





Coláiste na Tríonóide, Baile Átha Cliath Trinity College Dublin Ollscoil Átha Cliath | The University of Dublin

Irish Natural Capital Accounting for Sustainable Environments

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<u>Jane Stout</u>, Catherine Farrell (TCD) Mary Kelly-Quinn, Lisa Coleman (UCD) Stephen Kinsella (UL), Cathal O'Donoghue (NUIG) Orlaith Delargy, Fiona Smith (IFNC) Carl Obst, Mark Eigenraam (IDEEA)

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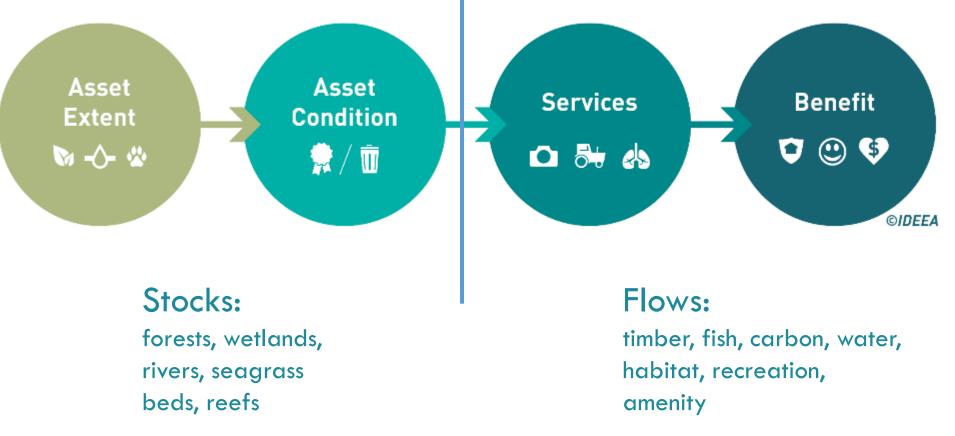
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Ecosystems, geosystems, Ecosystem **Benefits to people** atmospheric systems services FLOWS STOCKS

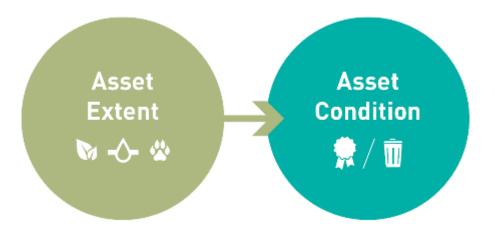
CORE ECOSYSTEM ACCOUNTING MODEL





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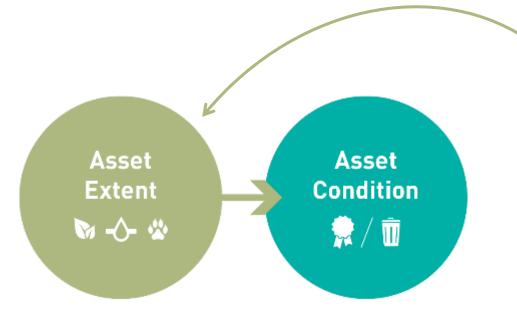
CORE ECOSYSTEM ACCOUNTING MODEL



Stocks: forests, wetlands, rivers, seagrass beds, reefs



CORE ECOSYSTEM ACCOUNTING MODEL

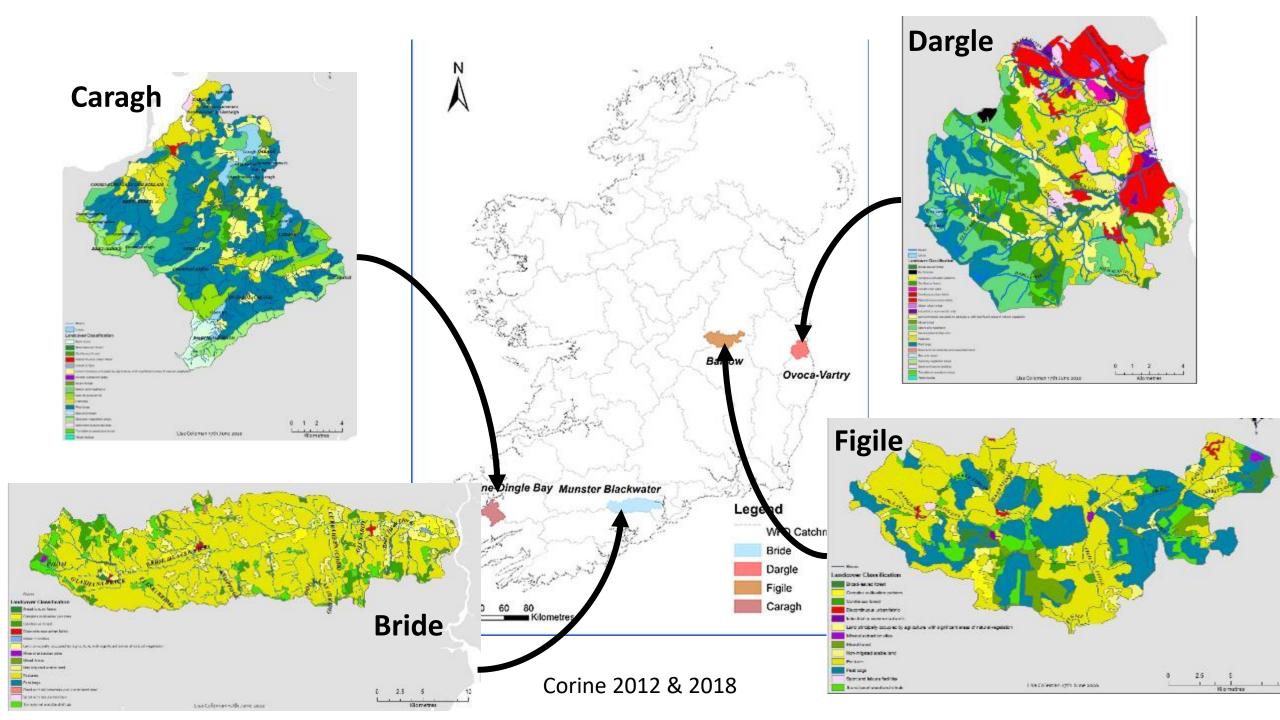


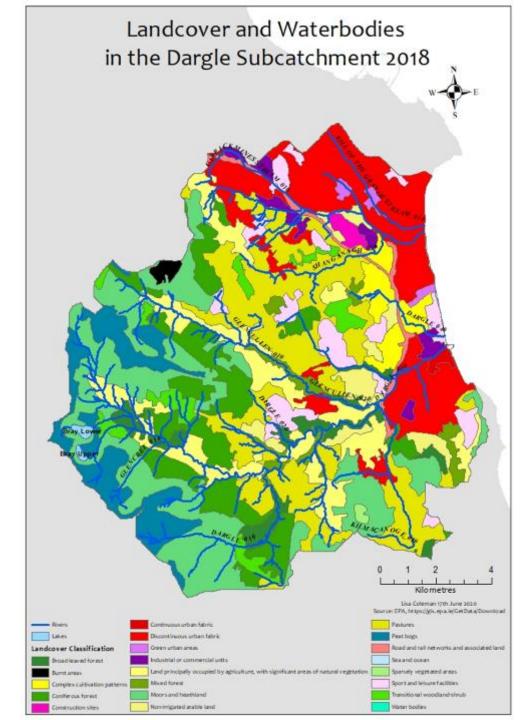
Extent: spatial amount and arrangement of ecosystems

Stocks: forests, wetlands, rivers, seagrass beds, reefs



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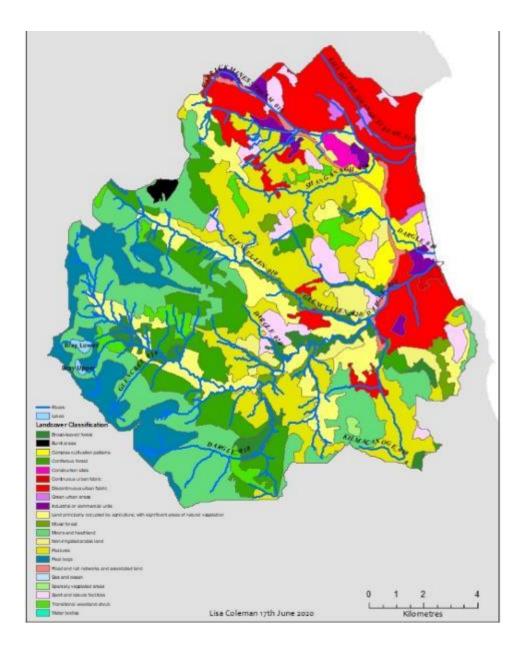


General	Cover	CORINE land cover
ecosystem	%	description CLC Level 3
type		
Freshwater	<1%	Water bodies
Woodland and	18	Coniferous, Broad-
Forest		leaved; Mixed Forest and
		Scrub
Peatlands and	25	Moors and Heathland;
Heathlands		Peat Bogs
Urban / Built	24	Urban fabric;
		Infrastructure;
Grassland and	33	Pastures; Agricultural;
Cropland		Arable
Coastal	<1%	Coastal wetlands and
		lagoons

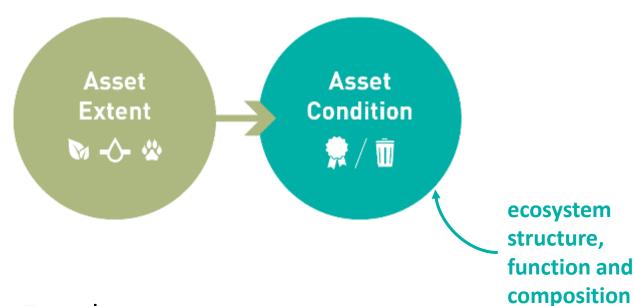


CORINE 12/18 Classifications >>	Continuous urban fabric	Discontinuous urban fabric	Industrial or commercial units	Road and rail networks and associated land	Mineral extraction sites	Construction sites Green urban areas	Sport and leisure facilities	Non-irrigated arable land	Complex cultivation patterns	Pastures	Land principally occupied by agriculture, w sig areas of natural vegetation	est	Mixed forest	Broad-leaved forest	Transitional woodland- shrub	Burnt areas	Moors and heathland	Peat bogs	Sparsely vegetated areas	Water bodies	Sea and ocean	TOTALS
Opening Stock	46	2,635	257	194	27	32 94	816	444	529	3,132	1,732	1,783	371	583	625		3,124	1,202	27	25	9	17,684
Additions to stock																						-
Managed expansion																						-
Natural Expansion																						-
Upward reappraisals																						-
Other additions		6	18			59	20	59	19	11		128			32	64	95					535
Total additions to stock		6	18			59	20	59	19	11	24	128			32	64	95					535
Reductions in stock																						-
Managed regression Natural Regression																						-
Downward reappraisals																						_
Other reductions					27		18	26	59	85		84			171		64					535
Total reductions in stock					(27)		(18)	(26)	(59)	(85)		(84)			(171)		(64)					(535)
Net change in stock		6	18		(27)	59	2	33	(41)	(75)	24	44			(139)	64	32					-
Closing stock	46	2,642	275	194		91 94	818	477	488	3,058	1,756	1,827	371	583	485	64	3,155	1,202	27	25	٥	17,684
	40	2,042	275	194		91 94	010	4//	400	3,038	1,750	1,027	571		405	04	5,155	1,202		25		17,004
Percentage Changes																						-
Additions to stock (%)	0.0%	0.2%	7.1%	0.0%	0.0%	186.6% 0.0%	2.5%	13.2%	3.5%	0.3%	1.4%	7.2%	0.0%	0.0%	5.0%	0.0%	3.0%	0.0%	0.0%	0.0%	0.0%	2
									-													
Reductions in stock (%)	0.0%	0.0%	0.0%	0.0%	-100.0%	0.0% 0.0%	-2.2%	-5.9%	11.2%	-2.7%	0.0%	-4.7%	0.0%	0.0%	-27.3%	0.0%	-2.0%	0.0%	0.0%	0.0%	0.0%	(2)
Not shares in stack (0)	0.00/	0.20/	7 10/	0.00/	100.00/	190 00/ 0 00/	0.20/	7 40/	7 70/	2 40/	1 40/	2 50/	0.00/	0.00/	22.20/	0.00/	1 00/	0.00/	0.00/	0.00/	0.00/	(1)
Net change in stock (%)	0.0%	-0.2%	-7.1%	0.0%	100.0%	-100.0%0.0%	-0.2%	-7.4%	1.1%	2.4%	-1.4%	-2.5%	0.0%	0.0%	22.3%	0.0%	-1.0%	0.0%	0.0%	0.0%	0.0%	(1)
Total landcover category							4,158				5,778				3,266				4,448	25	9	17,684
Change between 2012 and							,								.,							,
2018							59				(59)				(95)				95	-	-	-

Opening Stock 46 2,635 2,637 194 27 32 94 816 444 529 3,132 1,733 1,733 1,733	CORINE 12/18 Classifications >>	Continuous urban fabric	Discontinuous urban fabric	Industrial or commercial units	Road and rail networks and associated land	Mineral extraction sites	Construction sites Green urban areas	Sport and leisure facilities	Non-irrigated arable land	Complex cultivation patterns	Pastures	Land principally occupied by agriculture, w sig areas of natural vegetation	ns	Mixed forest	Broad-leaved forest	Transitional woodland- shrub	Burnt areas	Moors and heathland	Peat bogs	Sparsely vegetated areas	Water bodies	Sea and ocean	TOTALS
Managed expansion Natural expansion Upward repaprisable Total additions to stock 6 18 59 59 59 19 11 24 128 32 64 95 55 535 Total additions to stock 6 18 59 20 59 19 11 24 128 32 64 95 55 535 Total additions to stock 6 18 59 20 59 19 11 24 128 32 64 95 535 535 Reductions in stock 50 18 2 59 18 50 84 128 54 95 535 535 Downward reapprisable 2 2 3 26 9 85 84 139 64 325 45 64 355 535 Total reductions in stock 146 2,642 275 194 91 94 81 305 1,857 31 583 485 64 3,155 1,202 2 2 535 Total reductions in stock	Opening Stock	46	2,635	257	194	27	32 94	816	444	529	3,132	1,732	1,783	371	583	625		3,124	1,202	27	25	9	17,684
Natural Expansion Natural Expansion 18 59 20 59 19 11 24 128 53 54 95 53 535 535 Total additions to stock 6 18 59 20 59 19 11 24 128 54 95 535 535 Reductions in stock 6 18 59 20 59 19 11 24 128 54 95 535 535 Reductions in stock 6 18 59 20 59 19 11 24 128 54 95 535 535 Other reductions in stock 50 55 58 59 59 59 59 54 54 164 95 55 535	• •																						-
Upward reapprising Other additions Total additions to stock Managed regression Managed regressin Managed regression Managed regresi	Managed expansion																						-
Other additions 6 18 59 20 59 19 11 24 128 322 64 95 54 535 535 Reductions in stock 6 18 59 20 59 19 11 24 128	Natural Expansion																						-
Total additions to stock 6 18 59 19 11 24 128 532 64 95 54 55 56																							-
Reductions in stock Managed regression Natural																							
Managed regression Natural Regression Downward reapprisads $$			6	18			59	20	59	19	11	24	128			32	64	95					535
Natural Regression Natural																							-
$ \begin{bmatrix} Downward reapyraisals & U & U & U & U & U & U & U & U & U & $																							-
Other reductions 0.000 <td>-</td> <td></td> <td>-</td>	-																						-
Total reductions in stock						27		10	26	50	05		0.4			474		64					-
Net change in stock 6 18 (27) 59 2 33 (41) (75) 24 44 (139) 64 32 55 9 17,684 Closing stock 46 2,642 275 194 91 94 818 477 488 3,058 1,756 1,827 371 583 485 64 3,155 1,202 27 25 9 17,684 Percentage Changes Fercentage Changes Fercentage Changes Fercentage Changes Additions to stock (%) 0.0% 0.0% 0.0% 186.6% 0.0% 2.5% 13.2% 3.5% 0.3% 1.4% 7.2% 0.0% <t< td=""><td>Other reductions</td><td></td><td></td><td></td><td></td><td>27</td><td></td><td>18</td><td>26</td><td>59</td><td>85</td><td></td><td>84</td><td></td><td></td><td>171</td><td></td><td>64</td><td></td><td></td><td></td><td></td><td>535</td></t<>	Other reductions					27		18	26	59	85		84			171		64					535
Net change in stock 6 18 (27) 59 2 33 (41) (75) 24 44 (139) 64 32 55 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 7 5 2 44 (139) 64 32 5 6 6 3 5 5 5 6 5 5 5 5 <	Total reductions in stock					(27)		(18)	(26)	(59)	(85)		(84)			(171)		(64)					(535)
Closing stock 46 2,642 275 194 91 94 818 477 488 3,058 1,756 1,827 371 583 485 64 3,155 1,202 27 25 9 17,684 Percentage Changes						(=,)		(==)	(==,	(00)	(00)		(0.7			(-/-/		(0.)					(000)
Percentage Changes	Net change in stock		6	18		(27)	59	2	33	(41)	(75)	24	44			(139)	64	32					-
Percentage Changes									L	-													
Additions to stock (%) 0.0% 0.2% 7.1% 0.0% 0.0% 186.6% 0.2% 1.2% 3.5% 0.3% 1.4% 7.2% 0.0% 5.0% 0.0% 3.0% 0.0%	Closing stock	46	2,642	275	194		91 94	818	477	488	3,058	1,756	1,827	371	583	485	64	3,155	1,202	27	25	9	17,684
Additions to stock (%) 0.0% 0.2% 7.1% 0.0% 0.0% 186.6% 0.2% 1.2% 0.3% 1.4% 7.2% 0.0%																							-
Reductions in stock (%) 0.0%	Percentage Changes																						-
Reductions in stock (%) 0.0%	Additions to stock (%)	0.0%	0.2%	7.1%	0.0%	0.0%	186 6% 0.0%	6 2.5%	13.2%	3.5%	0.3%	1.4%	7.2%	0.0%	0.0%	5.0%	0.0%	3.0%	0.0%	0.0%	0.0%	0.0%	2
Net change in stock (%) 0.0% -0.2% -7.1% 0.0% 100.0% -1.2% 7.7% 2.4% -1.4% -2.5% 0.0% 0.0% 2.3% 0.0% -1.0% 0.0% <td></td> <td>0.070</td> <td>0.270</td> <td>,,</td> <td>0.070</td> <td>0.070</td> <td>20010/0 010/</td> <td>2.370</td> <td>10.270</td> <td>-</td> <td>0.070</td> <td>1.170</td> <td>,,.</td> <td>0.070</td> <td>0.070</td> <td>5.670</td> <td>0.070</td> <td>0.070</td> <td>0.070</td> <td>0.070</td> <td>0.070</td> <td>0.070</td> <td>-</td>		0.070	0.270	,,	0.070	0.070	20010/0 010/	2.370	10.270	-	0.070	1.170	,,.	0.070	0.070	5.670	0.070	0.070	0.070	0.070	0.070	0.070	-
Net change in stock (%) 0.0% -0.2% -7.1% 0.0% 100.0% -186.6% 0.0% -0.2% -7.4% 7.7% 2.4% -1.4% -2.5% 0.0%	Reductions in stock (%)	0.0%	0.0%	0.0%	0.0%	-100.0%	0.0% 0.0%	6 -2.2%	-5.9%	11.2%	-2.7%	0.0%	-4.7%	0.0%	0.0%	-27.3%	0.0%	-2.0%	0.0%	0.0%	0.0%	0.0%	(2)
Total landcover category 4,158 5,778 3,266 4,448 25 9 17,684 Change between 2012 and Cha																							
Change between 2012 and	Net change in stock (%)	0.0%	-0.2%	-7.1%	0.0%	100.0%	-186.6%0.0%	6 -0.2%	-7.4%	7.7%	2.4%	-1.4%	-2.5%	0.0%	0.0%	22.3%	0.0%	-1.0%	0.0%	0.0%	0.0%	0.0%	(1)
Change between 2012 and	Total landsover esterant							A 150				E 770				2 260				A A A O	25	0	17 601
•	. .							4,158				5,778				3,200				4,448	25	9	17,084
	-							50				(50)				(OE)				٥F		_	_

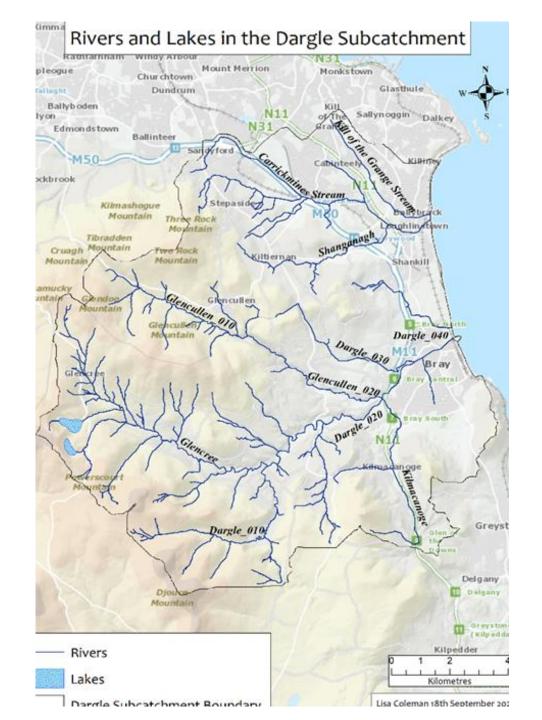


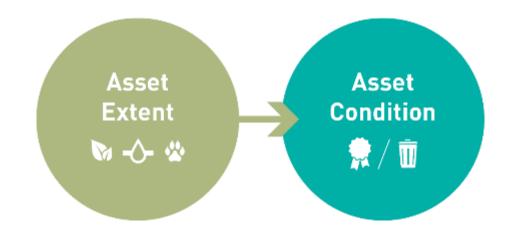
Lesson learned: Better, higher
resolution spatial data
required



Freshwater ecosystems:

- Surface water bodies: Ecological status available from WFD assessment (poor, moderate, good, high) & other sources (e.g. Wetland Map of Ireland http://www.wetlandsurveysireland.com/)
- Other freshwater wetlands: limited data on either extent or condition

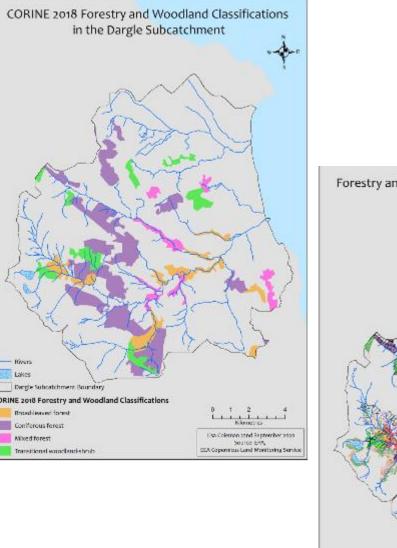


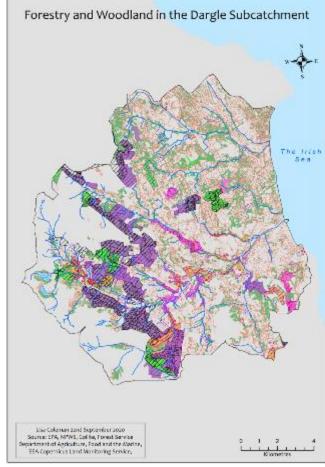


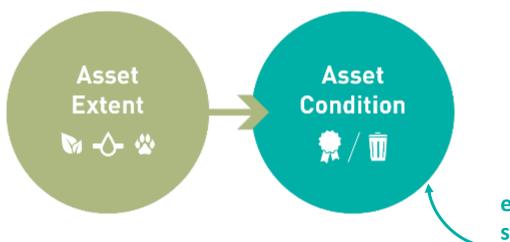
Woodlands:

- CORINE
- Native woodlands survey (2003-2008)
- Ancient and Long-established woods
- Article 17 woodlands habitats
- EPA Copernicus Small Woody Features
- EEA Urban Atlas Street Trees
- Coillte and private forestry plots

Lesson learned: Limited data on condition



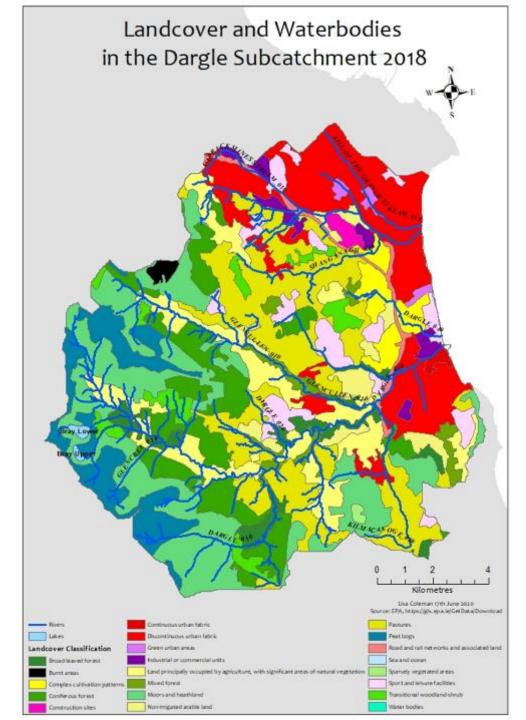


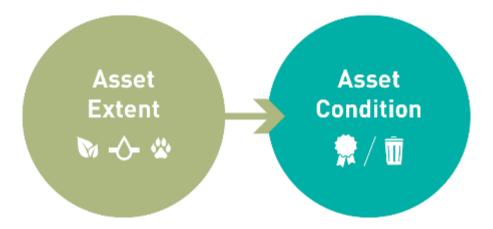


ecosystem structure, function and composition

Other ecosystem types:

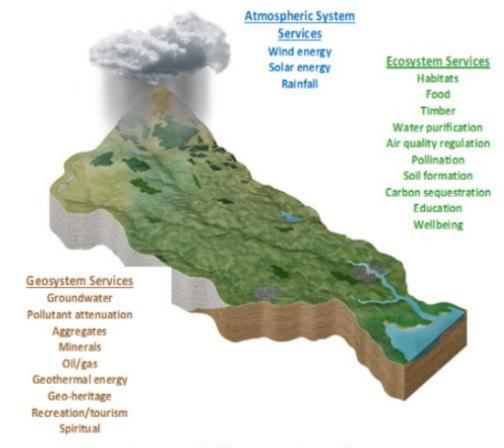
- Peatland/Heathland
- Urban/Built
- Coastal
- Grasslands
- Croplands





What else is needed?

- OSI/EPA Landcover map (due 2021)
- Freshwater habitats: extent and condition
- Woodland / Forestry: condition
- Peatlands / Heathlands: peat depth / drainage
- Urban: blue and green areas
- Coastal: need Article 17 data
- Farmland: limited data on grassland condition; link with LPIS



Services Provided by Nature in Catchments



Lessons learned (so far...)

- Lots of data, but not centrally held/organised – lots of work to extract and collate data
- Data gathered for specific purpose – often not linked to other uses / applications
- Land use review could underpin National Ecosystem Assessment – a baseline for NCA

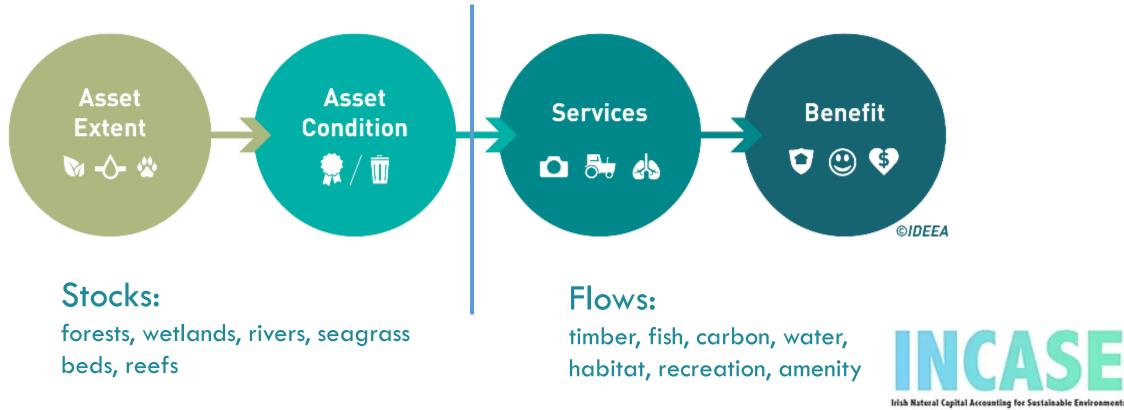


NCA can't just be done by statisticians / accountants – need to understand these systems – need range of expertise, including ecologists!



Next steps

- Asset and Risk (related to benefits) registers
- Risk makes links with policies and condition (nested systems = connected)
- Link with economists from stocks to flows







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