Basin Management Plan; overriding public interest in the proposed development and/ or benefits outweigh the benefits of the WFD objectives; the beneficial objectives of the modifications or alterations to the water body made by the development cannot be achieved by other means (see Figure 2 below).	Separate flowchart below.

Figure 1 and 2 below set out potential mitigation to reduce consenting risks for HRA and WFD. Figure 3 sets out the DCO process in the UK

- Examples of mitigation given are not exhaustive, they are largely obtained from literature review and call for evidence. A report written for ORJIP Ocean Energy in 2017, sets out consenting issues and risks for tidal lagoons following stakeholder engagement (Table 5.1) and identifies priority research projects (Table 5.2) in more detail7.
- Some of the research and evidence required is in existence or under development, but early review of this with consenting bodies will reduce risks. Similarly, requirements such as compensation may need to take novel or unprecedented approaches, early engagement and feasibility studies will reduce risks.
- Derogations under the Habitats Regulations are sequential, whereas under the WFD Regulations they are undertaken in parallel. Regardless, early work should be undertaken to collect evidence required to reduce consenting risk.

[7] Aquaterra and Marinespace, 2017, ORJIP Ocean Energy: The Forward Look: an Ocean Energy Environmental Research Project: http://www.orjip.org.uk/sites/default/files/ORJIP%20Ocean%20Energy%20Forward%20Look%203%20FINAL.pdf

- In this respect, much of the required evidence needed, would be used for WFD Assessment, HRA and EIA – for example alternatives, baseline and future baseline, impacts, mitigation and monitoring.
- Early definition of the project and its objectives will aid all consenting processes, including testing alternatives. For example, is the project a stand-alone tidal-power project to help meet net-zero or are there wider climate and nature resilience objectives?

Figure 1: HRA process and derogations

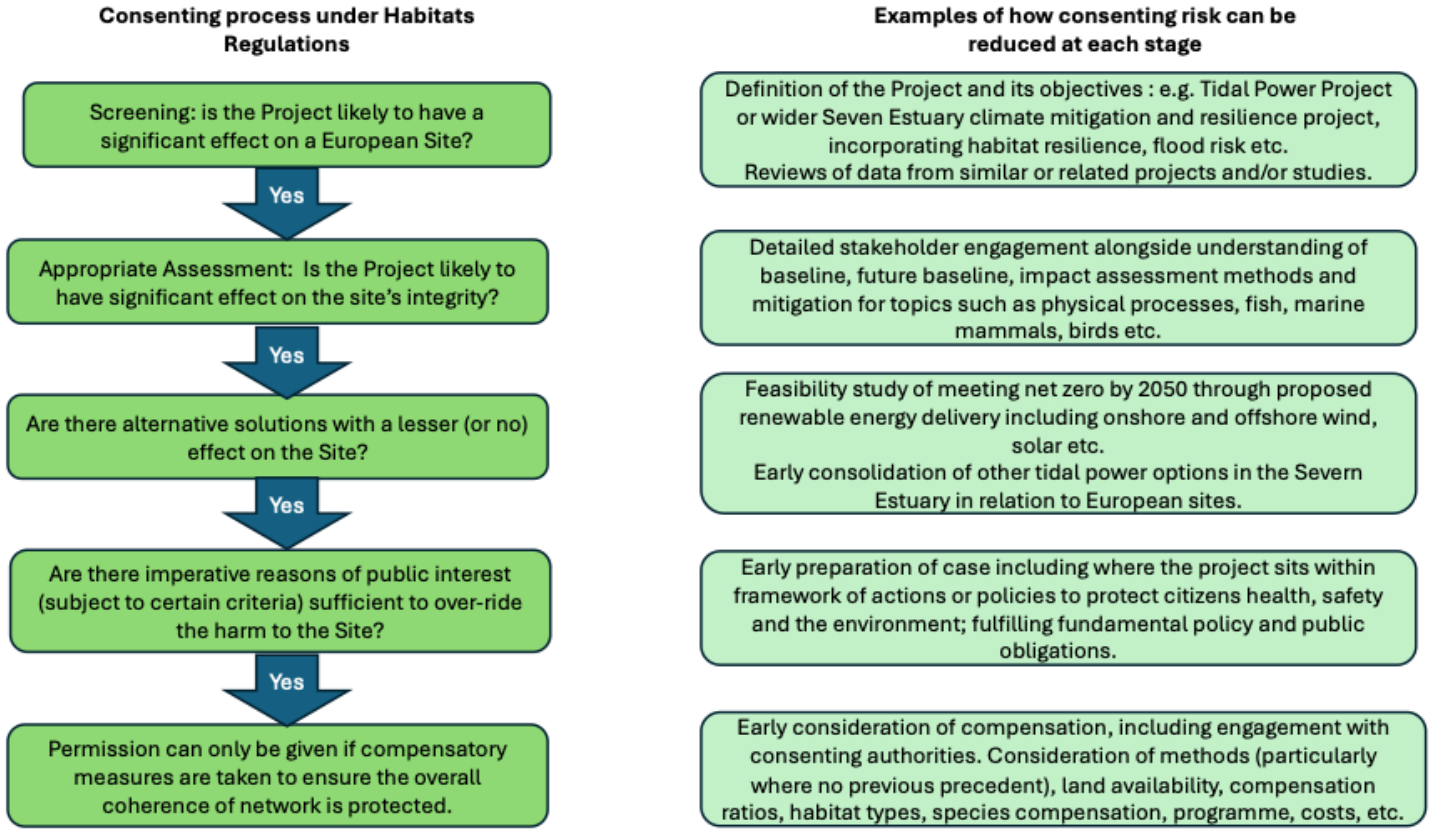

Figure 2: WFD derogations under Article 4.7 (all clauses must be met)

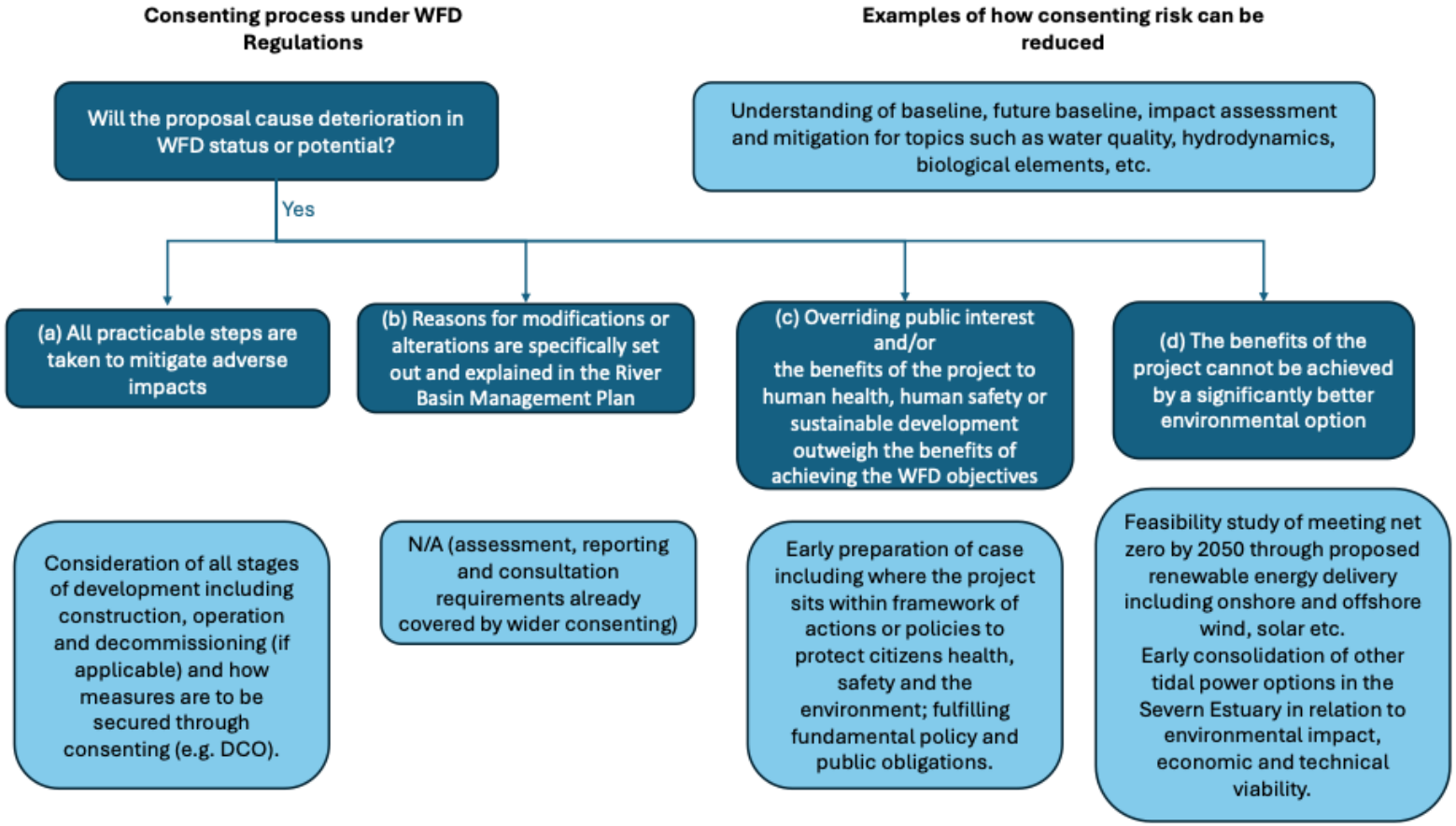

Figure 3: DCO Process in the UK


Pre-application
•Data collection and surveys
•Engineering and design
•Assessment processes
•Consultation with statutory bodies, the public and others
•Includes extensive reporting requirements to reflect above
Acceptance
•Submission of application and determination whether it meets standards
Pre-examination
•Examining authority is appointed,
•Registration of interested parties for Examination
Examination
•Interested parties can make representations, supporting evidence submitted and answers provided in writing or at hearings
Recommendation and Decision
•Planning inspectorate provides a report and recommendation
•The relevant Secretary of State to makes a decision to grant or refuse application
Post decision
•Once a decision is made there is a six week period when it can be challenged in a Judicial Review
•Post-consent requirements must be adhered to and discharged.

3 ECOLOGICAL COMPENSATION

3.1.1. This technical note has been produced to provide high-level advice and guidance to:

- Identify key policy and legislative drivers for ecological compensation relating to a future tidal energy project in the Severn Estuary and highlight the differences between drivers.
- Provide an order of scale estimate for the area required for ecological compensation to comply with the identified ecological compensation drivers. This estimate is based available published information on habitat compensation ratios and habitat loss for previous tidal energy schemes in the Severn Estuary put forward by third parties. It does not consider feasibility of compensation delivery.

3.1.2. This section does not provide a comprehensive review of all factors driving ecological compensation, just those likely to cause the largest requirement for compensation land. It does not provide legal advice or detailed technical advice about scheme consenting in relation to the Habitats Regulations (HRA), Biodiversity Net Gain (BNG) or Biodiversity Net Benefits (NBB) legal/policy frameworks.

DEFINITION OF ECOLOGICAL COMPENSATION

3.1.3. The term compensation has a different meaning in different ecological assessment and consenting processes. This has potential to cause confusion when seeking to plan for ecological compensation requirements. Table 1 outlines some of the key definitions in use.

3.1.4. In terms of definition, 'mitigation' is used in the specific sense defined in row 1 of Table 1. This is important as the greater degree to which avoidance and then mitigation (impact amelioration) can be deployed, the lower the requirement for compensation.

3.1.5. Approaches to address impacts under the BNG and Net Benefits for Biodiversity are referred to as offsets to distinguish them from other types of compensation, although in practice the difference between compensation and offset may be ambiguous.

Table 3-1 - Ecological Compensation Definitions

Term	Definition	Planning policy or legal requirement	Source
Mitigation hierarchy	National Planning Policy Framework (NPPF) states (paragraph 193 a): *"if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused"* CIEEM guidance states: **Avoidance** - seek options that avoid harm to ecological features (for example, by locating on an alternative site).	Policy	NPPF (December, 2024) Chartered Institute for Ecology and Environmental Management (2022). *Guidelines for* *Ecological Impact Assessment in the UK*

Term	Definition	Planning policy or legal requirement	Source
	Mitigation - Negative effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation. **Compensation** - where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures. **Enhancement** - seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.		*and Ireland* *Terrestrial, Freshwater, Coastal and Marine*
BNG hierarchy	The Biodiversity Gain Hierarchy and its effect for the purpose of the statutory framework for biodiversity net gain is set out in Articles 37A and 37D of the Town and Country Planning (Development Management Procedure) (England) Order 2015. This hierarchy sets out a list of priority actions: ● first, in relation to onsite habitats which have a medium, high and very high distinctiveness (a score of four or more according to the statutory biodiversity metric), the avoidance of adverse effects from the development and, if they cannot be avoided, the mitigation of those effects; and ● then, in relation to all onsite habitats which are adversely affected by the development, the adverse effect should be compensated by prioritising in order, where possible, the enhancement of existing onsite habitats, creation of new onsite habitats, allocation of registered offsite gains and finally the purchase of biodiversity credits. Planning authorities must consider how the Biodiversity Gain Hierarchy has been applied and if it has not been applied the reason for that or absence of a reason when determining whether to approve the Biodiversity Gain Plan.	Legal	Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities (May 2024). Guidance Biodiversity net gain - Planning practice guidance on biodiversity net gain.

Term	Definition	Planning policy or legal requirement	Source
Step wise approach	Paragraph 6.4.7 of Planning Policy Wales introduces the need for developers to following the step wise approach. This is as follows: avoid + enhance; or minimise + enhance; or mitigate/restore + enhance; or compensate on-site + enhance; or compensate off-site; or, if the preceding steps cannot be followed, refuse planning permission.	Policy	Planning Policy Wales, February 2024
HRA compensation	In the context of the Habitats Regulations the term 'compensation' has a very specific legal meaning which is distinct from other uses of the term. HRA compensation may only occur after an Appropriate Assessment has taken place and if the first two derogation tests have been satisfied: ● There are no feasible alternative solutions that would be less damaging or avoid damage to the site (in the context of the schemes objectives). ● The proposal needs to be carried out for imperative reasons of overriding public interest. Importantly, compensation measures cannot be considered when assessing likely impacts on the integrity of a site protected by the Habitats Regulations. That assessment must occur first before derogation tests are assessed. Habitats Regulations compensation measures need to fully address the damage which will or could be caused to the Habitats Site. If an Appropriate Assessment shows that a development proposal has failed the integrity test on a Special Area of Conservation, and an Annex 1 Priority Habitat or Annex II Priority Species would be affected[8], the public interest test typically needs to be based on one of the following reasons: human health; public safety;	Legal	Department for Environment, Food & Rural Affairs, Natural England, Welsh Government and Natural Resources Wales (2023). Guidance: Habitats regulations assessments: protecting a European site How a competent authority must decide if a plan or project proposal that affects a European site can go ahead.

[8] Priority habitat/species types in the context of the Habitats Regulations has the meaning given by Article 1(d) of the EC Habitats Directive. These are particularly rare or notable habitats in a European context.

Term	Definition	Planning policy or legal requirement	Source
	or important environmental benefits. Economic reasons are deprioritised from decision making. Where a case is made for overriding public interest the opinion of the relevant national government in England or Wales is a material factor in whether a compensation proposal is deemed to be appropriate and a scheme allowed to go ahead.		
European Protected Species (EPS) Mitigation	Under the requirements of the Habitats Regulations, Statutory Nature Conservation Bodies can grant derogation licences for activities which would otherwise be in breach of legislation protected certain species (e.g. newts, bats, otter). So called 'mitigation' licensing requires developers to implement reparative measures (on or off site) to address the impact on the protected species, this may include provision of new habitat. In the context of EPS, 'mitigation' has a meaning which incorporates mitigation and compensation actions, as defined in the mitigation hierarchy.	Legal	Natural England and Department for Environment, Food & Rural Affairs (October 2023) Guidance Protected species and development: advice for local planning authorities How to assess a planning application when there are protected species on or near a proposed development site.

POLICY AND LEGISLATION UNDERPINNING ECOLOGICAL COMPENSATION

3.1.6. Under legislation and government policy (in both England and Wales) on Environmental Impact Assessment, developers are required to follow the mitigation hierarchy (Table 1) to address significant environmental effects arising from their development projects. This includes effects on habitats and species, which may or may not be legally protected or designated. In most circumstances, features subject to legal protection form the most significant driver of compensation. This is likely to be the case in the Severn Estuary as large parts of the estuary are in protected nature conservation sites.

3.1.7. The need to compensate for impacts on certain species, habitats and designated sites is required by law for protected species and European sites (Special Areas of Conservation and Special Protection Areas) in England and Wales. Dealing with impacts on European sites is governed by the requirements of the Habitats Regulations 2017. As a matter of government policy, wetlands of international importance designated under the Ramsar Convention (Ramsar sites) are treated in the same way as European sites. From here on European sites and Ramsar sites are referred to as Habitats Sites.

3.1.8. The need to address impacts on Sites of Special Scientific Interest (SSSIs) relates to English and Welsh planning policy and the Wildlife and Countryside Act 1981. In the context of the Severn Estuary, most SSSIs are inside Habitats Sites. With the Habitats Regulations being the stricter legal regime it would typically take precedence in matters relating to compensation for SSSIs in the Severn Estuary.

3.1.9. There are no formal metrics for calculating compensation for impacts on Habitats Sites. Such compensation must be agreed with the Statutory Nature Conservation Body (SNCB)9 and the Competent Authority10. Compensation needs to reflect the area impacted but also functional replacement for ecological features affected.

3.1.10. The Environment Act 2021, and secondary legislation contained in the BNG regulations are key drivers of ecological compensation in England. The NBB approach is a key driver of ecological compensation in Wales. The NBB approach is rooted in the Environment (Wales) Act 2016. However, in contrast to England, NBB is operationalised through Planning Policy Wales11 rather than by direct legal mandate. The BNG and NBB approaches are 'habitat based' approaches to ecological compensation which are characterised for the purpose of this note as offsetting. They both seek to offset impacts arising from development based on the area of habitat impacted. The English BNG system uses a formal, quantitative metric to calculate the offset area required. The Welsh NBB approach uses a qualitative framework called the DECCA framework[12] to calculate the offset requirement.

3.1.11. Given that large parts of the Severn Estuary are subject to, or may be functionally linked to, one of several Habitats Sites, it is likely that the principal driver for ecological compensation will be the Habitats Regulations. Offset requirements relating to BNG (in England) and NBB (in Wales) may also be considerable owing to the potential area of habitat affected and the area-based calculation approach taken by BNG and NBB.

3.1.12. Ecological compensation requirements relating to legally protected species and those arising from other residual, ecological, significant adverse effects determined by an EIA may also be relevant considerations for a tidal energy project. However, they are unlikely to drive the same extent of compensation land as the Habitat Regulations or the BNG/NBB offset approaches. They are not discussed further.

3.1.13. It is accepted that there will be overlap between the categories noted above. For example, Habitat Regulations, BNG/NBB and EIA requirements could all, in theory, be addressed with the same compensation land. The government has published guidance on whether compensation for Habitats Regulations purposes can count towards BNG requirements in

[9] Natural England (England), Natural Resource Wales (Wales) and equivalent Scottish or Northern Irish bodies where relevant.

[10] A competent authority is a public body that decides to give a licence, permit, consent or other permission for work to happen, adopt a plan or carry out work for itself, such as a local planning authority. A competent authority may also be a minister or department of government.

[11] Planning Policy Wales, February 2024

[12] DECCA = Diversity, Extent, Condition, Connectivity and Aspects of ecosystem resilience

England[13], in certain cases it can but it cannot provide the final 10% of offset units required. The implication of these complexities on the extent of compensation land are outside the scope of this technical note and would require detailed investigation.

THE HABITATS REGULATIONS

3.1.1. In relation to Habitats Sites, the need for compensation is governed by the Habitats Regulations 2017. Developers must provide sufficient information to the Competent Authority to assess the risk of a proposal having a likely significant effect on a Habitats Site. Where there is a likelihood of a significant effect, developers must then assess whether there would be an adverse effect on a Habitats Site's integrity in the context of the site's Conservation Objectives14. Assessment of likely significant effects and assessment of effects on site integrity must take account of 'in combination effects' i.e. the effect of other schemes of development also affecting the same Habitats Site. Assessment must consider direct, indirect effects and include Functionally Linked Land which is land outside of the designation area which is vital for species using the designation (e.g. grazing marsh habitat near to a SPA used by SPA birds for foraging). For the Severn Estuary, such 'far field' effects could extend many miles beyond the estuary itself.

3.1.2. The general presumption in both English and Welsh planning policy is that development with adverse effects site integrity will be refused planning permission. However, in certain circumstances, a proposal that fails the integrity test may still go ahead. This is known as a derogation. Three legal tests must be satisfied to secure a derogation from the legislation:

- there are no feasible alternative solutions that would be less damaging or avoid damage to the site;
- the proposal needs to be carried out for imperative reasons of overriding public interest (see note on Priority Annex 1 Habitats in **Table 1**); and
- the necessary compensatory measures can be secured.

3.1.3. For derogation, the Competent Authority must notify the Appropriate Authority before approval - this is the relevant Secretary of State in relation to England and the Welsh Ministers in relation to Wales. The Appropriate Authority is responsible to secure any necessary compensatory measures.

3.1.4. Compensation measures for a Habitats Site are generally bespoke agreements between developer, SNCBs (potentially for both England and Wales in the case of the Severn Estuary) with the Appropriate Authority having final say. There are no accepted metrics for

[13] Department for Environment Food and Rural Affairs (March, 2024). Guidance
What you can count towards a development's biodiversity net gain - How developers can use habitat creation or enhancements to count towards their biodiversity net gain (BNG). https://www.gov.uk/guidance/what-you-can-count-towards-a-developments-biodiversity-net-gain-bng

[14] Natural England and Natural Resource Wales produce Conservation Objectives for European Sites. These are needed to help public bodies comply with the law and to protect these special wildlife sites.

calculating Habitats Site compensation. Compensation is about more than just replacing area lost, it must also functionally address impacts caused so that the integrity of the European site is maintained.

POTENTIAL COMPENSATION RATIOS UNDER THE HABITATS REGULATIONS

3.1.1. The 2010 Strategic Environmental Assessment provided a review[15] of compensation ratios agreed by other schemes to address Habitats Regulations requirements in the coastal/intertidal environment. The following statement is taken from this report:

"Compensation is a requirement introduced through Article 6 (4) of the Habitats Directive. The concept of compensation ratios is contained within EC guidance (e.g. EC, 200716). The extent of impact from a proposed development is determined through Appropriate Assessment as part of the Habitats Regulations Assessment. To maintain overall coherence of the Natura 2000 network as required by the Habitats Directive a multiplier termed the compensation ratio is applied to the outstanding impact to determine the amount of compensation required. Commission guidance states that there is wide acknowledgement that ratios should generally be substantially more than 1:1. Guidance states that ratios of 1:1 or below should only be considered where the measures will be 100% effective within a short period of time.

3.1.2. The 2010 Strategic Environmental Assessment provided case studies of previous ratios agreed with relevant SNCBs and Appropriate Authorities which range from 2:1 to 4:1 and span a range of periods from 2001 to 2009. Case studies considered include Cardiff Bay – Newport Wetlands which is relatively local to the Severn Estuary. In this case a ratio of 2.6:1 is reported to have been agreed with relevant parties. The SEA report confirms that this was non-equivalence habitat provision of freshwater wetland habitat compensating for lost mudflat. No recent data has been consulted for this exercise.

3.1.3. Complexity, uncertainty and the likely effectiveness of adaptive management of compensation measures all affect the final agreed area of compensation. These factors are all led by the strong influence of precautionary approach which guides the HRA process. The timing of compensation is also highly relevant, if compensation measures can be in place and functional before losses occur, this may support a lower compensation ratio.

[15] ANNEX C Severn Tidal Power Feasibility Study Working Paper: Compensatory Measures – Application of Compensation Ratios under Article 6 (4). A technical contribution to the work of the study by the HRA Expert Group.

[16] European Commission, 92/43/EEC. 2007. Guidance document on Article 6(4) of the 'Habitats Directive'. Luxembourg: Office for Official Publication of the European Communities.

PLANNING POLICY

3.1.1. Among other clauses necessitating compensation to be delivered, the National Planning Policy Framework (NPPF) requires that: *"if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused"* (clause 193 a). Under the accompanying Circular 06/2205 features considered to be material under 'biodiversity' include priority habitats and species, statutory designations and protected or otherwise notable species.

3.1.2. Planning Policy Wales requires adoption of the Stepwise Approach to avoidance of impacts and requires decision makers to secure Net Benefit for Biodiversity (NBB) using the DECCA framework (diversity, extend, condition, connectivity and adaptability to change) to assess whether a net benefit may be secured. Clause 6.4.3 states: "*Recognising that development needs to take place and some biodiversity may be impacted, the planning system should ensure that overall there is a net benefit for biodiversity and ecosystem resilience, resulting in enhanced well-being"*. Guidance exists for applying the DECCA framework to determine compensation requirements but no formal metric accompanies the metric.

BIODIVERSITY NET GAIN / MARINE NET GAIN

3.1.3. In England, the Environment Act 2021 act mandates that all new developments must achieve at least a 10% net gain in biodiversity compared to the pre-development baseline. It applies to virtually all vegetated habitats above 25m^2. However, the offset requirement is more stringent for Habitats of Principal Importance[17] such as saltmarsh and mudflat as are present in the Severn Estuary, than it is for lower distinctiveness habitats (e.g. improved grassland). Important to the context of the Severn Estuary study, BNG does not currently apply below the low tide line, it is also applicable to planning applications under the Town and Country Planning Act (TCPA) and not development consented by other pathways. It is anticipated that it will apply to Nationally Significant Infrastructure Projects from autumn 2025 but the precise rules for BNG and NSIPs are unclear at present. It is unclear whether it will apply in the future to other consenting pathways such as hybrid bills or other statutory development orders.

3.1.4. The government consulted on marine net gain in 2022 and reported back on its findings in December 2023. No further announcements on the method or approach to marine net gain have been published. Currently there is no mandatory requirement for marine net gain, the BNG requirement stops at the low tide mark.

[17] Habitats of Principal Importance are listed on Section 41 of the Natural Environment and Rural Communities Act 2006

POTENTIAL COMPENSATION RATIOS APPLICABLE TO BNG

3.1.5. The ratio for compensation resulting from the BNG is calculated using the Statutory Metric tool and can result in compensation ratios exceeding 10:1 for some high value habitats. There is no single ratio that can been applied to determine BNG compensation requirements as the metric determines the area of land required to compensate using numerous factors including the baseline habitat type; strategic importance to biodiversity of land; how many years in advance compensation habitat is created before the impact occurs; and the habitat condition compensation land may eventually reach. Owing to the way in which the BNG metric works, different ratios apply to different habitat types. The higher the 'distinctiveness[18]' of an impacted habitat the higher the level of compensation required.

3.1.6. There is currently limited guidance on how the HRA and BNG legal frameworks should interoperate where there is an adverse effect on Habitats Site integrity and HRA compensation is required. Defra has announced that such HRA compensation may contribute to the BNG requirement, as far as No Net Loss, but it cannot contribute to the final 10% net gain[19]. However, it is likely that the BNG framework could drive a much higher offset requirement for intertidal habitats, than previous approaches used to define HRA compensation (see Potential Compensation Ratios Under the Habitats Regulations above) as it uses a formal quantitative metric.

3.1.7. If a developer is unable to deliver the required BNG offset on-site or off-site it is possible to purchase statutory credits from the government. Statutory credits are a financial contribution which counts towards their mandatory 10% BNG. However, they may only be purchased if a developer can provide evidence that they considered on-site BNG and the reasons why this is not possible. Evidence must also be provided that the developer has approached three local or national suppliers (e.g. habitat banks or trading websites) and that insufficient off-site options are available in England. Statutory credits must be purchased at the rate of two needed for every one BU lost, they are intentionally priced highly to avoid being used to avoid on or off-site BNG requirements.

KEY DIFFERENCES BETWEEN HRA, BNG AND NBB

Table 3-2 - Key Differences between HRA, BNG and NBB

[18] A measure of the importance of a habitat used in BNG. It is based on how common or widespread a habitat is and how many notable species it supports. Habitats are graded from irreplaceable (highest) to very high, high, medium and low.

[19] Defra (March, 2024). Guidance: What you can count towards a development's biodiversity net gain

How developers can use habitat creation or enhancements to count towards their biodiversity net gain (BNG) [on-line] What you can count towards a development's biodiversity net gain - GOV.UK

Item	HRA	BNG	NBB
Legal requirement	Y	Y	N
Secretary of State or Welsh Ministerial approval needed for compensation	Y	N	N
Planning policy requirement	Y	Y	Y
Formal metric for quantifying compensation	N	Y	N
Applies below the low-tide mark	Y	N	Likely
Mitigation hierarchy must be applied	Y	Y	Y
Imperative reasons of overriding public interest test	Y	N	N
Functional replacement of biodiversity value for species needed (e.g. birds, fish etc.)	Y	N (habitat type and condition only)	Partly under DECCA framework
Can Habitats Regulations compensation count towards BNG or NBB?	N/A	Partly – not the final 10% of gain	Unclear - consultation with Natural Resource Wales required
On-going management duration	Permanent	30 years	Not defined
Like-for-like (equivalent) compensation needed	Yes – at the national Habitats Sites network scale	Like-for-like or better	Ecosystem resilience must be maintained
Planning route applicability	All planning routes.	Only TCPA applications currently. Likely to include DCO applications in 2025. Does not apply to other consenting pathways.	Unclear if just TCPA or other planning routes.

APPROXIMATION OF COMPENSATION AREAS

3.1.8. It is not possible to accurately predict what compensation ratio might be applied to a future tidal energy scheme in the Severn Estuary. An accurate understanding of compensation will depend on the outcome of a Habitats Regulations Assessment process and compensation will be scheme-specific relating to the extent and nature of the impact. No attempt has been made to calculate BNG or NBB compensation requirements as this would require detailed calculations using the Statutory Metric. However, it should be noted that the BNG metric could result in a far higher offset ratio that previous approaches to defining HRA compensation which have been largely based on professional judgement.

3.1.9. **Annex A** provides some habitat loss estimates and other qualitative information to guide thinking on the subject. Information was collated from one of the component reports of the Strategic Environmental Assessment - DECC (April, 2010). *Severn Tidal Power – Sea Theme Paper: Biodiversity Effects and Interrelationship* relating to the five tidal energy schemes under consideration by that assessment. Further habitat loss estimates were compiled by WSP from a variety of sources (see **Annex A**).

3.1.10. A limitation of this simplistic approach to calculating Habitats Regulations compensation is that it is area-focused. It is known that fish and birds are key qualifying features of Severn Estuary Habitats Site. Compensation for potential effects on these species will require more than just compensatory habitat creation. Factors such as disturbance, entanglement and direct mortality and severance would all be relevant issues that need to be mitigated and/or compensated to secure a derogation under the Habitats Regulations. A further issue is that indirect effects on distant habitats, which are functionally linked, but outside of a Habitats Site are not considered. Possible indirect effects on other Habitat Sites (i.e. those outside of the Severn Estuary) are also not be considered here.

3.1.11. The habitat loss estimates presented in **Annex A** range from 14,000ha to likely less than 100ha (see table notes). Habitat loss estimates were not available for four of the six schemes, however, the ‘notes’ column provides some qualitative information to help provide an indication of how much habitat may be lost. The column entitled ‘Approx. make-up of intertidal habitat within scheme’ provides an indication of the intertidal substrate type that could be lost (typically intertidal mud and fine sands are more important to the bird interests in the estuary). The larger barrage schemes typically result in much larger intertidal habitat loss than lagoon schemes.

3.1.12. **Annex A** shows that three schemes are distinctive in that they are unlikely to result in direct land take from inside one of the Severn Estuary European sites:

- Swansea Bay Tidal Lagoon;
- West Somerset Tidal Lagoon; and
- Stepping Stones Tidal Lagoon.

3.1.13. Of these Swansea Bay and Stepping Stones could result in little intertidal habitat loss (no quantitative estimate available), whereas West Somerset Tidal Lagoon may result in up to 400ha of intertidal habitat loss. Schemes avoiding direct land take from a Habitats Site

would typically have a smaller compensation requirement than those inside Habitats Sites habitat may still occur from water-level and other changes.

3.1.14. A range of ratios were extracted for provision of compensation habitat to address Habitat Regulations requirements from Annex C of the Strategic Environmental Assessment - HM Government (May, 2010). Severn Tidal Power Feasibility Study Working Paper: Compensatory Measures – Application of Compensation Ratios under Article 6 (4). Compensation ratios of between 1:1 and 3:1 were identified. However, the largest area of compensation provided in any of the case studies was 440ha, which would be an order of scale less than some of the habitat losses cited in **Annex A**. The impact of certain tidal energy schemes in the Severn Estuary would likely result in habitat loss/compensation calculations that are unprecedented in a UK context.

SUMMARY

- This technical note provides high-level advice on key drivers for ecological compensation for a future tidal energy scheme in the Severn Estuary. An order of scale estimate for the area required for ecological compensation is provided. The note does not provide detailed advice on the Habitats Regulations, Biodiversity Net Gain or planning policy compliance.
- Ecological compensation is defined differently in relation to different environmental assessment and consenting processes. In all cases it may only occur after avoidance and mitigation activities have been exhausted (i.e. follow the mitigation hierarchy). The English and Welsh planning system define the mitigation hierarchy slightly differently with the Welsh system using the step wise approach.
- In relation to the Habitats Regulations, compensation has a specific legal meaning and is the final derogation test that must be satisfied. Compensation must be agreed beyond the immediate consenting authority and ultimately rests with the Secretary of State or Welsh Ministers. The compensation test may be more challenging to satisfy if Annex I Priority habitats or Annex II Priority species are affected.
- For BNG or NBB offsets, a quantitative (BNG) or a qualitative (NBB) framework must be followed for calculating the area of offset required.
- Habitats Regulations compensation is the strictest ecological regime operating in England and Wales and is likely to be the principal driver for ecological compensation for tidal energy development in the Severn Estuary. A HRA must be accepted by the SNCB and derogation tests must be successfully passed before a compensation proposal can be agreed. Importantly, a HRA must consider in-combination effects (i.e. those caused by other developments), it must also explore ‘far field’ effects on functionally linked habitats which may be distant from the Severn Estuary. The final decision for compensation adequacy sits with the Secretary of State or Welsh Minister. The outcome for compensation is uncertain until all stages of approval/consent have been addressed.
- BNG currently only operates to the low tide mark. There is a formal metric for calculating BNG offset requirements and offset areas may be calculated once a scheme footprint has been designed. In the case of BNG, this can result in offset ratios exceeding x10, for high distinctiveness habitats.
- The NBB approach in Wales is not assessed with a quantitative metric. However, offsets must follow the DECCA framework which requires consideration of how the

concept of ecosystem resilience will be maintained. This is not a concept used by the BNG approach.

- In relation to Habitats Regulations compensation, European Commission guidance (which still has a bearing on how HRAs are conducted) states that compensation ratios should generally be more than 1:1 and ratios of 1:1 or below should only be considered where the measures will be 100% effective within a short period of time.
- Exploring previous intertidal compensation schemes, ratios agreed with relevant SNCBs and Appropriate Authorities range from 2:1 to 4:1. The Cardiff Bay – Newport Wetlands scheme agreed a radio of 2.6:1.
- Further work needs to be undertaken to explore how BNG interacts with the HRA framework. HRA is typically the stronger legal framework for scheme consenting, but BNG could result in a requirement for higher offset land requirements (i.e. a ratio of over 10:1 is possible under the BNG metric for mudflat habitat). BNG legislation currently only applies to TCPA planning applications but will extend to NSIPs in 2025. There are certain exemptions under the BNG regulations, but these would need to be investigated in a more detail study (e.g. Rule 4 exemptions allow non-like for like habitat trading etc.).
- Previous environmental assessment work of tidal energy schemes in the Severn Estuary has estimated a large range of habitat losses for different schemes, from 16,440ha to 18ha. Scheme design and locality have a large influence on possible compensation requirements. In general, large barrage schemes are likely to require higher compensation requirement.
- A future tidal energy scheme in the Severn Estuary would likely result in habitat loss/compensation requirements that are unprecedented in a UK context. The availability of land to achieve the required compensation will be a key issue influencing scheme consenting.

NEXT STEPS

3.1.15. The technical note has identified several uncertainties which require further exploration.

3.1.16. There is a need for detailed legal advice on key consenting issues associated with the Habitats Regulations in the light of post-Brexit change in the regulations and recent case law change since the 2010 Strategic Impact assessment.

3.1.17. Two further factors may be especially relevant to determining whether a tidal energy scheme can gain consent under the Habitats Regulations:

- Firstly, understanding other developments in the Severn Estuary which could act in consort with a tidal energy scheme to impact Habitats Sites. This in-combination assessment may need to extend well beyond the estuary itself.
- Secondly, a review of the availability of land for compensation based on an increased awareness of the possible quantity of compensation land needed which has been provided in this technical note and which accounts for projected sea level increase and therefore future land changes.
- There are several legal and policy frameworks driving ecological compensation in the Severn Estuary from both English and Welsh sides. Two priority questions require clarification:

- Firstly, what policy framework would take precedence for a cross-boundary tidal energy scheme or would different frameworks apply in different geographies?
- Secondly, how are BNG and NBB frameworks to be applied in relation to the Habitats Regulations?

3.1.18. Much of this relates to what consenting approach is used to deliver a tidal energy scheme and who the consenting authority will be. It may be necessary to obtain a legal opinion on the interoperability of BNG and the Habitat Regulations, in particular.

ANNEX A

Annex A - Compensation Table Estimates

Scheme	Scheme Type	Installed Capacity (MW)	Intertidal habitat total	Approx. make-up of intertidal habitat within scheme (Source: Magic Map - marine habitats layers for England and Wales)	Inside Habitats Site (SAC, SPA and/or Ramsar)?	Notes	Source of information about scheme
Shoots Barrage (as studied by the SDC and the STPFS)	Barrage	1050	3200	Mud, sand, gravel, mud and rock	Yes	This is a medium sized project located adjacent to the Prince of Wales Bridge and first studied in the 1930's when power generation from the Severn was first considered. It is located within both an SAC (Special Areas of Conservation) and SPA and would require a Habitat Regulations Assessment (HRA). The Shoots Barrage's preferred operation mode is on the ebb tide only due to the hydraulic gradient in this part of the estuary, and it would require significant compensatory habitats. The 2010 STPFS identified 27 to 37 sq km (2700 - 3700ha) of inter-tidal habitat loss which is between 8and 12% of the total inter-tidal habitat upstream of the barrage.	https://www.gov.uk/government/publications/3-severn-tidal-power-options-definitions-report-volume-1
Cardiff to Weston Barrage (as studied by STPG and STPFS)	Barrage	8600	14,000	Sand, mud, rock, sand, gravel	Yes	This is the largest tidal power project studied in Phase 2 of the Severn Tidal Power Feasibility Studies (STPFS) and is located within both an SAC (Special Areas of Conservation) and SPA. It would require a Habitat Risk Assessment (HRA). It could also operate as an ebb only scheme (lower capital cost, reduced impact on ports as high water levels are similar to existing but large loss of inter-tidal habitat) or in ebb and flood mode (more expensive as larger caissons are required, significant impact on the ports as the high water level is reduced by up to 2m upstream of the barrage but reduced loss of inter-tidal habitat). The 2010 STPFS identified 118 to 163 sq km (c.16300ha) of inter-tidal habitat loss when operating in ebb only mode. This is between 40 and 50% of the total inter-tidal habitat upstream of the barrage. If the project was operated in ebb and flood mode, the loss of habitat would be around 50% of the above figures. The 2010 study concluded that compensatory habitat sites would be necessary around the UK and in Europe for an ebb-only barrage of this scale.	https://www.gov.uk/government/publications/3-severn-tidal-power-options-definitions-report-volume-1
Cardiff Tidal Lagoon	Lagoon	3000	Unknown - see notes	Rock, shingle, mud and sand	Yes	This is a further example of a large lagoon and there are likely to be some changes in external water levels outside of the lagoon. Within the lagoon itself, the inter-tidal zone affected is approximately 12km along the north facing shoreline. The change in water level along this inter-tidal zone depends upon the extent of pumping and sluicing and could range from zero (mitigation pumping) to between 1 and 2m (no pumping or sluicing). The proposed location is located within both an SAC (Special Areas of Conservation) and SPA and will require a Habitat Regulations Assessment (HRA). NRW data suggests the intertidal zone is largely comprised of mudflat.	
Swansea Bay Tidal Lagoon (as proposed by TLP)	Lagoon	320	Unknow - see notes	Sand and shingle	No	The inter-tidal zone affected is approximately 3km along the south facing shoreline. The change in water level along this inter-tidal zone depends upon the extent of pumping and sluicing and could range from zero (mitigation pumping) to around 1m (no pumping or sluicing).	https://committees.parliament.uk/work/5283/swansea-bay-tidal-lagoon-inquiry/publications/3/correspondence/
West Somerset Tidal Lagoon as proposed by Tidal Engineering and Environmental Services (TEES)	Lagoon	2500	Not known although 400ha of inter-tidal habitat would be present in the impounding basin if consented.	Sand, shingle and rock	No	This is an example of a large lagoon and there are likely to be some changes in external water levels outside of the lagoon. Within the lagoon itself, the inter-tidal zone affected is approximately 15km along the north facing shoreline. The change in water level along this inter-tidal zone depends upon the extent of pumping and sluicing and could range from zero (mitigation pumping) to more than 1m (no pumping or sluicing). The proposed location exhibits both secretion and erosion with sand and muds overlying rock. Two-dimensional modelling has shown the scheme could have a small effect on the SACs (Special Areas of Conservation) and SPAs up-channel and a Habitat Regulations Assessment (HRA) will be required. Areas of intertidal mud, gravel and rock would be affected.	https://tidalengineering.co.uk/west-somerset-lagoon/
Stepping Stones Tidal Lagoon as proposed by WSP and Binnies in 2012 as a design concept	Lagoon	600	Unknown - see notes	Rock and shingle	No	As the external sea water levels are, to all intents and purposes, unchanged, there is no impact on the inter-tidal zone on the shorelines of the Severn Estuary outside of the lagoon. Within the lagoon itself, the inter-tidal zone affected is approximately 7.75km along the south facing shoreline. The change in water level along this inter-tidal zone depends upon the extent of pumping and sluicing and could range from zero (mitigation pumping) to around 1m (no pumping or sluicing). The shoreline is predominantly rock with little or no sand or mud.	Parsons Brinckerhoff Summary Report on Stepping Stones Lagoon 2012