Biodiversity metric 4 case study: Cabling for offshore wind development

This case study demonstrates how biodiversity metric 4 can quantify losses and gains within intertidal habitats and evaluate different options to achieve biodiversity net gain.

Overview

In this case study, power cables are coming ashore from an offshore windfarm to connect to the grid. They will cross terrestrial, intertidal, and subtidal habitats. Only the impacts on intertidal habitats are considered here.

This case study presents three scenarios for achieving a net gain in 'area habitat biodiversity units', using either:

1) enhancement of off-site habitat

2) creation of off-site habitat

3) advance creation of off-site habitat for habitat 'banking'

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

This case study demonstrates

- ✓ How to record temporary losses[1] in biodiversity metric 4 when the baseline habitats cannot be restored to their original condition within 2 years of the loss occurring.
- ✓ Different options for mitigating losses and achieving 10% biodiversity net gain.
- ✓ How to use the 'habitat created/enhanced in advance' function in biodiversity metric 4 for 'habitat banking', and how creating or enhancing habitats in advance can significantly reduce the area of habitat required to deliver an overall biodiversity net gain.
- ✓ The meeting of habitat trading rules within biodiversity metric 4 relating to habitat distinctiveness.

The site

In this case study, four power cables are coming ashore from an offshore windfarm to connect to the grid which will be installed through intertidal habitats, with the trenches backfilled to reinstate the habitats across the footprint of the works.

The on-site intertidal habitats within the project boundary will be impacted by the ~10m wide trenching for the cables, associated access tracks, any required grounding of barges, and anchor placement associated with installation vessels.[2]

This area of works is referred to as 'the proposed development'.

[1] Only habitats that can be restored to the same habitat in the same condition within a 2-year period classes as 'temporary' loss in biodiversity metric 4. When this is the case, the habitat can be recorded as 'retained' within the baseline tab.

[2] Although this is a hypothetical scenario, the scale of impact and footprint are loosely based on those from Hornsea 2 offshore windfarm.

Approach to biodiversity net gain assessment

Biodiversity metric 4 uses habitat inputs 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 would need to be delivered on-site and or off-site, to achieve a 10% biodiversity net gain relative to the baseline. Only area habitat biodiversity units are used in this case study.

This case study presents three scenarios:

- Scenario 1: Re-creation of habitat on-site and habitat enhancement off-site.
- Scenario 2: Re-creation of habitat on-site and habitat creation off-site.
- Scenario 3: Re-creation of habitat on-site and habitat creation in advance off-site, known as 'habitat 'banking'.

Assumptions and limitations

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

- Any impacts on habitats above 'mean high water' are not included here for simplicity, but should also be considered for real-world projects within the biodiversity net gain calculation.
- All habitats within the project boundary, or on-site, will be impacted by the cable trenching workings.
- No structures will be built on the intertidal habitats, so there will be no permanent loss. However, the habitats impacted will take more than 2 years to recover to their previous condition. This cannot be considered a 'temporary' loss within biodiversity metric 4, so there is a biodiversity net gain requirement.
- Habitats within the on-site development area are low strategic significance because they are either not identified in a local strategy, or there is no local strategy.

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 –all scenarios

At baseline, the proposed development 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, this baseline was calculated to yield 72.0 area habitat biodiversity units, as shown in Table 1. Any area habitat biodiversity unit losses and gains are measured against the baseline.

Table 1. On-site baseline habitat details.

Habitat type	Area (ha)	Habitat Distinctiveness	Habitat Condition	Strategic Significance	Total area habitat biodiversity units
Littoral mud	5	High	Poor	Low	30.00
Littoral coarse sediment	3	Medium	Good	Low	36.00
Saltmarshes and saline reedbeds	0.5	High	Moderate	Low	6.00
Total site baseline	**8.5**	**-**	**-**	**-**	**72.00**

Post-development area habitat biodiversity units

On site – all scenarios

All habitats within the proposed development will be lost in each of the three post-development scenarios. 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 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.

Once the cables have been installed, the impacted habitats will be re-instated in the same proportions, but with a target condition of 'good' for the created saltmarsh and 'littoral mud' habitat.

Biodiversity metric 4 accounts for the time taken for habitats to reach good condition and the difficulty of creating these habitats, resulting in the proposed re-creation of the baseline habitats yielding 47.40 area habitat biodiversity units post-development, which represents a deficit of -24.60 area habitat biodiversity units relative to the baseline.

Scenario 1: On-site habitat re-creation and off-site <u>enhancement</u>

In this scenario, the developer intends to deliver additional off-site habitat enhancement to achieve a net gain in area habitat biodiversity units.

The off-site location is of high strategic significance for these habitats and the spatial risk for this location also meets the *'Compensation inside Marine Plan Area of impact site'* category, which results in a risk multiplier of 1 being applied.

The developer proposes to enhance the off-site habitats from poor to good condition. For 2 ha of saltmarsh and 3.3 ha of 'littoral mud', this results in an off-site gain of 32.01 area habitat biodiversity units.

Combined with the on-site values, this results in an overall net gain of 7.41 area habitat biodiversity units or a 10.30% net gain. Table 2 summarises losses and gains in area habitat biodiversity units for Scenario 1.

Table 2. Summary of Scenario 1 calculations.

Calculation	Area habitat biodiversity unit outputs	Percentage change
On-site net change	-24.60	-34.17%
Off-site baseline	36.57	-
Off-site habitat enhancement	68.58	-
Off-site net change	+32.01	-
Total on-site and off-site net change	**+7.41**	**+10.30%**

Scenario 2: On-site habitat re-creation and off-site creation

In this scenario, the developer identifies 8.4 ha of 'artificial unvegetated, unsealed surface' habitat off-site, where saltmarsh and 'littoral mud' can be created through managed realignment.

Within biodiversity metric 4, this artificial unvegetated habitat generates zero baseline area habitat biodiversity units. This scenario assumes the same strategic significance and spatial risk categories for the off-site habitats as in Scenario 1, meaning that conversion of this very low distinctiveness habitat to 4.4 ha of saltmarsh and 4 ha of 'littoral mud' – both in moderate condition – yields 31.98 area habitat biodiversity units. This results in an overall net gain of 7.38 area habitat biodiversity units or 10.26% relative to the baseline.

Table 3 summarises losses and gains of area habitat biodiversity units for Scenario 2.

Scenario 3: On-site habitat restoration and off-site habitat created or enhanced ahead of development – 'habitat banking'

In Scenario 2 above, it is assumed that the creation of the off-site habitat occurred at the time of the impact. Whereas in Scenario 3, the developer could begin to create or enhance habitat in advance of the losses occurring. This is known as 'habitat banking'.

The key benefit of creating habitat in advance is that the risk multiplier for the time to reach target condition is reduced. This is accounted for by entering the number of years in advance that the habitat will be created into the 'habitat created in advance' column in biodiversity metric 4, as shown in Figure 1.

Post development/ post intervention habitats								
Strategic significance			Temporal risk multiplier					
icance	Strategic significance	Strategic position multiplier	Standard time to target condition/years	Habitat created in advance/years	Delay in starting habitat creation/years	Standard or adjusted time to target condition	Final time to target condition/years	Final time t target multiplier
ocal strategy	High strategic significance	1.15	7	5		Check details - Is there evidence habitat creation started and the threshold for Poor condition reached? ⚠	2	0.931
ocal strategy	High strategic significance	1.15	3	5		Check details - Is there evidence that habitat has reached target condition? ⚠	0	1.000

Figure 1. Screenshot of the biodiversity metric 4 area habitat creation tab.

In this scenario, 1.5 ha of saltmarsh and 1.4 ha of 'littoral mud' will be created in moderate condition, 5 years prior to losses occurring. Despite the strategic significance being the same as Scenario 2, the habitat creation will yield 32.24 area habitat biodiversity units. This is a net increase of 7.63 area habitat biodiversity units relative to the baseline, representing a 10.60% net gain, using a significantly smaller area.

Scenario comparison

Table 3 summarises and compares the losses and gains of area habitat biodiversity units for Scenarios 2 and 3. This highlights that by creating habitats in advance in Scenario 3, a similar net gain in area habitat biodiversity units can be achieved, despite the smaller area of habitat that has been created.

Table 3. Comparison of Scenario 2 and 3 outputs.

	Net change in area habitat biodiversity units	
Description	**Scenario 2**	**Scenario 3**
On-site net change	-24.60	-24.60
Off-site baseline	0.00	0.00
Off-site habitat creation	+31.98	+32.24
Off-site net change	+31.98	+32.24
Total net gain in area habitat biodiversity units	**+7.38**	**+7.63**
Total net percentage change	**10.26%**	**10.60%**

Table 4 further highlights the difference in habitat area required to achieve biodiversity net gain for each scenario, which differ due to the approaches taken. Creation of new saltmarsh and 'littoral mud' habitat on very low distinctiveness habitat in Scenario 2 habitat generates more area habitat biodiversity units per hectare than just enhancing these intertidal habitats in Scenario 1, whereas creating the same habitats in advance of impact generates the most units per hectare in Scenario 3.

Table 4. Comparison of area requirements for different off-site net gain delivery options presented in Scenarios 1-3.

Scenario	Off-site area required (ha)	Area habitat biodiversity unit gain	Percentage net gain
Scenario 1 – on-site creation, off-site enhancement	**5.3**	7.41	10.30%
Scenario 2 – on-site and off-site creation	**8.4**	7.38	10.26%
Scenario 3 – on-site creation, off-site advance creation – 'habitat banking'	**2.9**	7.63	10.60%

Conclusions

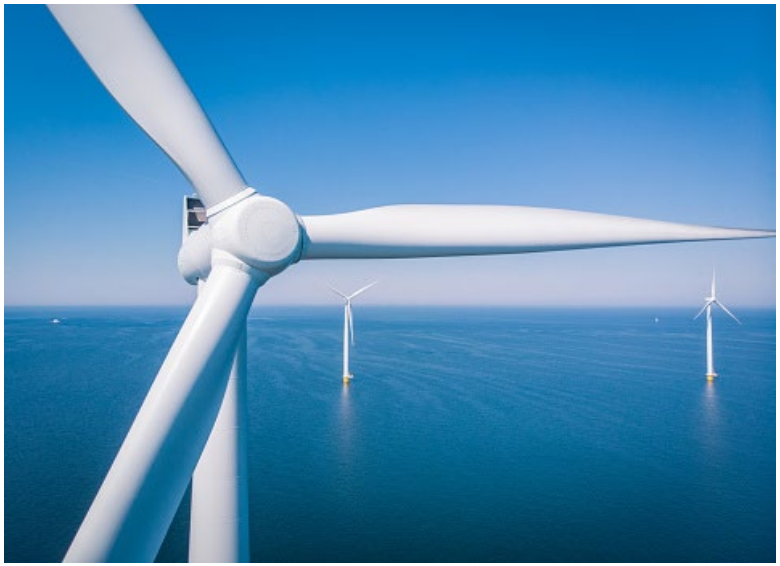
This case study demonstrates that, following a development impact, reinstating the same habitats on-site will not necessarily deliver a net gain in area habitat biodiversity units by itself. This is due to the risk factors associated with the difficulty of habitat creation and the time required to reach the target condition. Therefore, additional on-site or off-site creation or enhancement of suitable habitats may be required, while following the trading rules based on habitat distinctiveness, and other ecological and environmental factors.

Comparing these 3 scenarios illustrates the variation in the area of habitat required to achieve a 10% net gain, depending on whether habitat is being enhanced or created and whether that habitat has been created in advance, or 'banked'. Table 4 shows these differences between scenarios.

For the habitats in this case study, enhancement requires almost double the area, and creation almost three times the area of habitat, to achieve the same percentage net gain when compared to using 'banked' habitats created 5 years in advance. This demonstrates the potential value of habitat banking, which, although having an initial upfront cost, can provide a portfolio of sites offering additional flexibility to achieve net gain in a more cost-effective way.

Key messages and top tips

- 'Temporary' losses, where habitats will not be reinstated within 2 years in the same baseline type and condition, are recorded as loss and re-creation. This applies regardless of whether the re-created habitat is in the same or better condition than that which was present pre-development.
- The trading rules need to be met to achieve biodiversity net gain, and these should be considered when deciding which habitats to created or enhance, alongside other ecological context.
- Consider the location of habitat creation or enhancement. Delivering biodiversity net gain in locations that are strategically significant for that habitat increases the area habitat biodiversity unit value and may reduce the area of habitat required to deliver biodiversity net gain.
- Similarly, where off-site habitat creation or enhancement is needed, choosing locations that are close to the on-site location – within the same Marine Plan Area – means that the spatial risk multiplier will not reduce the number of area habitat biodiversity units generated.
- When 'banked' habitat is being used – created or enhanced in advance of impact – record how many years in advance the habitat was created in the 'Habitat created in advance' column in biodiversity metric 4.
- Different options for delivering biodiversity net gain require different areas of habitat to achieve the same percentage net gain. Habitat enhancement will usually require a smaller area than re-creation of the same habitat to achieve the same net gain. Using habitat created in advance will also require a smaller area than creating the same habitat at the time the development or loss occurs.
- Consider potential efficiencies of scale associated with habitat banking. Larger scale habitat creation can be more reliable and cost-effective in delivering net gains over the long term and area habitat biodiversity units can also be registered as a habitat bank and sold, potentially delivering a financial return.



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