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Hydrologic alteration and riparian vegetation in Spain

Riparian corridor restoration and flood policy in Scotland

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Intro

Scotland: SEPA, river restoration

Spain: PhD rip vegetation and hydrologic alteration

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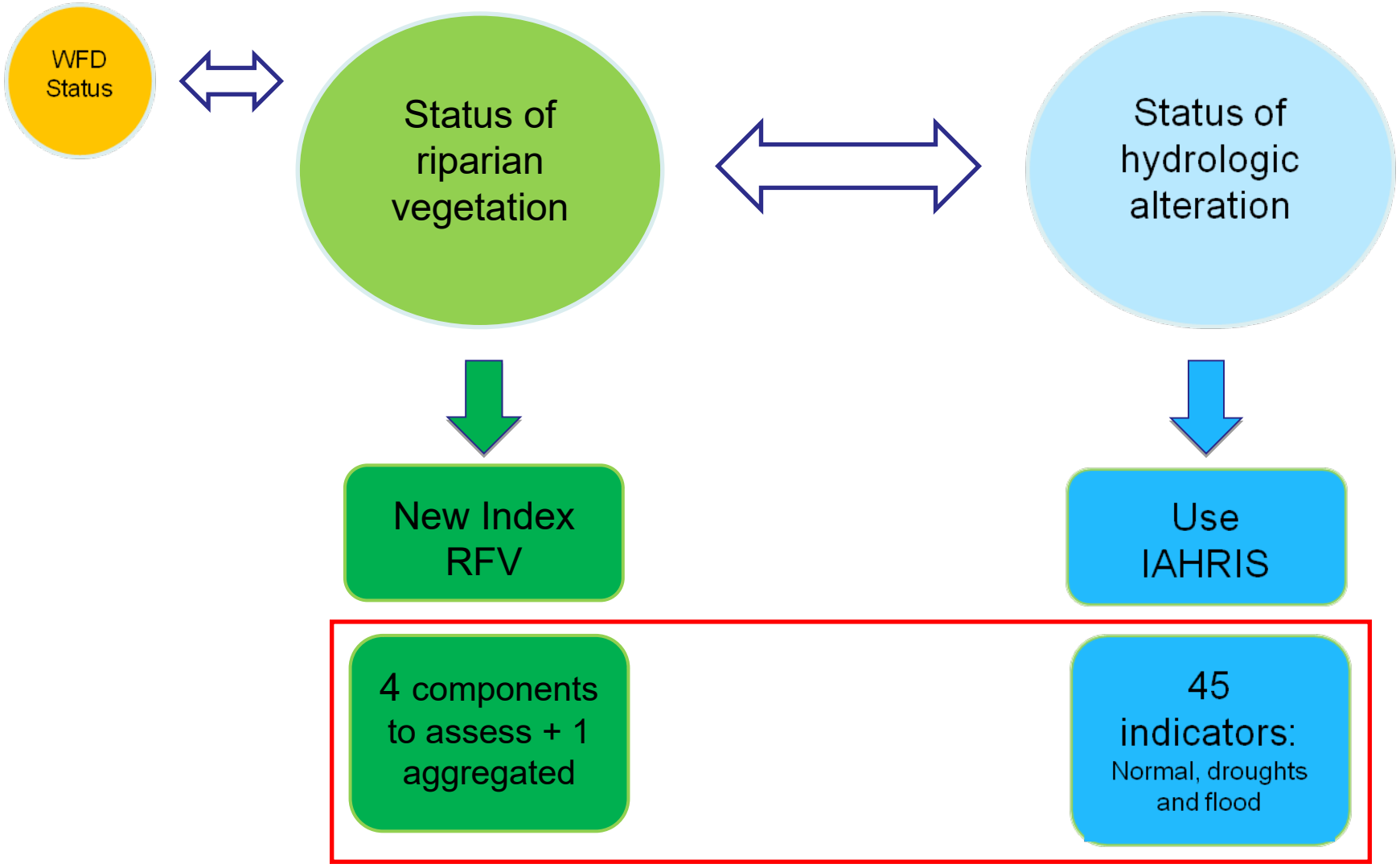
Hydrologic alteration and riparian vegetation in Spain



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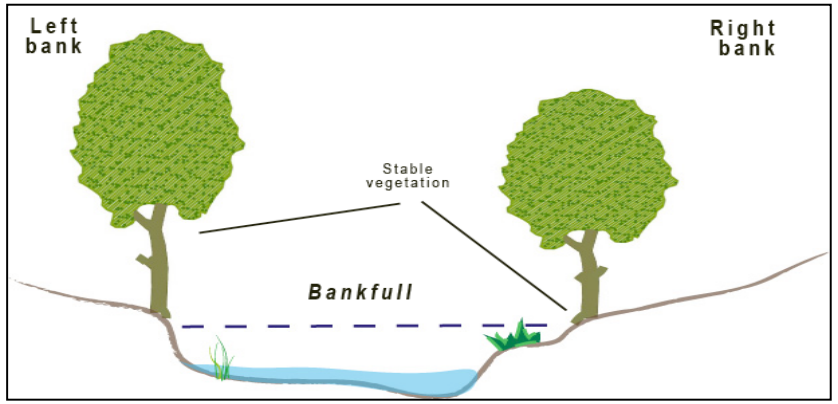
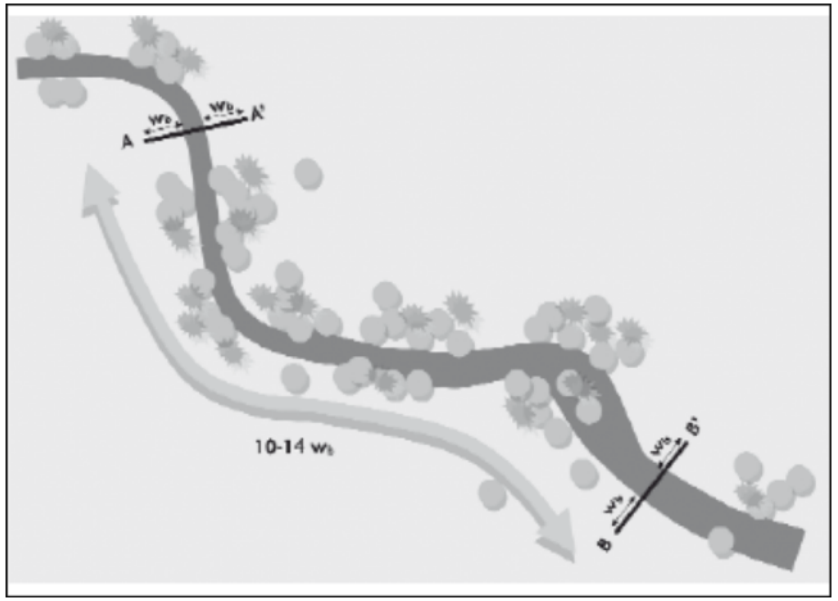
Riparian Index: RFV





	Clasificación
RFV Longitudinal	5 clases
RFV Transversal	5 clases
RFV Structure	5 clases
RFV regeneration	5 clases
RFV aggregated	**5 clases**

5 clases:
High →Good → Moderate →Poor → Bad
(5) (4) (3) (2) (1)

IAHRIS: Hydrologic alteration

- Software: http://ambiental.cedex.es/hidromorfologia-iahris.php

Study area (mostly Mediterranean)

Cuenca	Masas agua (Alt. Hidrológ.)	Masas agua (RFV)
Cantábrico	8	31
Miño-Sil	9	24
Guadalquivir	21	32
Guadiana	4	23
Duero	23	40
Tajo	22	32
Total	**87**	**182**

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Statistical comparison: IHA and RFV

Category	Hydrological Indicator	RFV index		RFV-long		RFV-trans		RFV-vert		RFV-temp	
		Chi-S	Tau-b (%)	Chi-S	Tau-b (%)	Chi-S	Tau-b (%)	Chi-S	Tau-b (%)	Chi-S	Tau-b (%)
Habitual values	**IHA1** (Dry)	-	-	-	-	-	-	-	-	33.4	20.9
	IHA2 (Weighted)	-	-	-	-	-	-	-	-	26.6	28.2
	IHA2 (Normal)	-	-	-	-	-	-	-	-	30,5	25,5
	IHA3 (Dry)	28.1	12.1	-	-	-	-	-	-	28.4	18.4
	IHA5 (Dry)	-	-	-	-	-	-	28,3	6,8	-	-
	IHA6 (Dry)	31.2	11.1	-	-	-	-	-	-	-	-
Floods	**IHA12**	-	-	-	-	-	-	-	-	43.9	12.0
Droughts	**IHA15**	32.3	11.9	-	-	-	-	-	-	-	-
	IHA20	-	-	-	-	26.3	19.8	-	-	26.5	11.7
	IHA21	36.1	39.4	-	-	-	-	37.5	32.5	-	-

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Results: relationship between vegetation and hydrologic alteration

- The **regeneration of the riparian forest** is the most sensitive component to the hydrologic alteration. (low flows, droughts and floods).
- **Management of flows during dry periods and drought is key** to minimise the impact of flow regulation on the status of riparian vegetation.
- The longitudinal component (first band) of the riparian vegetation is not significantly altered. There is not severe impacts from regulated flows. Two reasons could be associated with this (i) Spanish regulation via Hydraulic Public Domain (MMA, 2008), protecting this space from human activities, and (ii) the first band of riparian vegetation is more resilient to different stressors due to its proximity to water.

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WFD Status and riparian vegetation

- There is a lack of significant relationship between the WFD ecological status and the status of the riparian vegetation (only transversal component is correlated).

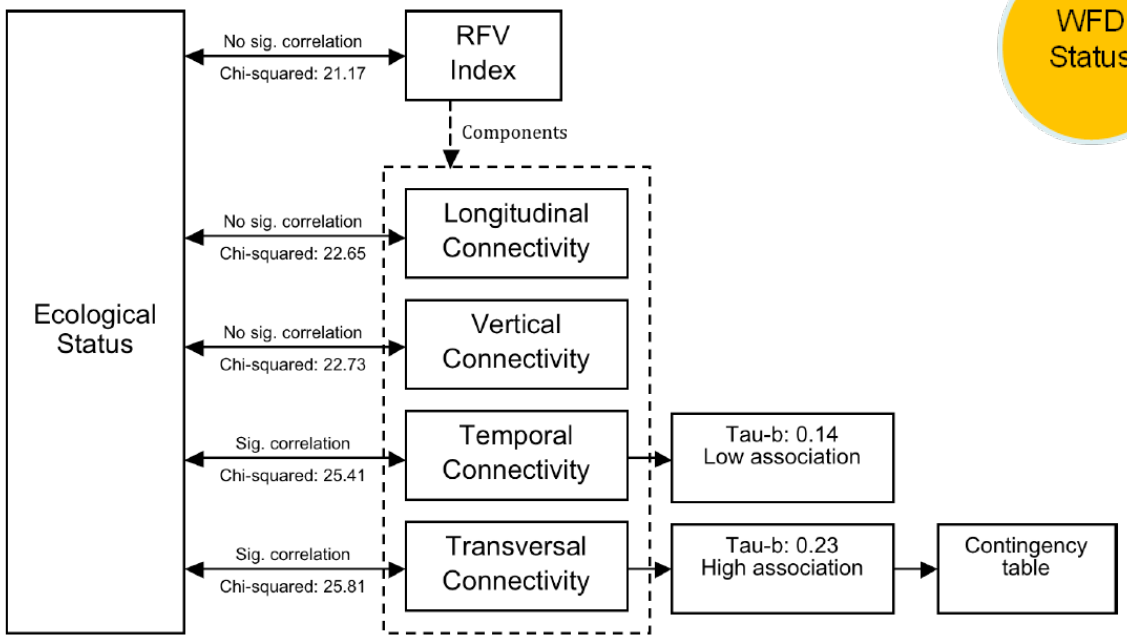
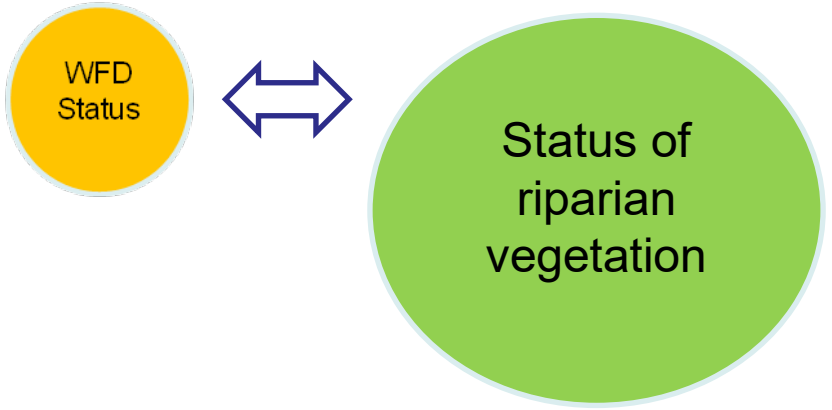
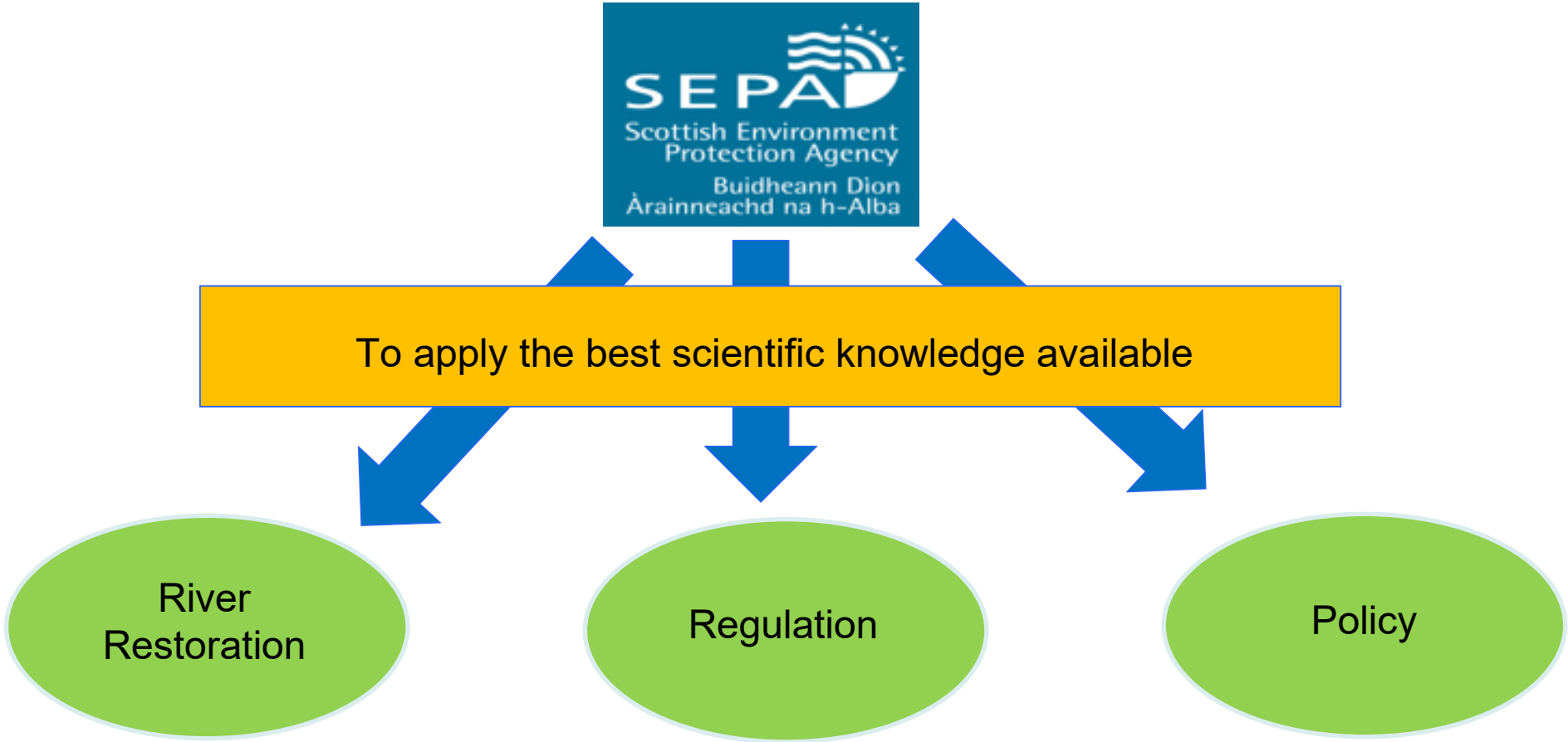


Figure 1 Results of the statistical analysis: correlations between ecological status and status of riparian vegetation.



Scotland: Obstacles and opportunities from an regulator perspective



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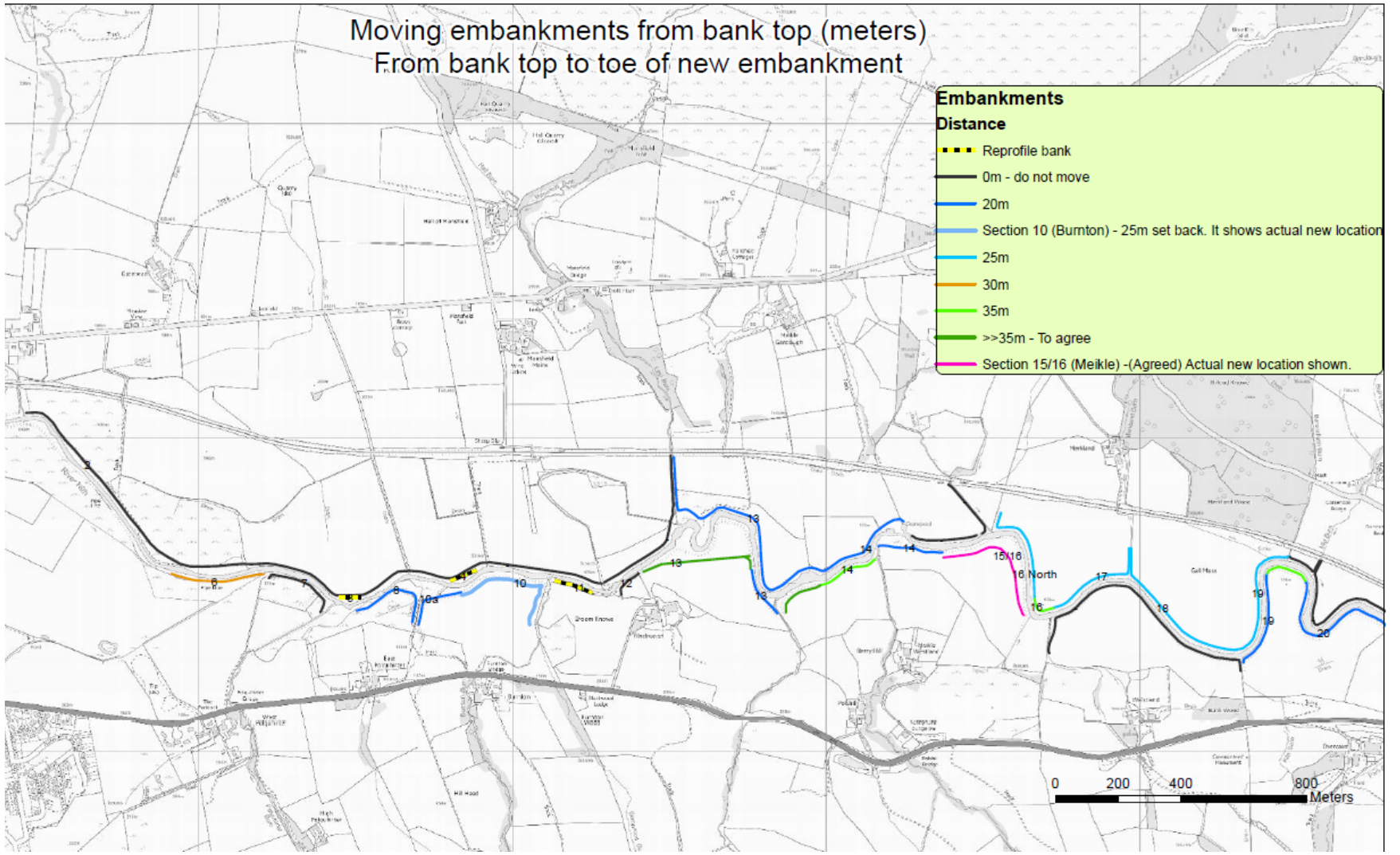
River restoration River Nith



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Regulation

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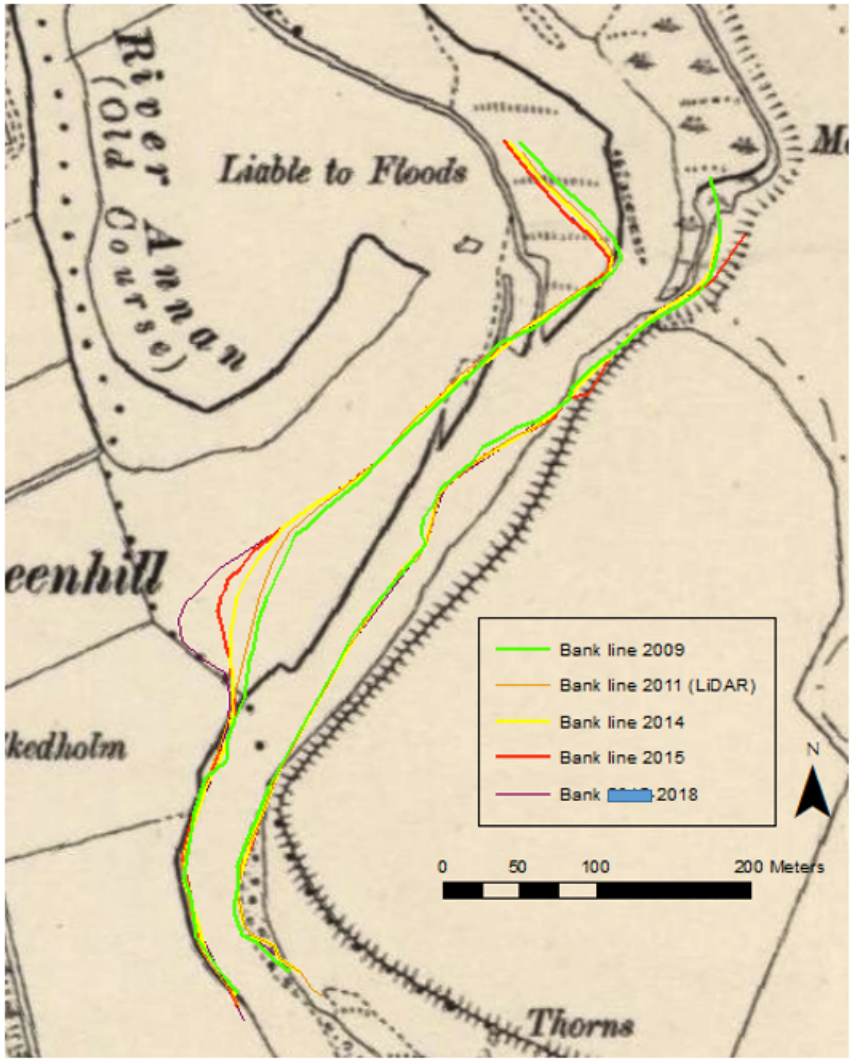

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Regulation: Videos

- Resources:
  - Guidance
  - Rules
  - Videos:

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

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Policy: Obstacles for riparian 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

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Money! 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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- Thank you!

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

- Thesis link
- https://www.researchgate.net/publication/291971207_Estudio_del_estado_de_la_vegetacion_de_ribera_en_la_Espana_peninsular_Implicaciones_de_la_alteracion_hidrologica_y_herramientas_para_su_manejo_y_gestion
- RFV
- https://www.researchgate.net/publication/264277471_Evaluating_the_quality_of_riparian_forest_vegetation_The_Riparian_Forest_Evaluation_RFV_index

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