

Restoration or ruin?

“Nature-Based Solutions” & salmon habitat “enhancement”



Chris Soulsby



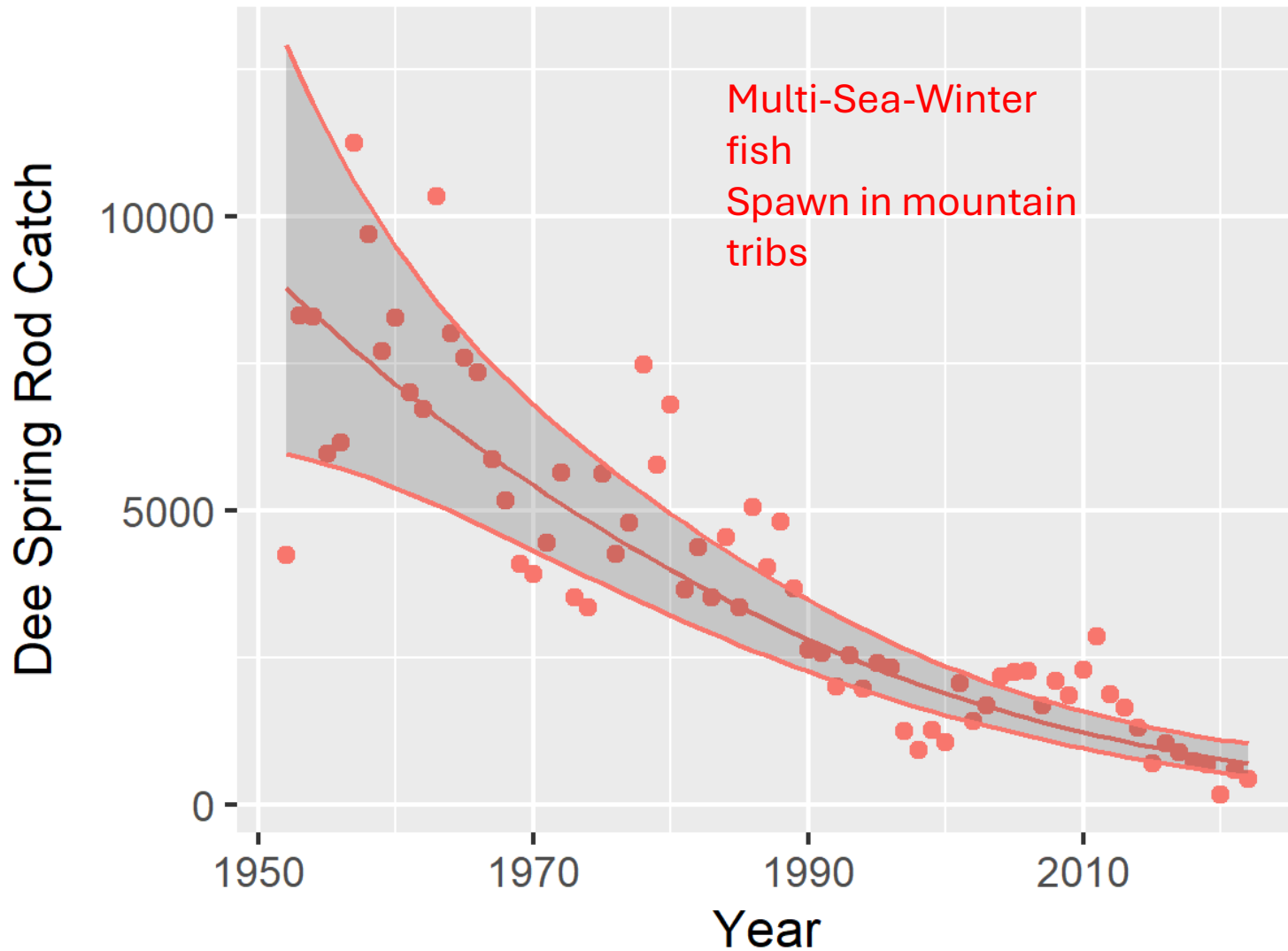
Aims

- Are salmon restoration schemes using Nature Based Solutions?
- Will they enhance salmon populations?
- What are the wider impacts of large-scale engineering?
- Do we need a re-think?

Context

- Effectiveness of Nature Based Solutions is often unknown.
- When evaluated many restoration projects fail (~50%).
- River engineering has history of overconfidence and unintended consequences.

Scottish salmon decline – marine problem



Climate change

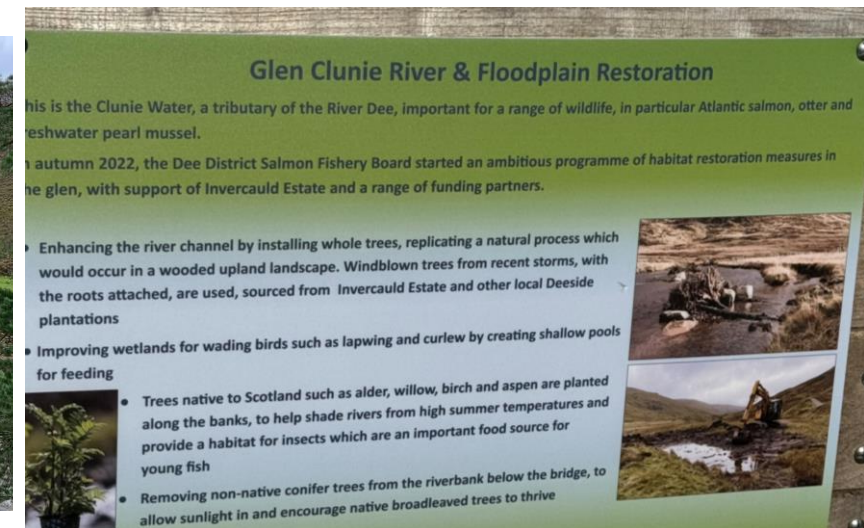
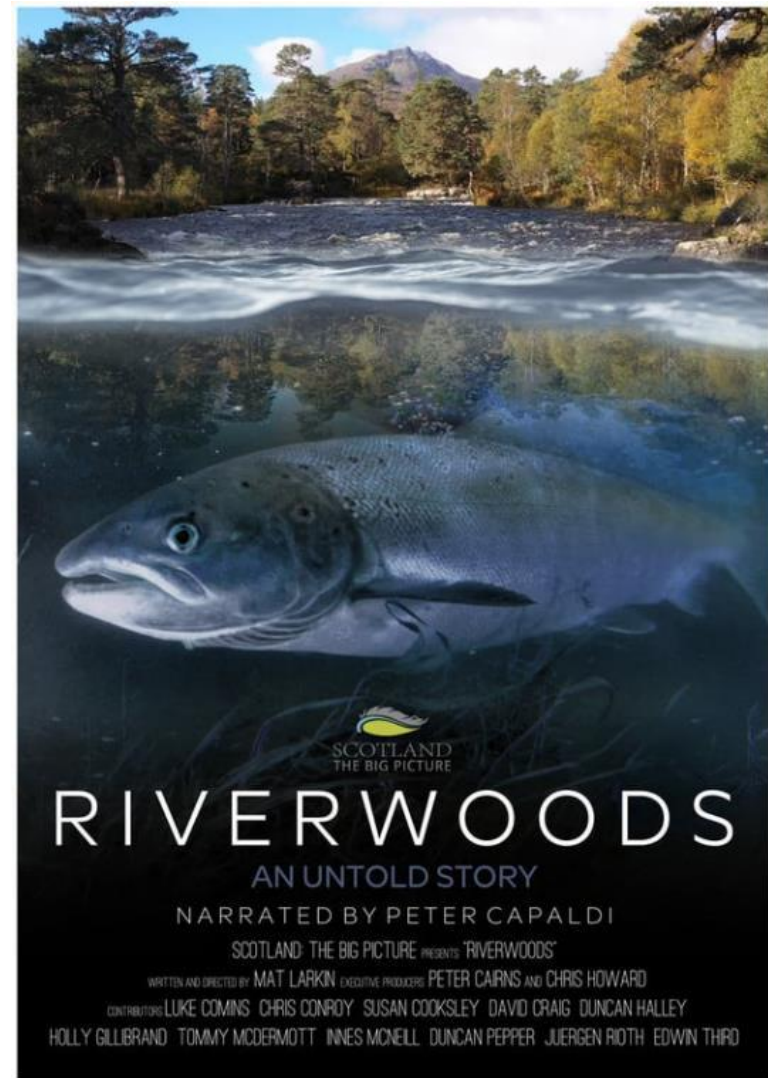


THE TIMES
THE SUNDAY TIMES

Wild salmon catches dive to record low in Scotland

Scientists warn that changes to the landscape and warming of rivers are causing an alarming decline in the salmon population

Riverwoods - salmon and trees: a fictional narrative?



Facilitated by recent policy and funding developments

SEPA's Regulatory Guidance on the Placement of Large Wood in the Water Environment

June 2020



Scottish Wild Salmon Strategy

NRC Research Press **PERSPECTIVE**

Wood placement in river restoration: fact, fiction, and future direction

Philip Roni, Tim Beechie, George Pess, and Karrie Hanson

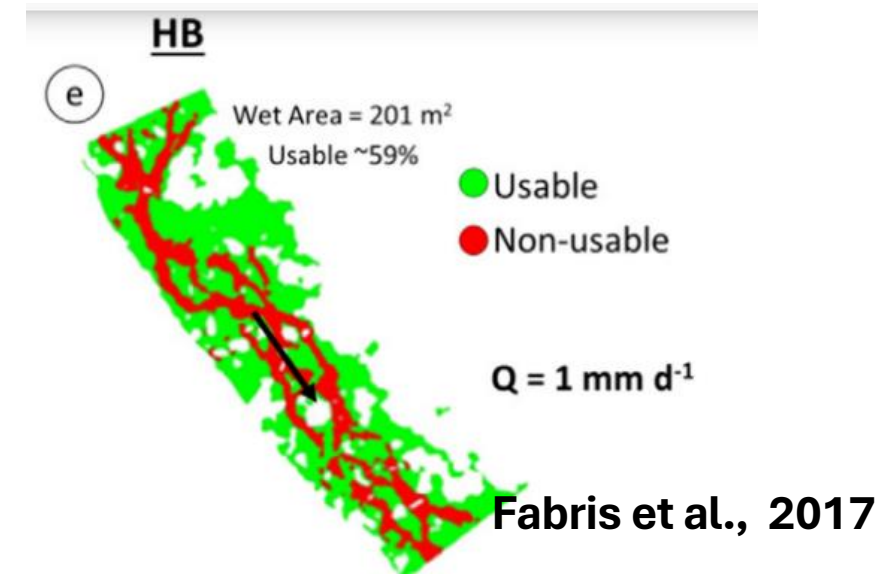
Abstract: Despite decades of research on wood in rivers, the addition of wood as a river restoration technique remains

January 2022

NRF

NATURE RESTORATION FUND

Engineering interventions to “restore” salmon habitat





Large wood in forest streams

Most in transient storage

Stable structures less common

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SPECIAL ISSUE PAPER

Why wood should move in rivers

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Abstract

Large wood is inherently mobile in naturally functioning river corridors

Photos: S&R Dugan

Delivery of salmon restoration projects: catchment based

Land owner/fishery manager, NGO

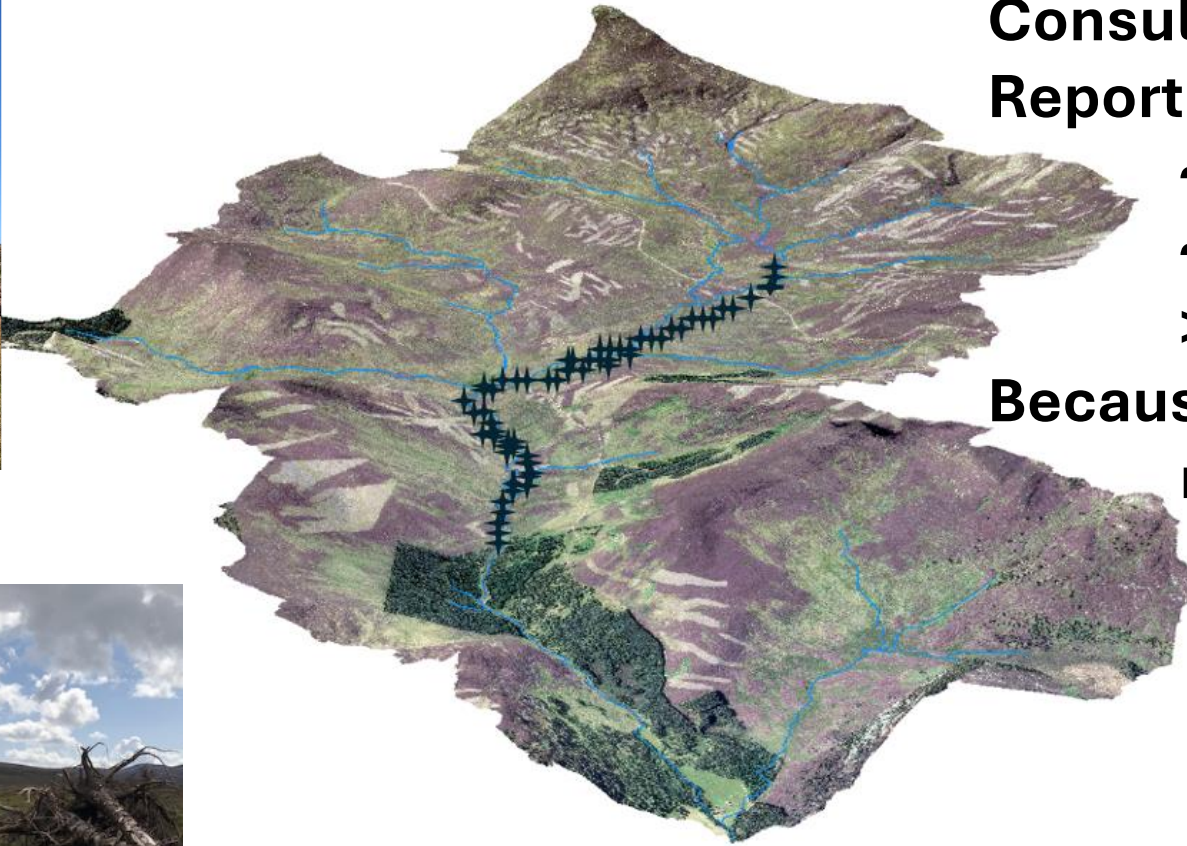
Consultant qualitative survey
Report

~70 structures

~100m

>200 trees

Because wood - usually no
regulation or assessment



Case study 1 - armoured supply-limited stream

Cumulative impact



Engineering interventions



0.5km



Engineering interventions:

Direct impact on river and riparian zone

Often on pre-existing high quality habitat

Compaction at crossing points

Digger access tracks 2-3X reach length



Risk of chronic high sediment pollution



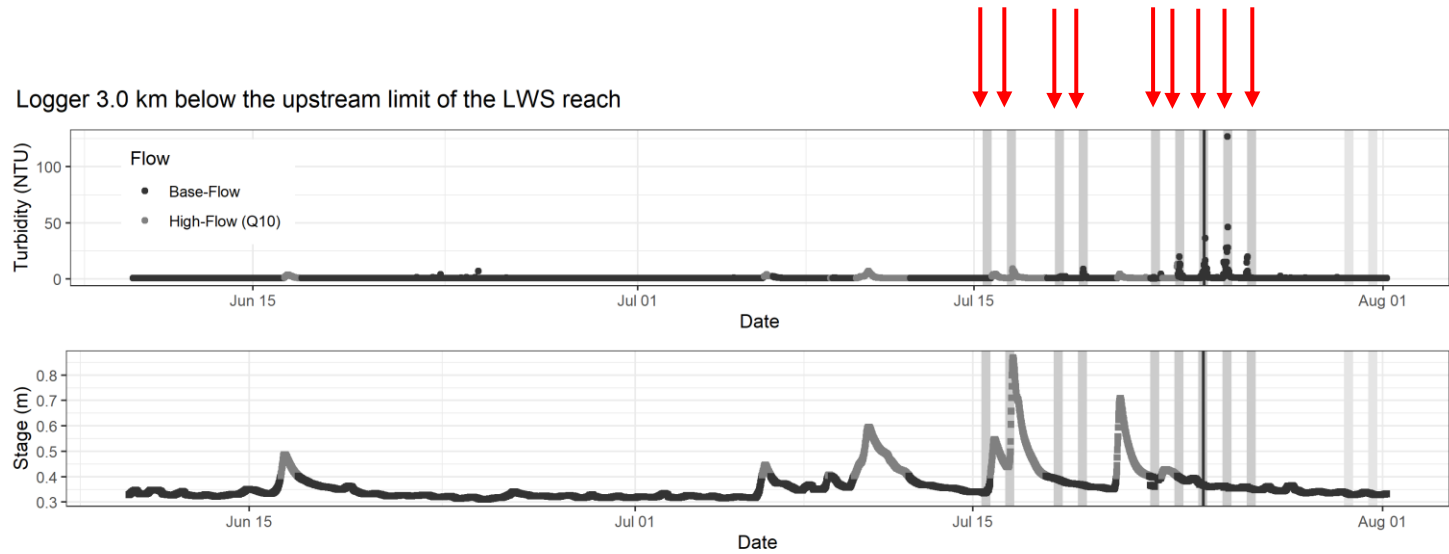
Cold, clean water?

Precautionary
principle?

Red-list protected
species



Propagation of sediment downstream & blanket deposition



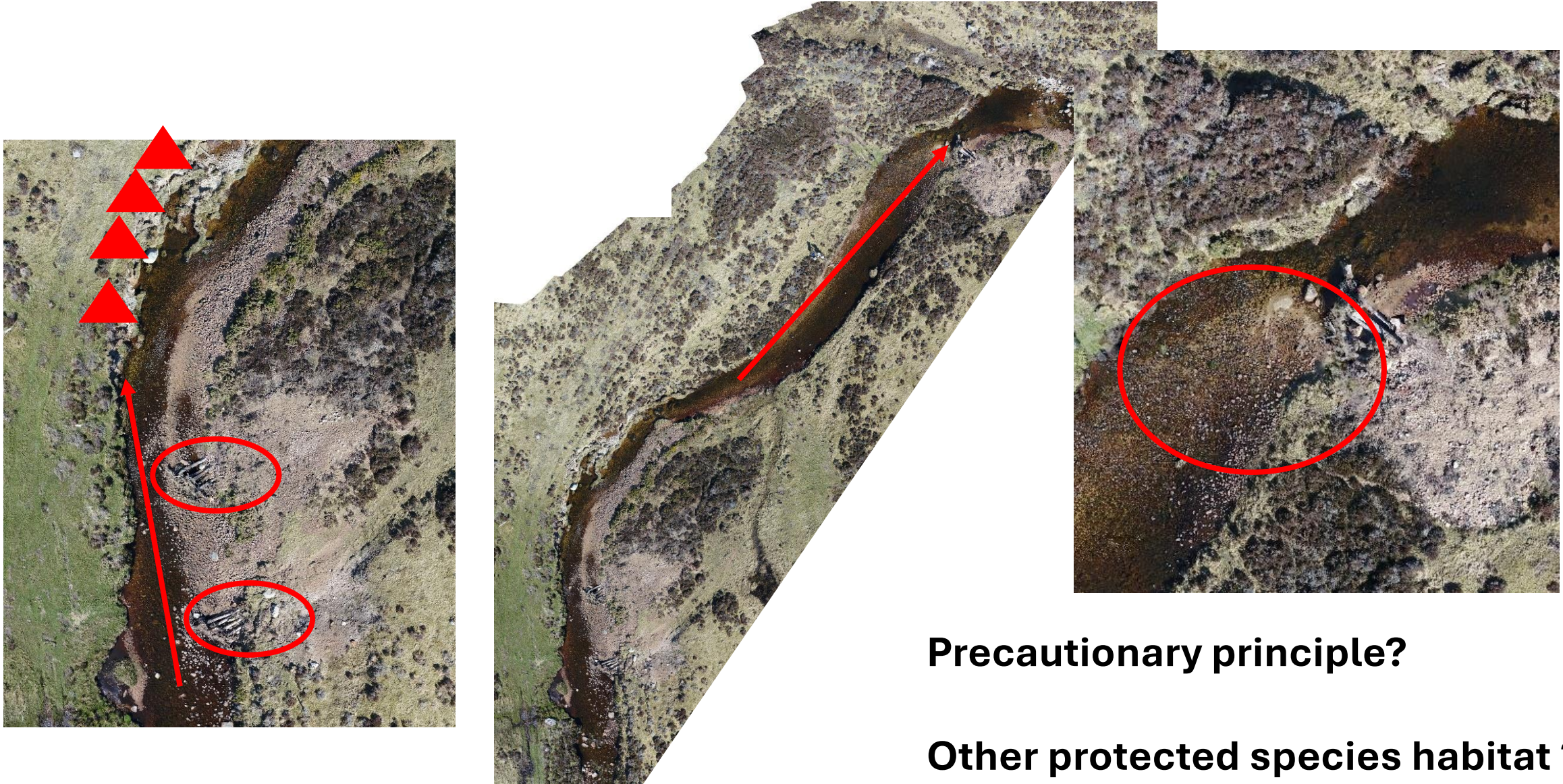
Consequences of altering erosion – deposition processes



or

at

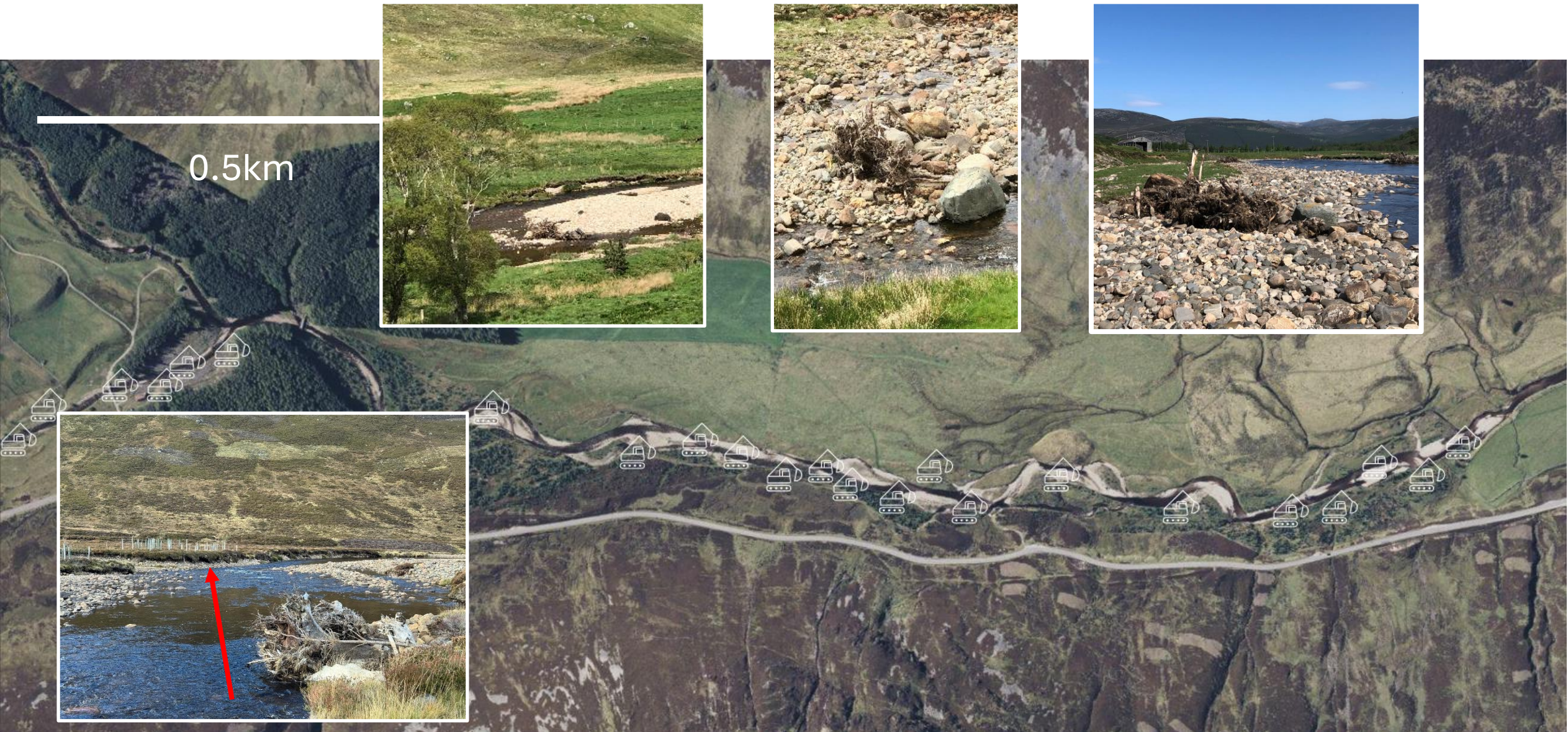
Engineering intervention: erosion – transport deposition



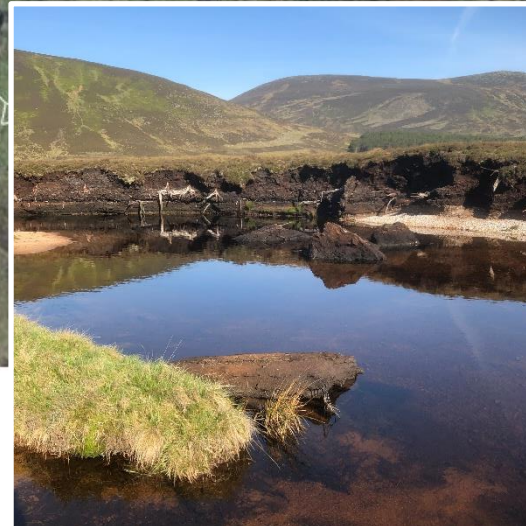
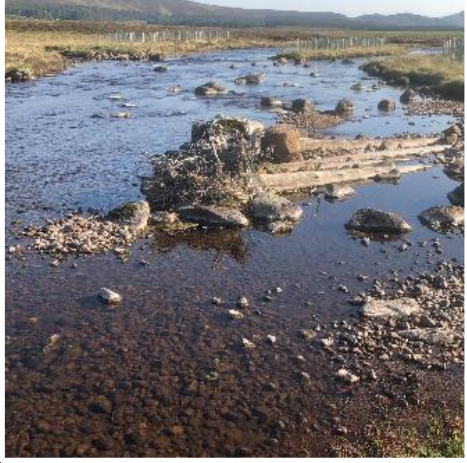
Precautionary principle?

Other protected species habitat ?

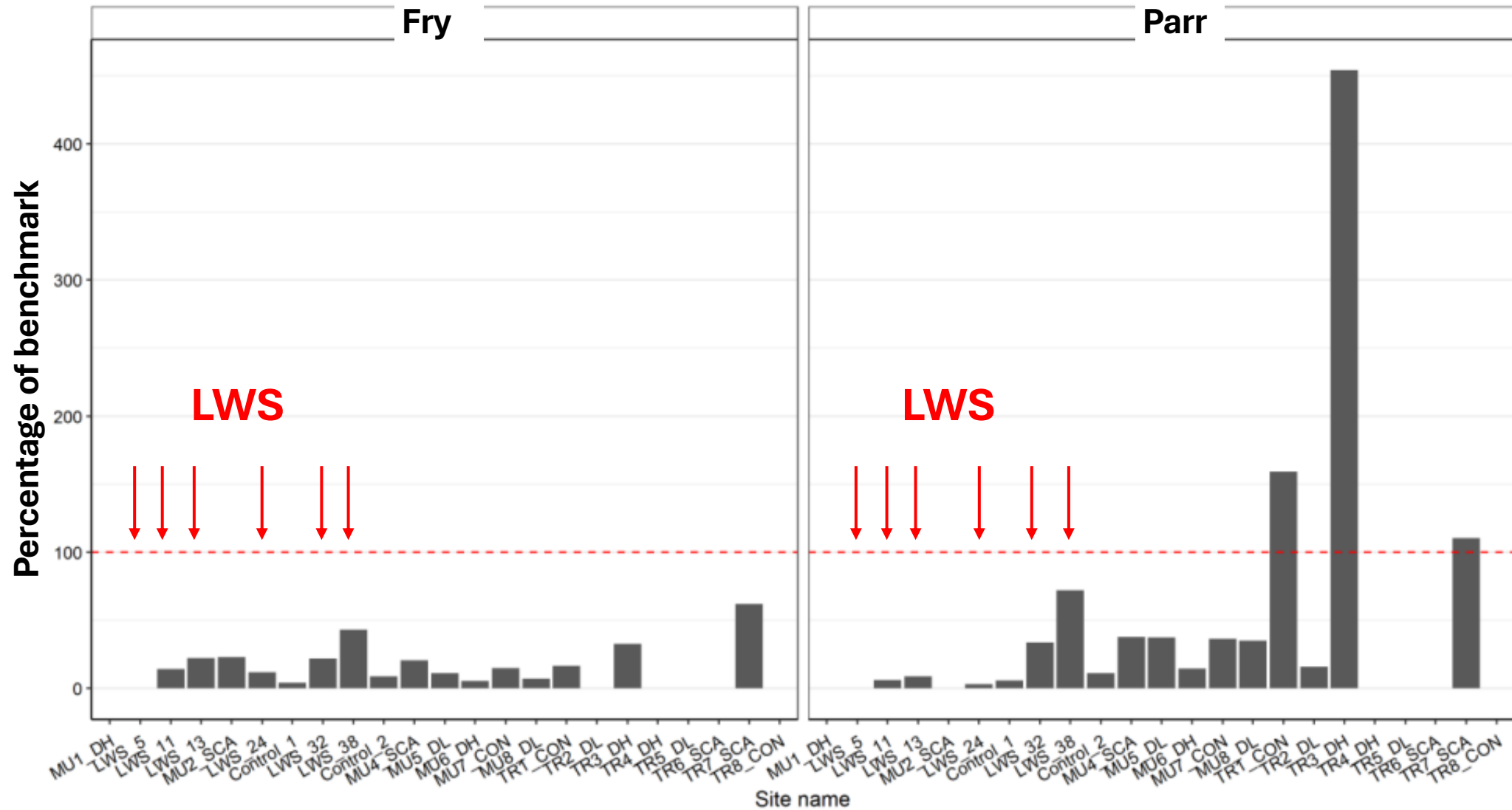
Case study 2 -transport-limited, steep mountain river channel



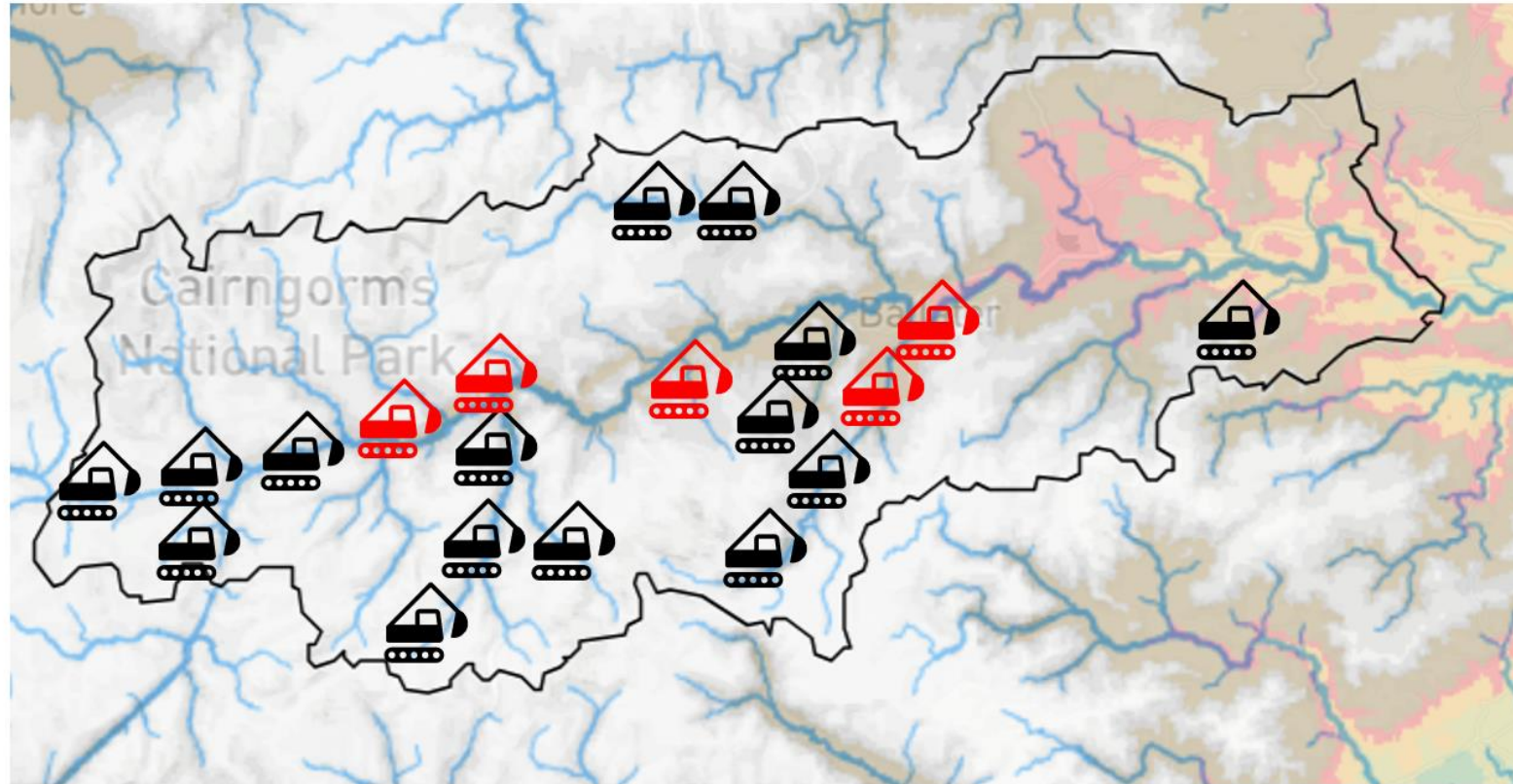
Case study 3 - supply-limited, low gradient lake outflow





River Muick – no benefit of LWS & under-saturated habitat



Approximate catchment-scale impact: upper Dee



-  x30 existing engineered interventions
-  x30 planned engineered interventions

2016 – 2025: ~ 500 LWS installed

2016 – 2025 : Spring rod catch fell from 877 – 120* (* provisional)

Are cumulative impacts of extensive engineering contributing to the decline?

Need for a re-think and review?

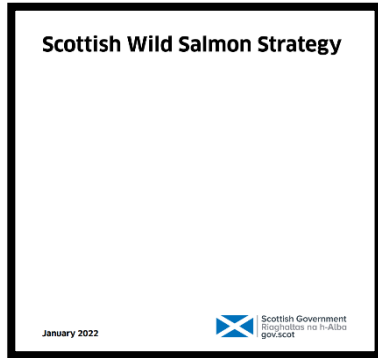
SEPA's Regulatory Guidance on the Placement of Large Wood in the Water Environment

June 2020



“Current guidance no-longer fit for purpose”

Need for review of effectiveness of LWS in salmon habitat restoration - 2025



“No evidence that restoration schemes with LWS will enhance salmon populations”



Conclusions

- Need for debate and critical thinking on NBS

LWS not nature-based

Non-solution to a complex problem

Unintended consequences

- Need for clarity and evidence-based realism on restoration goals with NBS
- Need for transparency: learning opportunities
- Value for money from public funds