

Natural capital and biodiversity net gain solutions to help address the current environmental crisis

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- Jacobs provides a full spectrum of services including scientific, technical, professional and construction- and programme-management across a range of sectors.
- We have a global 600 strong ecology and biology community.
- In Ireland we have a strong environment business which includes our ecology team based in Dublin



Introduction: the context

- The Inter-Governmental Panel on Biodiversity and Ecosystem Services (IPBES) published the global assessment report on biodiversity and ecosystem services in 2019. It highlighted the threat that our planetary systems are under.
- The State of Nature report stated that 41% of species have declined since 1970 in the UK. The findings of the report also noted that of 2,450 species of conservation concern in Ireland, 272 are threatened with extinction.



**"THE MORE WE EAT INTO
OUR NATURAL CAPITAL,
THE LESS RESILIENT WE WILL BE
TO THE SHOCKS WE KNOW
WE SHOULD EXPECT."**

President of Ireland, Michael D. Higgins
speaking at the National Biodiversity Conference 2019

- From The Irish Forum on Natural Capital (<https://www.naturalcapitalireland.com/>)

- Challenges facing biodiversity conservation are increasing, our work as ecologists and environmental managers can help address their challenges.
- New tools and policy approaches are becoming available to us to meet the challenges.
- This paper focuses on biodiversity net gain, ecosystem services assessment and natural capital tools and how these concepts help us in our work to halt biodiversity loss



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What is biodiversity net gain?

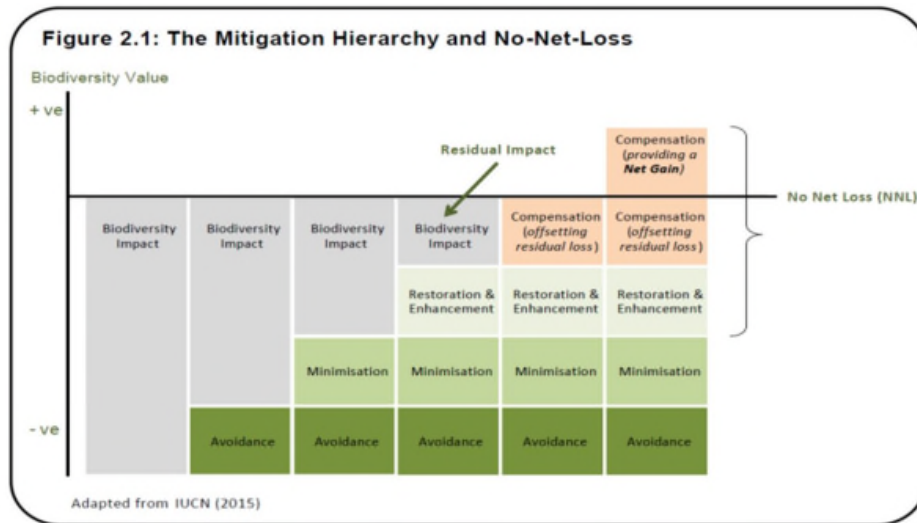
Biodiversity net gain (BNG) in development, occurs when the project leaves biodiversity in a better state than before.

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Mitigation and No-Net-Loss (NNL)



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1st Poll

Have you applied BNG or ecosystem service considerations on projects in:
a) Ireland? b) elsewhere?

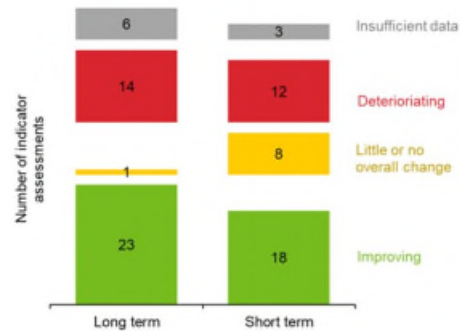
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Current context/drivers for mainstreaming BNG

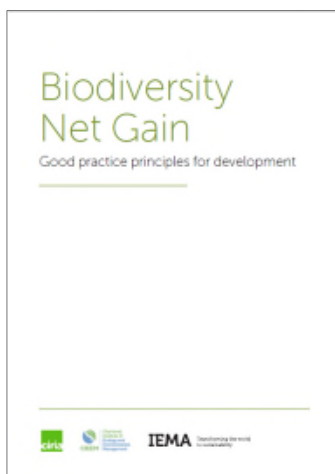
- Indicators show continued decline for numerous measures of biodiversity (IPBES 2019 & Biodiversity 2020: A strategy for England's wildlife and ecosystem services)
- Legally compliant development can result in decline of biodiversity.
- On-site mitigation and compensation success rates can be low.
- These advocate mainstreaming a BNG approach.

Figure 1: Number of long-term and short-term indicator assessments by direction of change all measures and strategy themes



Note: Based on 50 measures, which make up 24 indicators (6 measures are not assessed in the long term and 9 measures are not assessed in the short term).

Principles of applying BNG to projects



- Ten principles outlined
- **Applying a BNG approach to a project is more than just applying a metric.**
- Many of the principles involved are ones we already apply to our work (EclA /licencing).

Ten good practice principles

1. Apply mitigation hierarchy
2. Avoid losing biodiversity that cannot be offset
3. Be inclusive and equitable
4. Address risks
5. Make a measurable gain contribution
6. Achieve the best outcomes for biodiversity
7. Be additional
8. Create a net gain legacy
9. Optimise sustainability
10. Be transparent

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Aberdeen Western Peripheral Route (AWPR)

Biodiversity strategy



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Working in partnership

Biodiversity strategy development

After the mitigation hierarchy was applied there were still some residual impacts from the project. A Vision Statement was developed that had specific objectives to identify:

- potential additional measures which could further ameliorate direct impacts of the scheme; or
- the opportunities that existed to enhance the environmental value of the wider area to meet the scheme objectives.

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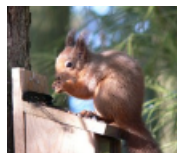
Project Selection

- A Workshop was held and more than 90 projects from various stakeholders were evaluated
- 35 projects selected as potentially suitable for achieving the offset mitigation objectives
- After further evaluation identified 8 projects as being the most suitable for providing the offset mitigation and biodiversity enhancement objectives.

Red Moss of Netherley
Wildlife Reserve Project



Aberdeen Red Squirrel Project



Water Vole Conservation Project



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The biodiversity enhancement projects

Name of Project	Mitigation Purpose				
	Water Vole	Red Squirrel	Habitat Loss	Water-courses	NMU Access
NE Scotland LBAP Community Based Water Vole Conservation	•		•	•	
Aberdeen Red Squirrel Conservation		•	•		
Craibstone Woodlands and Four Hills Walks					•
Forestry Commission for Scotland Grey Squirrel Control		•	•		
Red Moss of Netherley Nature Reserve			•	•	
River Dee Invasive Plant Control and Habitat Creation			•	•	
River Don Invasive Plant Control			•	•	
Non-Motorised User Access Development					•

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Contractual Obligations

Selected projects were contractually obliged as part of the funding agreement to:

- Deliver Biodiversity Objectives
- Provide Evidence of Delivery

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Lessons learned

- Buy in to the approach from the client and project team is essential to the success of a biodiversity offsetting strategy
- Statutory bodies and stakeholders need to be consulted and are part of the process in developing the biodiversity strategy
- Using independent and objective research to identify both key residual impacts and projects gives credibility to the strategy

The Jacobs logo is a white circle containing the word "Jacobs" in a bold, black, sans-serif font. It is positioned on the right side of the slide, overlapping a dark blue vertical bar.

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2nd Poll

Would your current understanding of BNG or ecosystem services enable you to apply them on projects?

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Natural capital & ecosystems services

Definitions

Natural Capital is the **stocks** of nature that produce value or benefits to people (directly and indirectly). It includes the living biotic aspects of nature, the abiotic non-living aspects (such as water, minerals and energy resources) as well as the natural processes and functions that underpin their operation (Natural Capital Committee, 2014).

Ecosystem services - the **flow** of services provided by the stock of nature which are of benefit to people, society and the economy. They are typically classified into Provisioning, Regulating and Cultural services.

Originally included Supporting services, but these are now seen as functions and processes associated with assets/stocks

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Ecosystem services provide a framework for identifying and valuing the flows of benefits/services provided by natural capital

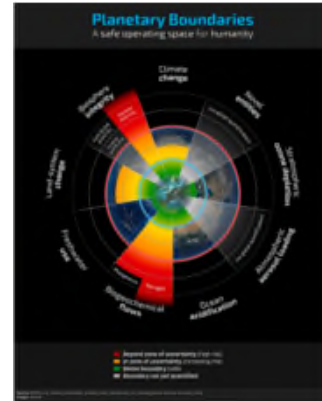


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WHY DOES NATURAL CAPITAL MATTER?

Stocks falling in 114 out of 160 countries

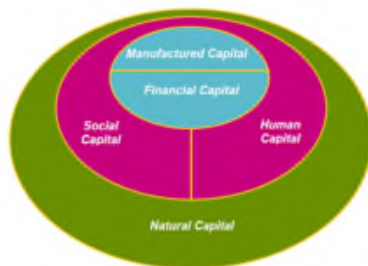
- Loss of land-based ecosystems £500 billion over last ten years
- Impact of Δ land use and decrease in biodiversity > climate change
- Biodiversity **and** Climate Change Crises



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Capital relationships

- Human Knowledge, skills, health
- Social Families, communities, governance
- Financial Money, stocks, bonds
- Manufactured Infrastructure, tools, roads
- Natural Lithosphere, atmosphere, biosphere, hydrosphere



Together constitute the wealth or assets of an individual, project, company or nation

All Capitals are reliant upon natural capital

Forum for Future 2009

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Ecosystem Asset



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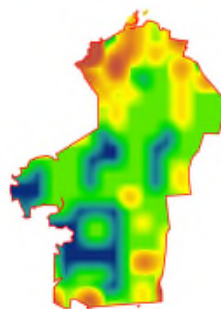
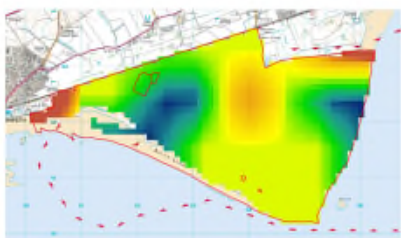
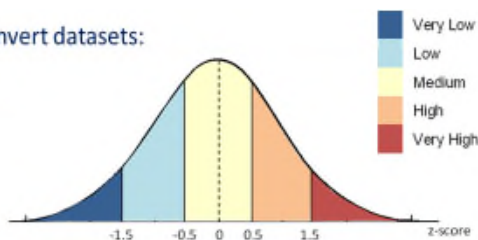
DTE Natural Capital Decision Support Tool Pilot GIS Based Natural Capital Land Use Decision Support tool

- Jacobs and Exeter University developed a pilot natural capital decision support tool to identify and evaluate the complex multiple attributes of natural capital, ecosystem services and land use constraints
- ESRI ArcGIS geodatabase format with graphical interface, outputs in Excel and ArcMap, created using VB.NET.
- Datasets; biodiversity importance, biomass carbon, topographic wetness index, soil carbon, solar radiation, wind speed and air quality, cultural value, value of solar radiation and wind energy and environmental designations.
- These enabled an interpretable model to be developed to help identify the best and least cost areas for MoD training.

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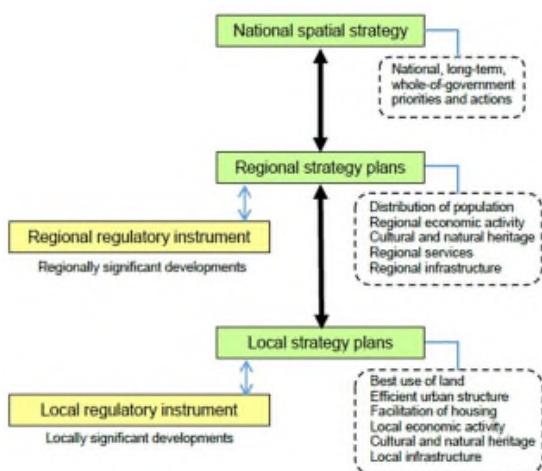
A 4-step process was used to convert datasets:

1. Conversion / combination
2. Scaling
3. Normalisation
4. Calculation of z-score



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Embedding Ecosystem Services in decisions: Regional Spatial Strategies –Oman



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Theoretical framework for structuring and implementing adaptive planning approaches.

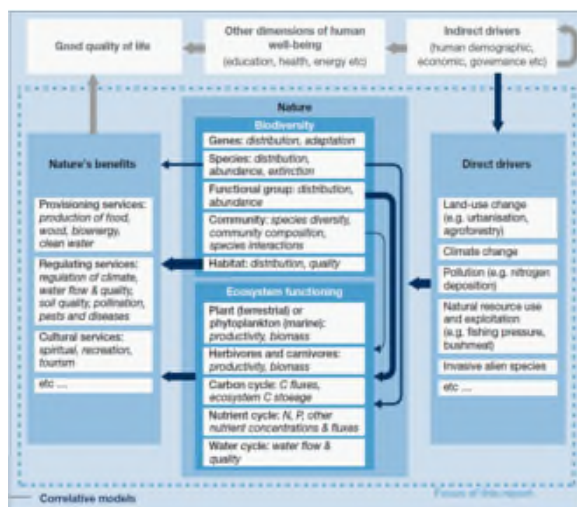
- IPBES methodological assessment report: Scenarios and models of biodiversity and ecosystem services 2017



- An understanding of the objectives and key approaches for the spatial required a defined framework of objectives, constraints and opportunities

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We included wildlife benefits and ecosystem services in conservative rather than exploitative system



- Opportunities and constraints for sustainable use of wildlife resources were identified
- This required data such as species and habitat distribution, traditional land-use, existing transportation links, agricultural areas, protected areas, tourism etc
- GIS analysis was used to develop specific regional zones with planning and development priorities based on the ecosystem services and natural capital of an area and enabled an integrated mountain to coral reef system protected zone.

3rd Poll

What do you see as the main blocker to applying BNG on projects?

- A) Lack of policy/legislative requirement?
- B) Client understanding
- C) your own understanding?
- D) All of the above?

Take home messages

- There are a number of drivers for implementing BNG, consider these at the start of your project(s).
- Remember BNG is more than just applying a metric, apply the good practice principals throughout the lifecycle of the project.
- BNG must be measurable, consider what metric you will use and what data you require to complete this task.
- Work with your multi discipline team to maximise biodiversity on your site.
- Consider need for off-site compensation and liaise with potential providers.
- Natural capital and ecosystem services provide a different starting point for a conversation with clients to value their assets.
- Natural Capital and ecosystem services can provide a unifying vocabulary for none specialists and provide different evidence to support biodiversity protection and enhancement.

Thank You
Any questions ?

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Reinventing tomorrow.



Useful references

- The Irish Forum on Natural Capital (<https://www.naturalcapitalireland.com/>)
- CIRIA, CIEEM and IEMA (2019). Biodiversity Net Gain: Good practice principles for development. A practical guide..
- CIRIA, CIEEM, IEMA (2016). Biodiversity Net Gain: Good practice principles for development.
- The Biodiversity Metric 2.0 (JP029)
 - <http://nepubprod.appspot.com/publication/5850908674228224?cache=1564421772.98>
- Highways England (2018) Chief Engineers Memorandum 422/18 Supporting Transparency around our Biodiversity Performance.

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