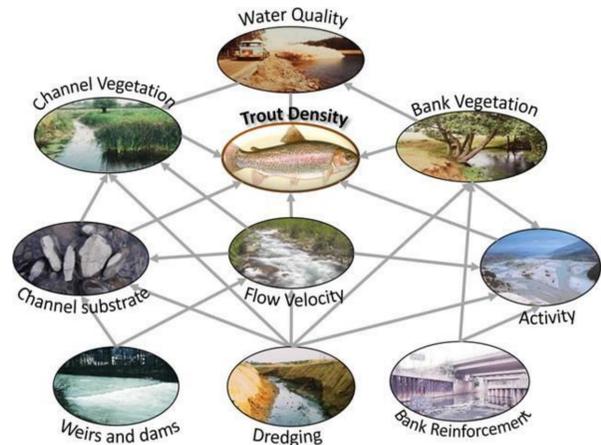




# A global literature review summarising research on control-responses shaping river ecosystems

## Introduction

Identifying control-responses between river ecosystem properties can aid management decisions, such as identifying factors affecting brown trout (right). We performed a global literature review search to identify key control-responses that could inform models incorporated within our OFWAT funded project 'CatchmentLIFE'.



## Results

In total, 1058 papers containing 3050 control-response linkages were identified. Human activities (e.g., dams, climate change) affecting hydrological properties (e.g., droughts, floods) have been most widely researched, followed by land cover effects on water quality and water quality impacts on ecology (e.g., fish and macroinvertebrates).

| Responses      | Controls         |                          |            |           |                |               |         |      |
|----------------|------------------|--------------------------|------------|-----------|----------------|---------------|---------|------|
|                | Human activities | Management interventions | Land cover | Hydrology | Hymo / Habitat | Water quality | Ecology | Sum  |
| Hydrology      | 401              | 11                       | 117        | 0         | 12             | 0             | 0       | 541  |
| Hymo / Habitat | 278              | 32                       | 99         | 48        | 113            | 4             | 0       | 574  |
| Water quality  | 326              | 24                       | 399        | 111       | 39             | 18            | 4       | 921  |
| Ecology        | 266              | 30                       | 223        | 148       | 367            | 378           | 20      | 1432 |
| Sum            | 1271             | 97                       | 838        | 307       | 531            | 400           | 24      | 3468 |

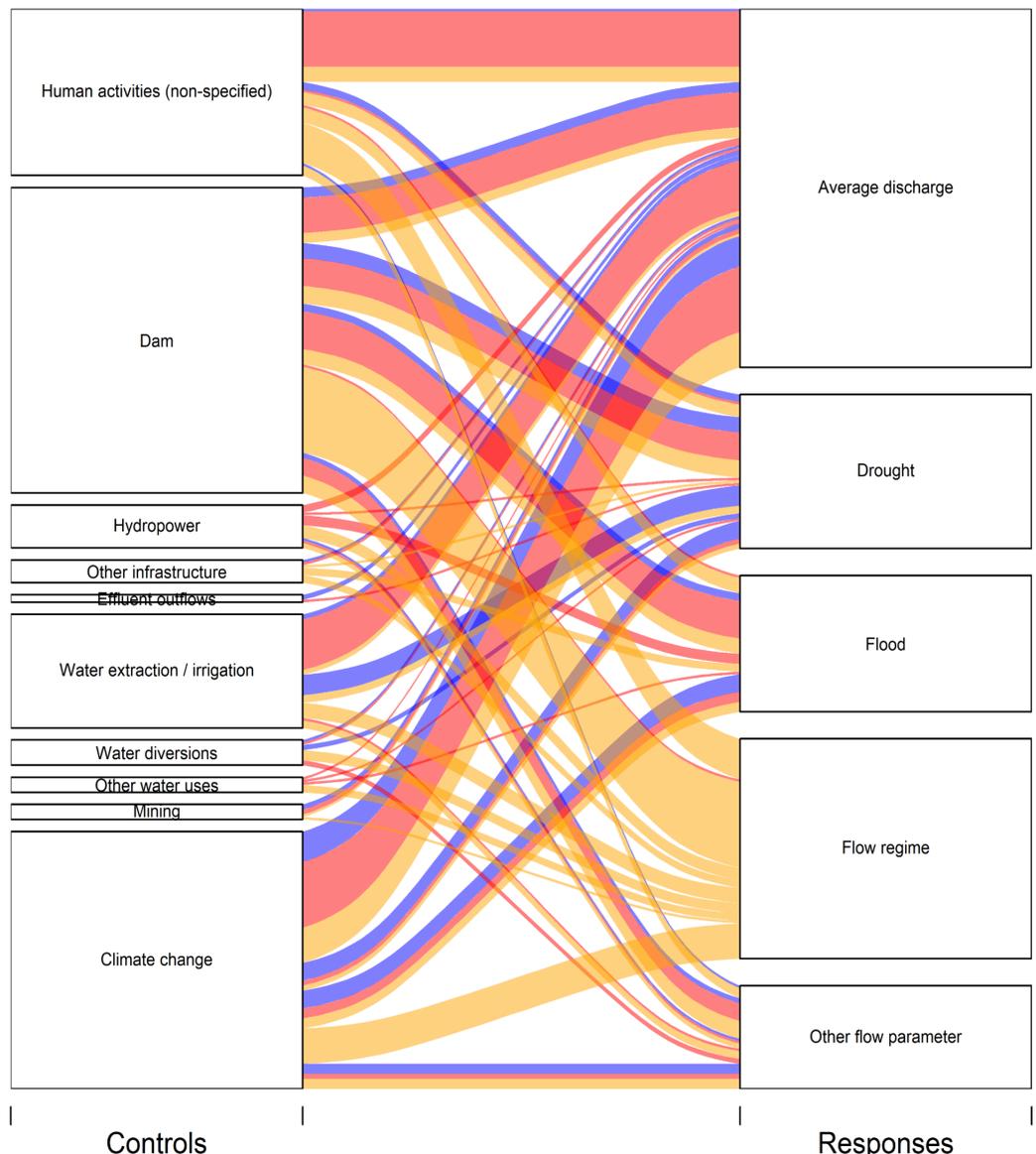
The number of control-response linkages within different categories. (Hymo / Habitat = Hydromorphology / Physical habitats)

We visualised relationships between control-responses and the amount of scientific evidence reflecting this. For example, the graph (right) shows how various human activities reduce water volumes, although dams can have variable hydrological effects depending on their operational regime.

## Implications and next steps

These results will be used in expert-led workshops, where ecologically relevant control-responses will be gleaned. This will inform statistical models in a decision support software – the main output of CatchmentLIFE. This will allow end-users to target key pressures are affecting river ecosystems in restoration schemes.

We will publish this data to help individuals to identify publications examining relationships potentially relevant to different management questions.



The number of linkages between certain human activities (control) and hydrological properties (responses). Thicker lines = more evidence. Blue = increase, red = decrease, orange = not clear.