Water for all:

towards a Payment for Ecosystem Services approach to water management in the Lunan Water, Scotland.

Upper Lunan Water Catchment – Eastern Scotland

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IWA-DP Thailand Nov 2018

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Scottish Government
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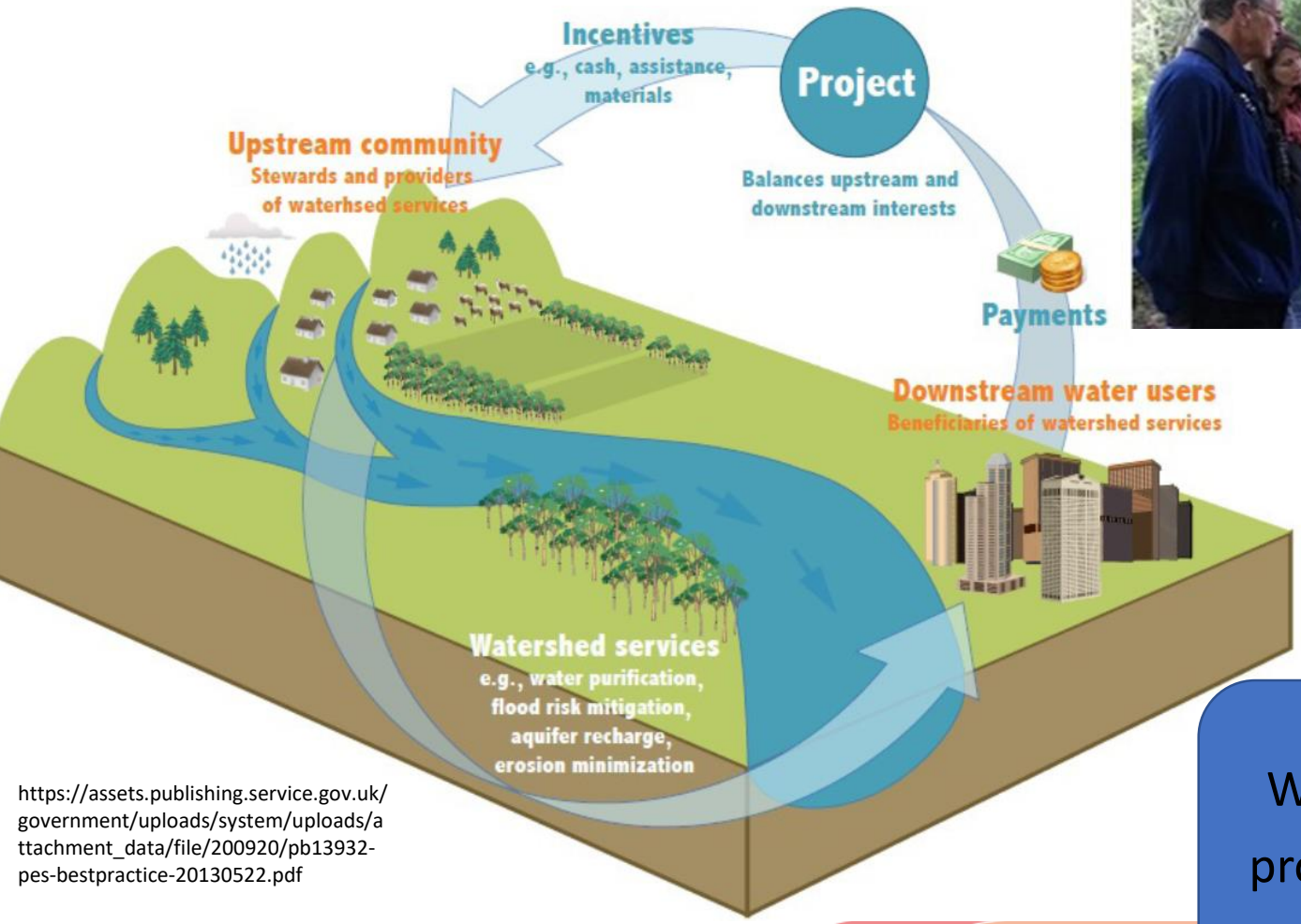
Payments for Ecosystem Services – Lessons (PES-LES)



https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/200920/pb13932-pes-bestpractice-20130522.pdf

What happens when we propose PES schemes for water management?

Lunan Water catchment
Eastern Scotland

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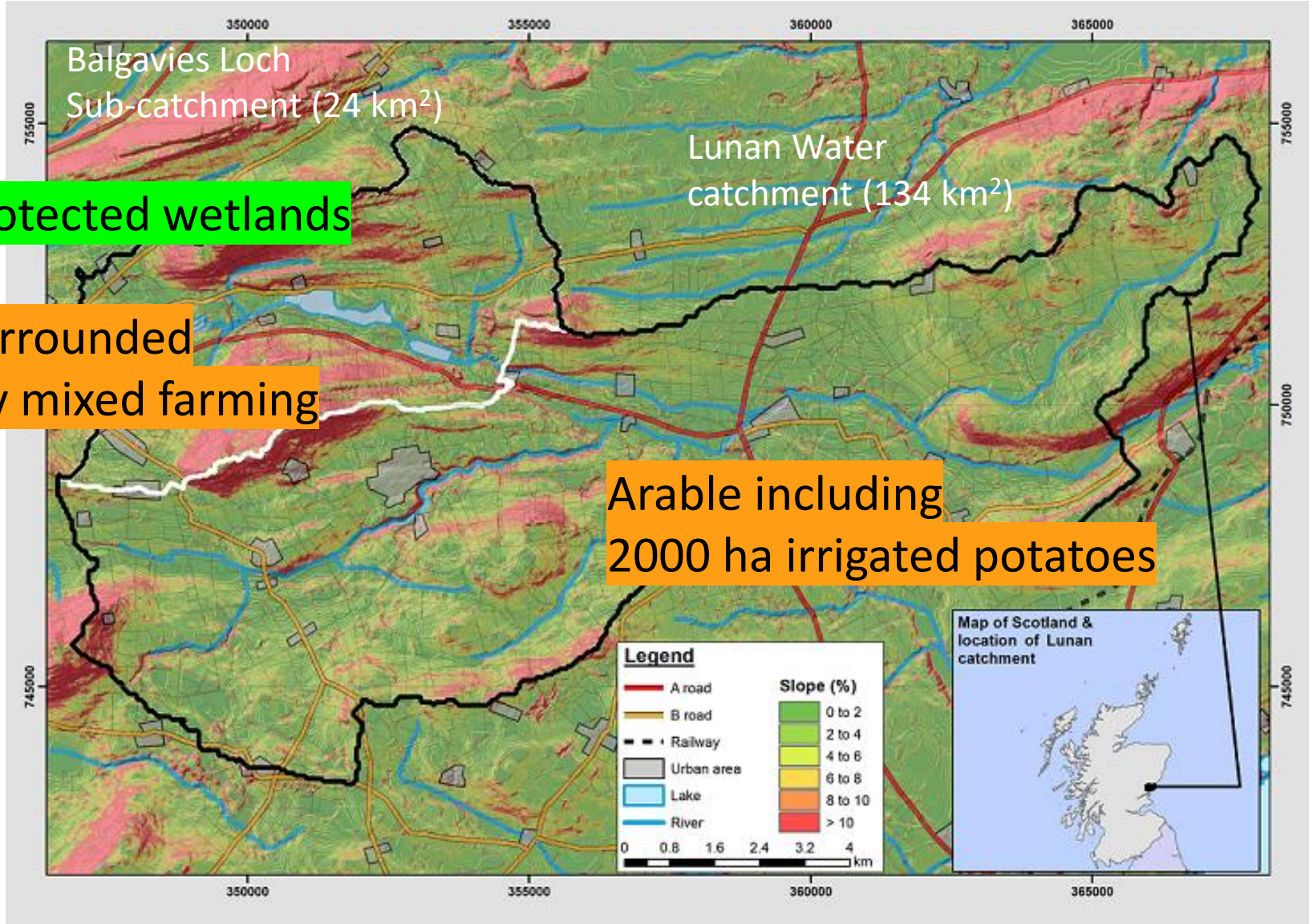
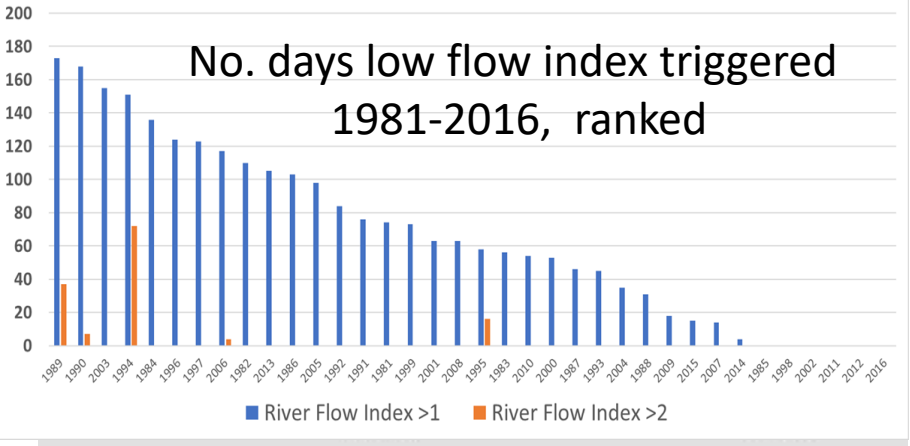
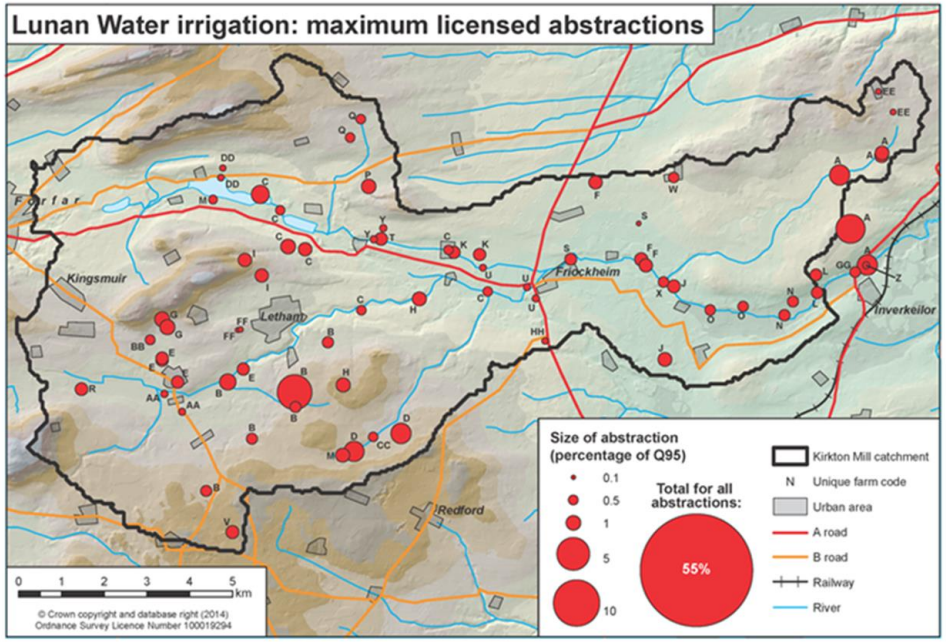


Wetland services for low flow



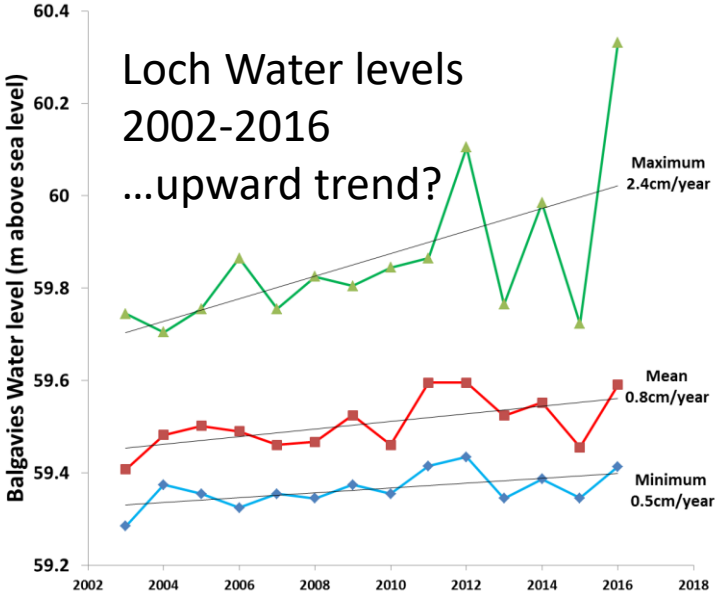


Wetland services for nutrients

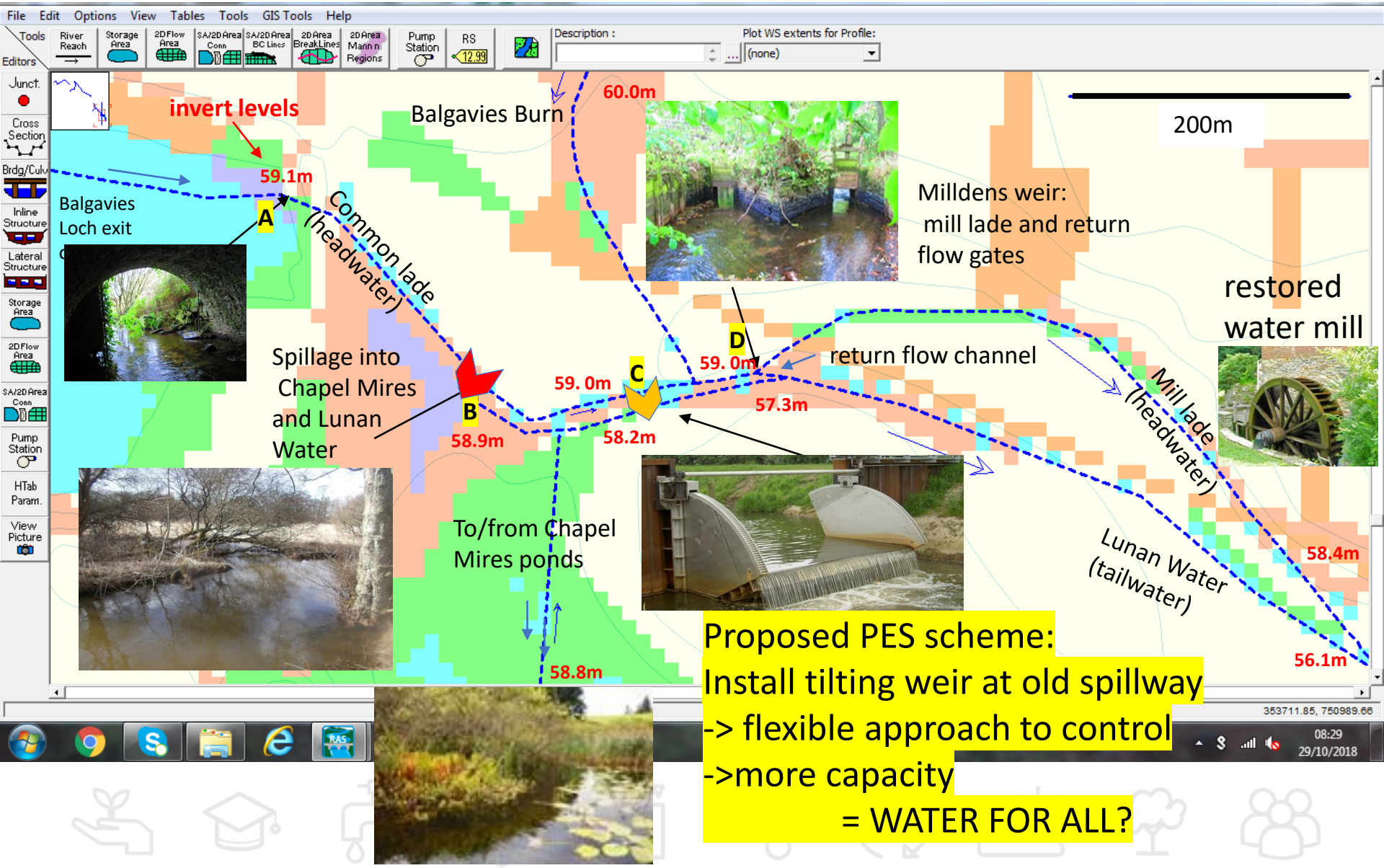
Wetland services at high flows

Upper catchment wetlands slow floodwaters but…

..do outlet hydraulic structures limit water release too much?

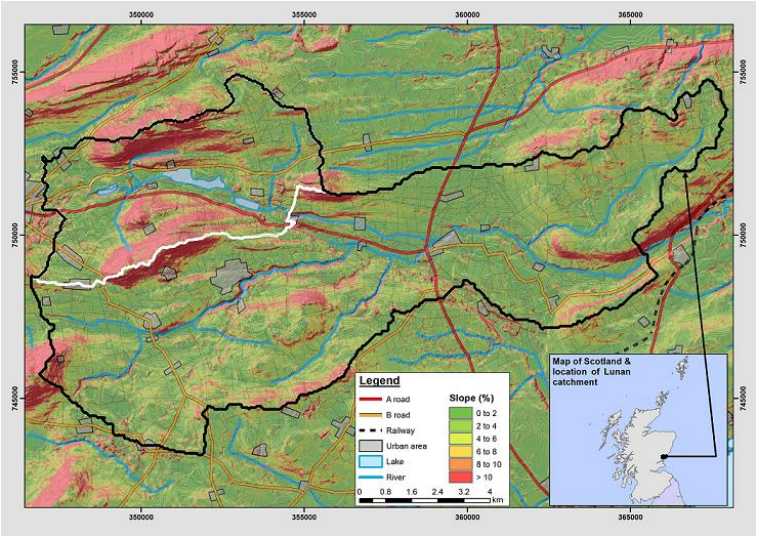


Historical hydraulic controls d/s Balgavies Loch



Lunan Catchment Management & PES - LES steering group (2016- present)

- Angus Council (chair)
- Scottish Natural Heritage
- Scottish Wildlife Trust
- Scotland Environment Protection Agency
- Esk Rivers and Fisheries Trust
- James Hutton Institute
- National Farmers' Union for Scotland



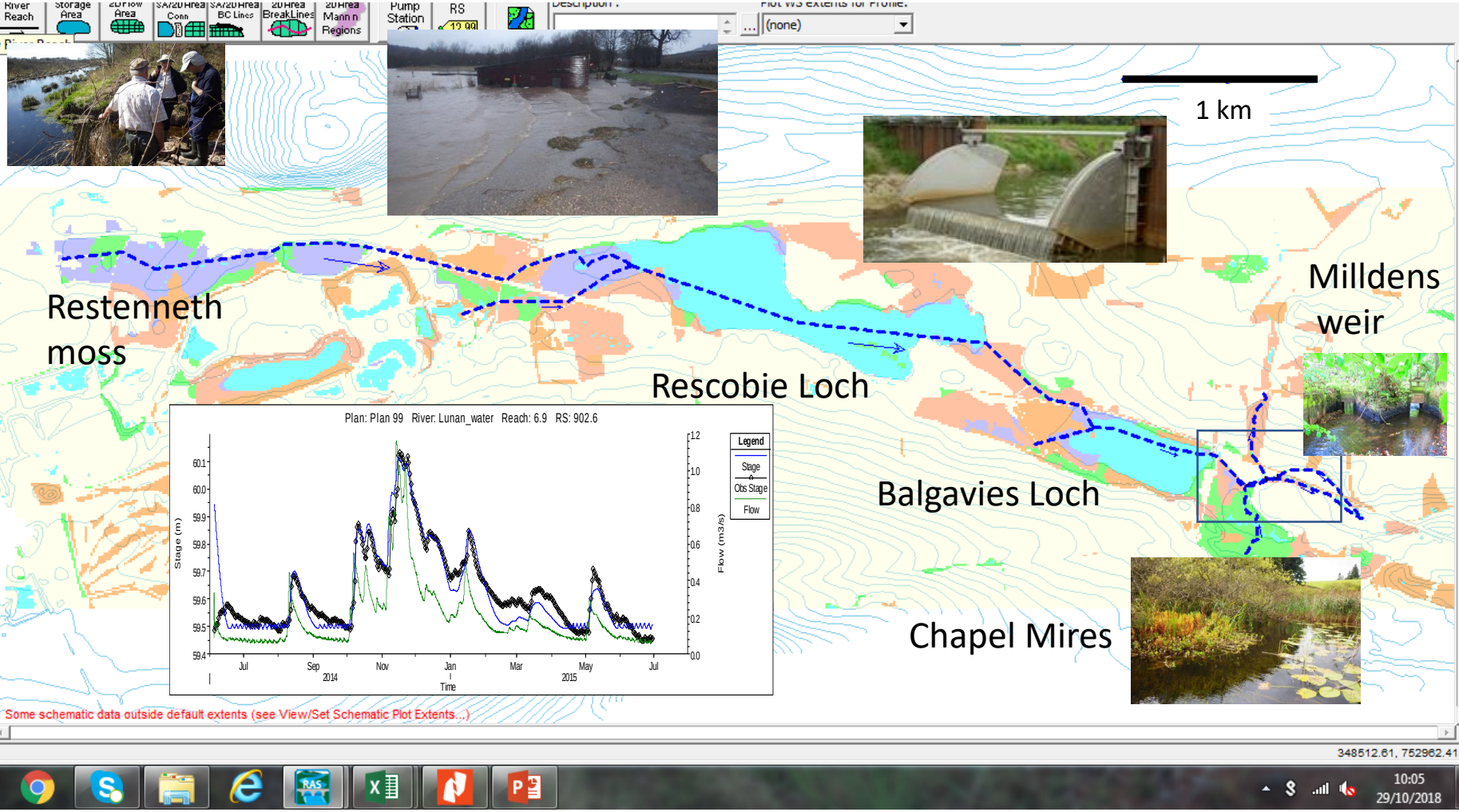
- Technical proof of concept for PES scheme

- Survey of attitudes in catchment

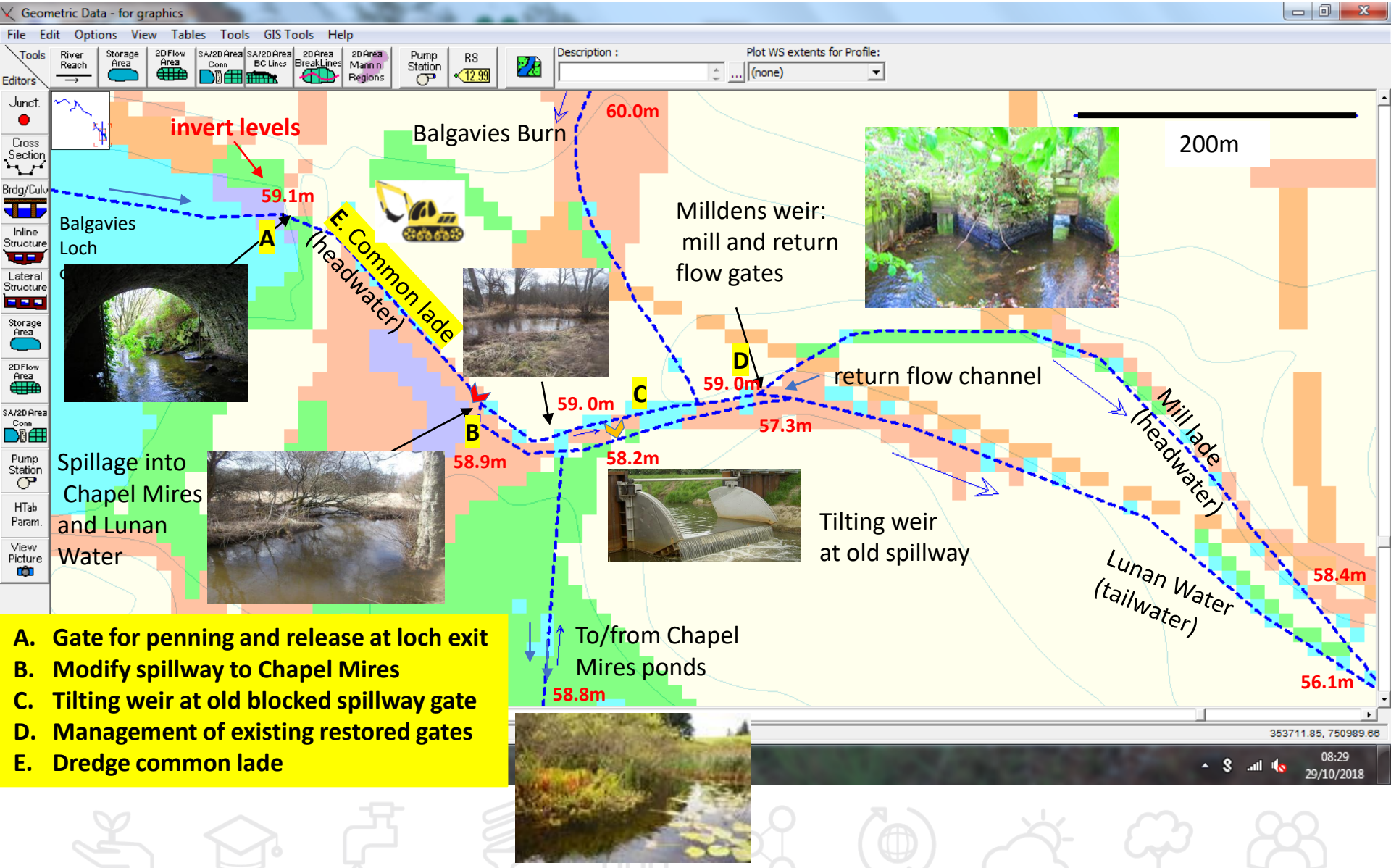
- Approaches to governance and regulation

Technical: Hydraulic model of upper catchment

HECRAS 5.0.1

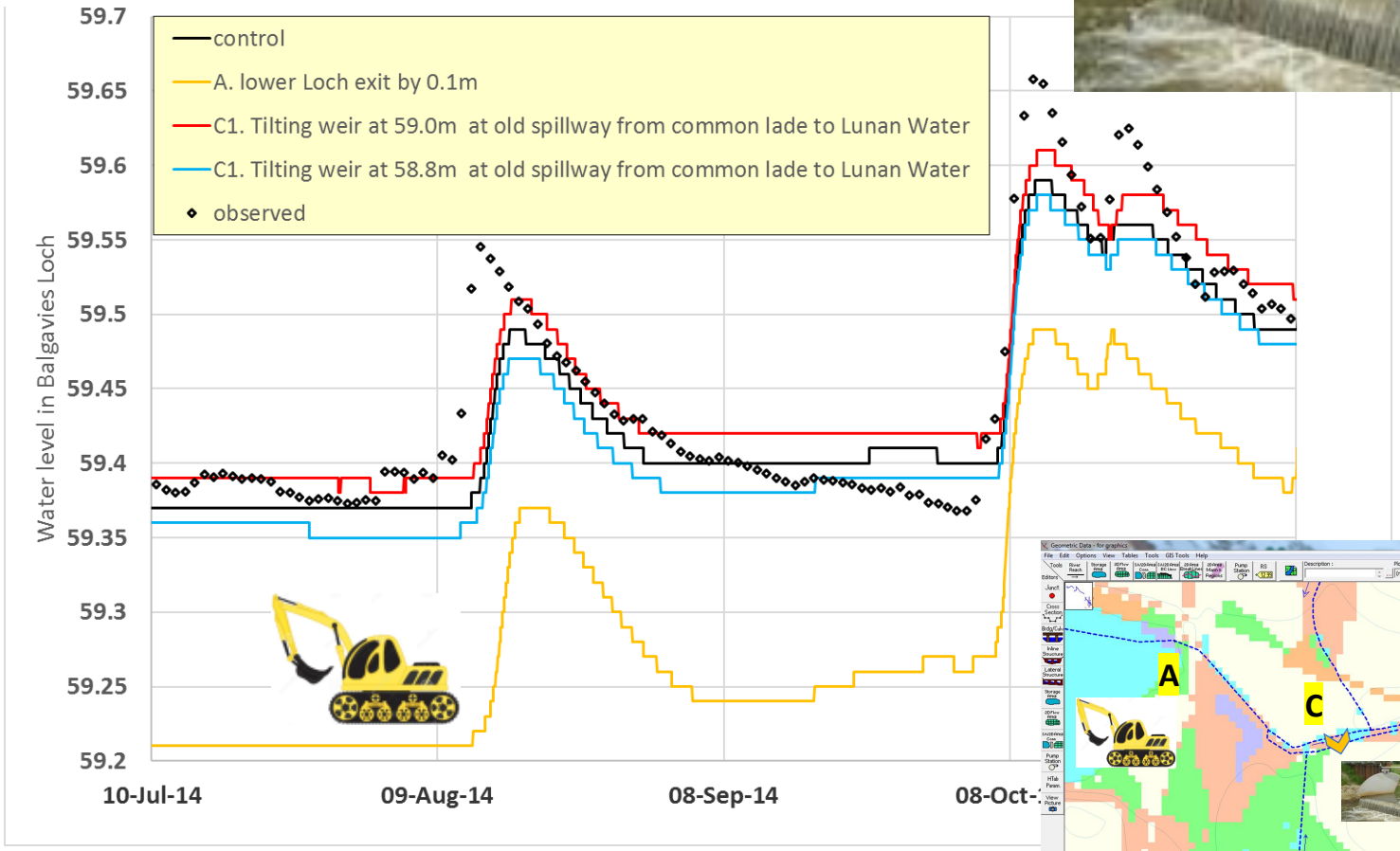


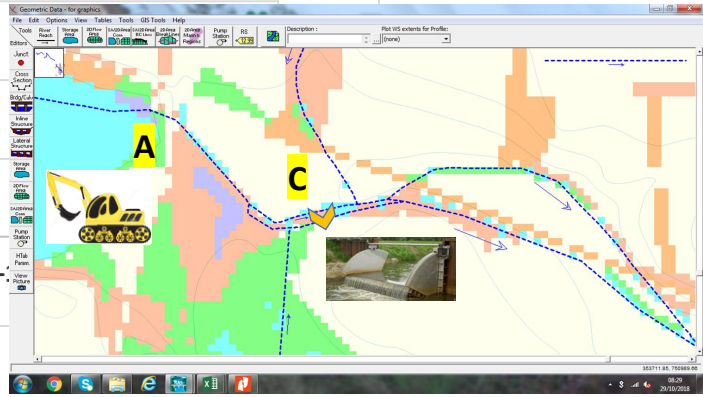
Scenarios for improvement in hydraulic controls



A. Gate for penning and release at loch exit
B. Modify spillway to Chapel Mires
C. Tilting weir at old blocked spillway gate
D. Management of existing restored gates
E. Dredge common lade

Upper catchment flood risk impacts

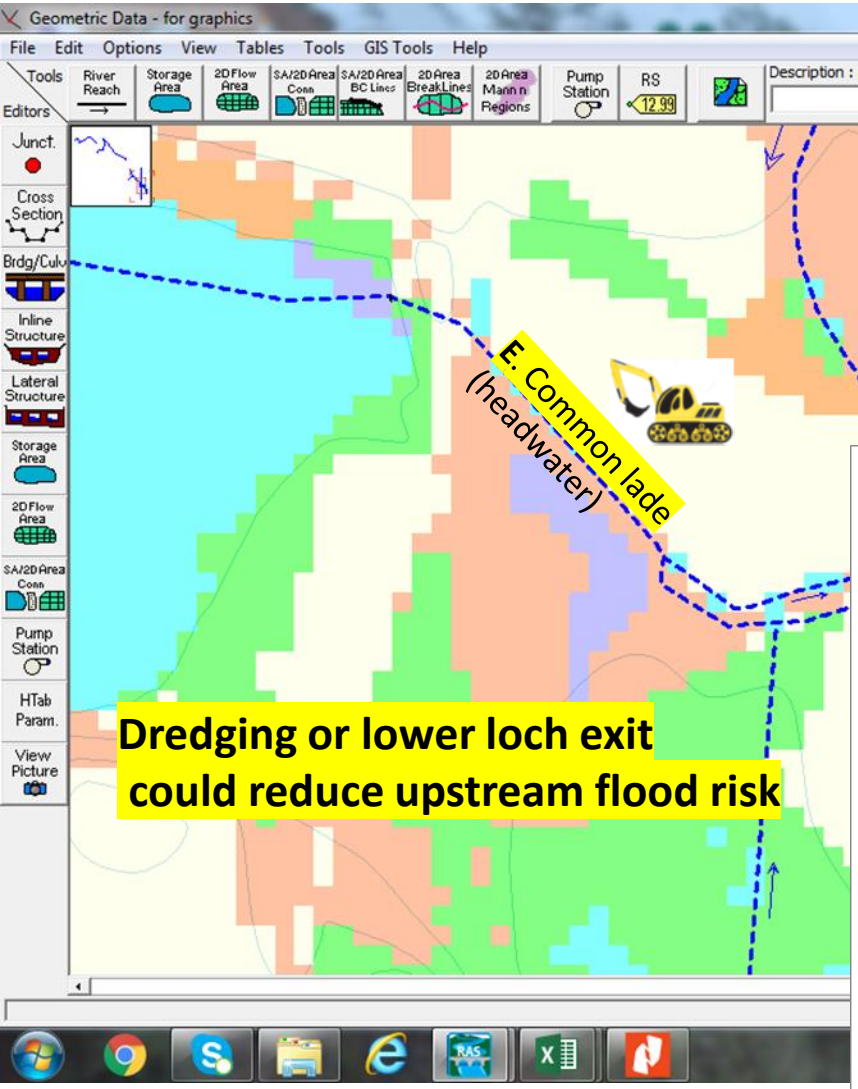


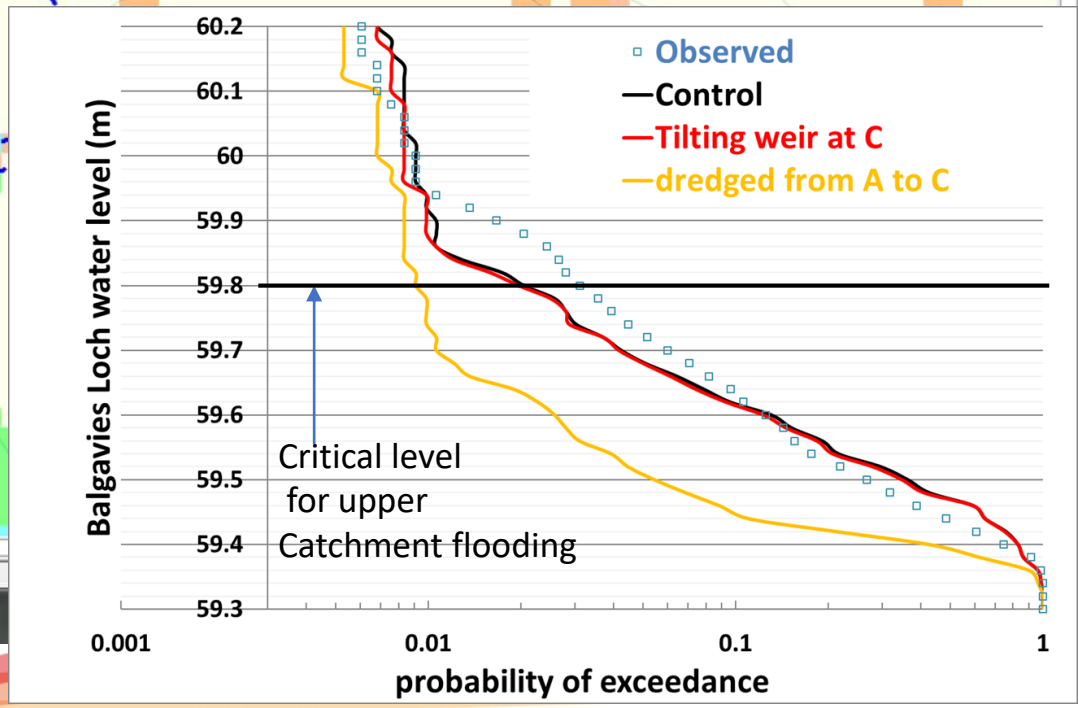


Tilting weir at C. old spillway not effective for lowering loch peak levels

Tilting weir at A. or dredging effective

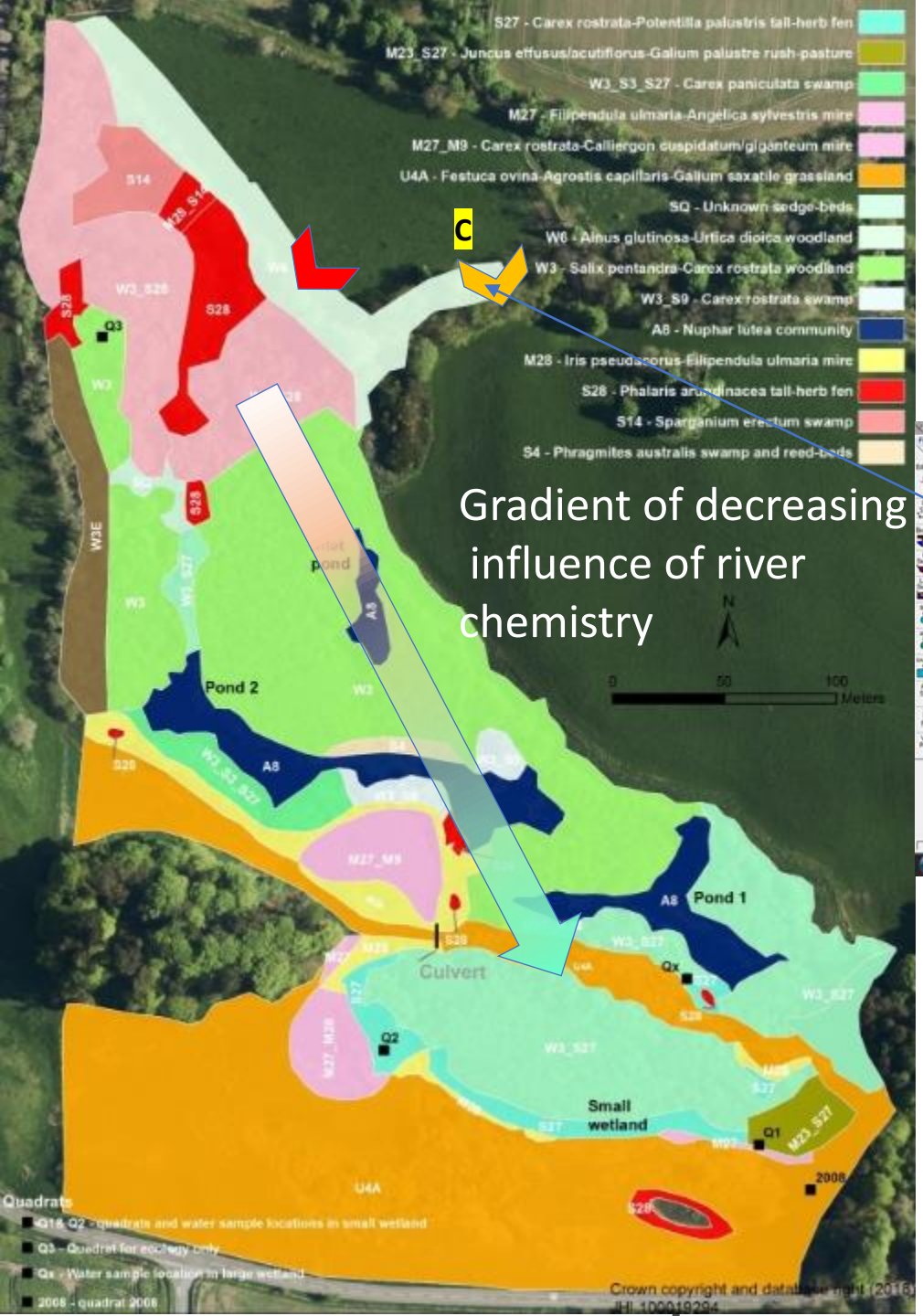
Flood risk benefits



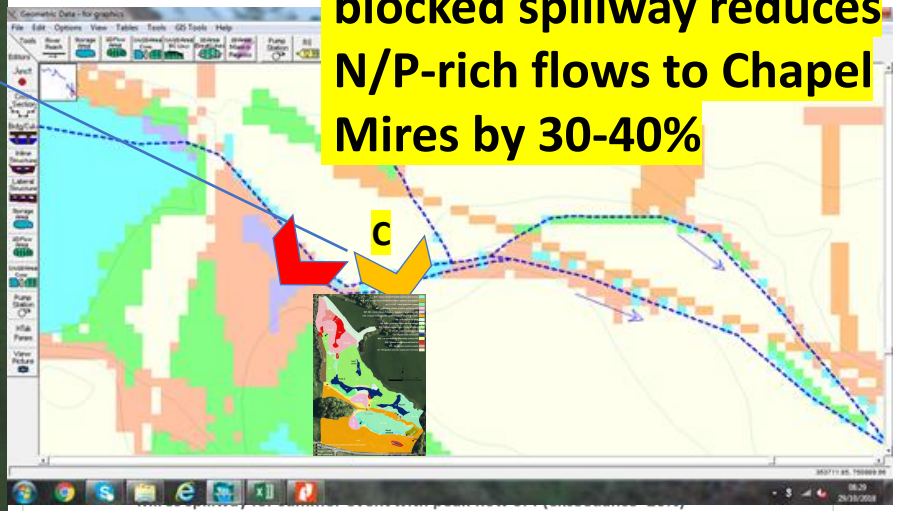


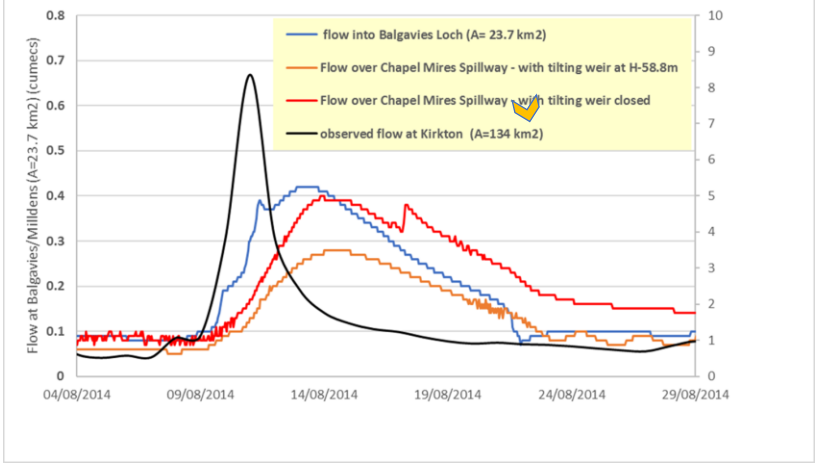
Nutrient management benefits

The James Hutton Institute

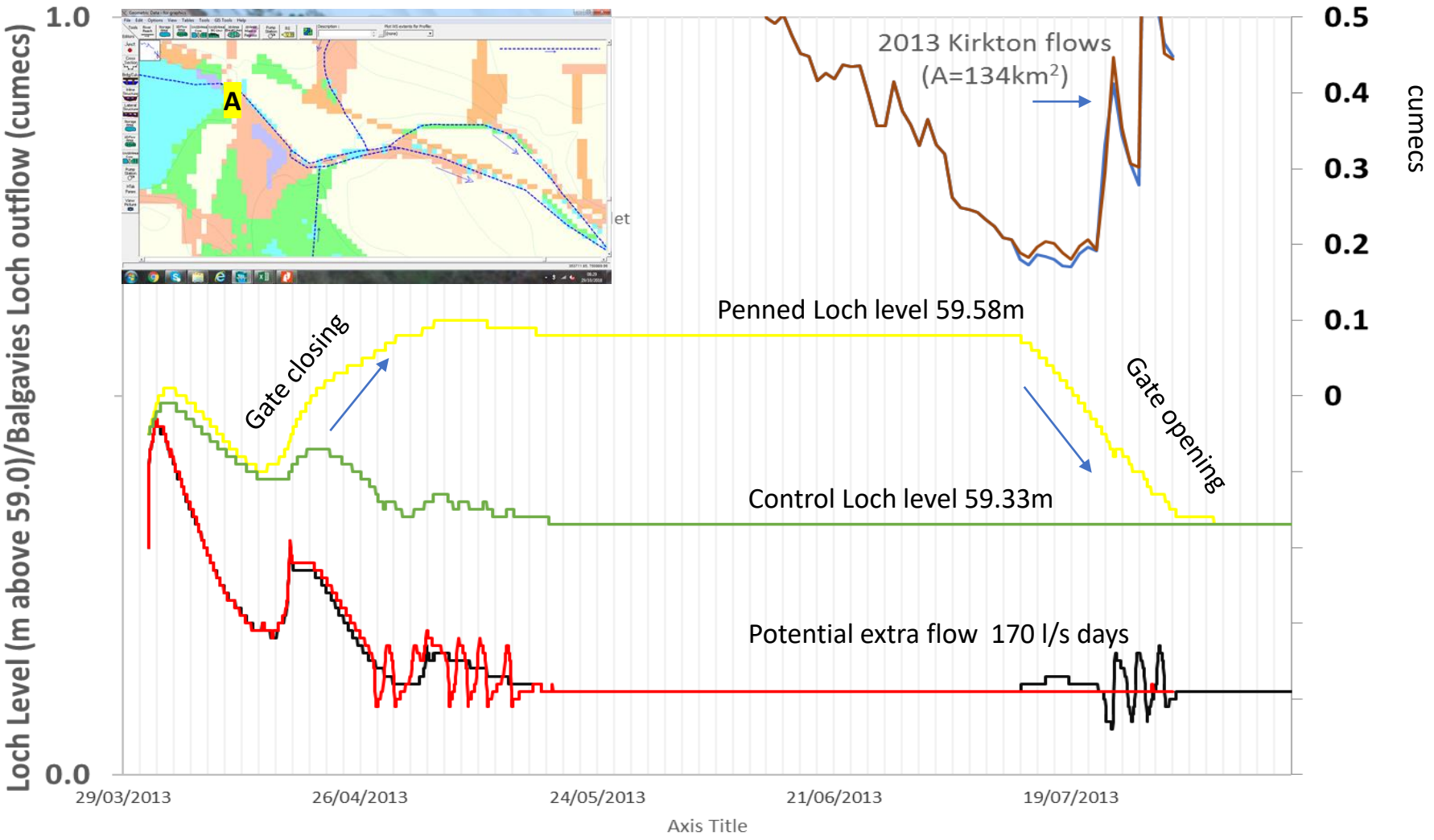


Tilting weir at site of old blocked spillway reduces N/P-rich flows to Chapel Mires by 30-40%





Low flow benefits of “store & release” from Loch



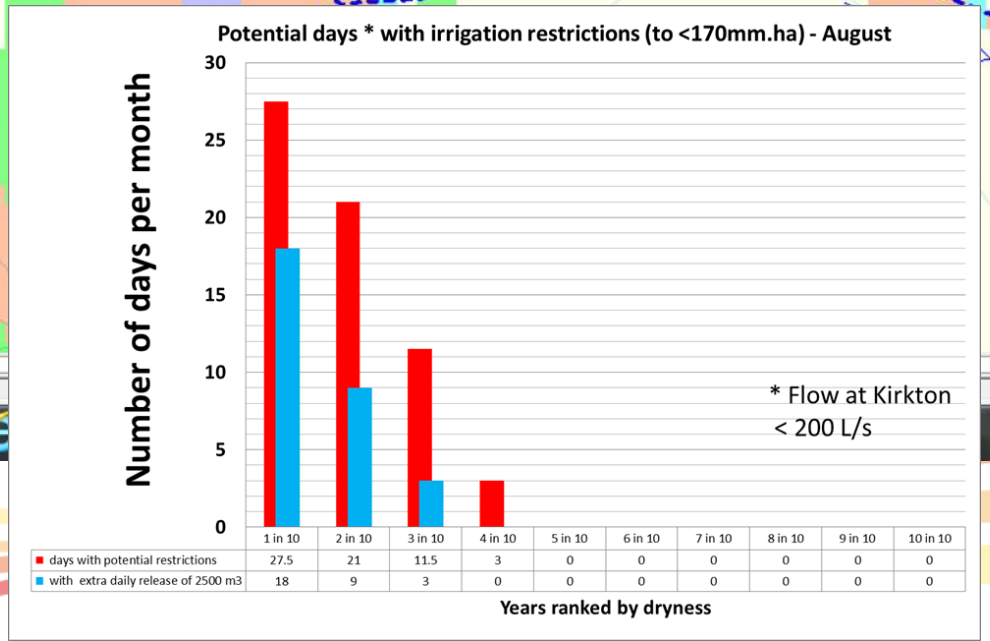
Low flow benefits

Geometric Data - for graphics

File Edit Options View Tables Tools GIS Tools Help

A

managing loch exit generates 170 L/s days during low flow



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Water for All : Improve management of water by flexible control of water flows

Local stakeholder concerns identified:

flooding, wetland ecology, irrigation, fisheries and water quality

Question:

Could water levels in lochs and wetlands be managed to give better ecosystem services across the catchment using smart hydraulic controls

Impact at low flows

- **Weir on Balgavies loch outlet**
- delay irrigation restrictions by 5-9d; annualised benefit of ca £30k

Impacts on wetland ecology

- **Tilting weir on mill lade d/s of Balgavies Loch**
- Diverts sediment and nutrients from Chapel Mires at critical times

Flooding impacts

- **Dredging/loch outlet management**
- Lower upstream flood risk

Developing management instruments

Riparian owner concerns:

Will it work?

Will I get the blame if it doesn't?

Is it financially robust?

Will I get my say?

Agency concerns:

SNH- wetland ecology

SEPA – WFD / low flows

Angus Council – floods

Who will run it?

Rivers Trust?

CIC?

Agency?

Governance evidence

- **SURVEY: Willingness to pay X governance**
- CIC Share offer? Public finances? Charitable trust?

Eco-hydrological and hydraulic model evidence

- What are the changes in delivery of benefits and risks?
- real-time forecasting of impacts of weir management

Robust long term funding streams

- **Capital (<50k) and running costs <10k pa relatively minor**
- Business plan and liability agreed before consent application to SEPA

Comment from a farmer at Glensaugh event:
"Farmers will never seek collaboration unless it is mandatory"

Everyone should be quick to listen, slow to speak and slow to become angry James 1,19

http://www.hutton.ac.uk/research/projects/payments-ecosystem-services-lessons

Survey on attitudes

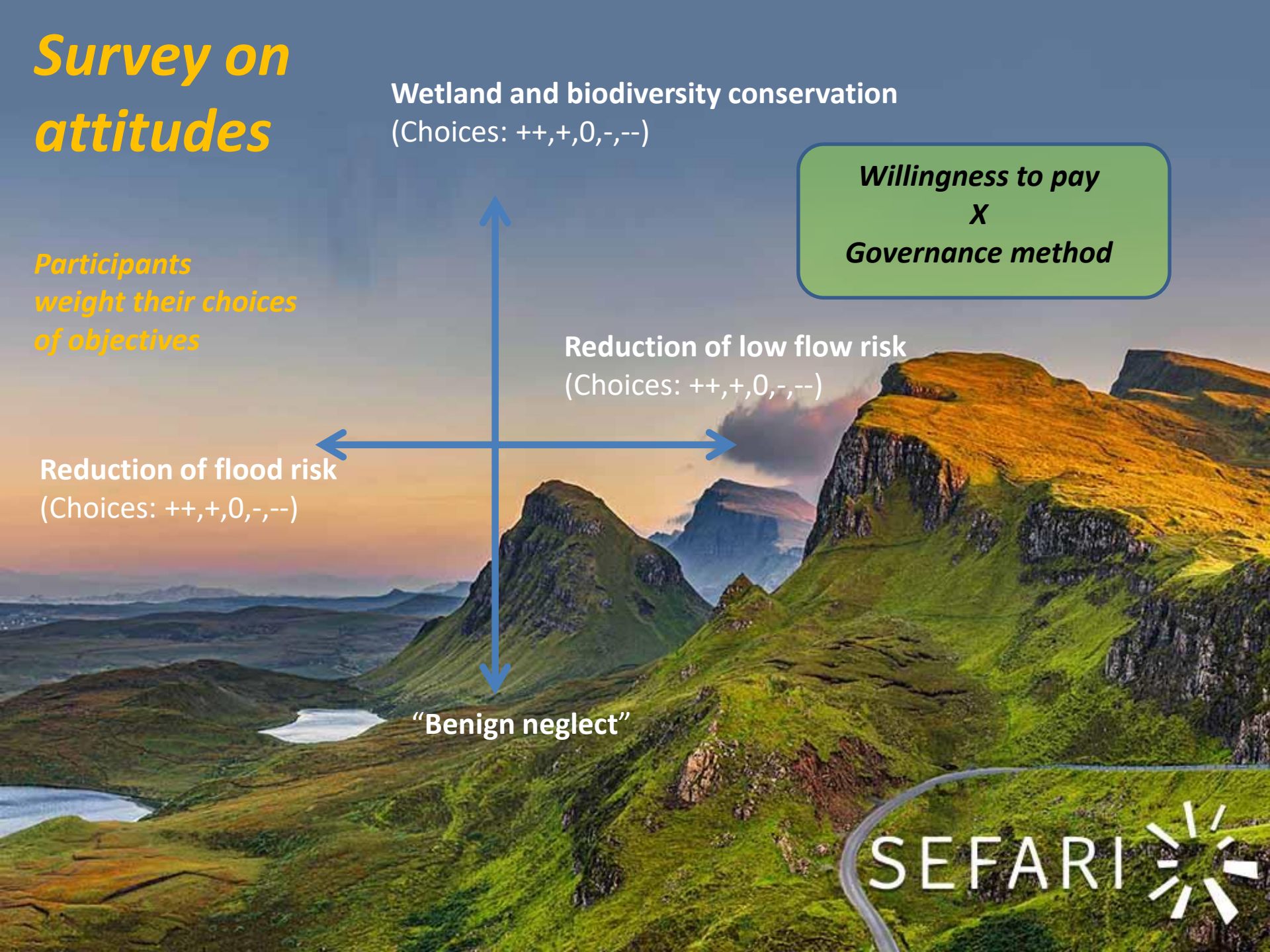
Wetland and biodiversity conservation
(Choices: ++,+,0,-,--)

Willingness to pay
X
Governance method

Participants weight their choices of objectives

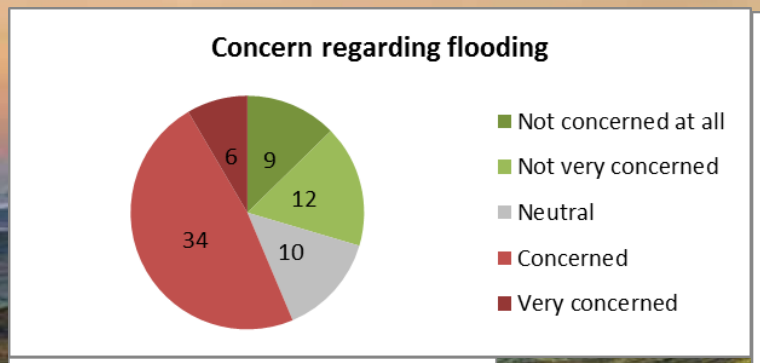
Reduction of low flow risk
(Choices: ++,+,0,-,--)

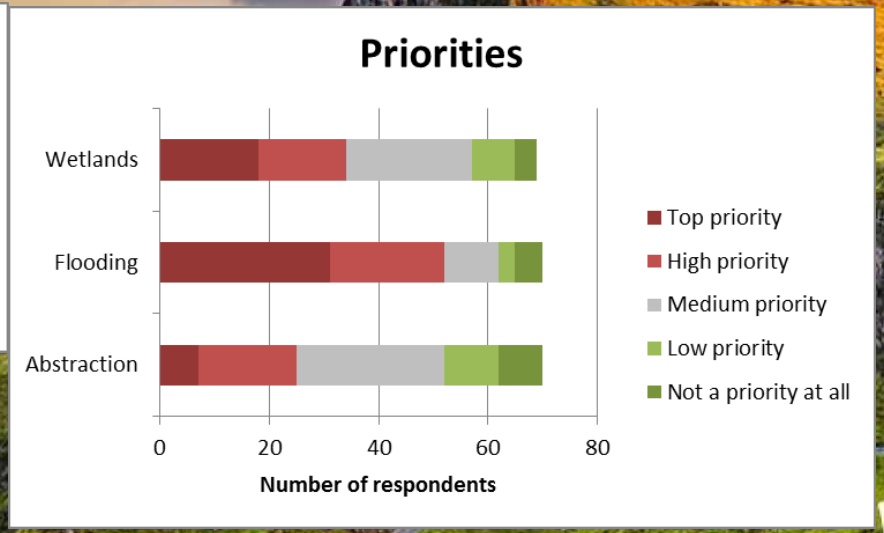
Reduction of flood risk
(Choices: ++,+,0,-,--)



Survey – concerns and priorities

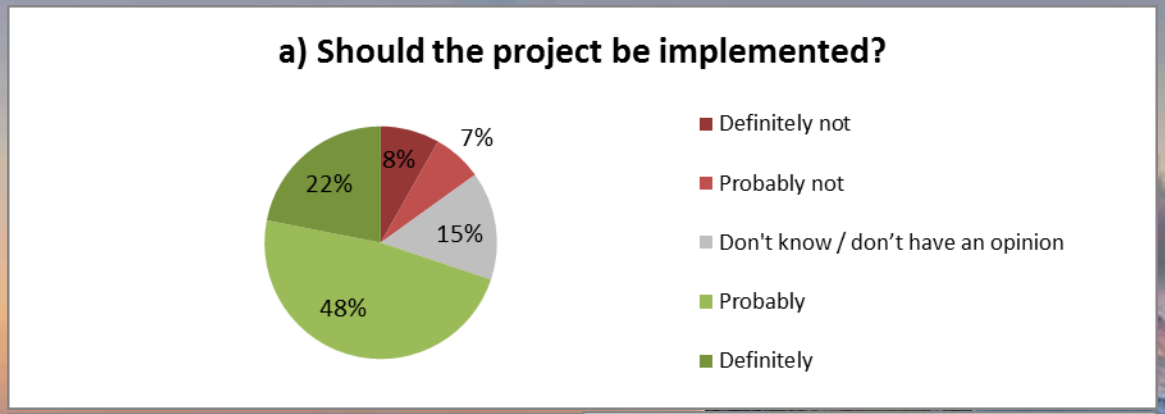
- Survey implemented July - August 2017
- Postal survey + internet survey
  - 73 responses (farmers + residents)

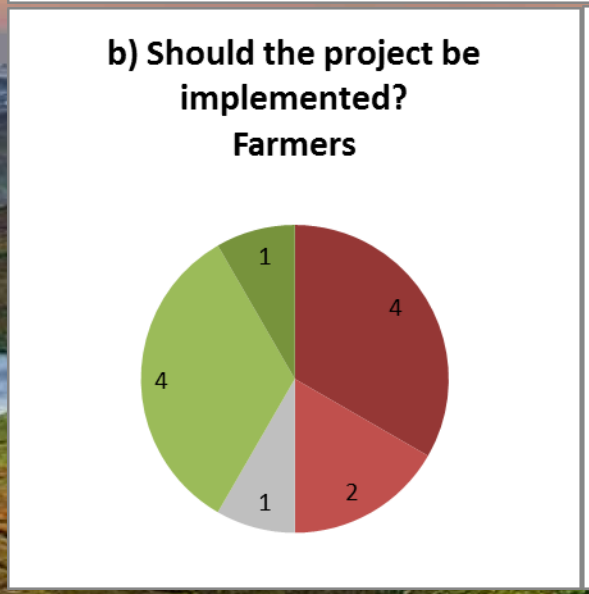


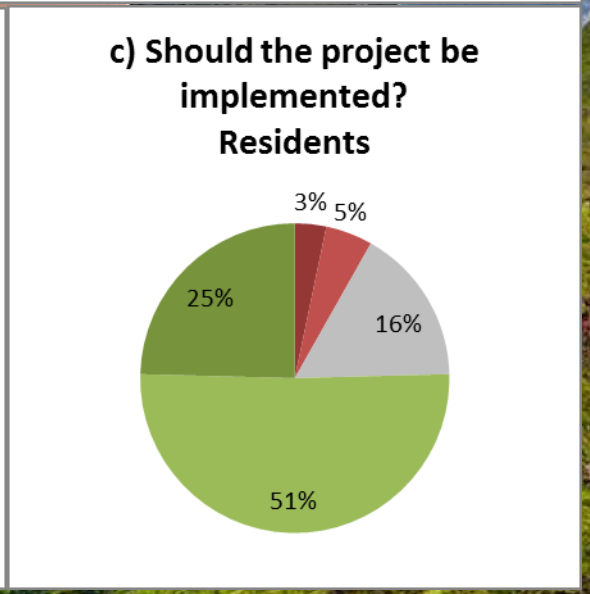


Survey – acceptance of project

- A controversial project ?

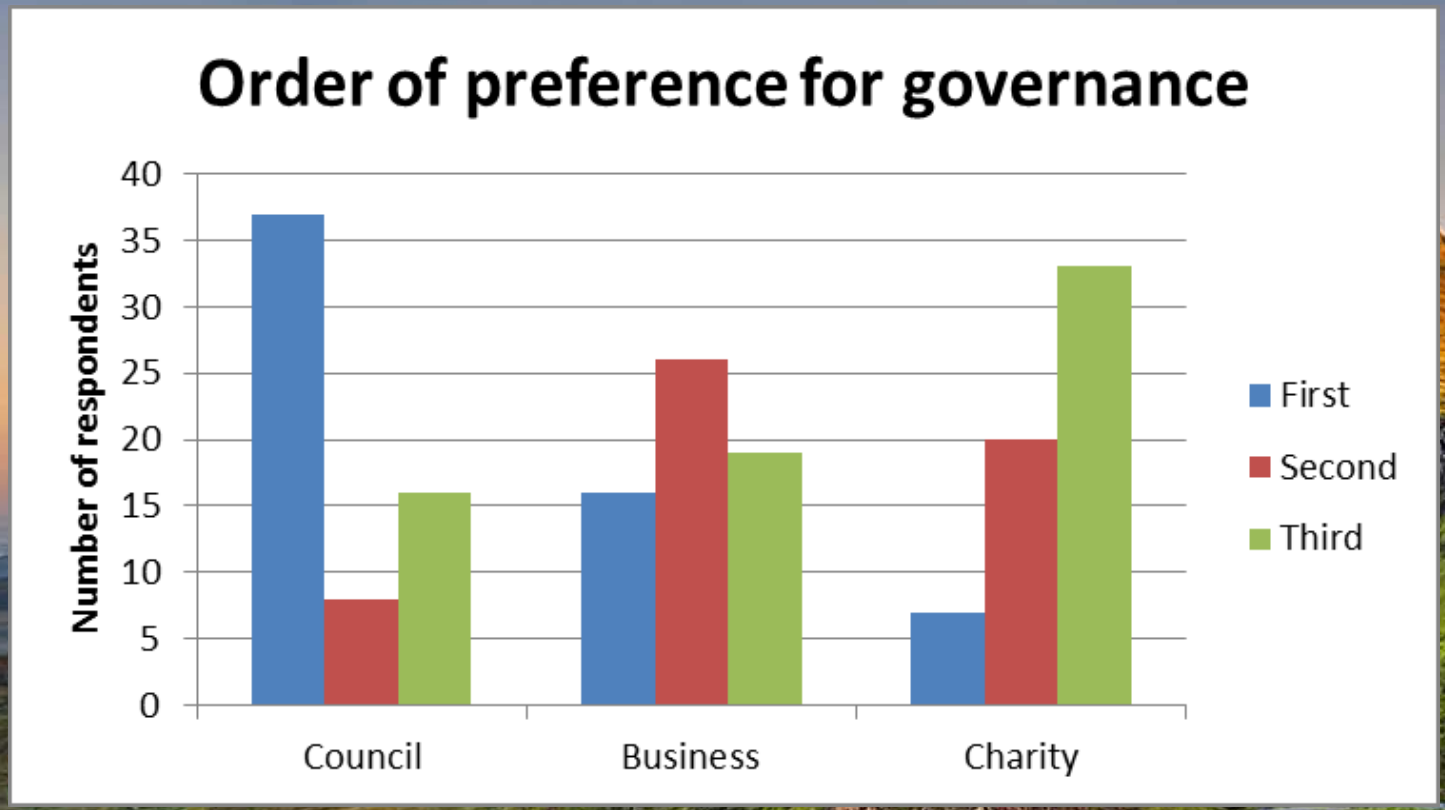






→ 2 types of concern:
- About the project itself,
- And about its governance

Survey – governance



Barriers to implementation

- Challenging to demonstrate technical feasibility
- Predicted benefits quite thinly spread across users
- Strongest concerns on long term management and legal issues
- Among those in favour there were no clear champions of the scheme
- Need to dedicate time and energy to pursuing approval for installation and management after installation
- Insufficient or doubtful benefit to stakeholders
- Lack of precedence
- Need for drainage boards in Scotland?


What happens when we propose PES schemes for water management?

Thank you

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- https://www.hutton.ac.uk/research/projects/payments-ecosystem-services-lessons

- https://www.hutton.ac.uk/research/projects/luan-water-diffuse-pollution-monitoring-project-first-10-years