INLAND WATERWAYS ASSOCIATION

Introduction:

BIODIVERSITY NET GAIN FOR CANAL RESTORATION

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INTRODUCTION

Biodiversity Net Gain (BNG) will fundamentally change the way we approach Waterway Restoration in the future. Where previously biodiversity and the environment would have been an afterthought or a nice 'added extra', BNG will require developers and construction organisations to put biodiversity at the heart of all activities from project inception to the aftercare.

This means restoration groups will need to reassess current activities and strategies to cater for the eventual inclusion of BNG within the planning framework. While much of the current BNG Framework is undergoing review, this document is designed to provide a brief introduction to BNG. For a more detailed look into Biodiversity Net Gain you can find a number of guides written by CIEEM and its partners online at: **cieem.net/i-am/current-projects/biodiversity-net-gain**

BNG seeks to shift developers away from the current management standards for meeting existing legislative requirements on biodiversity and the environment. Where traditionally developers would seek to mitigate the loss of habitat, as a result of their project, by creating/adding/offsetting other habitats, often in localities away from the ecological footprint of their project, BNG looks to ensure habitats are replaced on a like-for-like basis. Thus a habitat loss will be offset by a new habitat which contributes equally in terms of form, function or relation to biodiversity. For example, we will no longer see a meadow being replaced with a woodland.

At minimum developers need to provide at least 10% net gain to biodiversity for their project.

Biodiversity Net Gain: Good practice principles for development (CIEEM, 2016) sets out ten fundamental principles to support the incorporation of BNG into the design, construction, operation and maintenance phases of development projects.

The ten good practice principles for development are as follows:

Mitigation Hierarchy	Avoid or minimise the impacts on biodiversity and only compensate where these cannot be achieved
Impacts on Irreplaceable Biodiveristy	Avoid losing biodiversity that cannot be offset by gains elsewhere e.g. SSSi
Be Inclusive and Equitable	Engage stakeholders early and include them throughout the project lifecycle
Address Risks	Mitigate difficulty, uncertainty and other risks to achieve net gain, by incorporating contingencies
Measurable Net Gain Contribution	Achieve an overall gain for biodiversity, ecosystem services and nature conservation priorities
Best Results for Biodiversity	Use credible evidence and local knowledge to justify BNG choices over the project for best results
Be Additional	Achieve nature conservation outcomes that demonstrably exceed existing obligations
Net Gain Legacy	Ensure your Net Gain is sustainable beyond the construction phase and is well managed into the future
Optimise Sustainability	Prioritise BNG and where possible the wider environmental benefits for sustainable society and economy
Be Transparent	Communicate all net gain activities in a timely and transparent manner with stakeholders

MITIGATION HIERARCHY

Before attempting to accommodate BNG into your projects, it is vital to understand the Mitigation Hierarchy.

The hierarchy consists of three sequential steps to mitigate damage to biodiversity and the environment. From a net gain perspective, developers need to demonstrate they have utilized the mitigation hierarchy throughout the planning, delivery and reporting stages of their project.

The mitigation heirarchy is as follows:

1 AVOID

Avoid creating impacts from the outset, through identifying potential impacts ahead of development and incorporating design measures to prevent impacting upon protected species and habitats. For example, retain priority habitats on the canal to negate habitat loss.

2 MINIMISE

Adapt the project to reduce the impact on biodiversity from operations and developments, such as the project layout, work times, scale, materials and locations, thus minimizing negative impacts. Examples include such measures as reducing noise and pollution, designing exclusion zones near habitat features, or using materials with no leaching properties or are biodegradable.

3 COMPENSATE: REHABILITATE

Measures taken to rehabilitate degraded ecosystems following impacts that cannot be avoided. Compensation aims to return an area to the original ecosystem that occurred before impacts, whereas rehabilitation restores ecological functions and/or ecosystem services. For example planting trees to stabilise soil, installing a fish/eel pass at a weir or lock or enhancing the existing habitat present on site.

3 COMPENSATE: OFFSET

Measures taken to compensate for any residual, adverse impacts after full implementation of the previous three steps of the mitigation hierarchy. Biodiversity offsets can provide compensatory mechanisms for significant residual impacts on biodiversity. There are two types of offsets: ‘restoration offsets’ - which aim to rehabilitate or restore degraded habitat, and ‘averted loss offsets’ which aim to reduce or stop biodiversity loss (e.g. future habitat degradation) in areas where this is predicted.

Incorporate BNG into your organisations, structure and projects. Setting a goal that aligns with local authorities and national bodies will improve success with planning applications.

PLANNING STAGE

Feasibility & Scoping

The first step is to assess your project, whether that is the full canal route or the restoration phases. The full route will require BNG to be integrated at all parts of the project to identify opportunities and limitations to achieving net gain. Smaller restoration phases e.g. lock rebuilds, may not require a net gain outcome due to the minimal footprint. Full guidance on development footprints in relation to BNG has yet to be fully realised (especially with regards to linear projects) and further updates will follow as BNG is fleshed out.

The purpose of scoping the project is to assess whether the project can achieve net gain, where to seek support and how to achieve a 'win-win' for both restoration and biodiversity in the local area.

1. **Identify local and strategic priorities** - local authorities will have published targets for biodiversity e.g. Biodiversity Action Plans, Green Infrastructure Strategies, Local Nature Plans etc. Successful BNG projects should aim to support and contribute to the local plans.

2. **Explore the area of the proposed project** - assess and identify areas which will be affected by plans e.g. will the project affect irreplaceable statutory designated sites (SSSI/Ancient Woodland), will the project affect ecological services such as flood relief and could benefits to the public be provided?

3. **Engage stakeholders** - look internally and externally to engage stakeholders to discuss the project and decide the priorities for BNG. For larger scale projects look at contacting local planning authorities, Statutory Nature Conservation Organisations and local communities.

ECOLOGICAL IMPACT ASSESSMENT

Large-scale projects will require ecological assessments to assess the baseline features, potential impacts from works and to advise on mitigation measures required. Applying BNG at this stage will allow for the habitats surveyed and features present to be quantified into biodiversity units providing a numerical value to the projects impact. Biodiversity units value the local ecology and clarify the value of proposed mitigation measures, which will produce a figure for the net gain or loss for each habitat and that of the whole project. The results are reported to the local planning authority and submitted for further assessment and can be qualitatively and quantitatively assessed by the stakeholders. The table below demonstrates how habitats can be assessed during a project.

EXAMPLE PROJECT – REINSTATE 2KM OF CANAL

Assessed Habitat	Baseline Biodiversity Units	Key Ecological Feature	Works Impact	After Works
1 ha Arable Land	1	Area of open green space within a heavily urban area	Permanent loss of 0.33 ha, converted into canal	0.66 biodiversity units = loss of 0.33 units
1 ha Canal (standing water)	2	Foraging resource for bats, essential for fish population and opportunities for reptiles	Gain of 1.33 ha and a temporary loss of 0.1 ha during construction	3.32 biodiversity units = gain of 1.2 units
0.15 ha species rich hedgerow	0.5	Foraging recourse, ecological corridor nesting opportunities	No impacts	0.5 biodiversity units = no loss
Total	3.5			4.48 biodiversity units (21.8% net gain)

APPLYING BIODIVERSITY NET GAIN

Not all habitats are equal; size, designation, connectivity, protected species and invasives all play a part in the calculations of biodiversity units.

HABITAT TRADING

The core principle is to ensure that BNG should add to and enhance the existing natural environment, not transform the range of habitat types. A **like-for-like** approach should be followed. Habitat lost should replaced by the same habitat e.g. woodland for woodland. Where possible projects should look at adding enhancement measures. Sometimes the like-for-like approach is not always possible and in these cases, the project should look at **'trading up'**. This means taking a low priority habitat like amenity grassland and converting it into a priority habitat like reed beds.

Key points to consider when habitat trading:

1. Avoid losing biodiversity that cannot be offset
2. Ensure the gains exceed the area lost
3. Deliver a project that goes beyond current obligations
4. Ensure the trades make sense and achieve best possible outcomes for biodiversity
5. Think carefully about the role the existing habitat plays and whether your habitat trade delivers the same needs for species present
6. Make sure the trade is possible and can be achieved

LOCATION & BIODIVERSITY FEATURES

Location is key. Where possible compensation measures should be located as close as possible to the site of the works/development. Ideally these measures should be applied on site. Net gain should contribute towards priorities set out in local authority plans and other governing documents, with an emphasis on features affected by the development.

The following features should be considered when thinking about the location for mitigating projects:

1. Soil characteristics
2. Home ranges
3. National/local populations
4. Connectivity
5. Foraging opportunities
6. Refuge
7. Barriers
8. Proximity to urban areas
9. Strategic location

Always refer back to local strategies and priorities.

It may not be possible for all areas of the project to achieve BNG. Irreplaceable habitats lost due to construction such as SSSI's and Ancient Woodland cannot achieve a net gain. However the mitigation hierarchy should still be applied.

ENHANCEMENT

Enhancement measures can help provide net gain for habitats on site and can be applied throughout much of the project lifecycle and incorporated into other mitigation measures. Enhancements can occur both on site and within the local area to meet net gain contributions.

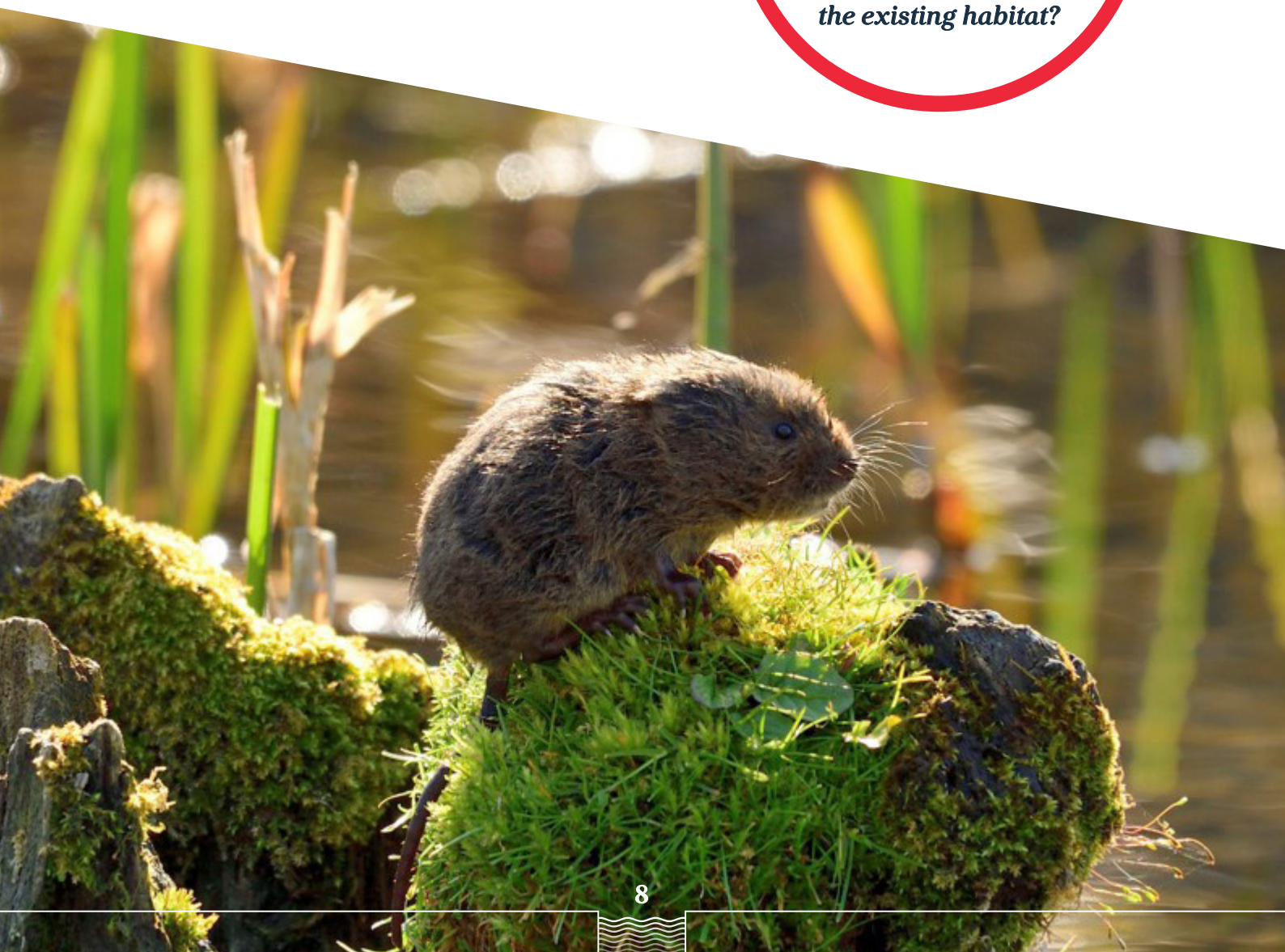
Enhancement options could include:

1. Increasing the area of existing habitats on site and in the surrounding area
2. Improving the quality of habitats
3. Creating new habitats to perform ecosystem functions
4. Reducing pressures on habitats e.g. removing barriers
5. Creating/enhancing connections between habitats

TIME LAGS & TIMESCALES

Time plays a role in ensuring BNG objectives are met and the impact to habitats is avoided. The key is to reduce the length of time the project negatively impacts the habitats. For instance, if works require a temporary stoppage of water flow within a canal, the loss of habitat will negatively affect the project's BNG aims through removing key ecological features and directly removing a habitat including a number of species for an amount of time. It is best practice to reduce the amount of time between net loss and net gains. Early planning is essential here.

Reduce the amount of time between habitat net loss and net gains. If the project needs to remove a habitat at the later stages of a project, why not create that habitat before losing the existing habitat?



MANAGING BIODIVERSITY NET GAINS

RESPONSIBILITIES

Responsibility to meet BNG falls under a number of key roles (including contractors t& third parties) during the project lifecycle and the on-going management of the habitat, for up to 30 years after the project is completed. It is important to measure, record and report if each habitat is meeting net gain outcomes set in the project plans. The ongoing management can be passed on to a third party (e.g Statutory Nature Conservation Organisations, local authority or charity group) with ongoing budgets and support.

COSTS

Consider the costs for managing BNG; ***budgets will need to be provided for a number of considerations such as:***

1. Purchasing land
2. Offsite offset
3. Third party management
4. Monitoring and reporting
5. Inflation

Don't be afraid to put BNG costs into funding bids. Funders are now looking at ensuring the environment is fully considered within the project.

MONITORING

Ongoing management and monitoring is the key to a successful BNG project. Authorities will ensure the net gains made during and after the project meet the specified outcomes stated in the early stages. If, during regular monitoring, one aspect is falling behind, the project lead can review and assess BNG plans.

PLANNING

The project team must be open to adapting BNG management in light of monitoring over the project lifecycle. Adaptive management is primarily focused on achieving the original outcomes of BNG under unexpected or unaccounted factors including, pollution, invasive species or discovered ecosystem services. In some circumstances the original BNG may not be possible and other areas will be required to be improved or further activities required to make up the shortfall, after internal or planning reviews.

EVIDENCING

BNG will need to refer to the original proposals against actual outcomes to determine actual net gain. Stakeholders and ecological professionals will investigate the original baseline pre-project and assess best practice across the construction phase, to ensure the mitigation hierarchy has been followed. The management post construction will also require a demonstration and reporting of conditions throughout.

It is good practice to ensure:

1. Measurable and achievable objectives
2. Net gain at different stages of the project is reviewed
3. A standard format for data collection is applied and provided locally and nationally, set by local planning authorities or ecological experts
4. Clear contingencies are in place to account for unforeseen circumstances
5. A formal review process for shortfalls for BNG

AN OPPORTUNITY: ACTING AS A THIRD PARTY IN BNG

As potential land owners/land managers involved with Waterway Restoration, developers working within your area may be looking for sites and projects which could support their own BNG projects. With BNG becoming mandatory, restoration groups could find their own aims and objectives are benefited by offering to host the mitigation measures of local developments. Ecological priorities should be agreed by the group's trustees/committee to respond to BNG requests.

Example BNG offsets that could be provided include: hedgerow enhancement, habitat creation (including canal channels), reed bed creation and converting hard engineered banks into vegetated riparian habitats.

Work with local stakeholders and approach developers to offer your site for BNG offset.

WHAT BNG COULD LOOK LIKE FOR CANAL RESTORATION

THE BIODIVERSITY METRIC 2.0

Restoration groups would not be expected to independently review the biodiversity value of the canal route. This would most likely be left to a qualified ecologist to ascertain the pre and post construction biodiversity levels; based on DEFRA's 'Biodiversity Metric 2.0' (currently under consultation), to inform project managers of the required units to achieve BNG. Habitats will be scored on the following proposed components, each with specific 'metrics' or indicators, to create an indicative score for biodiversity quality pre and post-construction.

Pre-construction baseline biodiversity score:

DISTINCTIVENESS	CONDITION	SIGNIFICANCE	CONNECTIVITY	AREA IN HECTARES
Whether the habitat is of high, medium or low value to wildlife	Whether the habitat is a good example of its type (e.g. cropland, grassland, heathland, lakes, woodland, urban, wetlands)	Score is based on landscape-scale factors defined nationally and locally	The score is based on 'habitat aggregation' calculation	Size of the area containing specified habitats

Post development biodiversity unit:

SPATIAL RISK	TEMPORAL RISK	DELIVERY RISK
Distance of offset from site	Time for habitats to reach target condition	Difficulty of habitat creation

Biodiversity Net Gain requirement:

POST DEVELOPMENT BIODIVERSITY UNITS	PRE-CONSTRUCTION BASELINE BIODIVERSITY UNITS

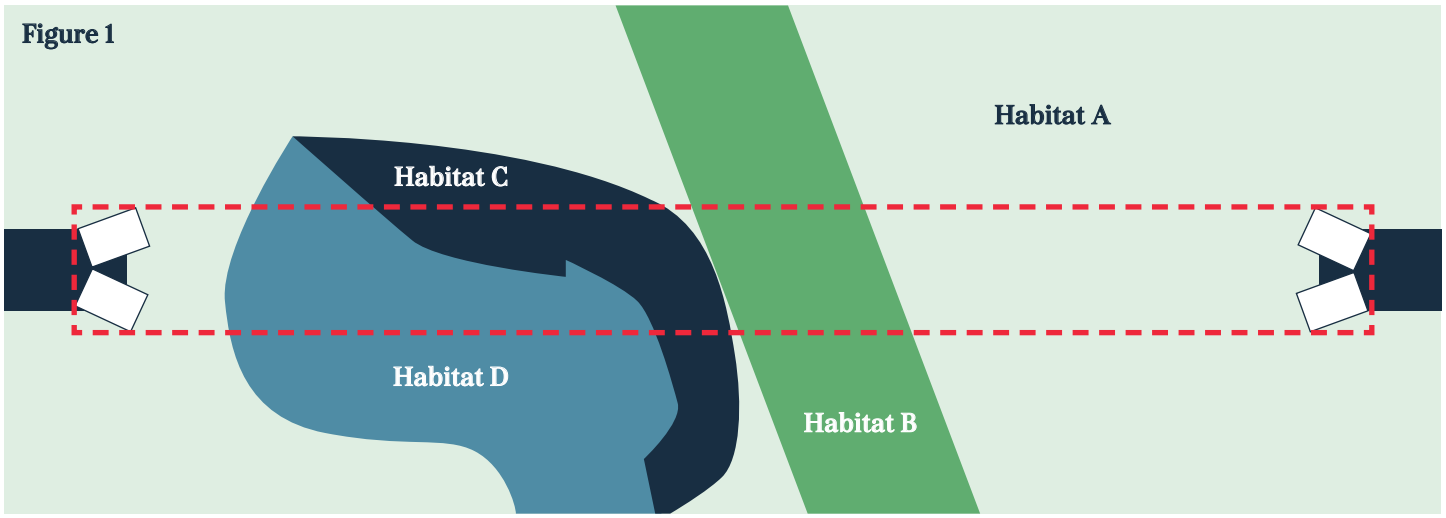
Let us see what this could look like applied to canal restoration.

PRE-CONSTRUCTION

At the pre-intervention stage, after the project has been scoped and assessed, we record the ecological baseline against the proposed route (see figure 1). Each habitat is given a biodiversity score based on area, function and species present.

In this example, the whole site is given a unit score of 67 broken down into the following:

Habitat A = 1 unit
Habitat B = 20 units
Habitat C = 6 units
Habitat D = 40 units

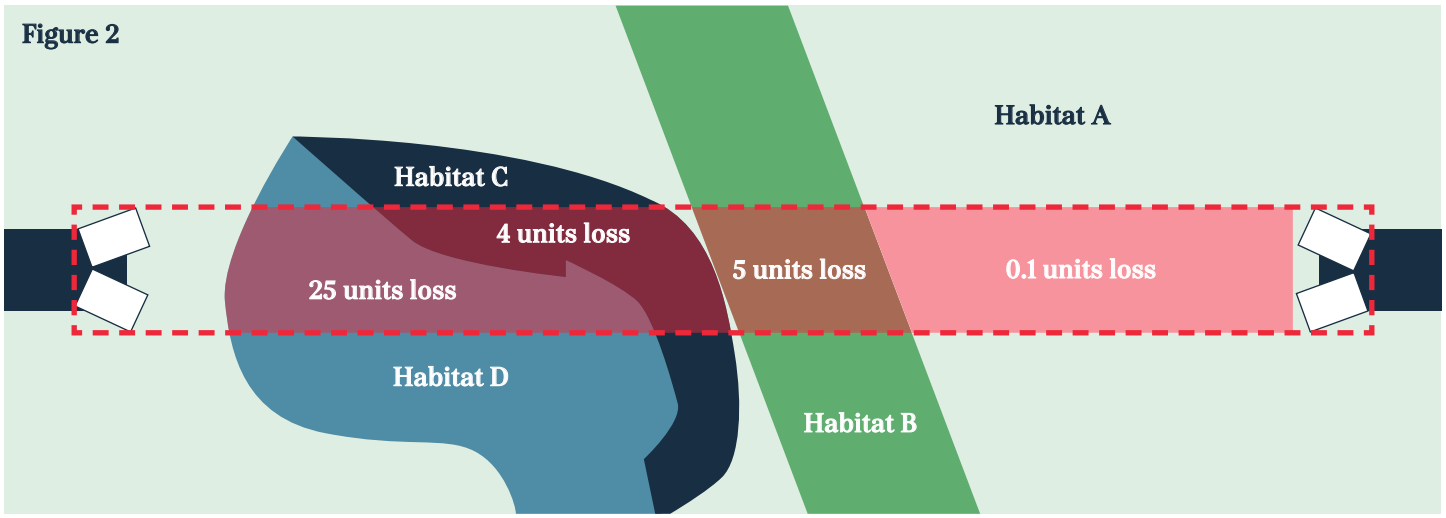


IMPACT ASSESSMENT

The impact assessment stage occurs when assessing the proposed work impacts against the ecological baseline. The loss of biodiversity units will inform mitigation measures and how to best negate the impacts from the works, such as an alternate route.

The proposed works shown in Figure 2 would result in the following biodiversity unit losses in each habitat:

Habitat A = 0.1 units loss
Habitat B = 5 units loss
Habitat C = 4 units loss
Habitat D = 25 units loss
Total Loss = 34.01 units

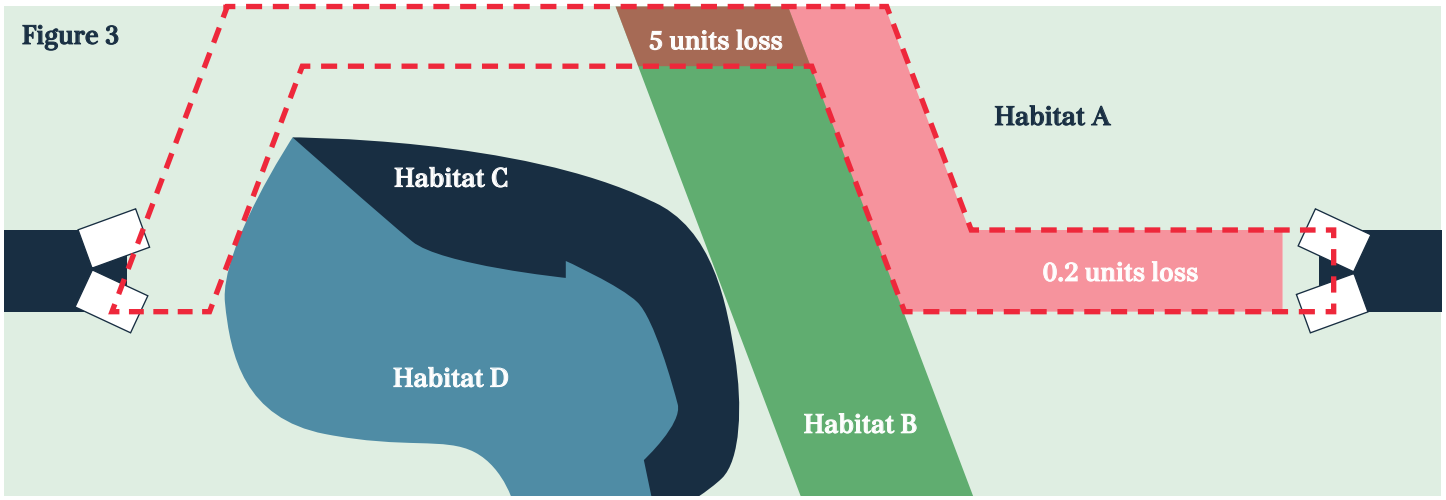


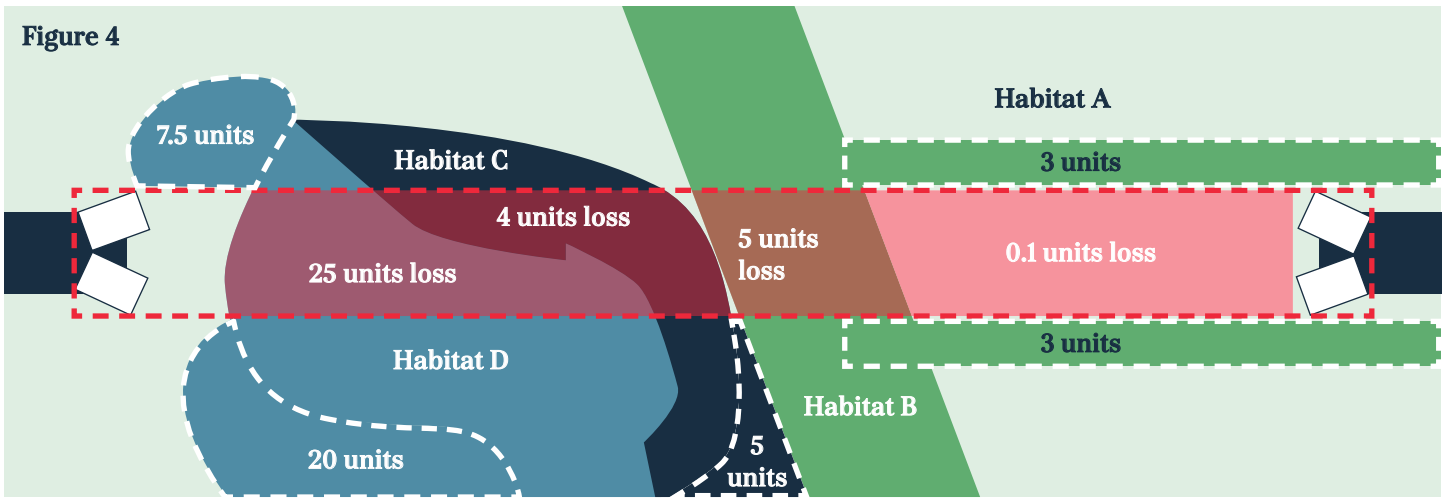
ACHIEVING BIODIVERSITY NET GAIN

The application of the mitigation hierarchy to the proposed route, as well as weighing up the cost benefits and risk options, shows there are various ways net gain could be achieved. Figure 3 demonstrates the application of avoidance measures to save a 29 unit loss. Avoidance options cannot always be achieved. Combining minimisation efforts and compensation can also achieve net gains as shown in Figure 4.

In Figure 4, compensation measures have been applied to expand the extent of certain habitats after works, leaving the following gains in each habitat:

Habitat A = 0.1 unit loss
Habitat B = 1 unit gain
Habitat C = 1 unit gain
Habitat D = 2.5 units gain
Total Gain = 4.4 = 15% net gain above losses





While 10% is the minimum, it is suggested to aim for higher gains to negate unexpected losses during any of the phases.

CONCLUSION

Biodiversity Net Gain will fundamentally change the way we approach waterway restoration in the future requiring trusts and societies to put biodiversity at the heart of all construction activities. Rather than a cost however, BNG should be seen as an opportunity to highlight the ecological niche that waterways offer. As it is incorporated into the planning system, IWA will keep on top of the changes and ensure restoration groups are kept up to date with the implications and opportunities.