



Working to restore & enhance our rivers



# An action strategy for river restoration

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**Science & Technical Manager**

**The River Restoration Centre**



# *The River Restoration Centre (RRC)*

## *Vision and objectives*

*‘Naturally functioning, wildlife-rich systems,  
valued by people’*

- To actively **promote** the re-establishment of **natural processes**, features, habitats and biodiversity of a river system
- To **support** others to achieve this by **collating knowledge**, information and evidence to **share best practice** throughout the river and catchment management community.





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# Training & Certification

## Certification

- 12 training courses running
  - Since 2017 the RRC has offered 84 courses training 1058 delegates in River Restoration topics.
  - Training online, face-to-face and hybrid (online + fieldwork)
- MSc in River Restoration with Cranfield University in preparation



Introduction to Hydromorphology (Level 1)



Developing a Catchment-wide Restoration Plan

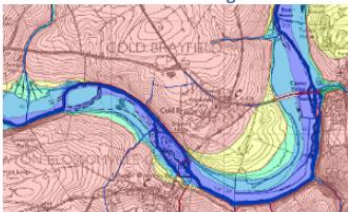
Understanding your catchment

Identifying Pressures and Impacts  
Prioritising Projects

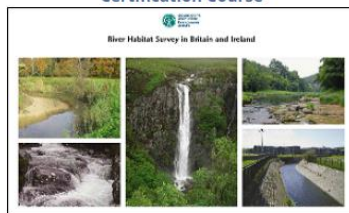
Hydromorphology for River Restoration (Level 2)



Mapping for Natural Flood Management



River Habitat Survey Certification Course



Advanced Hydromorphology (Level 3)



Desk-based assessment for river restoration planning & catchment management



River Erosion Management



Putting Ecology into River Restoration: An Introduction



citizen River Habitat Survey



Restoring River Floodplain Systems







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# Action strategy or strategies?

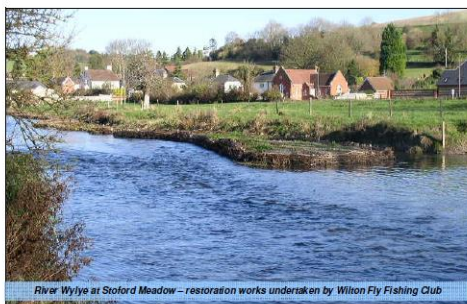
## Strategic frameworks



### Strategic Framework for Restoration of the River Avon System

Non Technical Summary - Final Report

November 2009



River Wylfe at Stoford Meadow – restoration works undertaken by Wilton Fly Fishing Club

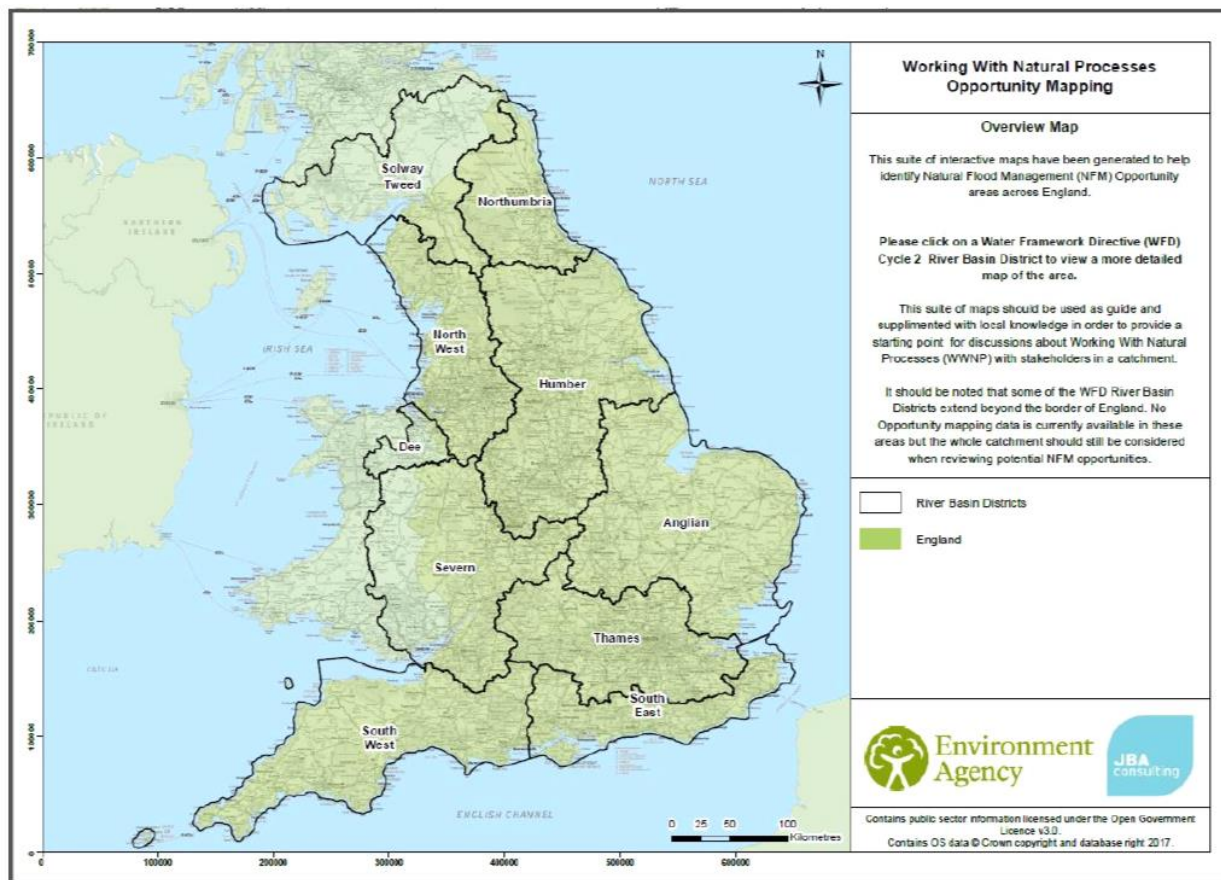
**Halcrow**

Burderop Park, Swindon, Wiltshire SN4 0QD  
Tel 01793 812479  
www.halcrow.com

**GeoData Institute**

University of Southampton  
SO17 1BJ  
Tel 023 8059 2719

## Opportunity-driven initiatives

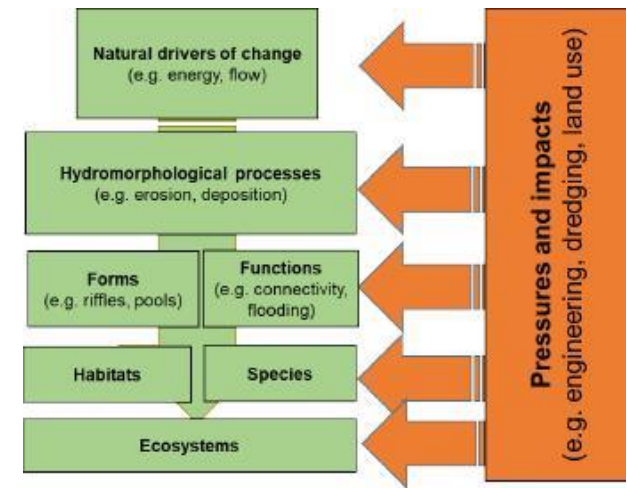




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# What are we looking to create?

- A restoration plan that works at **catchment scale** through the identification of **pressures and impacts** on **catchment and river processes**.
- A plan that identifies a set of **restoration options** that will contribute to improving catchment processes.
- A plan that delivers **SMART** aims and objectives.

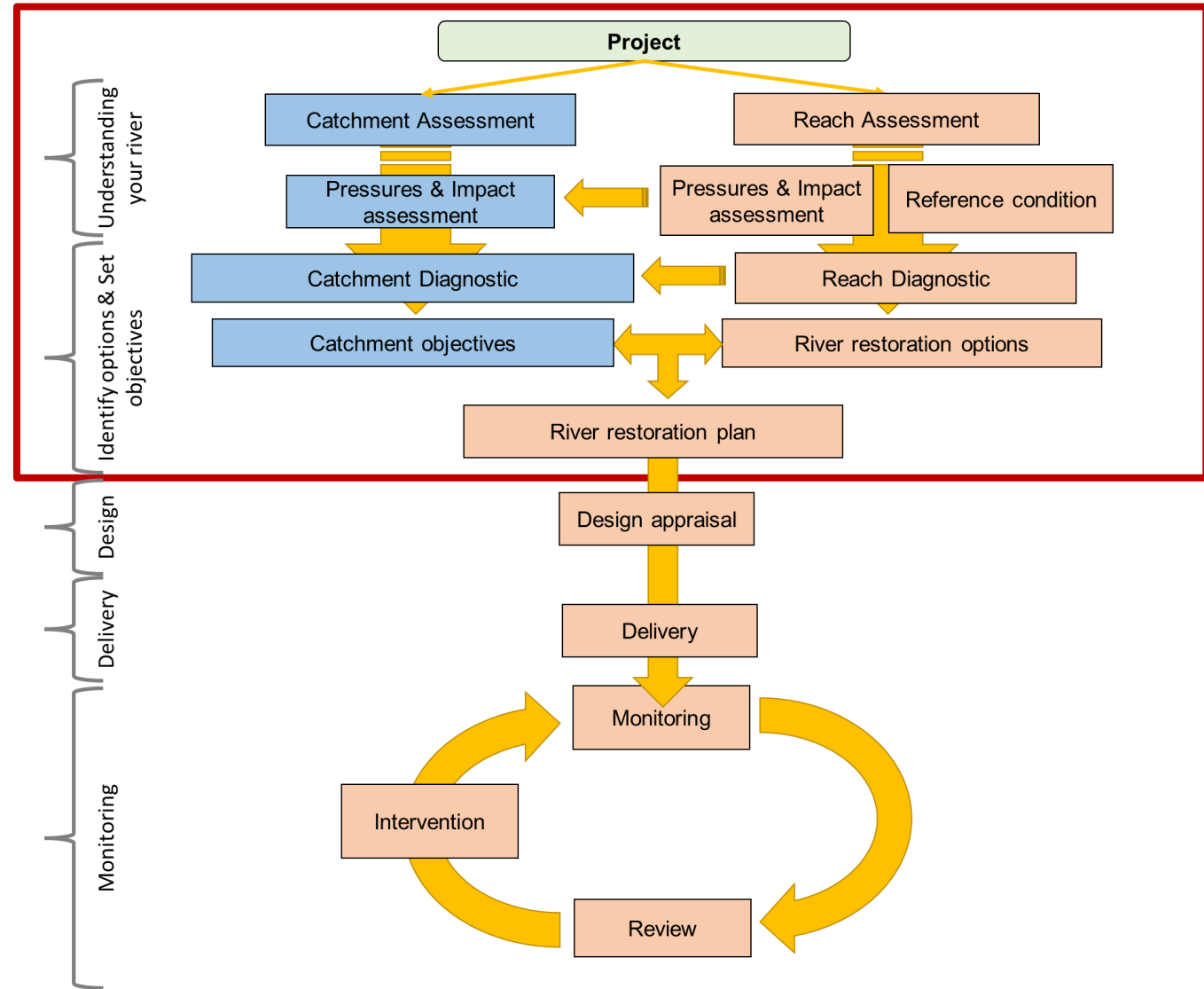




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# RRC River Restoration planning and delivery process

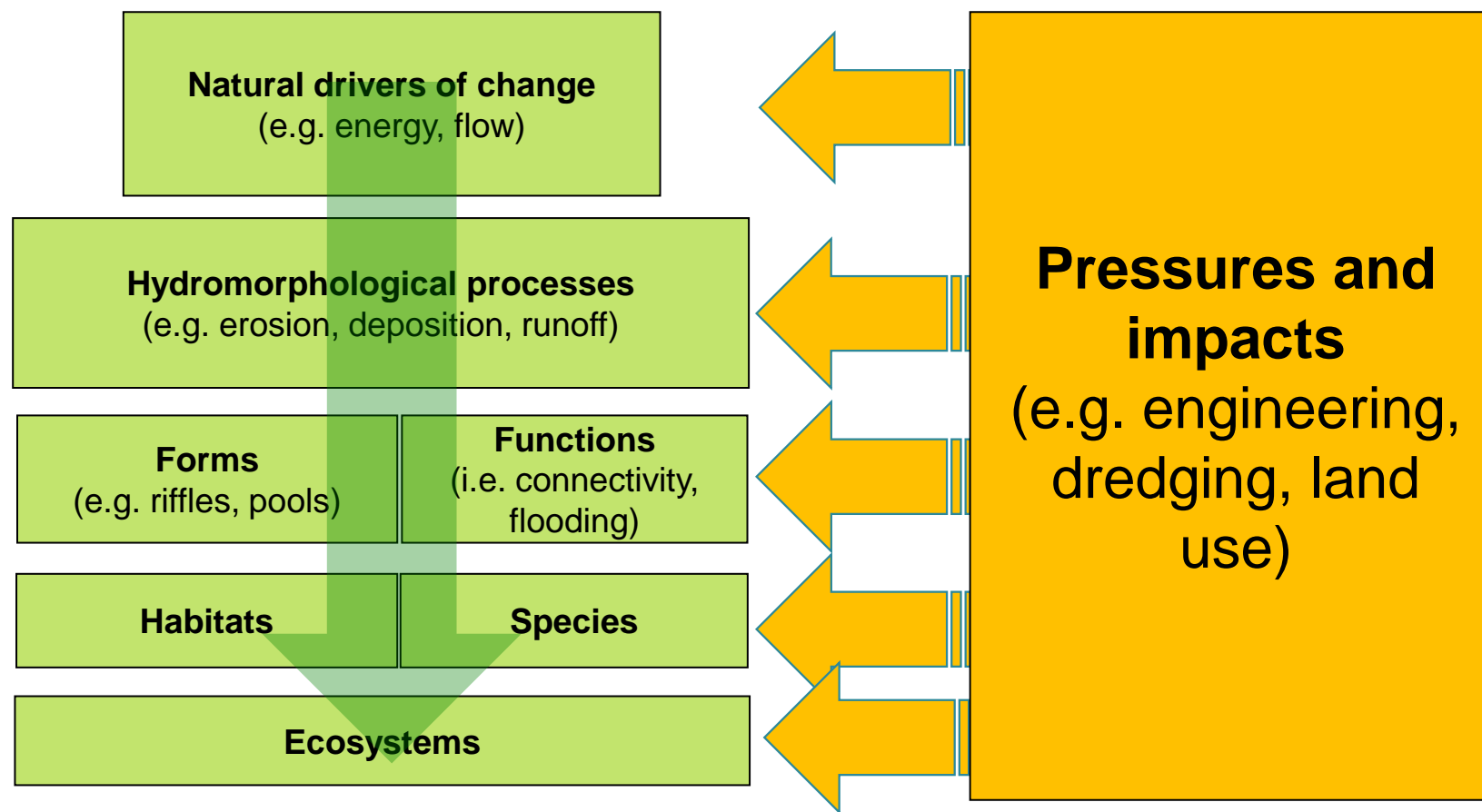
1. Understand your river and catchment
2. Setting objectives
3. Design
4. Delivery
5. Monitoring
6. Review





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# Hydromorphological Framework



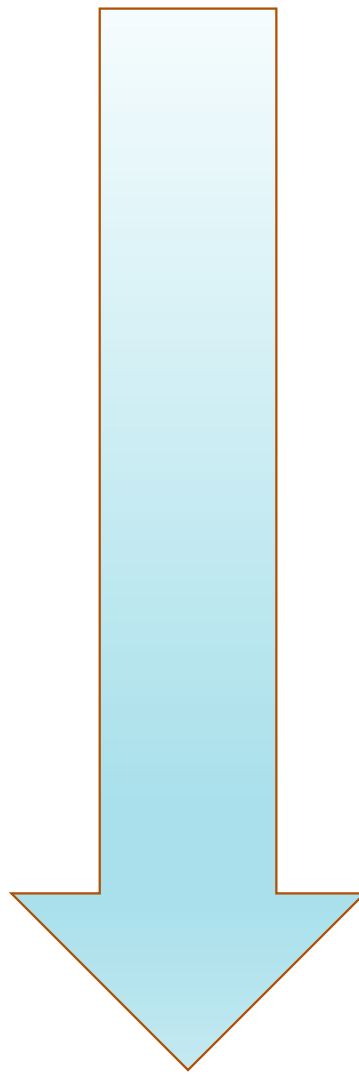




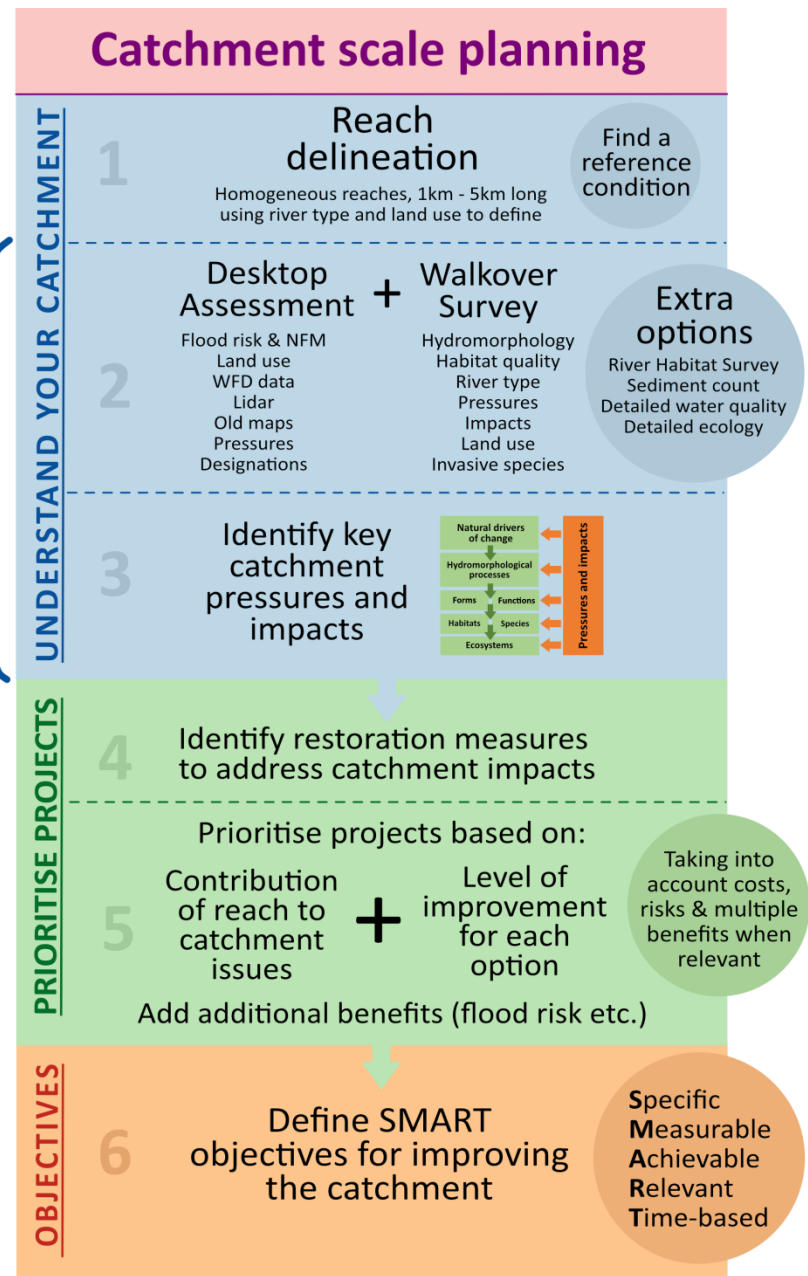
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# In practice...

- Understand your catchment
  - Reach delineation
  - Desktop assessment & fly over
  - Walk over and River Habitat Surveys
  - Identify pressures and impacts
- Identify restoration option **benefits**
- **Prioritise** projects
- Define **objectives**
- Restoration planning



Update regularly

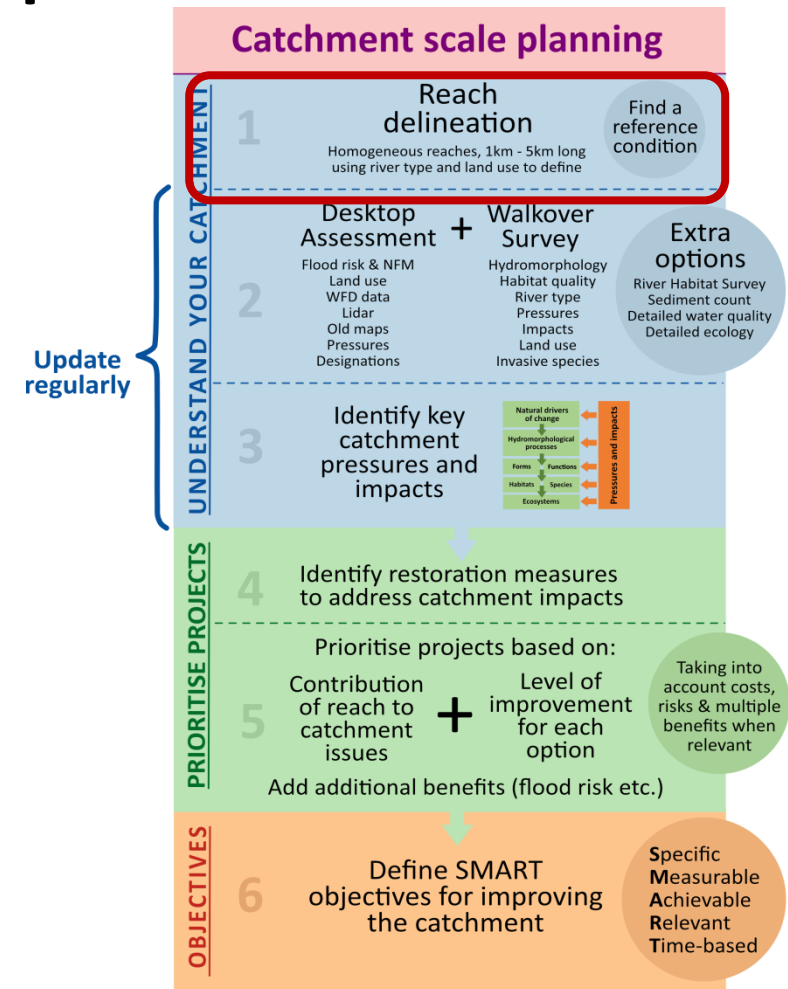




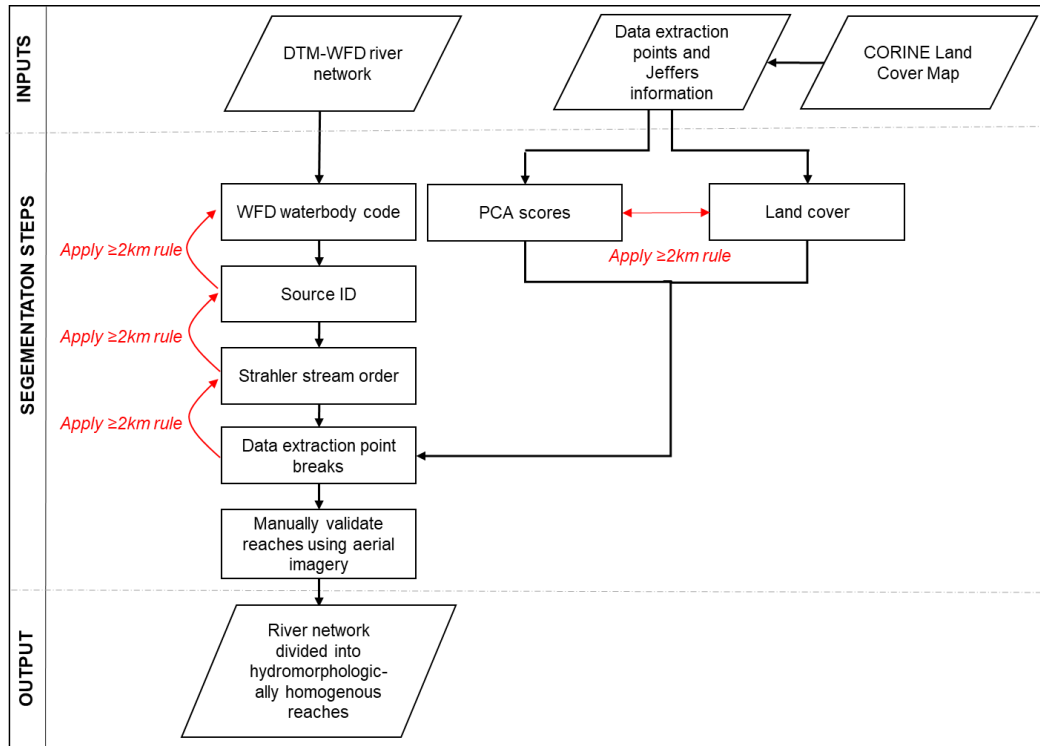
# 1 - Reach delineation

## Homogenous hydromorphological reaches

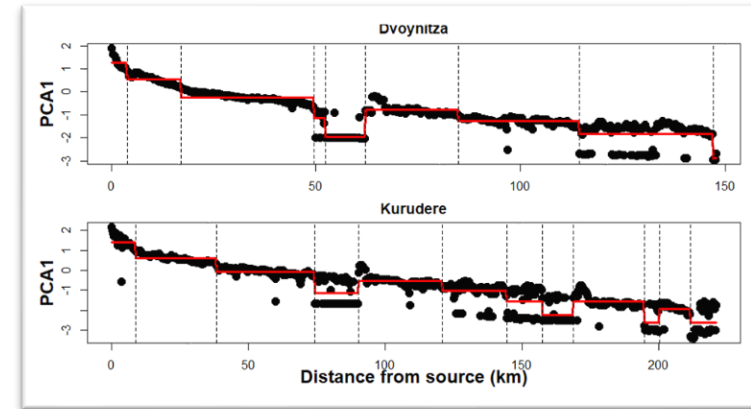
- One observed and reference condition
- Homogeneous in terms of pressures and impacts
- Identify reference condition



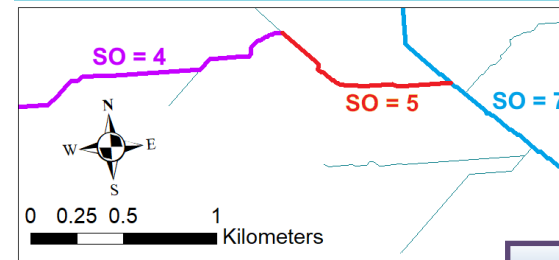
# 1- Reach delineation



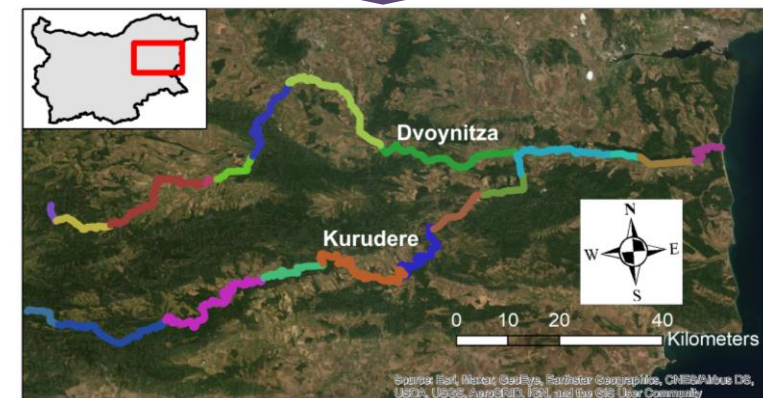
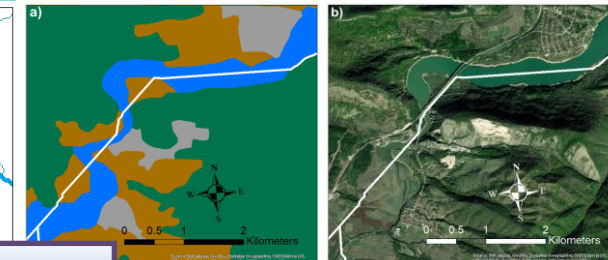
## Breaks in stream energy



## Stream order (size)



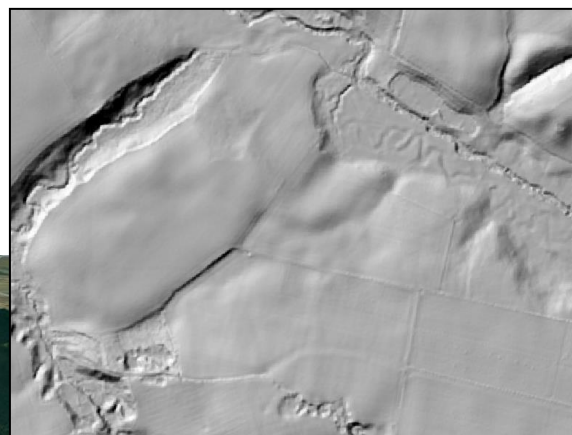
## Land use



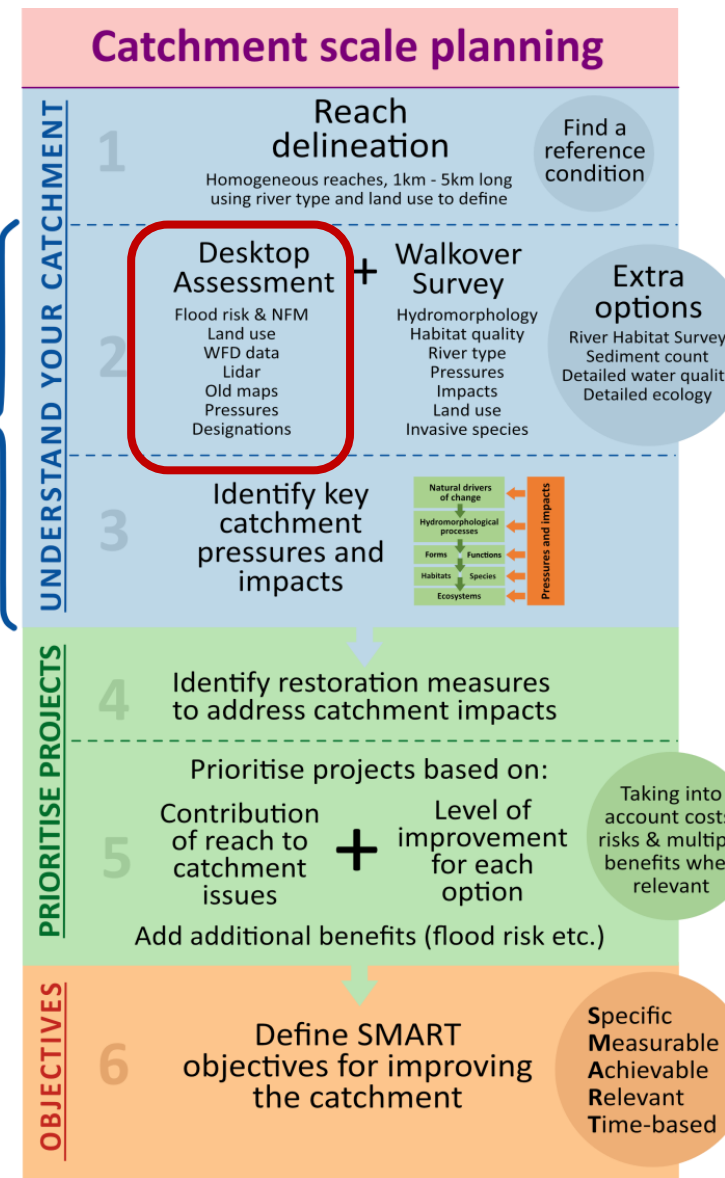


# 2 – Desktop assessment and fly over survey

- **Data:** Google map/earth data, OpenStreetMap, Open datasets, Lidar, Old maps
- **Methods:** RRC fly-over survey and Google Street View
- **Outputs:**
  - Pressure identification and mapping
  - Hydromorphological condition assessment
  - WFD status
  - Land use mapping
  - Historical and landscape context

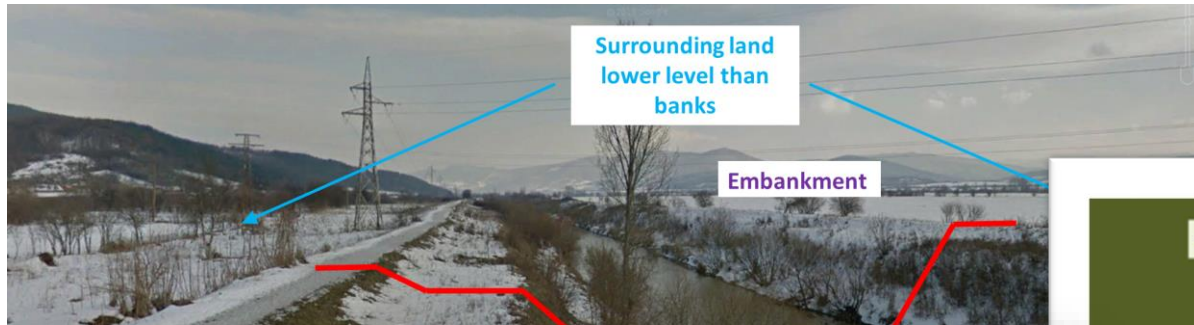
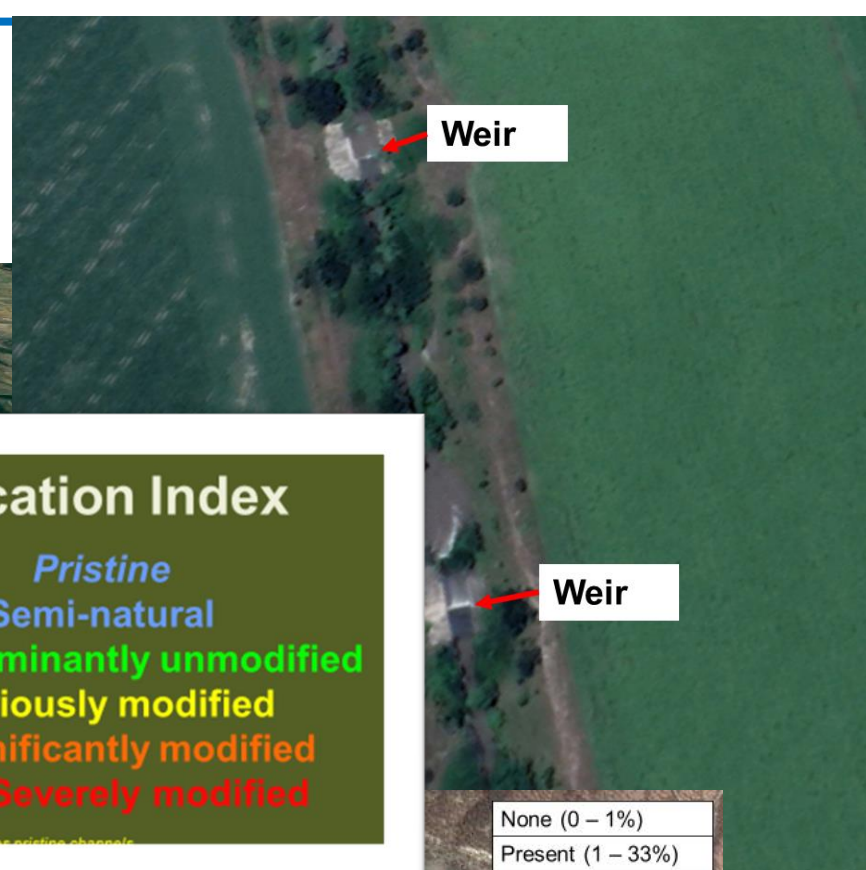


Update regularly





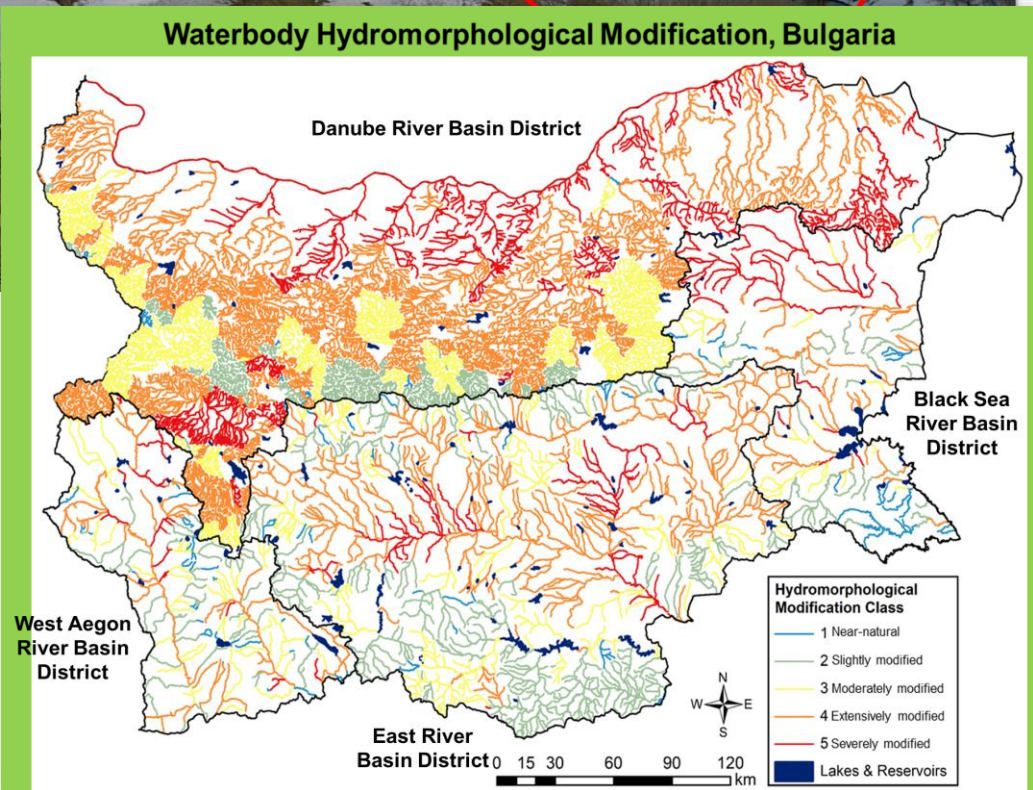
# Fly over survey



## Habitat Modification Index

|              |                          |
|--------------|--------------------------|
| 0            | <i>Pristine</i>          |
| [0 - 14[     | Semi-natural             |
| [14 - 100[   | Predominantly unmodified |
| [100 - 300[  | Obviously modified       |
| [300 - 600[  | Significantly modified   |
| [600 or more | Severely modified        |

Footnote: "semi-natural" includes existing channels



|                   |
|-------------------|
| None (0 – 1%)     |
| Present (1 – 33%) |
| Extensive (≥ 33%) |
| Not Visible       |
| Not Known         |



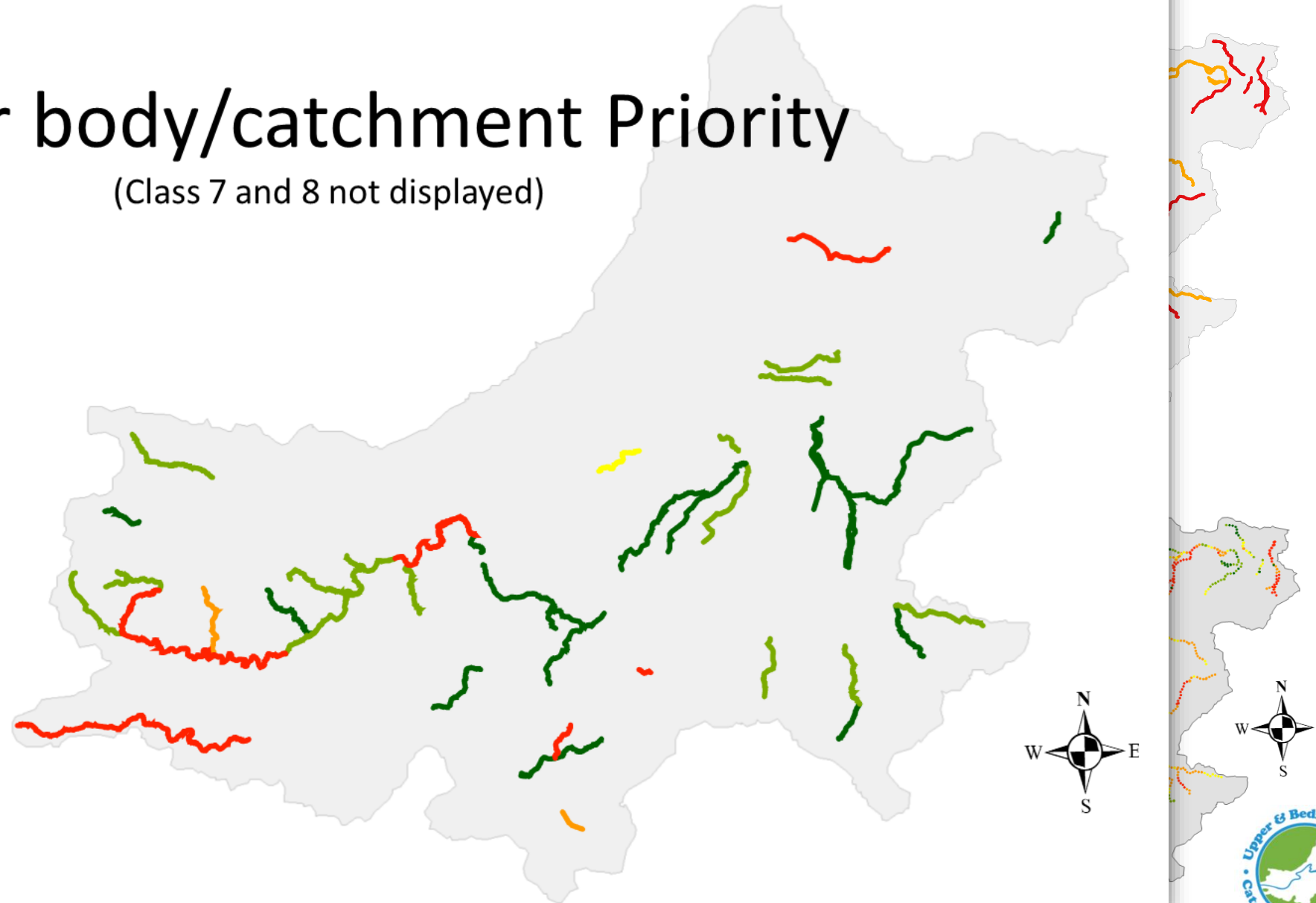


# Water body/catchment Priority

(Class 7 and 8 not displayed)

## Priority

- 1
- 2
- 3
- 4
- 5





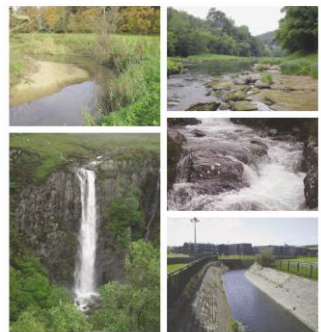
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# 2 –Field surveys

- **Continuous data recording:** RRC walkover survey, 360 photographs
- **Survey methodologies:** River Habitat Survey, RHAT, MIMAS, Mesohabitat mapping.
- **Outputs:**
  - Ground truth desktop and fly over assessments
  - Collect more detailed information on river quality and pressures
  - Identification of river restoration measures and opportunities



River Habitat Survey in Britain and Ireland



**The River Restoration Centre**  
CATCHMENT WALKOVER SURVEY - Version 1

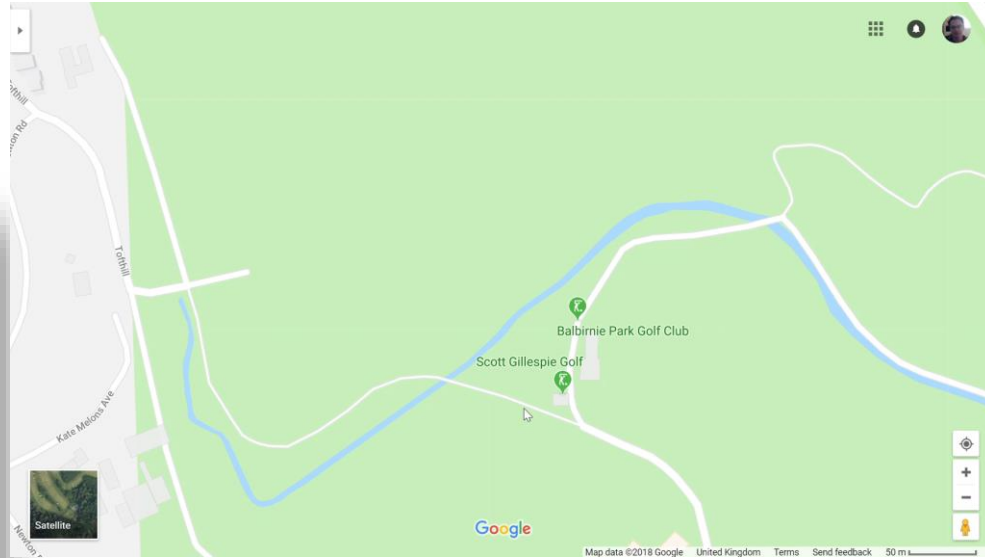
Field Survey Form

Reach description:  
 Reach length (m):   
 Reach length (ft):   
 Upland or lowland:  Upland  Lowland  
 River name:   
 Survey name:

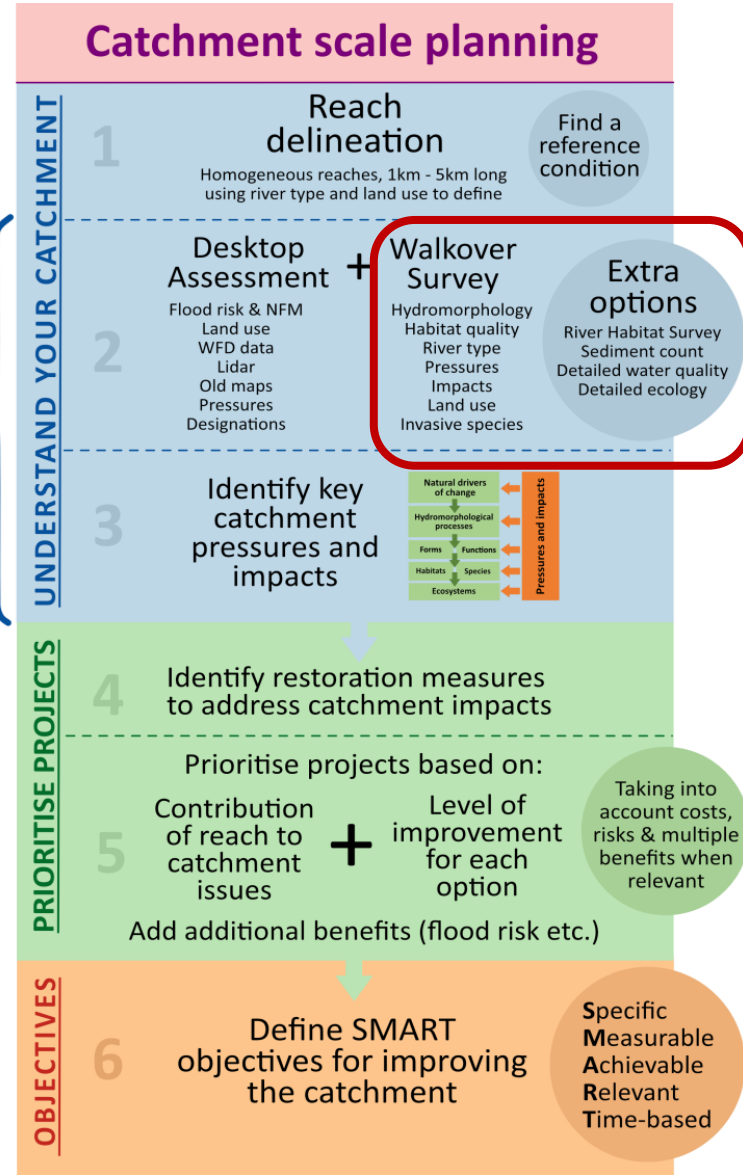
Pre-dominant Valley Form and Land Use:  
 Predominant valley form:  Upland  Lowland  
 Land use:  Agricultural  Residential  Industrial  Other

Artificial Features:  
 Is this reach part of a river or an artificial channel?  River  Artificial  
 Are adverse conditions affecting the survey?  Yes  No  
 Average river width (m):  Average river depth (m):   
 When options show with shaded boxes, tick one box only.

| Feature            | Code | Description | Code                | Description |   |
|--------------------|------|-------------|---------------------|-------------|---|
| Natural/unmodified | L    | R           | Artificial/modified | L           | R |
| Vertical control   |      |             | Reinforced          | whole       |   |
| Vertical width toe |      |             | Reinforced          | top only    |   |
| Stony (10%)        |      |             | Reinforced          | top only    |   |
| Concrete           |      |             | Reinforced          | top only    |   |
| Composite          |      |             | Artificial          | low stage   |   |
| Natural bank       |      |             | Poached             | bank        |   |
|                    |      |             | Enhanced            |             |   |
|                    |      |             | Set back            | embankment  |   |



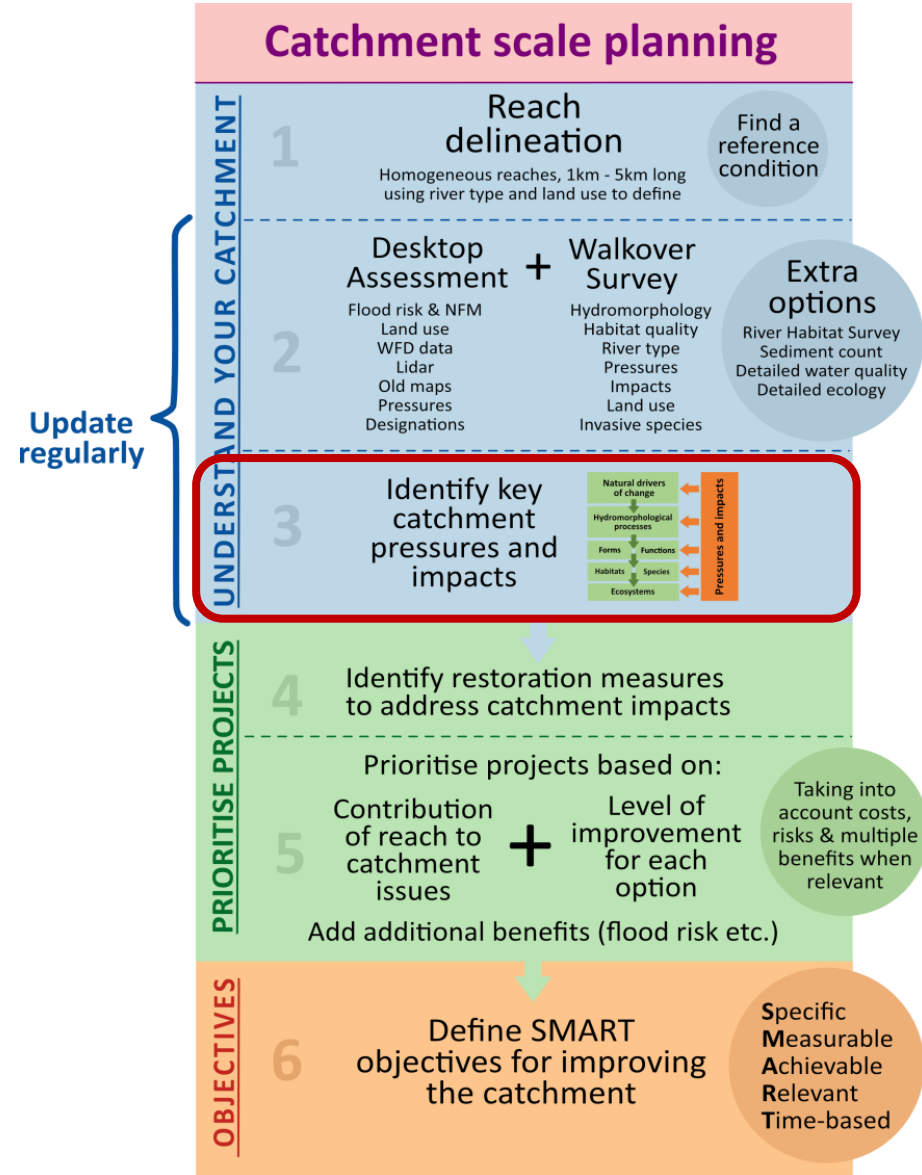
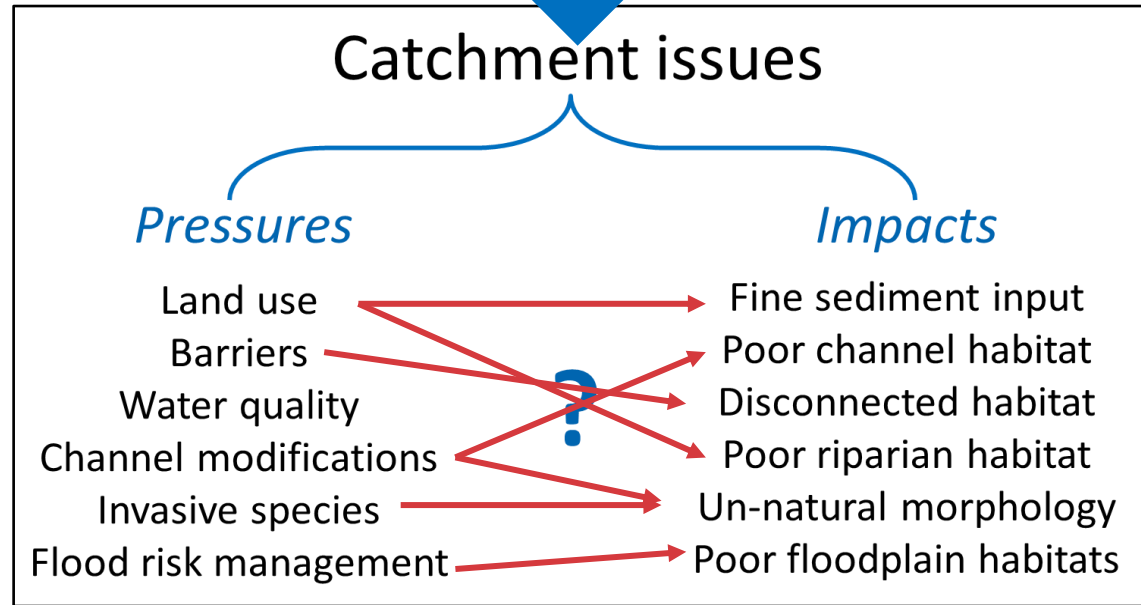
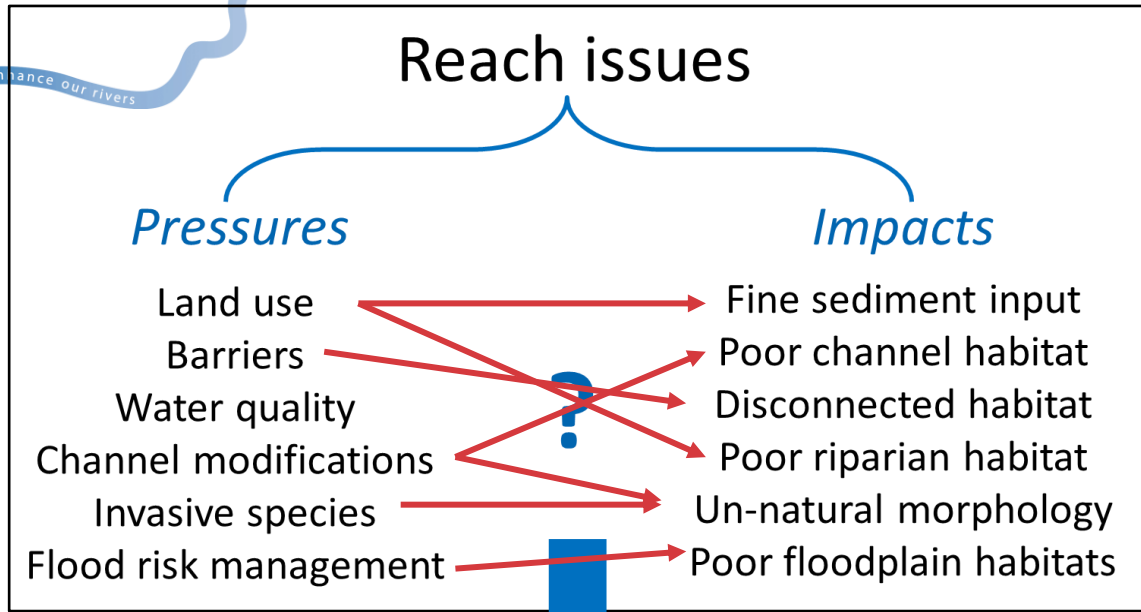
Update regularly







# 3 – Identify catchment pressures and impacts





Land use causing fine sediment inputs at the headwater

Transport of fine sediment exacerbated by realignment

Fine sediment accumulation caused by over-widening

MAP LEGEND

1



Google My Maps



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# 4/5 – Identify and prioritise restoration measures

## Catchment impacts

### Measures

| Details |                                                   |                                                                                  | Benefits to water body Impacts (0-low to 3 high) |                                     |                      |              |                        |                          |                            |                         |
|---------|---------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------|----------------------|--------------|------------------------|--------------------------|----------------------------|-------------------------|
| Reach   | Reach pressure                                    | Measure                                                                          | Water quality                                    | Poor geomorphic processes and forms | Poor habitat quality | Connectivity | Poor riparian habitats | Poor floodplain habitats | Fine sediment accumulation | Artificial bed material |
| 2       | Realignment, Bank protection & Resectioning       | 1 1 Remove bank protection on left bank                                          | 0                                                | 2                                   | 1                    | 0            | 1                      | 1                        | 0                          | 1                       |
|         |                                                   | 1 2 Remove bank protection on left bank and use large wood                       | 0                                                | 2                                   | 2                    | 0            | 1                      | 1                        | 0                          | 1                       |
|         |                                                   | 1 3 Re-meander channel                                                           | 0                                                | 2                                   | 2                    | 0            | 1                      | 0                        | 0                          | 0                       |
|         |                                                   | 1 4 Remove artificial material from the channel                                  | 0                                                | 1                                   | 0                    | 0            | 0                      | 0                        | 0                          | 2                       |
|         | Weir                                              | 1 1 Remove weir                                                                  | 0                                                | 1                                   | 0                    | 2            | 0                      | 0                        | 0                          | 0                       |
|         |                                                   | 1 2                                                                              | 0                                                | 2                                   | 1                    | 2            | 0                      | 0                        | 0                          | 0                       |
|         | Urban land use                                    | na No feasible option to remove land use                                         | 0                                                | 2                                   | 1                    | 0            | 1                      | 1                        | 0                          | 1                       |
|         | Bridges                                           | 1 1 Remove large bridge abutments                                                | 0                                                | 1                                   | 1                    | 0            | 0                      | 0                        | 1                          | 0                       |
|         | Outfalls                                          | 1 1 Survey and monitor outfalls to identify issues                               | 1                                                | 0                                   | 0                    | 0            | 0                      | 0                        | 0                          | 0                       |
|         | Invasive species                                  | 1 1 Control the patch of Japanese Knotweed so that it does not spread downstream | 0                                                | 0                                   | 0                    | 0            | 1                      | 1                        | 0                          | 0                       |
| N/A     | 1 1 Create more diversity in square ponds         | 0                                                                                | 0                                                | 0                                   | 0                    | 0            | 1                      | 0                        | 0                          |                         |
| N/A     | 1 1 Improve access to the river for the community | 0                                                                                | 0                                                | 0                                   | 0                    | 0            | 0                      | 0                        | 0                          |                         |

Reach Pressures

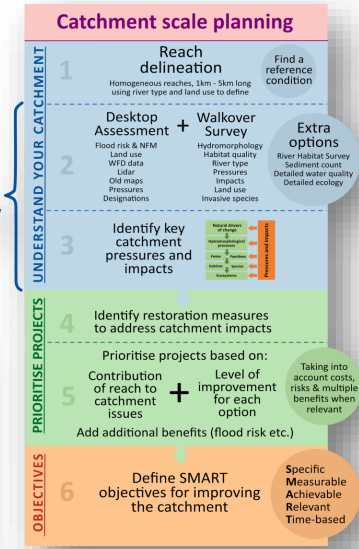
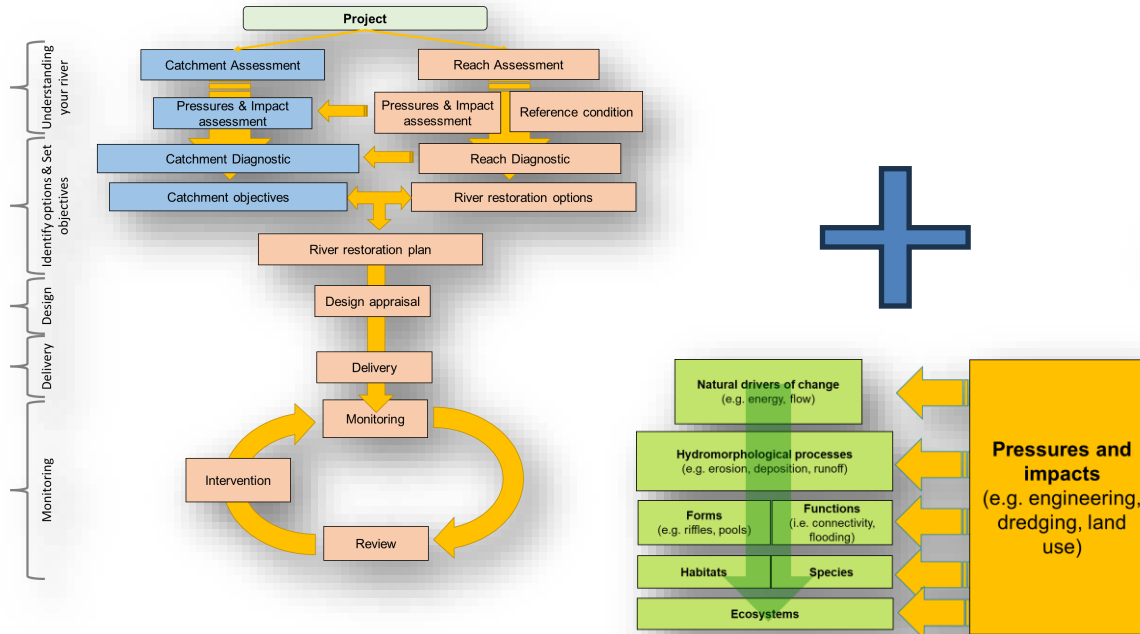
Link



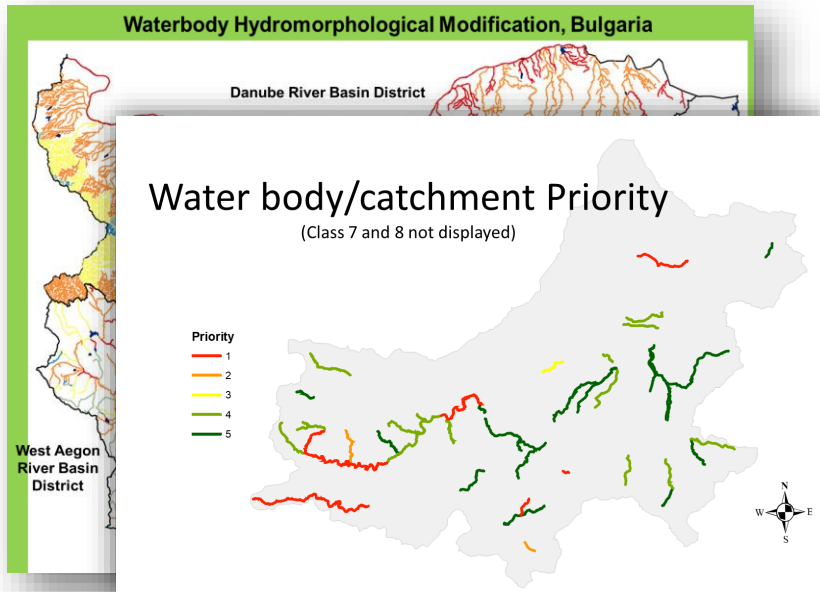




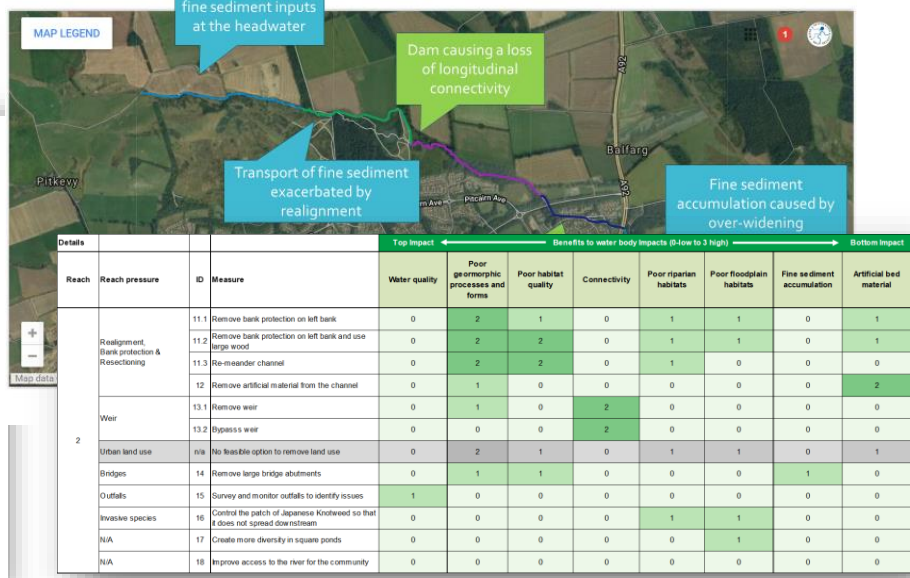
# Summary



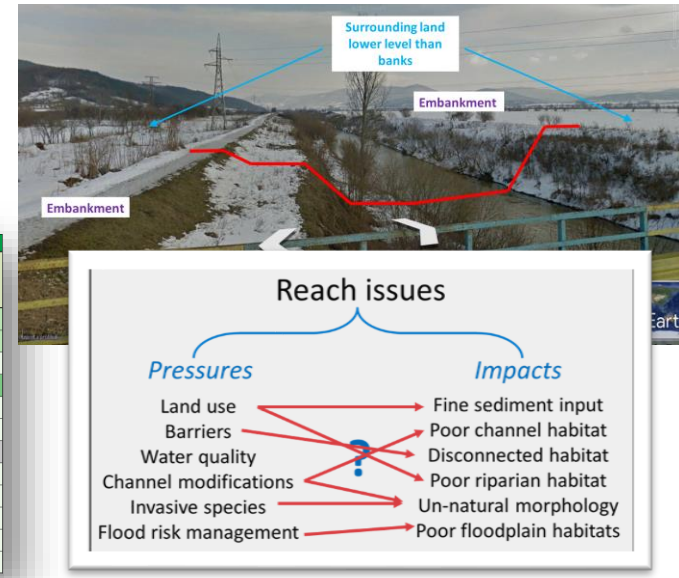
## National/regional scale



## Catchment scale



## Reach scale





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# Useful links

RRC training page: <https://www.therrc.co.uk/rrc-courses-and-workshops>

RRC training platform: <https://www.therrc.co.uk/learn>

River Habitat Survey: [www.riverhabitatsurvey.org](http://www.riverhabitatsurvey.org)

Citizen River Habitat Survey: <https://www.therrc.co.uk/crhs>

## Applications with:



Sustainability at the heart of a living, working, active landscape valued by everyone



**the River Restoration Centre**  
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**25th RRC Annual Network Conference**  
**24th & 25th April 2024, Venue Cymru, Llandudno, North Wales**

**CALL FOR ABSTRACTS OPEN!**

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