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Opportunities for restoring riparian vegetation at different scales based on responses to changes and existing management in Scotland

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COST CONVERGES

MONITORING AND ASSESSMENT OF RIPARIAN VEGETATION IN EUROPEAN COUNTRIES

WG 1 Workshop - Madrid, Spain, 29-30 January 2020

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- 1 Role of SEPA and riparian vegetation
- 2 Changes and opportunities/obstacles for rip restoration
- 3 Examples of opportunities for rip restoration

SEPA: What do we do?

75,000 km2

3 main areas: Central belt, highland and agri land

Manage 2,300 river water bodies

26,000km

Private land

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Background

- Public body working for the Scottish Government:
  - Regulate, develop policy, restore and preserve.
  - We try to link science with regulation and policy. **Evidences**.
  - We have to translate the knowledge into something people can understand and is **feasible**.

- Rivers: morphology is a key element for classification. Scotland decided that rip vegetation was a relevant element for the morphological classification (which is part of the ecological classification under WFD).

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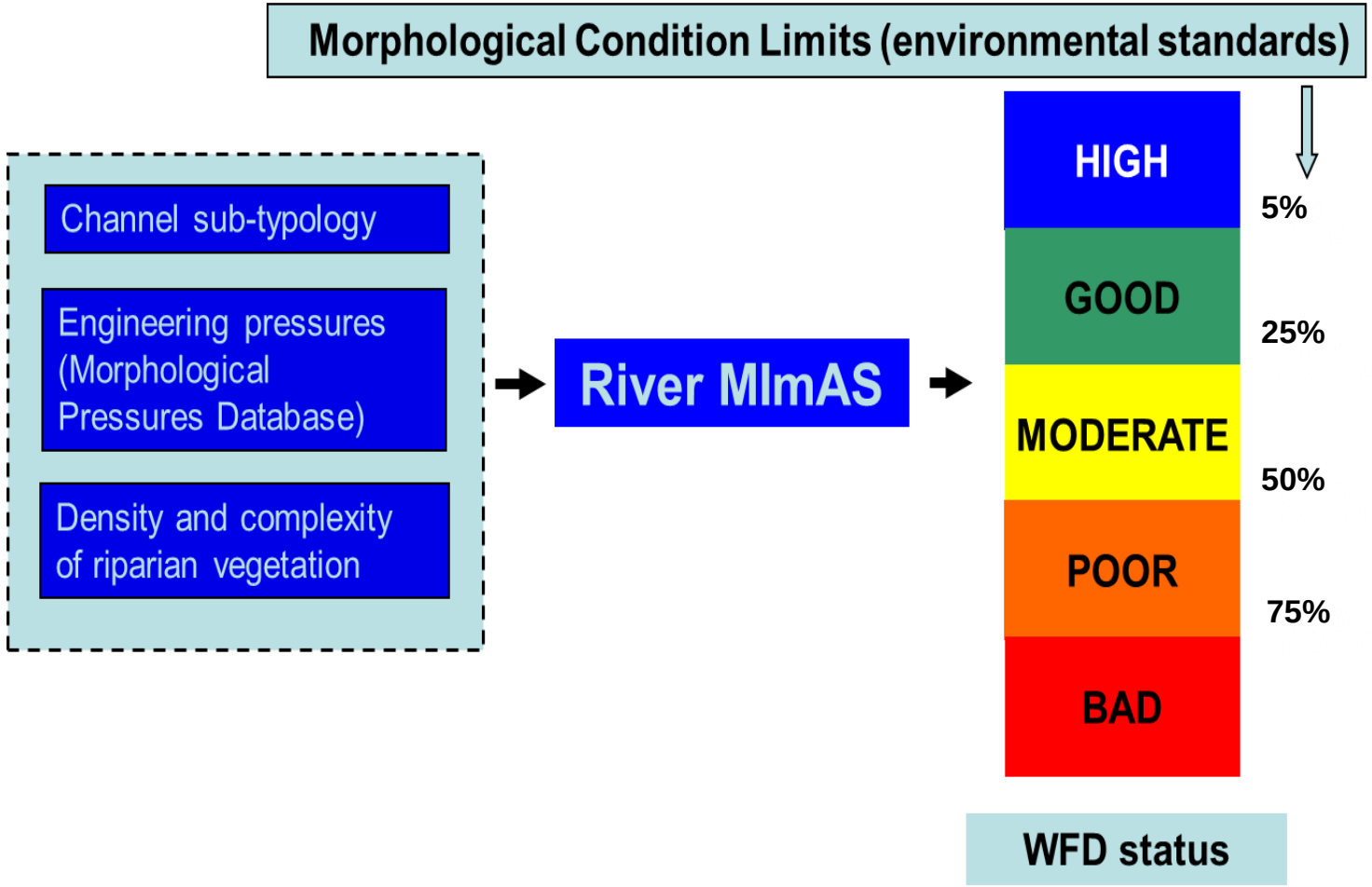
MImAS – How does it work?



Vegetation: structure

1. Bryophytes, mosses and lichens.
2. Short or creeping herbs or grasses (below knee high).
3. Tall herbs or grasses, e.g. bracken (knee high or above).
4. Scrub and shrubs (plants with woody stems but shorter than trees).
5. Saplings and trees.

	**Complex (C):** vegetation with 4 or 5 different height categories. Scrub or trees must also be present.
	**Simple (S):** vegetation of 2 or 3 different height categories.
	**Uniform (U):**dominated by vegetation that is all about the same height. This could mean a stand of a single species, OR a stand comprising several species of the same height. **Coniferous plantation** should also be recorded as **uniform**.
	**Bare (B):** predominantly bare earth or unvegetated bank material (e.g. brick, concrete, tarmac). This should also be recorded where bridge abutments are on the bank top/face.

Figure 7.1 Definitions of vegetation structure categories.

Vegetation: density

	**Continuous (C):**>50% natural tree cover or **coniferous plantation**.
	**Scattered (Sc):** 5-50% natural tree cover.
	**None (N):**< 5% natural tree cover (e.g. one or two isolated trees) or no tree cover.

Figure 7.2 Definitions of tree density categories.

Figure 7.10 Simple vegetation with no tree cover.

Figure 7.9 Simple vegetation with continuous tree cover.

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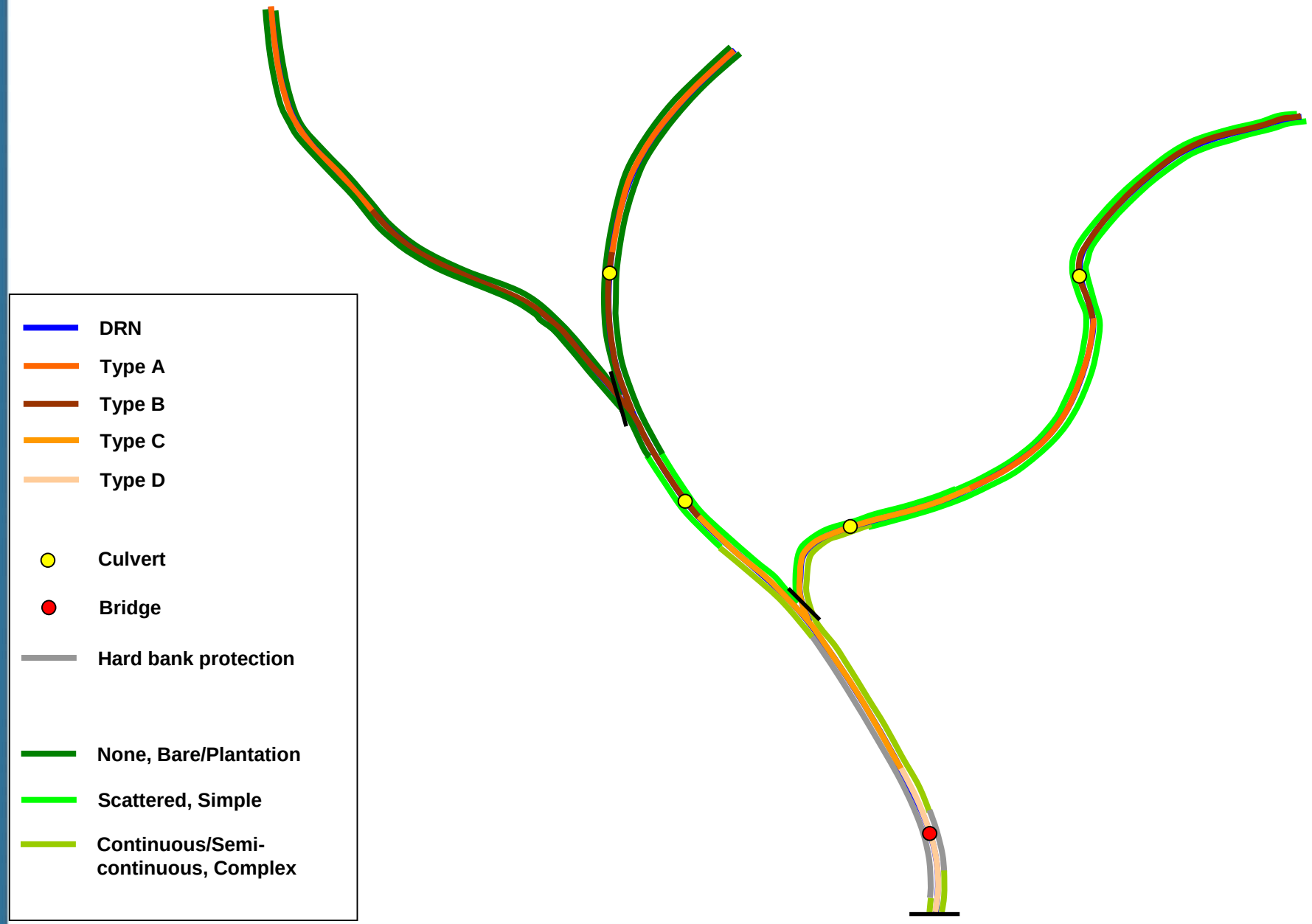

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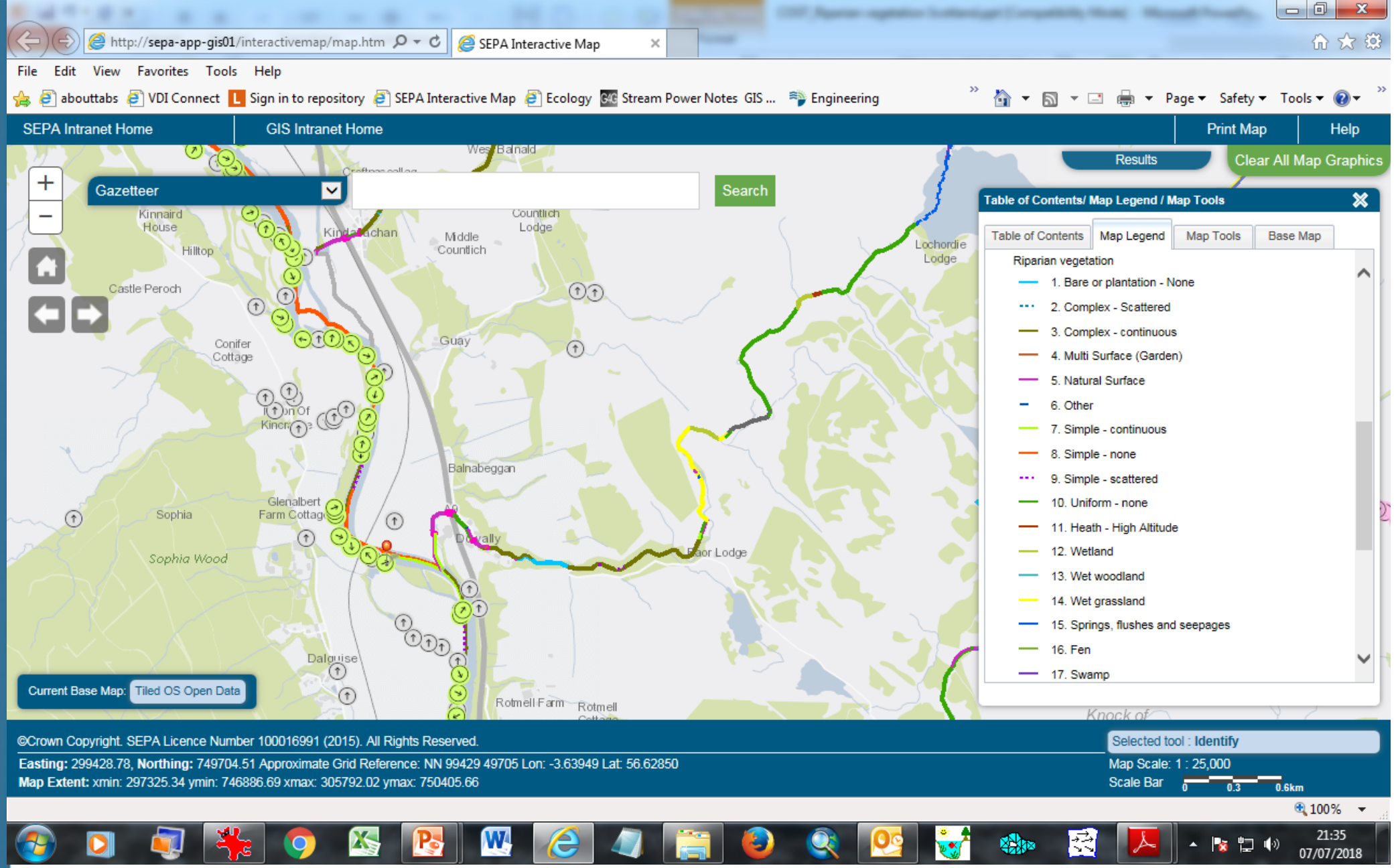
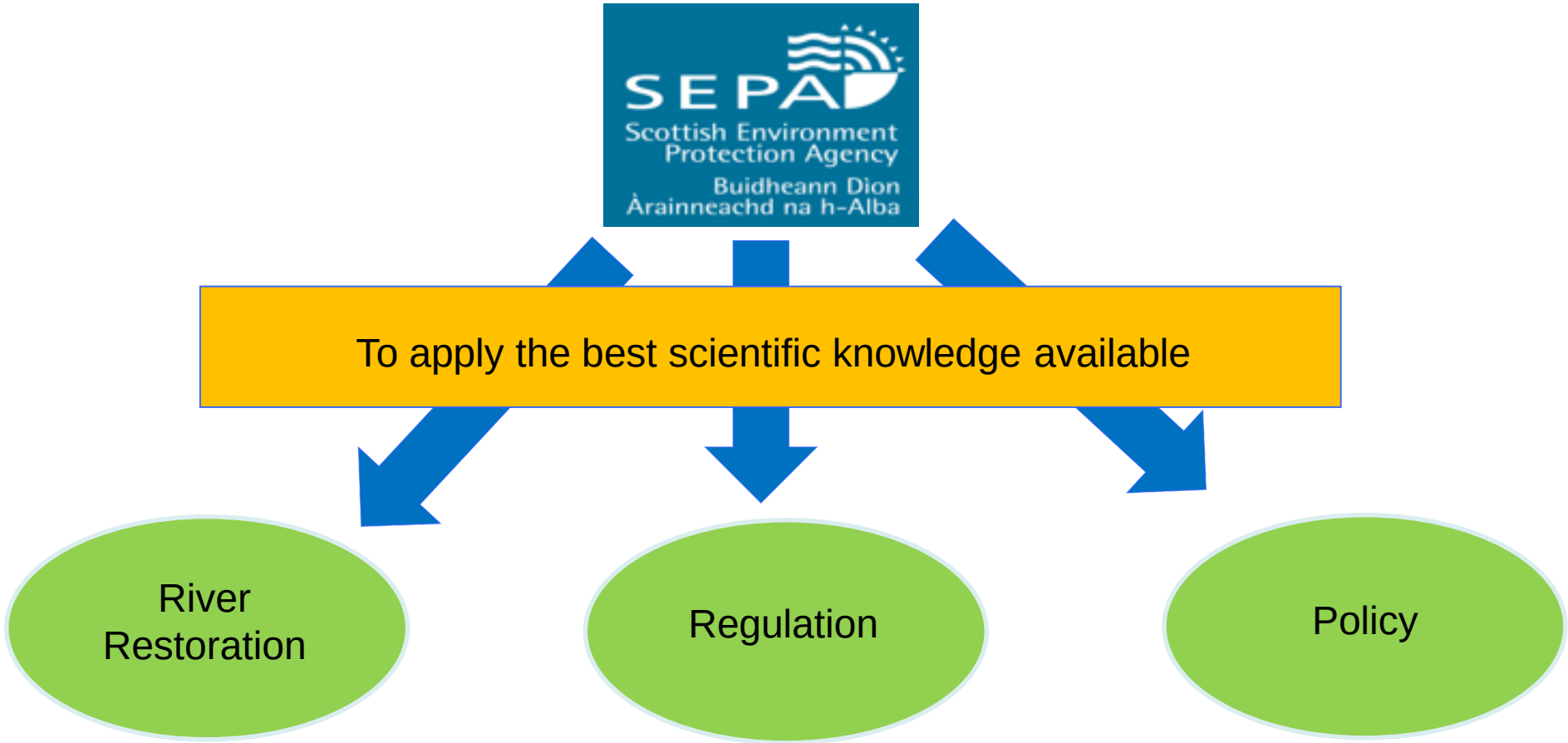


River MImAS results

WB	Zone	Activity	Activity Impact (%)	Total Impact (%)
3000	Channel	Embankments and Floodwalls no Bank Reinforcer	47.42	63.86
3000	Channel	Low Impact Channel Realignment	5.75	63.86
3000	Channel	Riparian Vegetation	4.44	63.86
3000	Channel	Green Bank Reinforcement and Bank Reprofiling	2.63	63.86
3000	Channel	Set Back Embankments and Floodwalls	1.15	63.86
3000	Channel	Impoundments	1.12	63.86
3000	Channel	Grey Bank Reinforcement	0.54	63.86
3000	Channel	Bridges	0.42	63.86
3000	Channel	Pipe and Box Culverts	0.28	63.86
3000	Channel	Intakes + Outfalls	0.12	63.86

Opportunities for rip restoration



Changing environment…

- Everything is changing around rivers: climate, society, politics, etc.
- Climate: e.g. more extreme rainfall events, flood risk, etc.
- Society: e.g. environmental awareness.

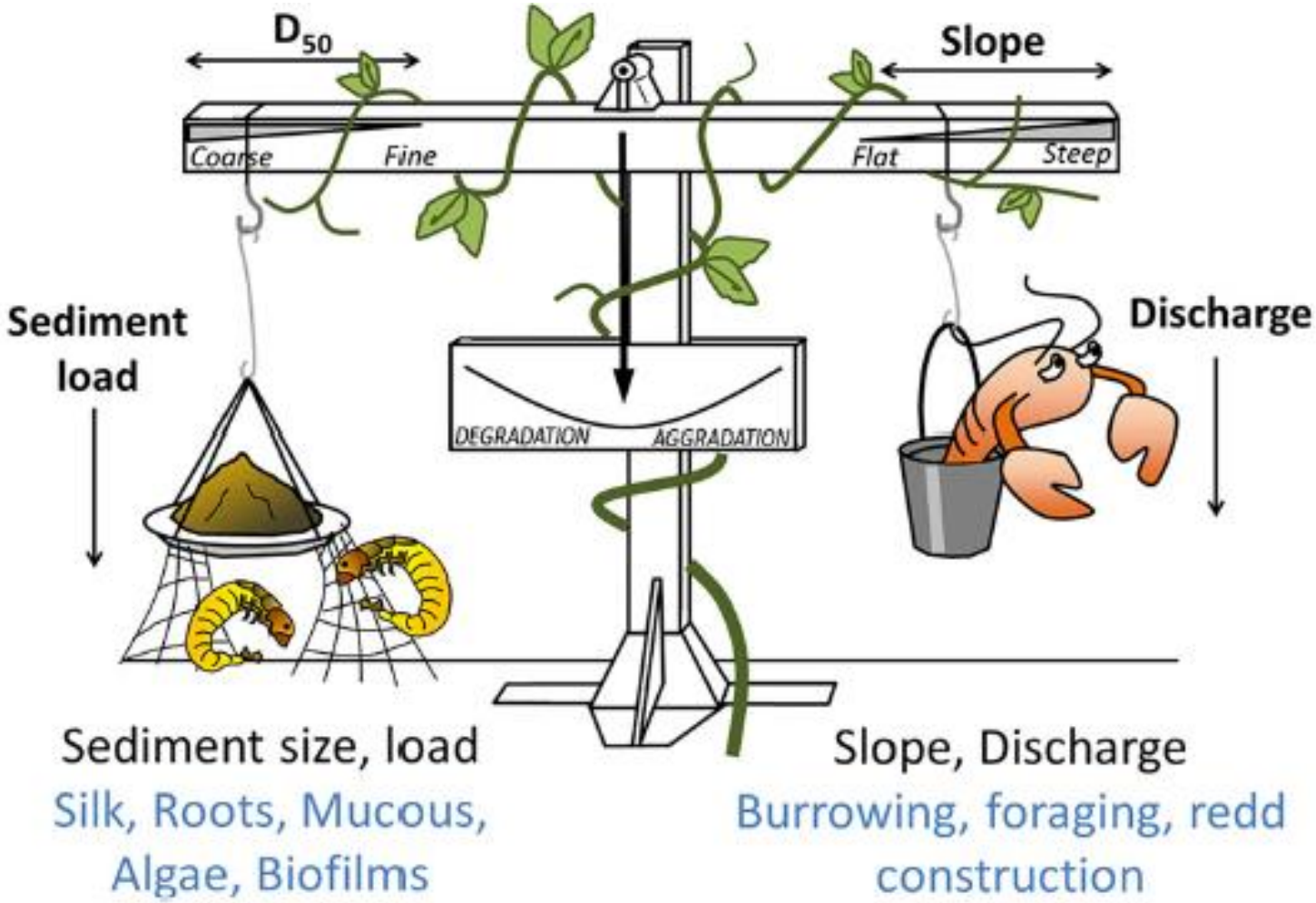
  What do people feel is a healthy functional corridor?

- These changes sometimes they can be **obstacles** and **opportunities** for rip vegetation→ Within wider restoration projects.

Science to support the change…

- Drones, DTMs, new tools to quantify morph change…
- **COST Converges**: functional riparian corridor. We need to translate this into something practical to create **opportunities**. Not only for riparian restoration:

	Opportunities	Obstacles
Fisheries/anglers	Rip veg can improve spawning habitat	Rip veg complicate access
Farmers	Reduce erosion	Tradition of cleaning rivers
Flood Risk	NFM	Rip veg block bridges and culverts, increases flood risk
Government	WFD objectives	Cost, unfeasible



Biomic river restoration: A new focus for river management **(2019)**

Matthew F. Johnson[1] | Colin R. Thorne[1] | Janine M. Castro[2] | G. Mathias Kondolf[3] | Celeste Searles Mazzacano[4] | Stewart B. Rood[5] | Cherie Westbrook[6]

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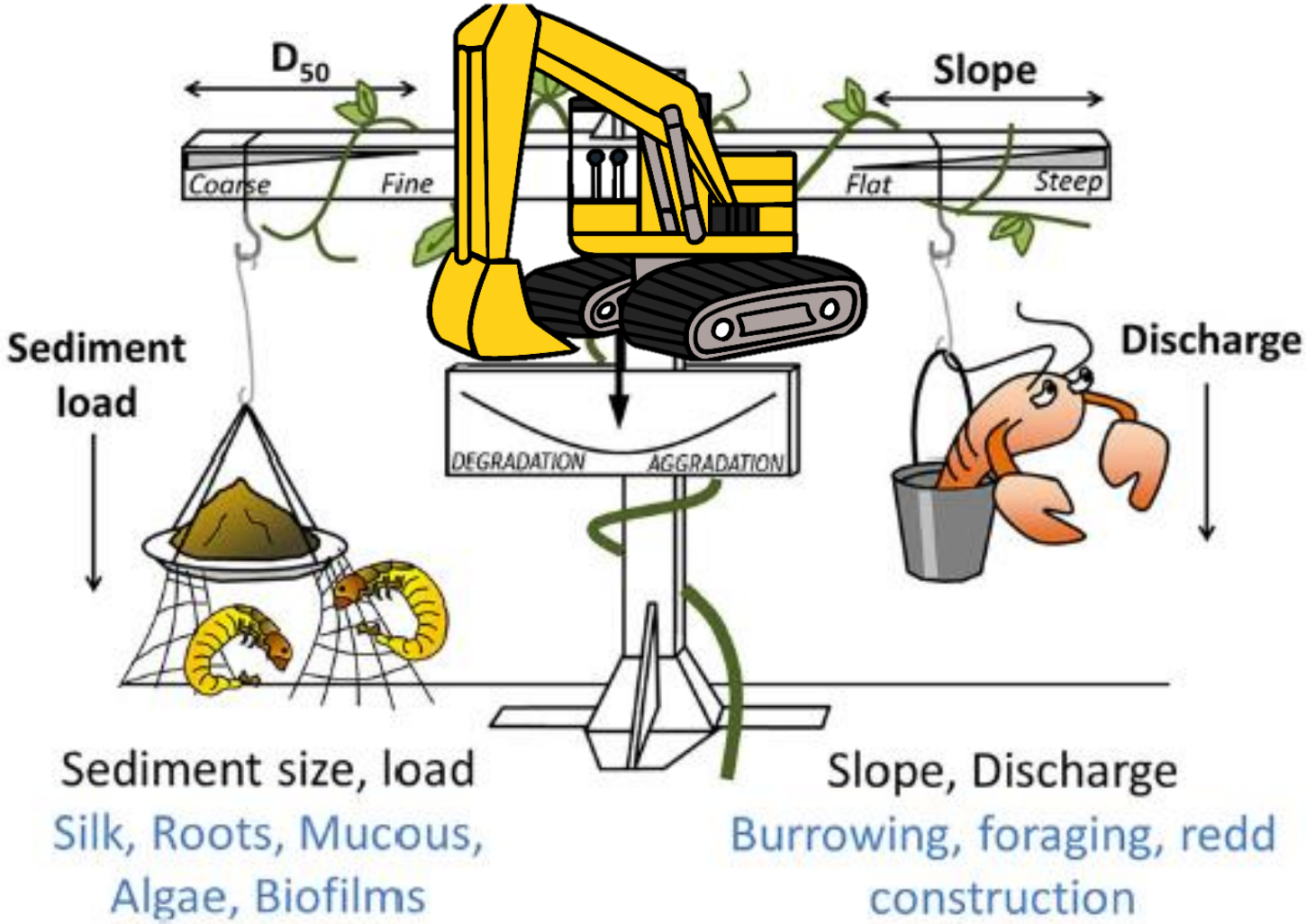

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Restoration

Regulation

“Restoration”: River Bowmont. Instream structures

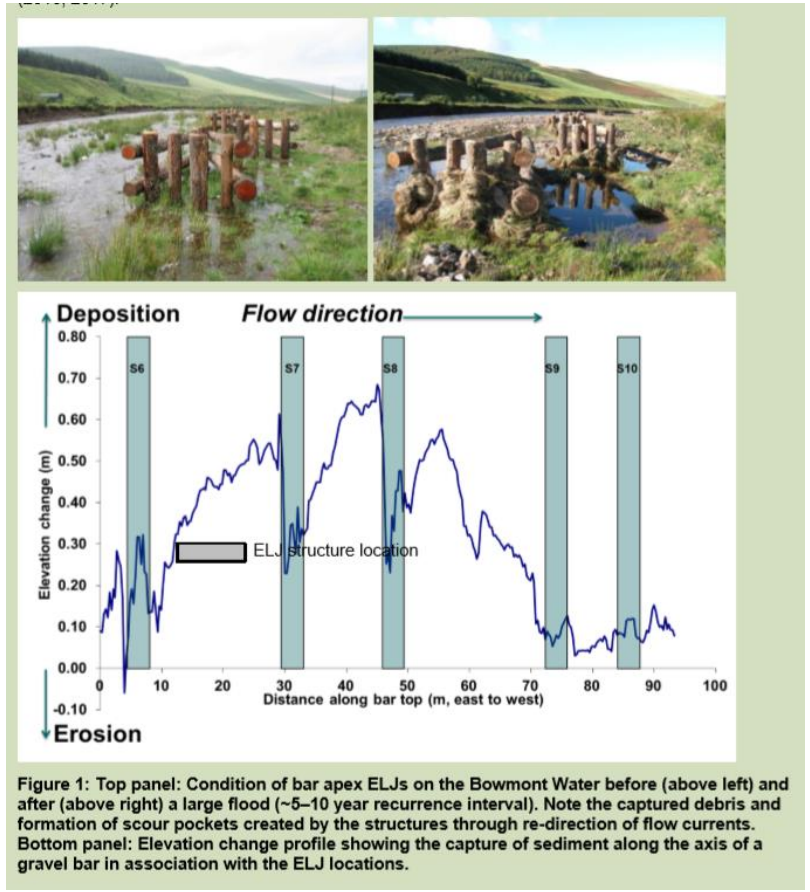

Figure 1: Top panel: Condition of bar apex ELJs on the Bowmont Water before (above left) and after (above right) a large flood (~5–10 year recurrence interval). Note the captured debris and formation of scour pockets created by the structures through re-direction of flow currents. Bottom panel: Elevation change profile showing the capture of sediment along the axis of a gravel bar in association with the ELJ locations.

Addy and Wilkinson (2016, 2017)

- https://www.therrc.co.uk/sites/default/files/projects/14_bowmont.pdf

Restoration: Allt Lorgy - Instream large wood

Before Cross channel Boulders

Woody Debris After

Before

Upstream left bank bar After

- https://cbecoeng.co.uk/our-projects/allt-lorgy-restoration/
- https://www.speyfisheryboard.com/allt-lorgy-restoration-project/

Restoration: River Gairn. Instream large wood + tree planting

- Dee/Gairn
  - https://www.bing.com/videos/search?q=river+dee+board&&view=detail&mid=EF0CECA1211274E66368EF0CECA1211274E66368&&FORM=VRDGAR&ru=%2Fvideos%2Fsearch%3Fq%3Driver%2520dee%2520dee%2520board%26qs%3Dn%26form%3DQBVR%26sp%3D-1%26pq%3Driver%2520dee%2520dee%2520board%26sc%3D0-19%26sk%3D%26cvid%3DC78A571D759142D598052EC4DAAB3DF6

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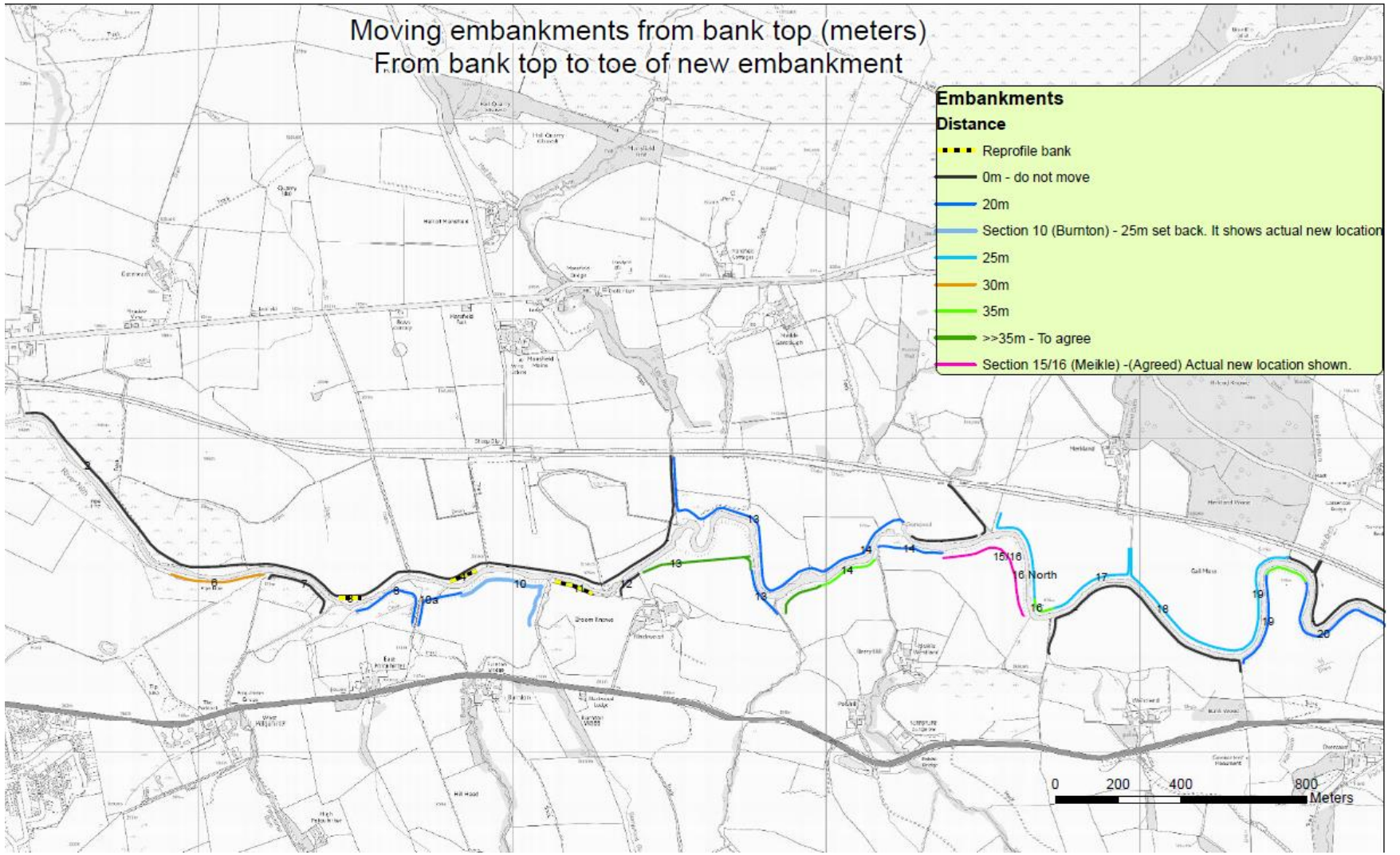
River restoration River Nith



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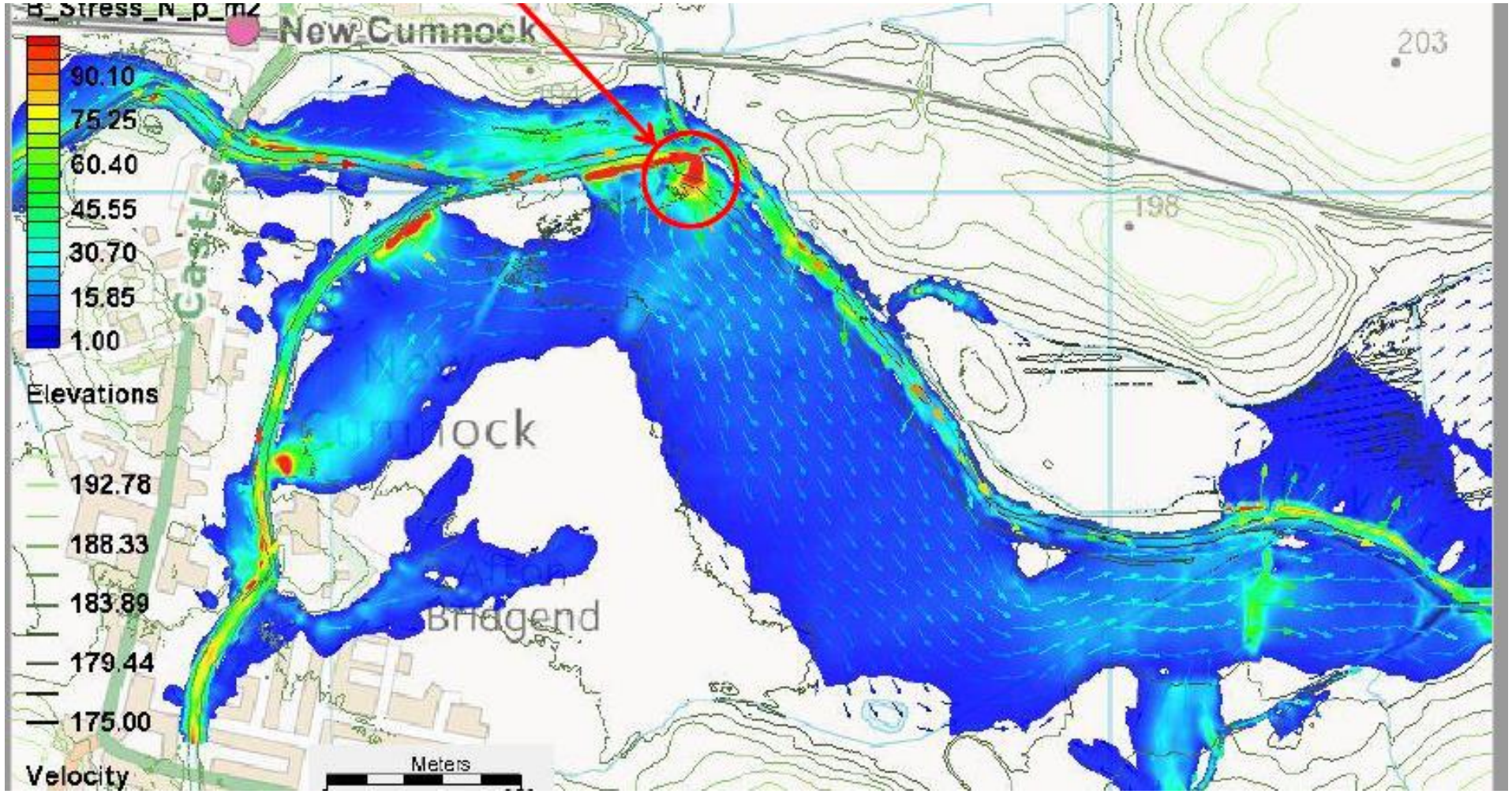
River restoration River Nith



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River Nith - Embankment set back (June 2019)

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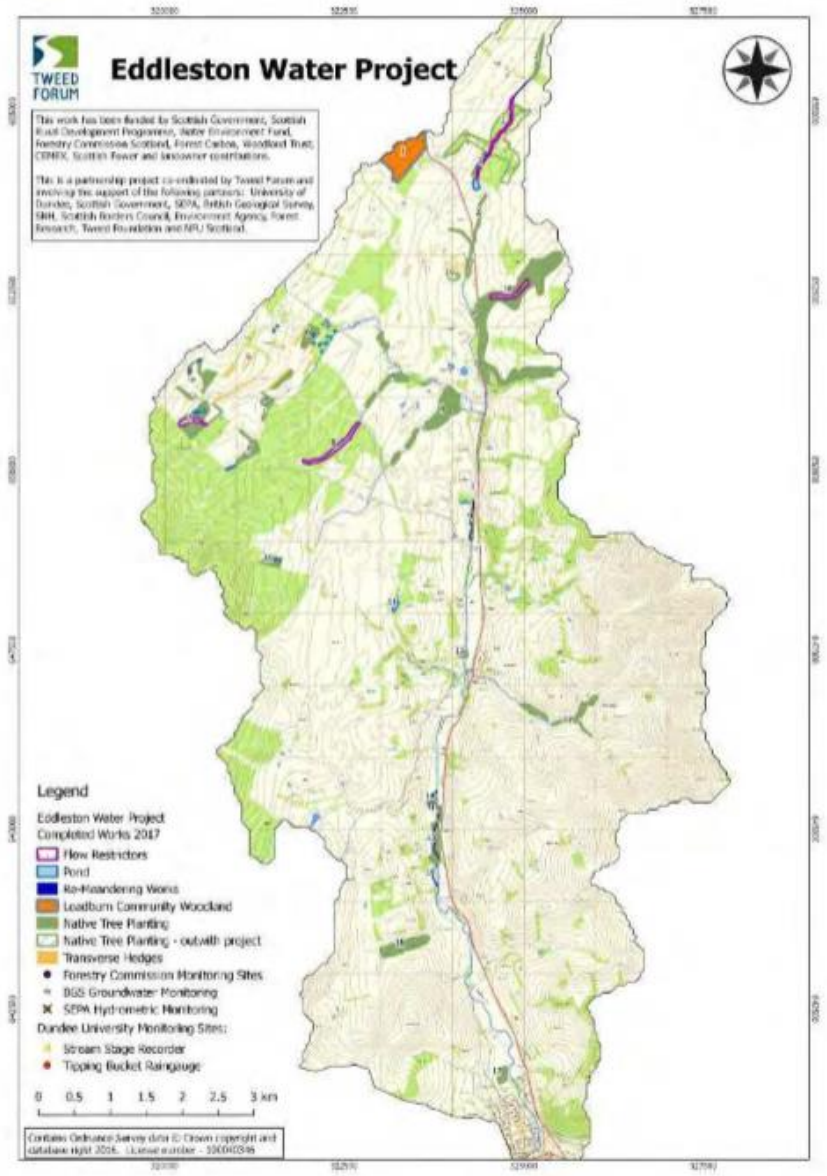
Restoration: Eddleston Project



- Website of the project: https://tweedforum.org/our-work/projects/the-eddleston-water-project/
- A detailed report here: http://tweedforum-org.stackstaging.com/wp-content/uploads/2018/08/Eddleston_Report_Jan_2017.pdf

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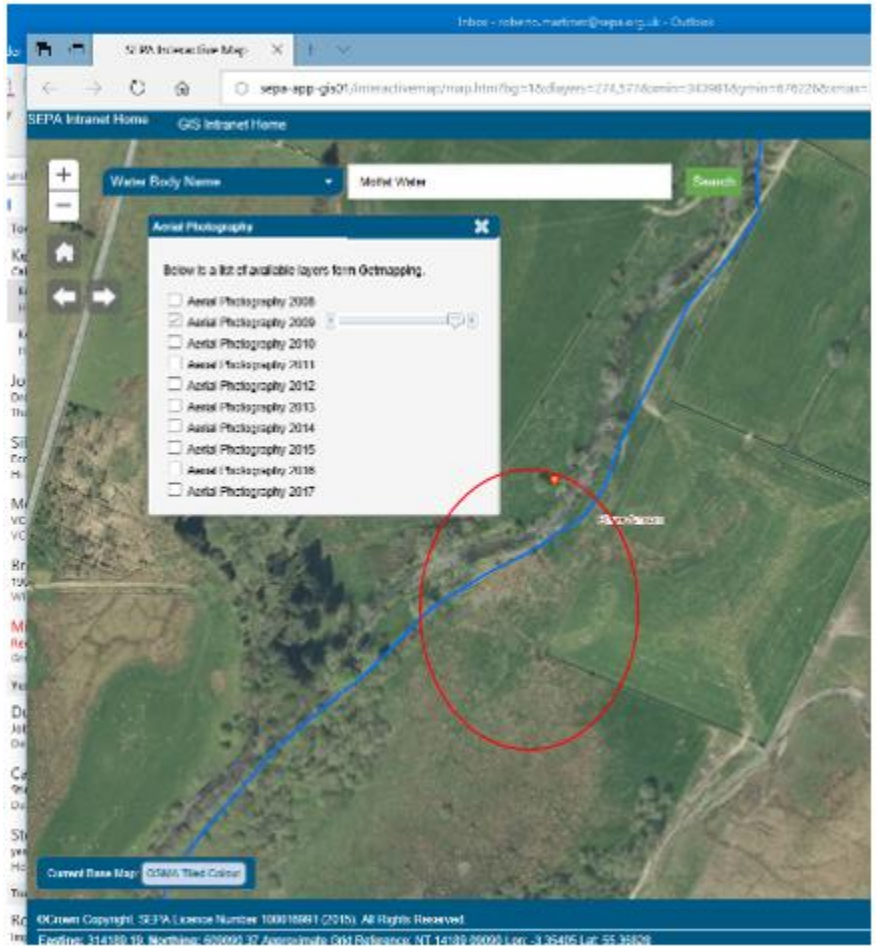
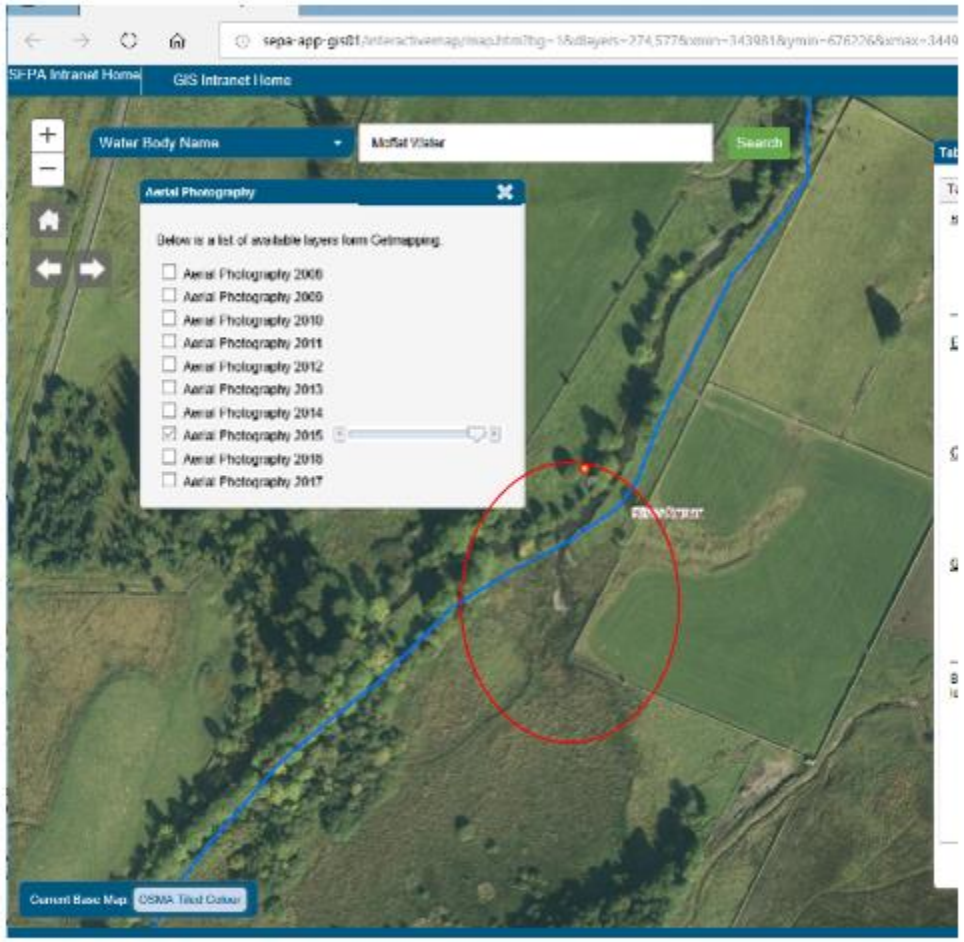
Regulation: Moffat Water: fish migration - opportunity for rip restoration



2009 No channel



2015 Channel

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Regulation: Moffat Water fish migration - opportunity for rip restoration

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Regulation: Moffat Water - fish migration opportunity for rip restoration

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Regulation: River Anan. Bank erosion. Opportunity for rip restoration

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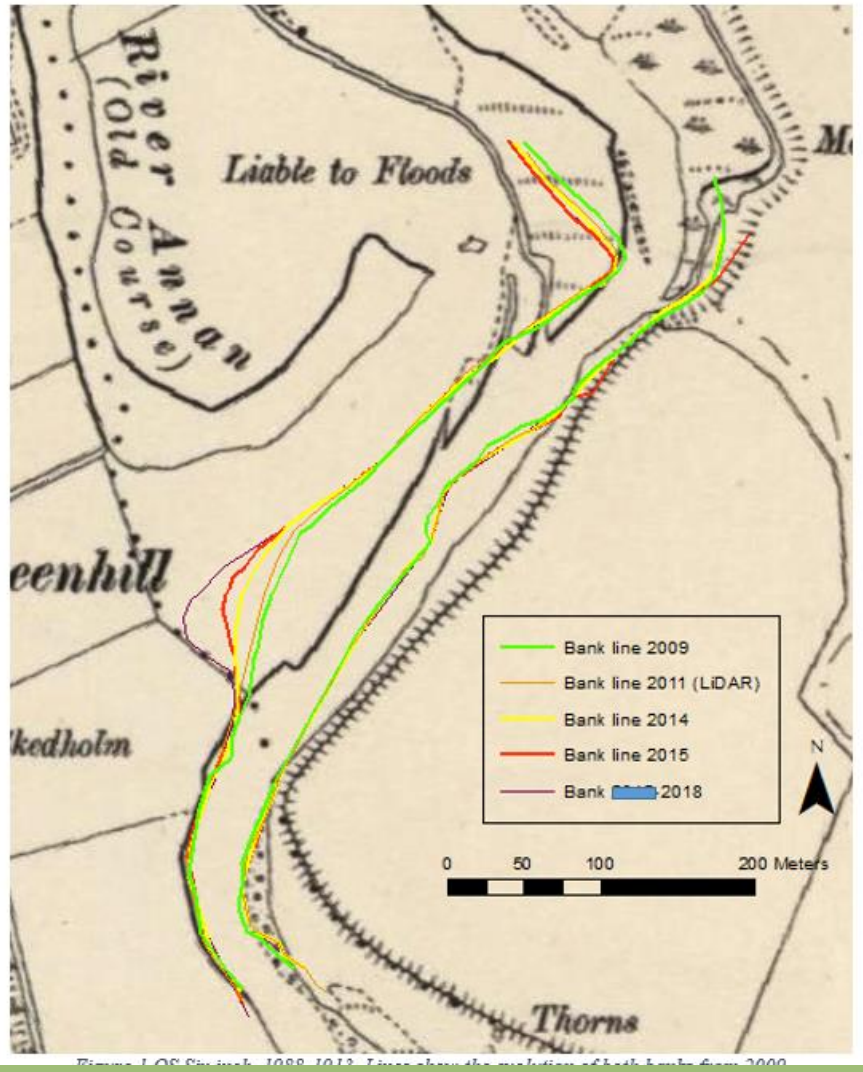
Regulation: River Anan. Bank erosion. Opportunity for rip restoration



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Regulation: River Anan. Bank erosion. Opportunity for rip restoration

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Regulation. River Nairn: Opportunity for restoration

https://youtu.be/5bvDeJuzMzI

Regulation: Videos

- Resources:
  - Guidance
  - Rules
  - Videos:

- https://www.sepa.org.uk/regulations/water/engineering/sustainable-riverbank-protection/

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https://vimeo.com/276064876

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Policy: Obstacles for rip vegetation restoration. Flood Risk

Alyth 1 – upstream side, old bridge

Alyth 2 – debris on footbridge and imbricated cars

Alyth 3 – collapsed footbridge at Primary School

Almondbank – Black Bridge collapsed

Kingussie 1 – railway bridge over Gynack, at station

Kingussie 2 – road bridge over River Gynack

Elgin – River Lossie, upstream of town

Worcester Bridge, River Severn

Policy: Big opportunity.

Overcoming obstacles through climate change measures.

Scottish Conservation Finance Project

- *'More investment in nature conservation is urgently needed '*
- It is about identifying nature-based solutions that deliver multiple benefits - protecting and restoring biodiversity and healthy ecosystems as the foundation of our prosperity and wellbeing.

- **Riverwoods**: A Scotland-wide network of riverbank woodland, plus 'in-river' restoration. This has the potential to deliver a wide range of economic benefits, including flood mitigation, water quality improvements, water cooling, carbon sequestration and biodiversity benefits.

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Conclusions:

Every single case is an opportunity for riparian vegetation restoration

Everything is a slow process. Knowledge transfer is slow

Patience and negotiate. Manage your own expectations

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- Thank you!

- Roberto.Martinez@sepa.org.uk

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