

Alive with Nature

An evidence-based analysis of the benefits of investing in the natural environment in Stirling

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VALUING NATURE
Annual Conference 2018



**Natural
Capital
Solutions**

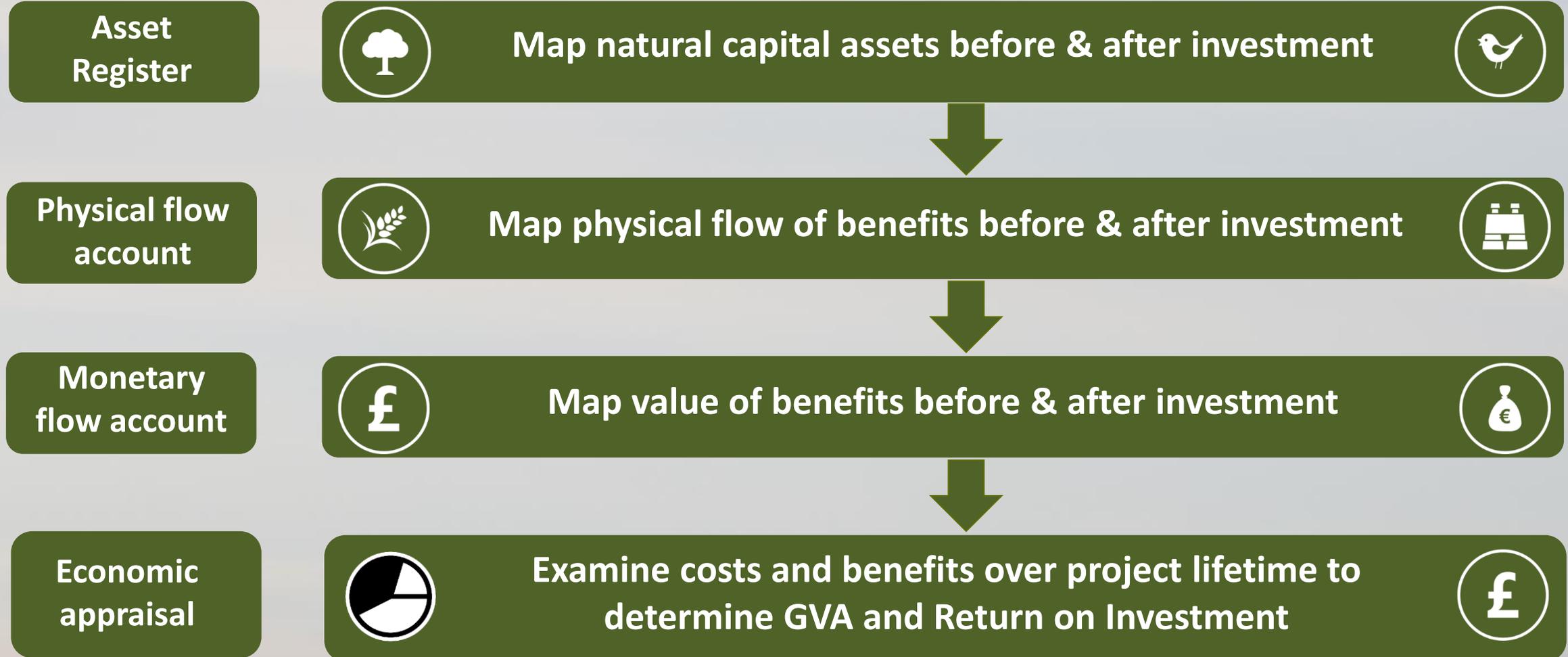
14th November 2018

Stirling City Deal case study

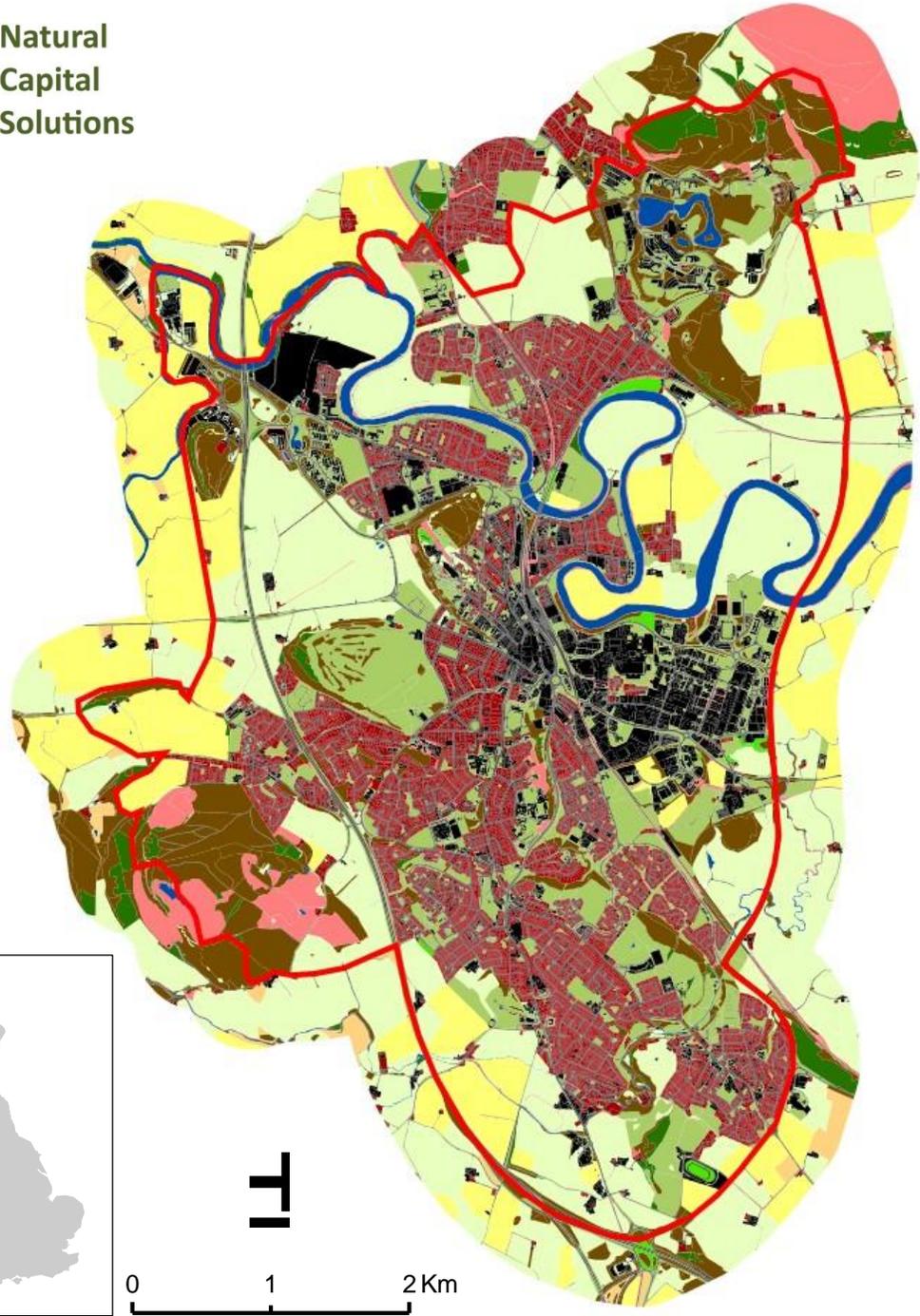
- The City of Stirling was seeking funding for a major investment in the natural and built environment as part of a City Deal.
- What will be the impact of the new investments on natural capital and the benefits that it provides?
- Will this derive a positive or negative Return on Investment?
- What lessons can be learnt to support better decision making and to put natural capital at the heart of the economy?



A spatial assessment framework



Natural capital assets - baseline

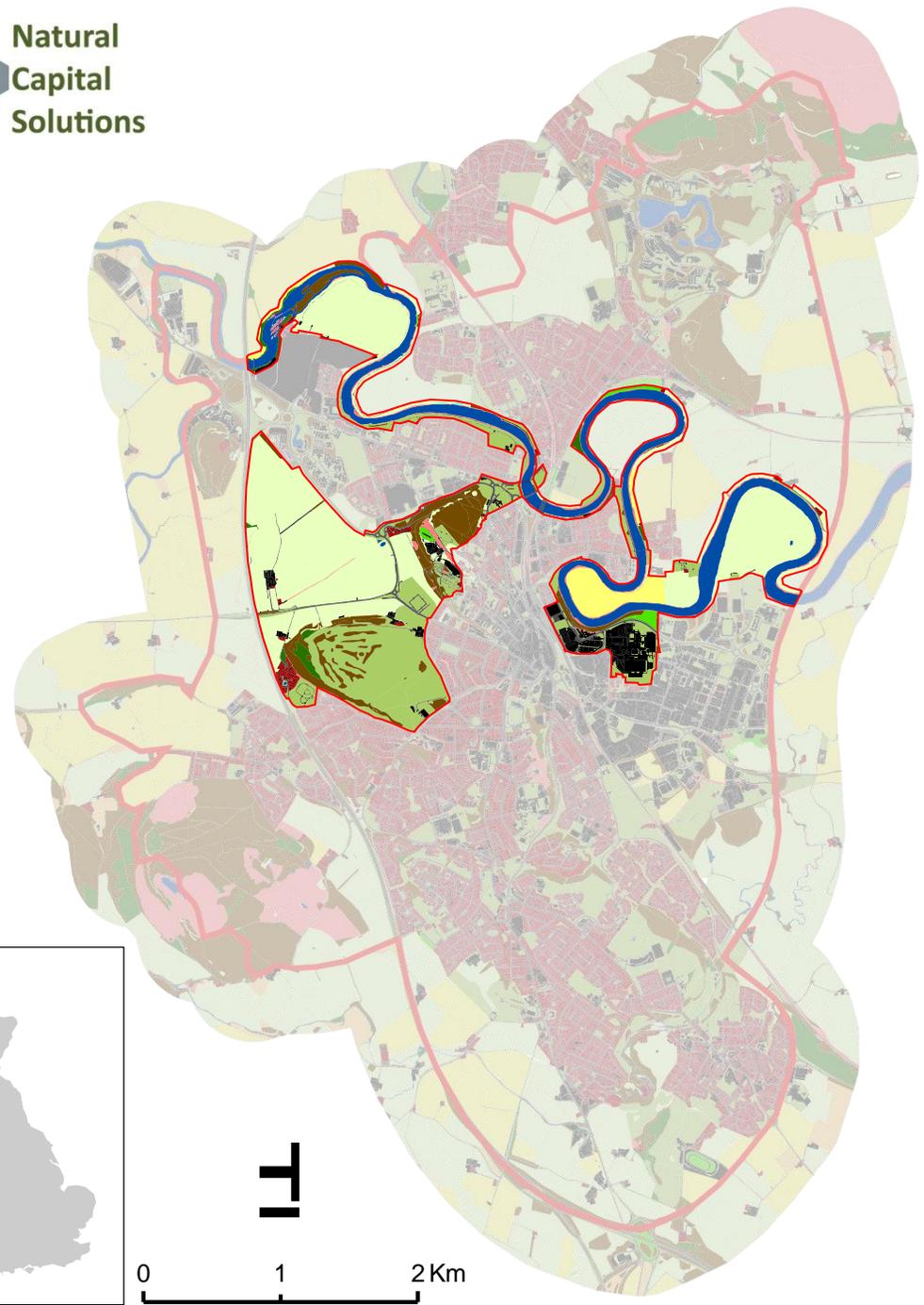


Legend

- Stirling City boundary
- Broad habitat**
- Cultivated land
- Uncertain agriculture
- Improved grassland
- Amenity grassland / road verges
- Semi-natural grassland
- Unknown grassland
- Woodland and scrub
- Water
- Built up areas
- Infrastructure
- Gardens
- Other habitats

Broad habitat	% cover
Cultivated land	7.1
Improved grassland	22.1
Amenity grassland / road verges	15.3
Semi-natural grassland	1.3
Unknown grassland	0.4
Scrub	1.1
Trees / Parkland	2.0
Broadleaved woodland	4.8
Coniferous woodland	2.7
Mixed woodland	1.3
Water	3.2
Built up areas	13.0
Infrastructure	10.0
Gardens	12.7
Other habitats	2.9

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The planned investments



City Park

- New park in unique landscape setting
- Would act as gateway to Stirling and location for major events
- Grassland, lakes, woodland, wetlands, city farm
- Extensive path network, visitor centre and new road infrastructure



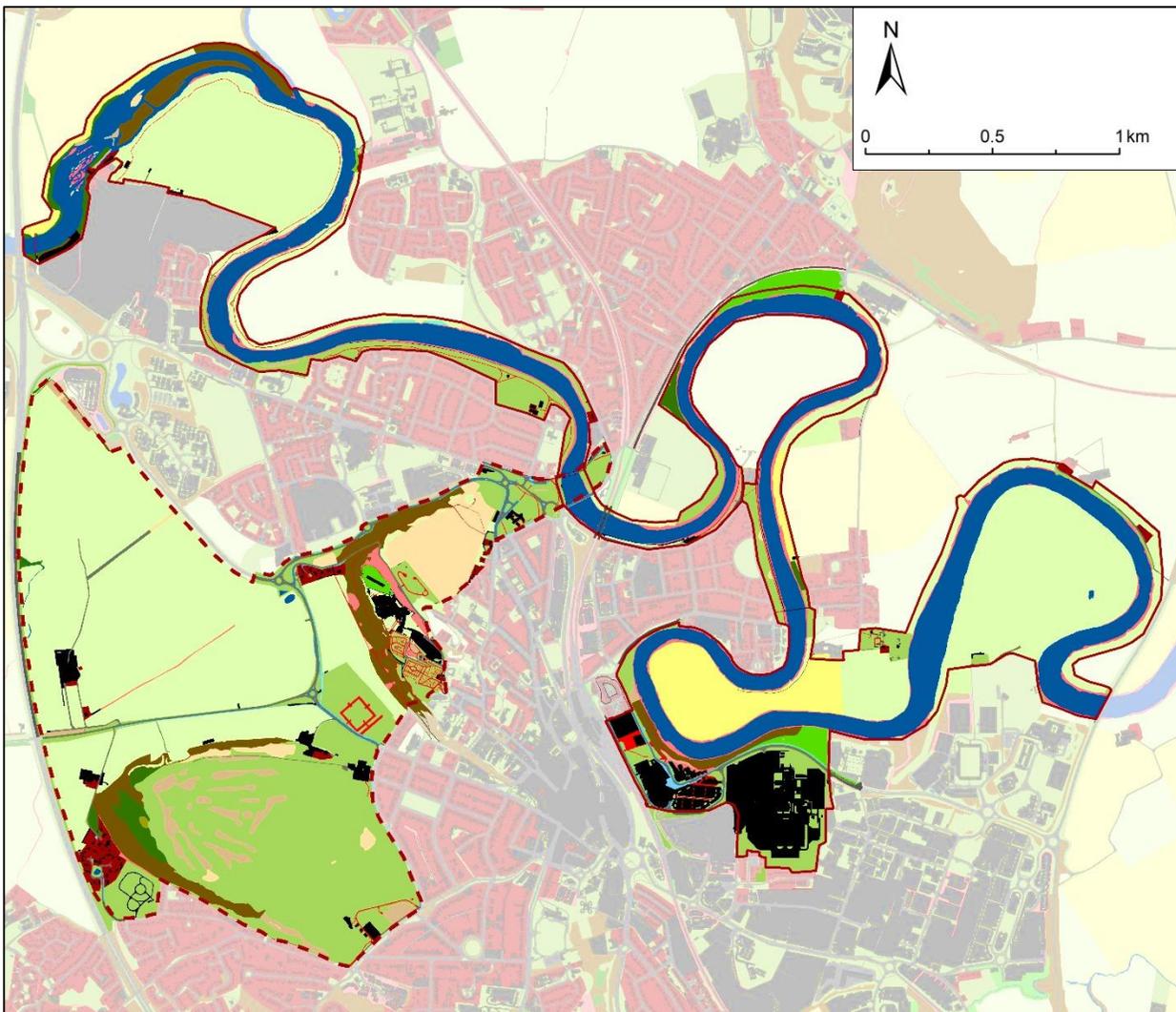
River project

- Reconnecting the city with its river and heritage
- Linking communities – new footpath and cycleway throughout length of river, plus new bridges
- Wildlife sanctuary within 5 mins walk of city centre
- Extensive plantings of wildflowers, trees, orchards

Natural capital assets: City Park and River projects

Baseline

Investment



Mapping ecosystem services and their values

Type of service	Benefits	Physical & monetary flows
Provisioning	Agricultural production	✓
	Timber/woodfuel production	✓
Regulating	Atmospheric carbon	✓
	Air quality regulation	✓
Cultural	Recreation	✓
	Physical health	✓
Other benefits	Property values	✓
	Tourism	✓

Type of service	Benefits	Indicative maps
Regulating	Noise regulation	✓
	Local climate (urban heat) regulation	✓
	Water flow regulation	✓
	Water quality	✓
Cultural	Accessible nature	✓

Atmospheric carbon

New plantings will sequester (take up) an additional:

- 14.1 tonnes of CO₂ along the river and 62.9 tCO₂ in the City Park

Changing land-use will reduce agricultural emissions by:

- 67.5 tCO₂ along the river and 106.6 tCO₂ in the City Park

Providing an annual benefit of **£5,230** (river) and **£10,840** (City Park).

Air quality regulation



New plantings will absorb an additional:

- 74 kg of PM₁₀ along the river and 139 kg in the City Park
- 0.83 kg of SO₂ along the river and 0.62 kg of SO₂ in the City Park,

With an annual value of **£5,700** (river) and **£10,700** (City Park)

Recreational visits

New accessible greenspace estimated to attract an additional:

- 580,00 recreational visits to the river area and 560,000 to the City Park
- providing additional annual welfare benefits worth **£2.40M** and **£2.31M** respectively

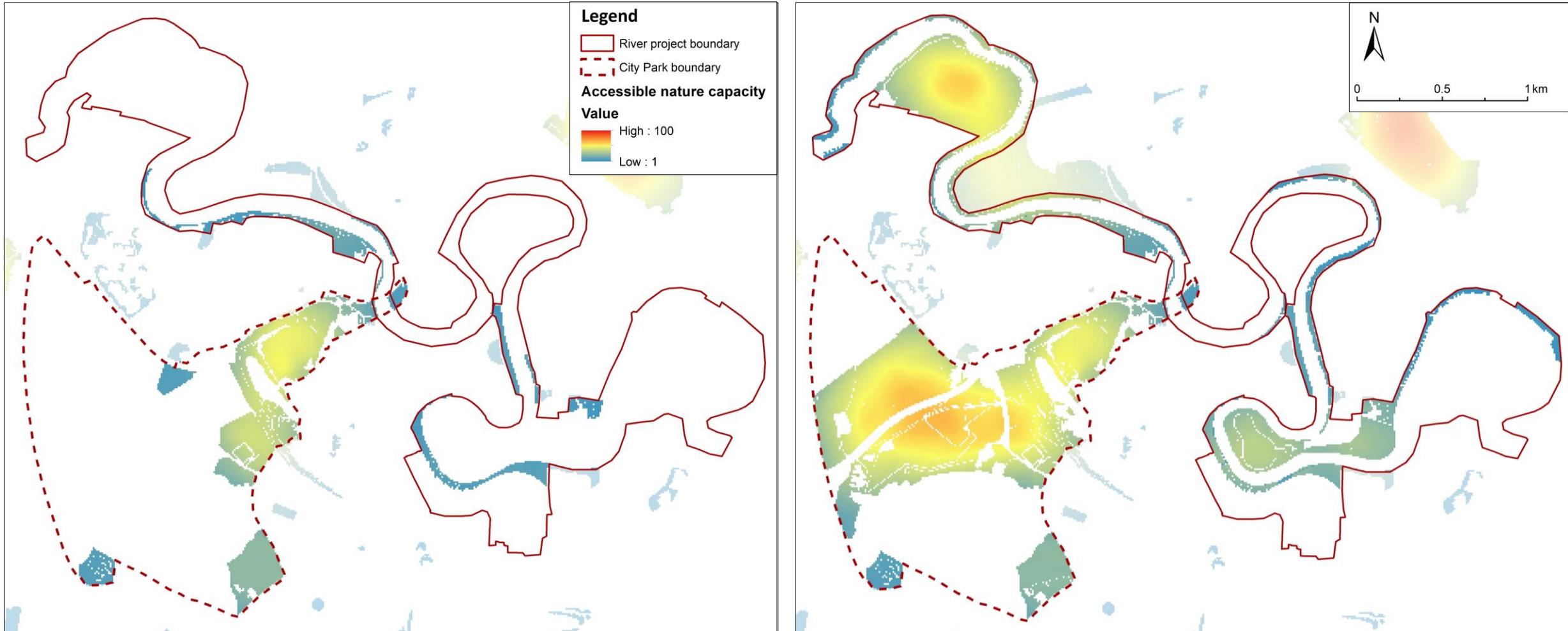
Health and wellbeing

- River project will provide a large increase in accessible greenspace close to peoples homes. City Park will provide large destination greenspace.
- Provides a setting for active visits that increase Quality Adjusted Life Years (QALYs).
- Minimum annual welfare gain or costs avoided through physical activity:
River: **£278,300** City Park: **£16,100**

Accessible nature capacity

Baseline

Investment



Models the perceived naturalness of the area and whether it is publicly accessible

Economic appraisal of investments

		City Park	River
		Present value at 3.5%, £M (2017 prices)	
Benefits	Ecosystem services	41.0	46.8
	Property enhancement	12.0	12.8
	Tourism	95.7	143.6
	GVA benefit gain from investment	32.9	38.6
	TOTAL	181.7	241.7
Costs	Capital	44.1	53.2
	Operational & maintenance	49.5	59.1
	TOTAL	93.3	112.3
Net Present Value	50 years at 3.5%	88.1	129.5
Internal Rate of Return		12.5%	13.7%
Sensitivity analysis	NPV range (low-high benefits)	43-173	46-210

Key points

- The benefits of investing in natural capital are considerable and should be taken into account in decision making
- Recreation and health and wellbeing provide the greatest benefits
- The value of ecosystem service benefits ensure a positive Return on Investment for the proposals in Stirling
- Mapping the spatial location and distribution of benefits (especially in relation to demand) provides valuable additional information.
- Building a green urban network that optimises biodiversity and ecosystem services provision will provide considerable benefits for health and prosperity



ALIVE WITH NATURE:

A Natural Capital Development Plan
for Stirling



Further information

- Full technical report containing all maps, methods and results available from (go to case studies page): www.naturalcapitalsolutions.co.uk
- Summary document also available
- Please get in touch for further info: jim.rouquette@naturalcapitalsolutions.co.uk

