Biodiversity Metric 4 case study 2: Port development

This case study demonstrates how biodiversity metric 4 can quantify losses and gains in intertidal habitats associated with new infrastructure.

Overview

This case study is based on hypothetical proposal for a new jetty, pier, and terminal structure on the upper shore of the Thames estuary, outside of any designated site. The new structures are required for the import of raw materials and will be built over the intertidal foreshore, resulting in the loss of the underlying habitats.

This case study presents two scenarios for achieving a biodiversity net gain in 'area habitat biodiversity units', with one scenario offsetting on-site losses with the creation of off-site habitat at the time of development, and the other offsetting losses using 'banked' off-site habitat which has been created in advance.

This case study demonstrates:

- ✓ How to record permanent losses in biodiversity metric 4.
- ✓ Different options for mitigating losses including the use of off-site habitat interventions to achieve a 10% biodiversity net gain.
- ✓ The use of the 'habitat created/enhanced in advance' function in biodiversity metric 4 for 'habitat banking', which can significantly reduce the area of habitat required to deliver a biodiversity net gain.
- ✓ How to meet the trading rules within biodiversity metric 4.

Note: All habitat data presented in the tables of this case study are taken directly from biodiversity metric 4.

The site

In this hypothetical case study, a new jetty, pier, and terminal is proposed to be built over the intertidal foreshore. The total area impacted is referred to as the 'project boundary' and is shown in Figure 1 below.

Development will result in the permanent loss of all intertidal habitats within the project boundary.

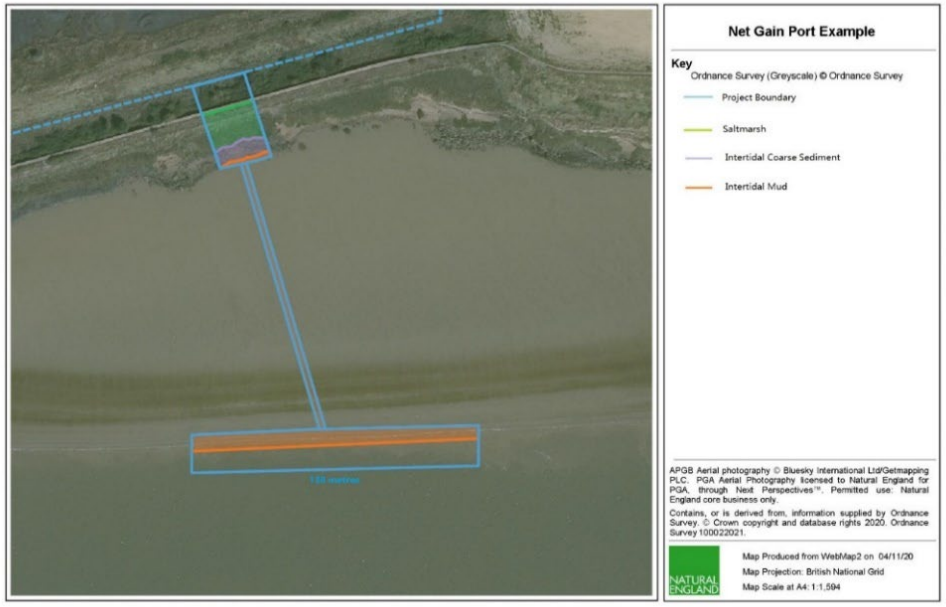


Figure 1. Hypothetical boundary of the proposed port development

Approach to biodiversity net gain assessment

Biodiversity metric 4 uses habitat data input into it, to calculate how many biodiversity units the site scores at baseline prior to development; how many biodiversity units will be lost because of the development; and how many additional biodiversity units are needed to offset the losses and achieve a minimum 10% biodiversity net gain relative to the baseline.

This case study focuses on area habitat biodiversity units only, and presents two scenarios:

- Scenario 1: Loss of habitat within the development boundary and habitat creation at the time of habitat loss off-site.
- Scenario 2: Loss of habitat within the development boundary and habitat creation in advance off-site, or habitat 'banking'.

Assumptions

For the purposes of this case study, it is assumed that:

- There will be permanent loss of all habitats within the project boundary.
- Though any impacts to habitats above mean high water need to be considered within biodiversity net gain calculations, they are not included in this case study for simplicity.
- The target post-intervention condition of the proposed habitats will be reached. In practice this requires monitoring and oversight by an ecologist to ensure it was achieved.
- None of the habitats in the case study are identified in a local strategy, therefore on-site strategic significance is 'low'.

Trading rules

In any project, the trading rules of biodiversity metric 4 need to be adhered to in order to achieve a biodiversity net gain. The trading rules are based on habitat distinctiveness – which directly relates to habitat type, as well as broad habitat.

This case study contains high distinctiveness habitats which require any losses to be mitigated by creating or enhancing the same habitat type, and medium distinctiveness habitats where any loss can be mitigated by creating or enhancing habitat within the same broad habitat type, or habitats of higher distinctiveness.

Baseline area habitat biodiversity units

The on-site baseline contains 'saltmarshes and saline reedbeds', 'littoral mud' and 'littoral coarse sediment' habitats in an area of low strategic significance for these habitats.

Using biodiversity metric 4, the project baseline was calculated to be 2.37 area habitat biodiversity units, as shown in Table 1. Any area habitat biodiversity unit losses and gains are measured against the project baseline.

Table 1. On-site baseline habitat details.

Habitat type	Area (ha)	Habitat Distinctiveness	Habitat Condition	Strategic Significance	Total area biodiversity units
Littoral mud	0.11	High	Good	Low	1.98
Saltmarshes and saline reedbeds	0.026	High	Moderate	Low	0.31
Littoral coarse sediment	0.019	Medium	Poor	Low	0.08
Total	**0.16**	**-**	**-**	-	**2.37**

Post-development area habitat biodiversity units

For both scenarios, all on-site habitats within the project boundary will be lost due to the port construction works, resulting in a loss of 2.37 area habitat biodiversity units.

In order to meet the trading rules, loss of 'saltmarshes and saline reedbeds' and 'littoral mud' need to be mitigated by creating or enhancing the same habitat types, as they are both high distinctiveness. Loss of 'littoral coarse sediment' needs to be mitigated by creating or enhancing habitats within the same Intertidal broad habitat type, or a higher distinctiveness habitat.

Scenario 1: Off-site habitat creation at time of habitat loss

The developer contracts with a landowner who proposes to undertake a habitat creation scheme off-site, outside of the development boundary, but within the same Marine Plan Area.

The landowner will build a tidal exchange scheme where seawater can flood in and out via a breach in the seawall of a small area of poor-quality low-lying coastal land, comprising the habitat 'artificial unvegetated, unsealed surface', which is very low distinctiveness.

The new tidal regime will create 0.17 ha of saltmarsh and 0.49 ha of 'littoral mud', both in moderate condition. This will generate 0.6 saltmarsh and 2.01 'littoral mud' area habitat biodiversity units, respectively.

The area proposed for habitat creation has:

- High strategic significance because a local strategy has identified it as being suitable for intertidal mud and saltmarsh creation.
- Low spatial risk because it is located within the same Marine Plan Area as the development site where the area habitat biodiversity unit losses occur.

In Scenario 1, the habitat creation work is initiated by the landowner at or soon after the granting of planning permission for the new port and the commencement of construction – therefore close to the time of impact. This is reflected in biodiversity metric 4 by leaving the 'Habitat created in advance' and 'Delay in starting habitat creation' columns blank or filling in them in with zeroes.

The off-site habitat creation generates 2.61 area habitat biodiversity units, as shown in Table 2.

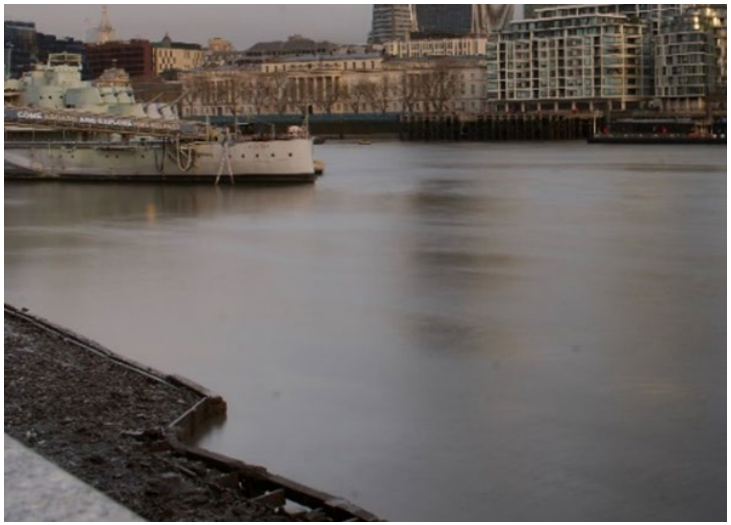
Table 2. Area habitat biodiversity units for habitat creation off-site.

Habitat type	Area (ha)	Habitat distinctiveness	Habitat condition	Strategic significance	Spatial risk	Total biodiversity units
Saltmarshes and saline reedbeds	0.17	High	Moderate	High	Low	0.6
Littoral mud	0.49	High	Moderate	High	Low	2.01
Total off-site	**0.66**	**-**	**-**	**-**	**-**	**2.61**

The off-site habitat creation results in a biodiversity net gain of 0.24 area habitat biodiversity units, which is 10.16% above the total site baseline, as shown in Table 3. This delivers a biodiversity net gain whilst also complying with the trading rules.

Table 3. Summary of Scenario 1 calculations.

Calculation	Area habitat biodiversity unit outputs	Percentage change
On-site net change	-2.37	-100%
Off-site baseline	0.00	-
Off-site habitat creation	+2.61	-
Off-site net change	+2.61	-
Total on-site and off-site net change	**+0.24**	**+10.16%**



Scenario 2: Creation or enhancement of habitat ahead of impact - 'habitat banking'

In Scenario 2, moderate condition 'saltmarsh and saline reedbeds' and 'littoral mud' are created, like in Scenario 1, however in this instance they are created 10 years in advance of the port development. This could be part of a habitat creation strategy undertaken by the port or by another third party. By creating habitat in advance, a 'habitat bank' is established and registered to support future development ambitions.

The number of advance years in which the habitat is created is input into the 'habitat created in advance' column within biodiversity metric 4. Because of this early habitat creation, the risks associated with creation are reduced, so more area habitat biodiversity units are generated compared to the same area of habitat that isn't created in advance.

This means that for Scenario 2, trading rules are met, and a 10.73% biodiversity net gain is achieved due to a net increase in 0.25 area habitat biodiversity units, using a smaller area of habitat.

Scenario comparison

Creating habitats in advance of impacts can significantly reduce the number of hectares of the same habitat type required to offset losses, and achieve a biodiversity net gain, as evidenced in Table 4.

Table 4. Comparison of the areas of habitat required to achieve biodiversity net gain.

Scenario	Area of saltmarsh (ha)	Area of littoral mud (ha)	Total off-site habitat area required (ha)	Percentage net gain achieved
Scenario 1 – creation at time of impact	0.17	0.49	0.66	10.16%
Scenario 2 – creation in advance	0.03	0.16	0.19	10.73%

Table 5 further shows that biodiversity metric 4 reduces the 'time to target condition' when habitats are created in advance of impact, meaning that more units are generated for the same area of habitat.

Table 5. Comparison of 'time to target condition' and area habitat biodiversity units achieved.

Habitat type	Standard time to target condition (years)	Area habitat biodiversity units	Time to target condition with creation 10 years in advance	Area habitat biodiversity units
Saltmarsh and saline reedbeds	7	0.11	0	0.41
Littoral mud	3	0.65	0	2.21

As 'saltmarsh and saline reedbeds' and 'littoral mud' typically take less than 10 years to reach moderate condition, by the time the development takes place 10 years after their creation, the habitats can be assumed to have reached the desired condition.

By creating habitats in advance, the landowner can generate a 'bank' of cost-effective area habitat biodiversity units that could be used to offset current and future development projects. These could also be made available to other developers, potentially generating additional revenue for the landowner.

Conclusions

This case study demonstrates how off-site habitat creation can deliver biodiversity net gain for a scheme impacting intertidal habitats. It also highlights that creating habitat in advance can significantly reduce the area of habitat required to achieve a biodiversity net gain, demonstrating the potential value in habitat banking.

If a habitat 'bank' produces more area habitat biodiversity units than is required to meet one specific development's biodiversity net gain obligation, surplus area habitat biodiversity units can also be sold to other developers. Note – in Scenario 2, any units could be used to offset not just saltmarsh and 'littoral mud' losses but also any low or medium distinctiveness intertidal habitat impacts as per the trading rules.

Developers should consider the efficiencies of scale associated with large scale and early habitat creation when planning habitat creation projects. Small scale habitat creation designed to fit the bespoke needs of a project may be cost-effective in some circumstances. However, larger scale projects created in advance can provide more certainty in attaining desired

habitat quality and can reduce overall habitat creation and management costs over the longer term. This also applied to projects involving habitat enhancement.

Key messages and top tips

- Apply the mitigation hierarchy at the design stage to avoid impacts on high distinctiveness habitats or, if impacts are unavoidable, to minimise them as far as possible.
- Consider the location of habitat creation or enhancement. Delivering biodiversity net gain in locations that are strategically significant and or within the same Marine Plan Area increases their area habitat biodiversity unit value and therefore reduces the area of habitat required to deliver biodiversity net gain.
- When 'banked' habitat is being used, record how many years in advance the habitat was created in the 'Habitat created in advance' column in biodiversity metric 4.
- Consider potential efficiencies of scale associated with habitat banking. Larger scale habitat creation can be more reliable and cost effective in delivering biodiversity net gains over the long term and area habitat biodiversity units can also be registered as a habitat bank and sold, delivering a financial return.

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