



ACHIEVING FLOOD REDUCTION WITH NATURAL WATER RETENTION MEASURES IN AGRICULTURAL CATCHMENTS

Steering Group Meeting: Progress PhD

Pia Laue

CONTENT_

WHAT IS NWRM?

WHY NWRM IN IRELAND?

SLOWWATERS PROJECT

PHD AIMS ★

WHAT IS NWRM?_

“

ENHANCE THE WATER STORAGE POTENTIAL OF LANDSCAPE, SOIL, AND AQUIFERS, BY RESTORING ECOSYSTEMS, NATURAL FEATURES AND CHARACTERISTICS OF WATER COURSES AND USING NATURAL PROCESSES.

European Union

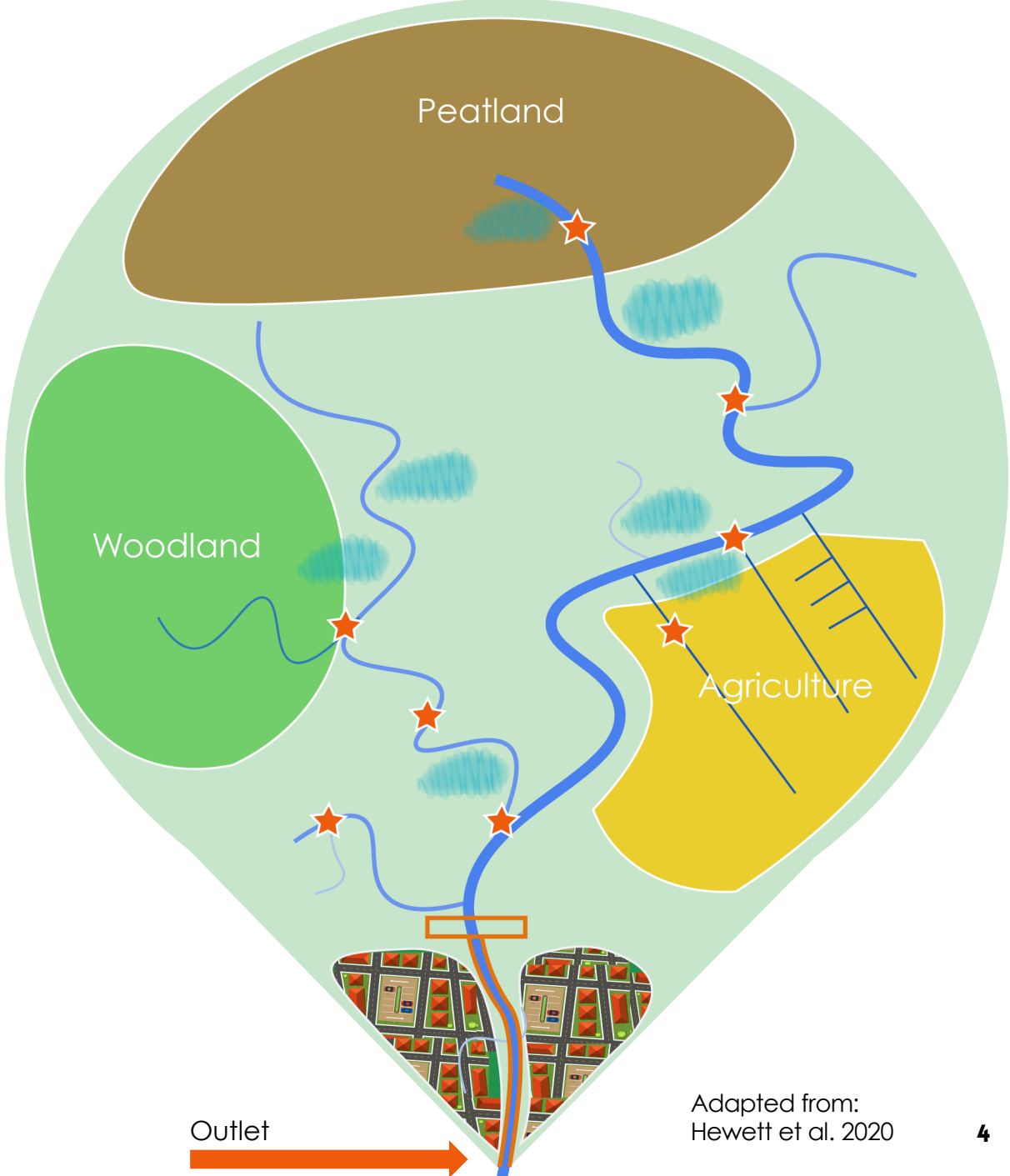
KEY MECHANISMS_

1 INCREASING STORAGE

2 INCREASING ROUGHNESS

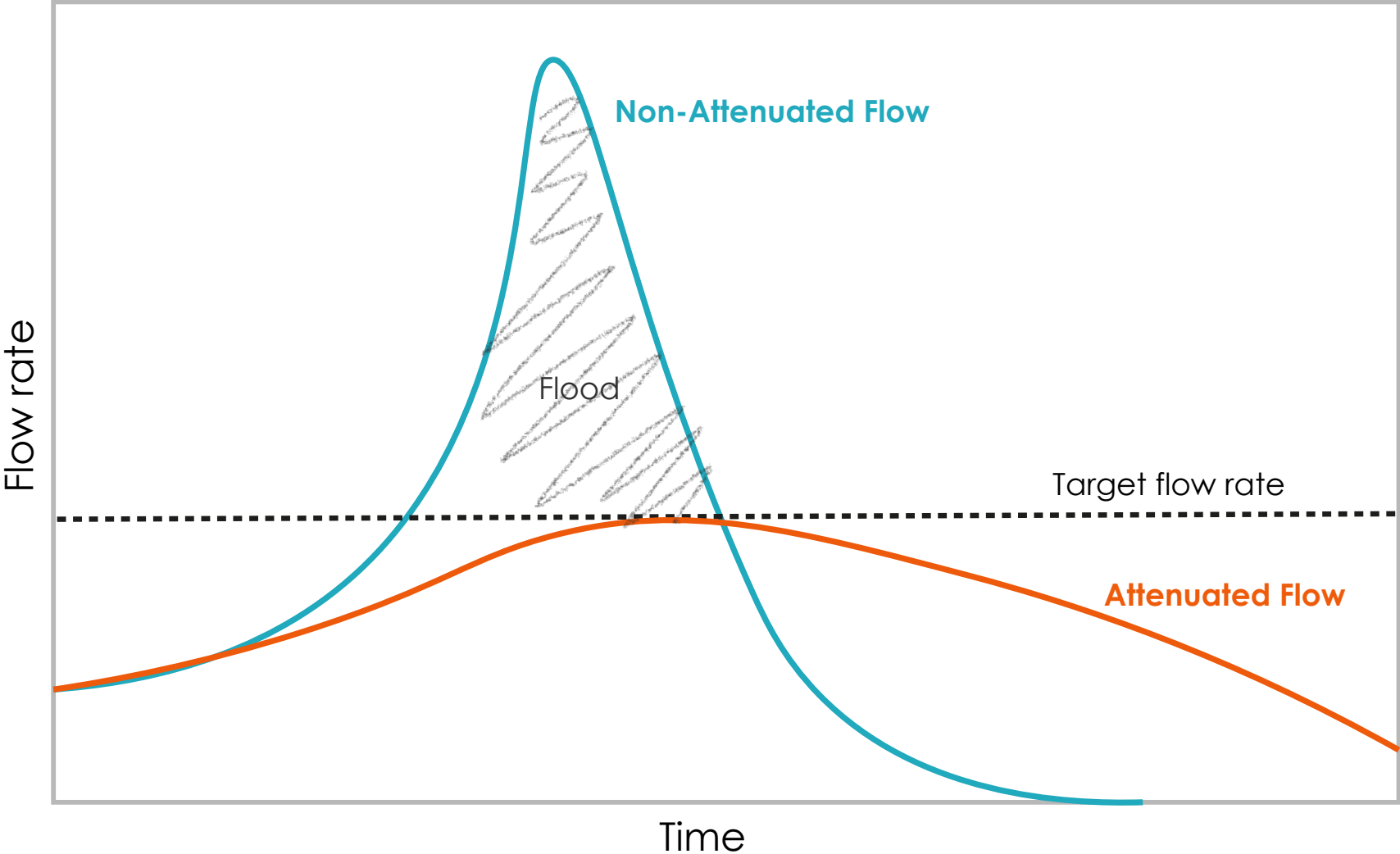
3 INCREASING LOSSES

4 DE-SYNCHRONISATION



Adapted from:
Hewett et al. 2020

FLATTEN THE CURVE_



WHY NWRM IN IRELAND?_

Feb 24th 2020 TheJournal.ie



'WE'RE AMATEUR METEOROLOGISTS AT THIS STAGE': LOCALS FEAR FURTHER FLOODING ALONG SHANNON AFTER OVERNIGHT RAIN.

13.6 mm of rain was recorded at Shannon Airport yesterday.

Feb 22nd 2020 IrishTimes.com



FLOODS IN THE MIDLANDS: 'IF THIS WAS HAPPENING IN DUBLIN IT WOULD BE FRONT-PAGE NEWS'

Farmers in flood-hit areas of the midlands say their situations are being ignored.

FLOOD DRIVERS_



LAND USE CHANGE

Urbanization

Deforestation

Intensification of Agriculture

AGRICULTURE

Soil compaction

Channel Modification

Increased Runoff

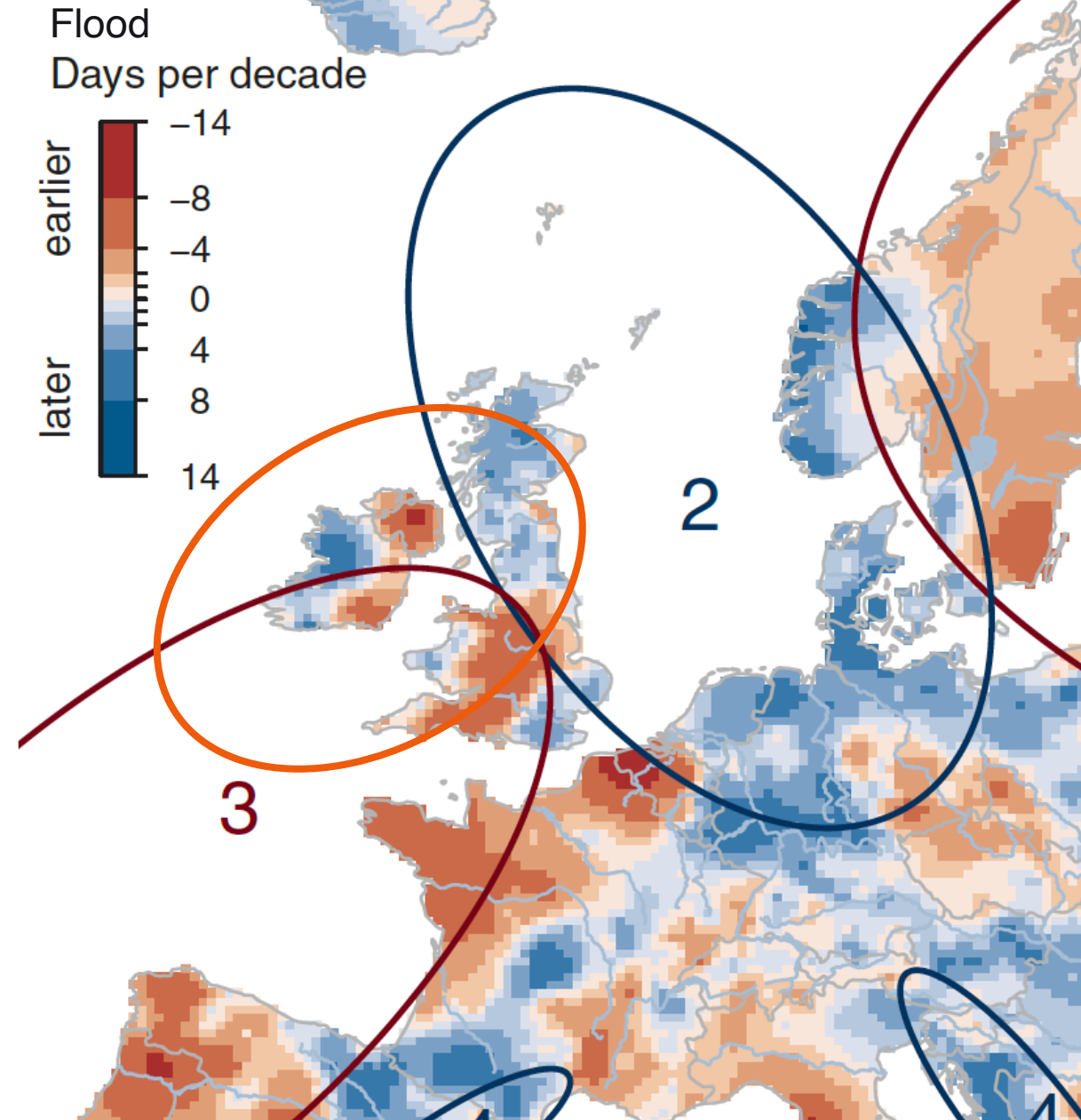
CLIMATE CHANGE_

1 EARLIER SNOWMELT

2 LATER WINTER STORMS

3 EARLIER SOIL MOISTURE MAX

4 STRONGER WINTER



PROJECT_

SlowMatters

FUNDED BY

Four-year project (2019-2023)
funded by the



AIMS

- 1** Install NWRM on agricultural land in Ireland
- 2** Process-based understanding of the effectiveness of NWRM
- 3** Provide data on wider benefits e.g. water quality of NWRM



COOPERATION

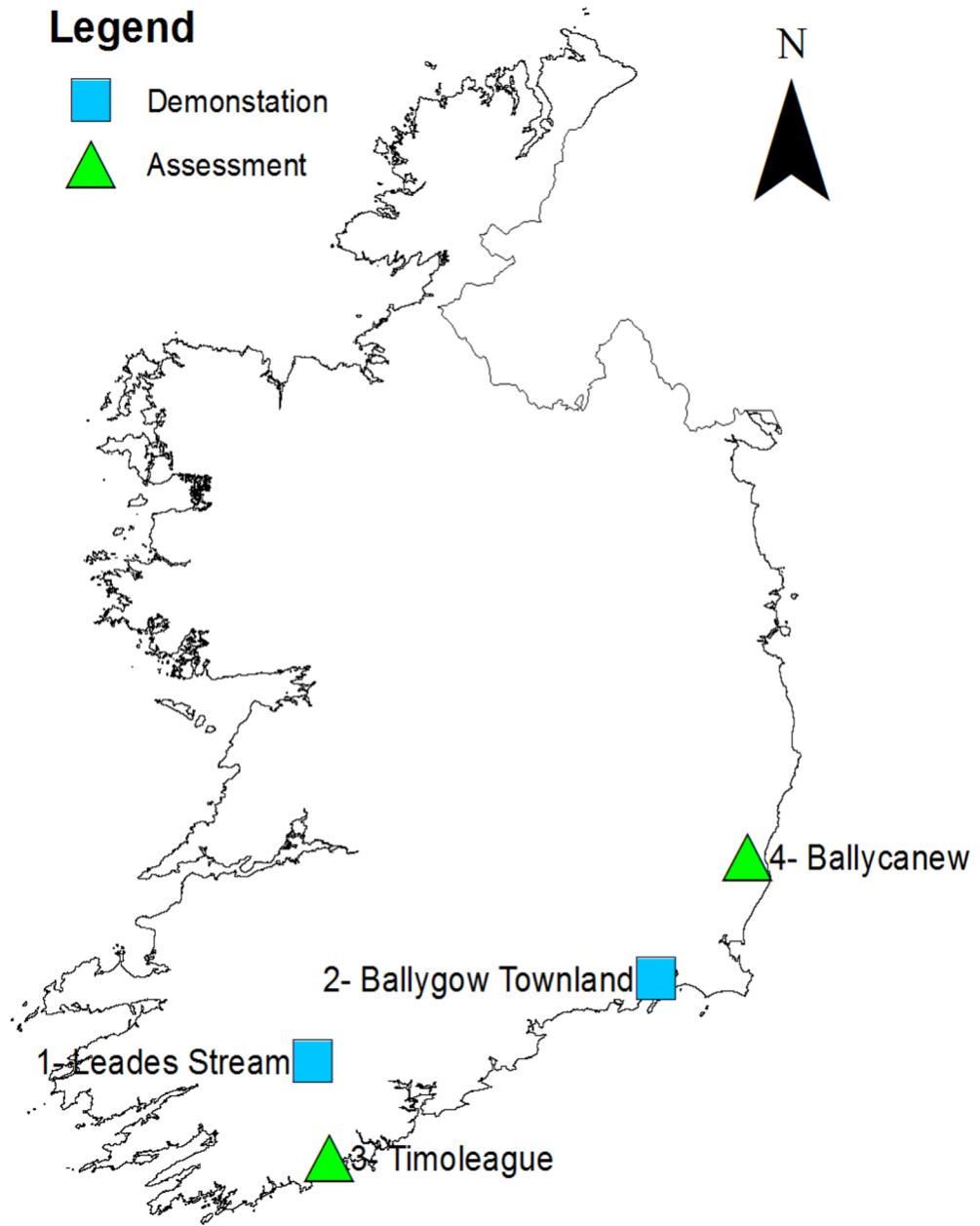
Trinity College Dublin
University College Cork
Newcastle University, UK
James Hutton Institute, Scotland

<https://nwr mireland.wordpress.com>

SITES_

Legend

-  Demonstration
-  Assessment



PHD AIMS_



1

DEMONSTRATION SITES

To evaluate the effectiveness of NWRM attenuation in reducing flood peaks and attenuation in two small (~1 km²) catchments in Ireland on agricultural land.

2

ASSESSMENT SITES

To evaluate approaches for scaling up attenuation potential in 10 km² and 100 km² catchments through modelling of 10-yr data sets in Ireland.

3

LITERATURE REVIEW

To critically evaluate the state of knowledge for NWRM in the wider literature and recommend best practice for different land uses in Ireland.

NWRM FEATURES_



EARTHEN BUNDS

In the corner of the fields. Draw off channel with an inlet armoured with coarse material to prevent scour. Soil bund at front of feature with a drainage pipe.

Attenuate floods

Nutrient retention

OFFLINE STORAGE

Ponds and wet areas in front of the bund structure. Retains flood water (300-800 qm³) for 12-24 hours.

Retain water

Increased biodiversity

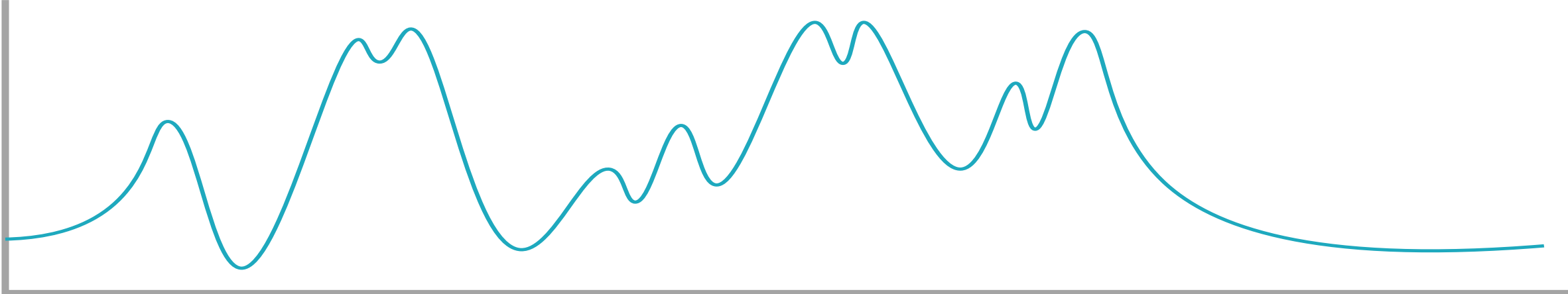
LEAKY BARRIERS

Large tree trunks spanning the width of the ditch. Potential for out of bank storage and flood attenuation. Constructed in series in Leades.

Attenuate floods

Water quality enhancement

METHODS_



MONITORING

- Water levels
- Rainfall

FIELD CHARACTERIZATION

- Stream
- Vegetation
- Soils
- DEM

EXISTING DATA

- Time Series Analysis
- (Flood) Modelling

DEMONSTRATION SITES

ASSESSMENT SITES



THANK YOU