



the River Restoration Centre

Working to restore and enhance our rivers

Delivering River Restoration: Recipes for Success

13TH ANNUAL NETWORK CONFERENCE



Restoring Europe's Rivers

The RIVERFORC project is made possible with the contribution of the LIFE+ financial instrument of the European Commission and works in partnership with



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A HYDRAULIC AND FISHERIES BASED POST-PROJECT APPRAISAL OF THE INCHEWAN BURN RESTORATION PROJECT, BIRNAM, SCOTLAND

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Biological and Environmental Sciences
University of Stirling

River Restoration Centre conference
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Introduction

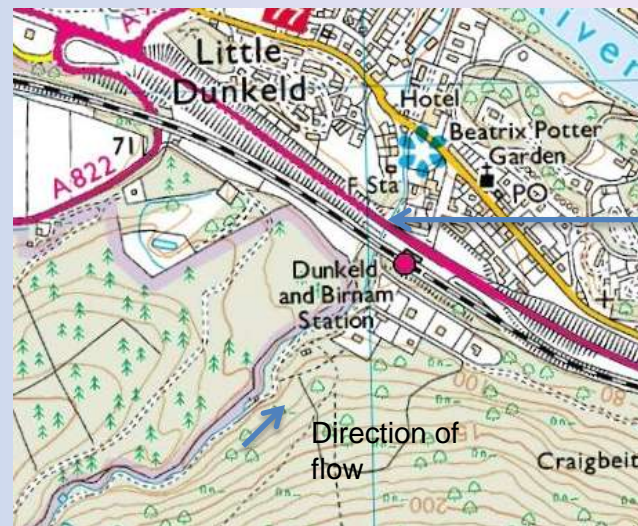
Inchewan Burn encased in gabions during upgrading of A9 Road (1970s).

Dewatered burn and prevented fish passage

Local Ghillie took upon himself to remedy the situation

RRC advised/funding from HEI Fund.

Physical works undertaken in 2008 and improvement of upstream habitat (conifer removal from burn margins)



River Tay

Restored reach

A9

Railway

The river restoration works

Before



During



- INTRODUCTION
- THE RESTORATION WORKS
- STAFFING AND METHODS
- FINDINGS
- CONCLUSIONS

The river restoration works

After



Downstream



Staffing and Methods

Personnel:

Students (BSc) under tuition of David Gilvear (Fluvial geomorphologist) and Colin Bull (Fisheries biologist)

Hydraulic Habitat Assessment:

5 sites – 3 upstream, restored A9 reach, 1 downstream.

100 measurements of velocity and depth along centre line; also depth and velocity at 3 cross-sections leading to over 700 measurements in total; Top ten boulder sizes in each reach at top, middle and bottom.

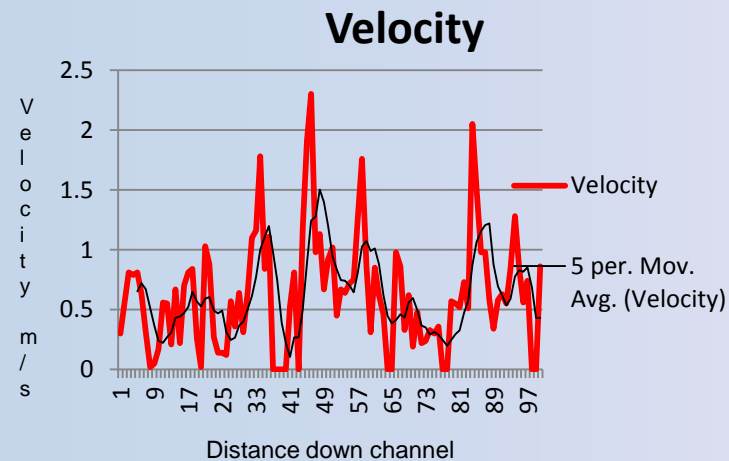
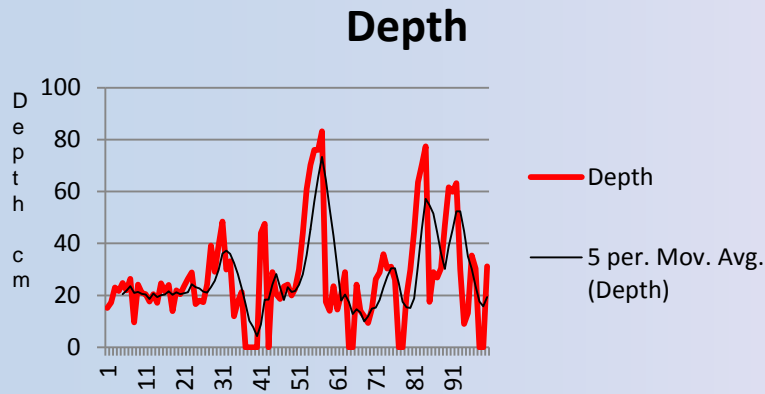
Fisheries assessment:

4 sites – 2 upstream (n=2), restored A9 reach (n=2), 1 downstream (n=2)

Electracatch backpack, 250 V PDC. Operated by fully trained SFCC team leader; 5 minute timed sampling selecting for optimal salmonid habitats available. Species present, number and size recorded.

Findings

Hydraulic habitat assessment

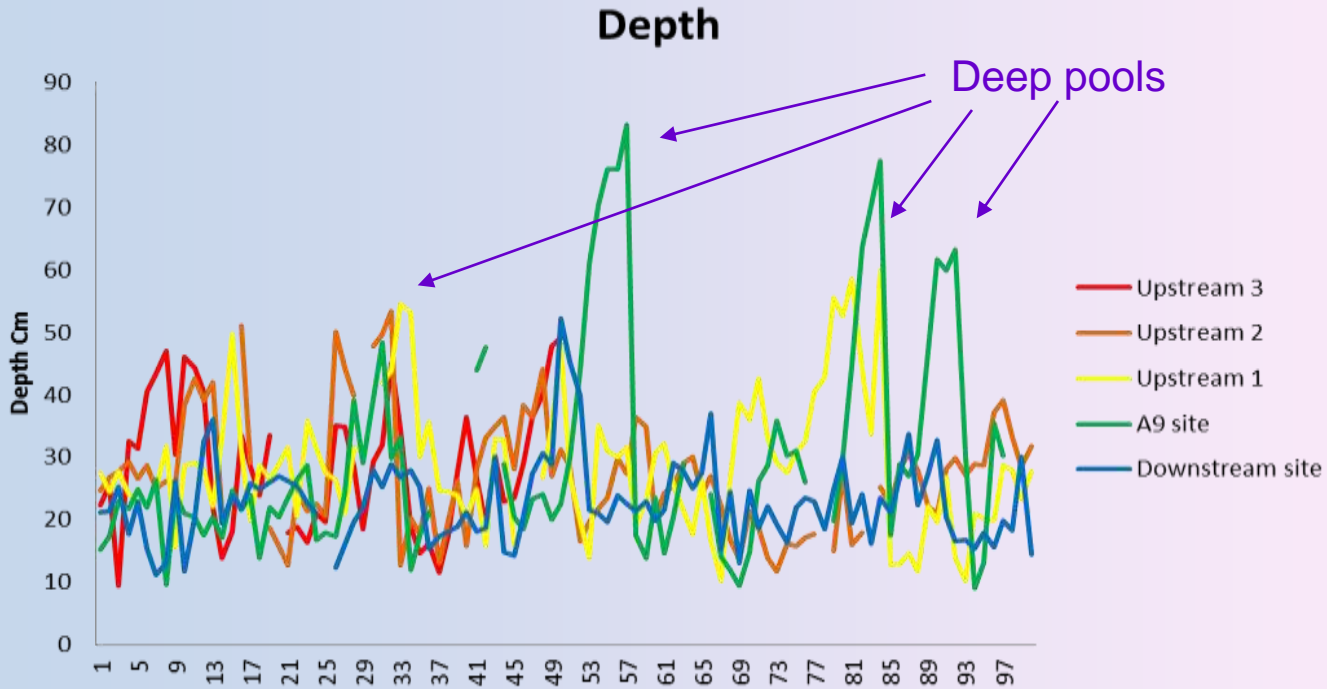


Restored reach

- Depths at low flow - 0-80cm
- Water Velocities - 0.15-2.5 ms⁻¹
- Step-pool morphology

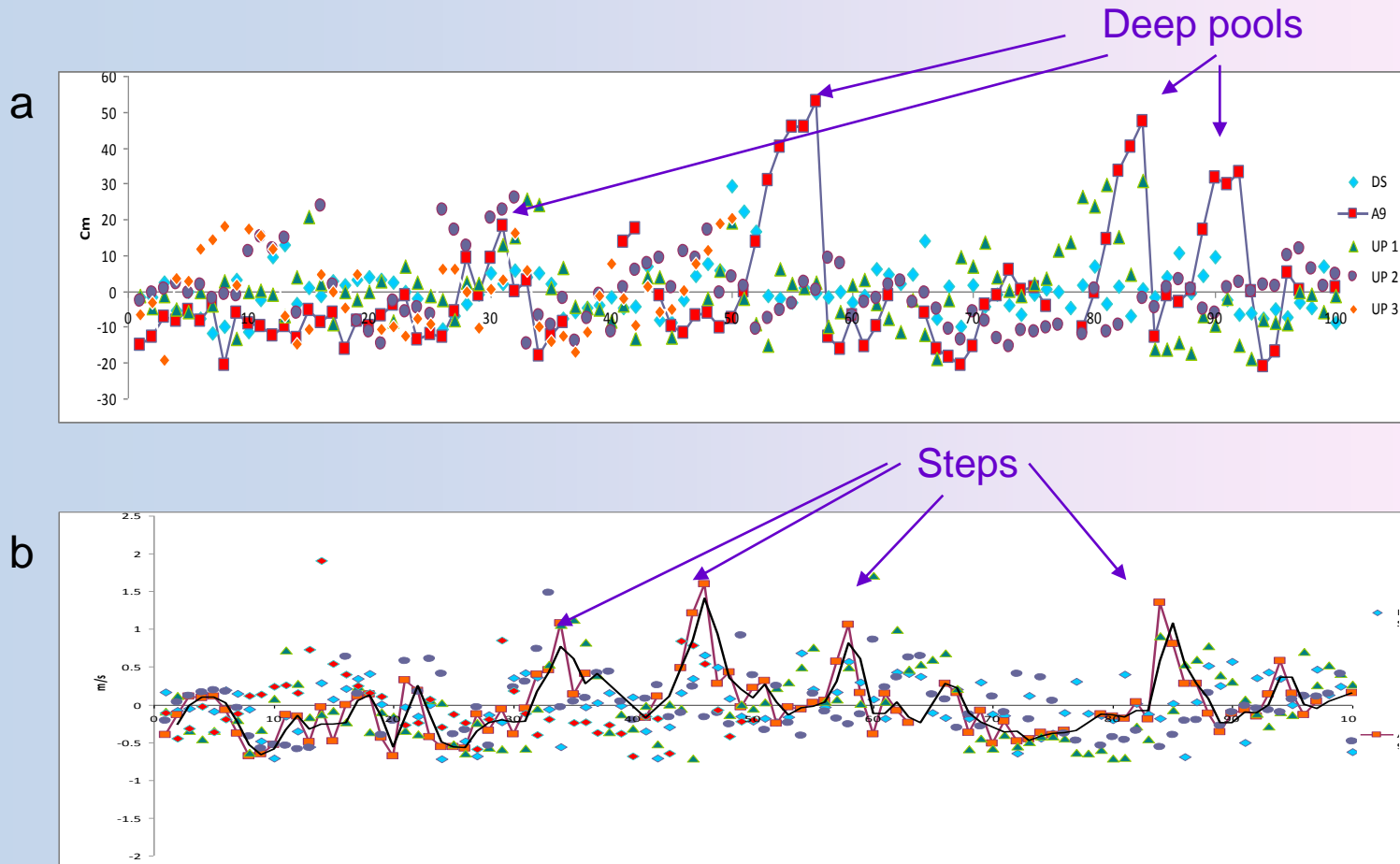
Findings

Hydraulic habitat assessment



Findings

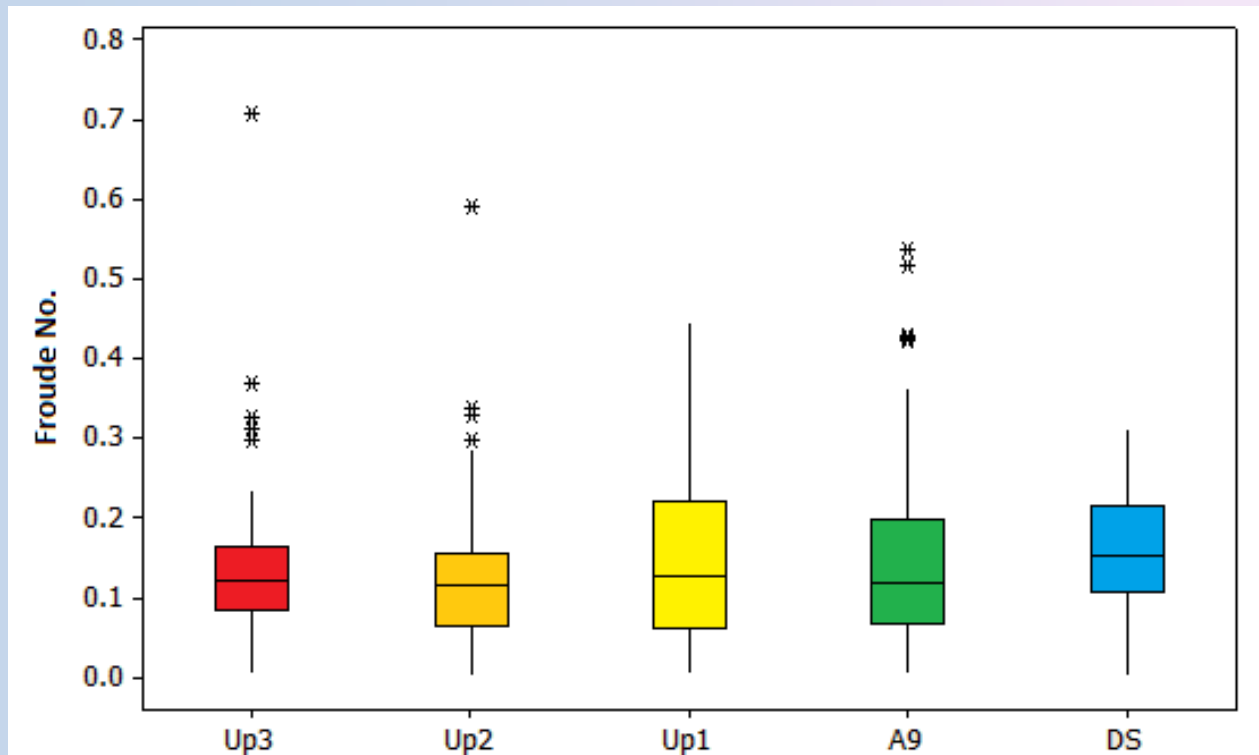
Hydraulic habitat assessment



Residuals around average depth (a) and velocity (b)

Findings

Hydraulic habitat assessment

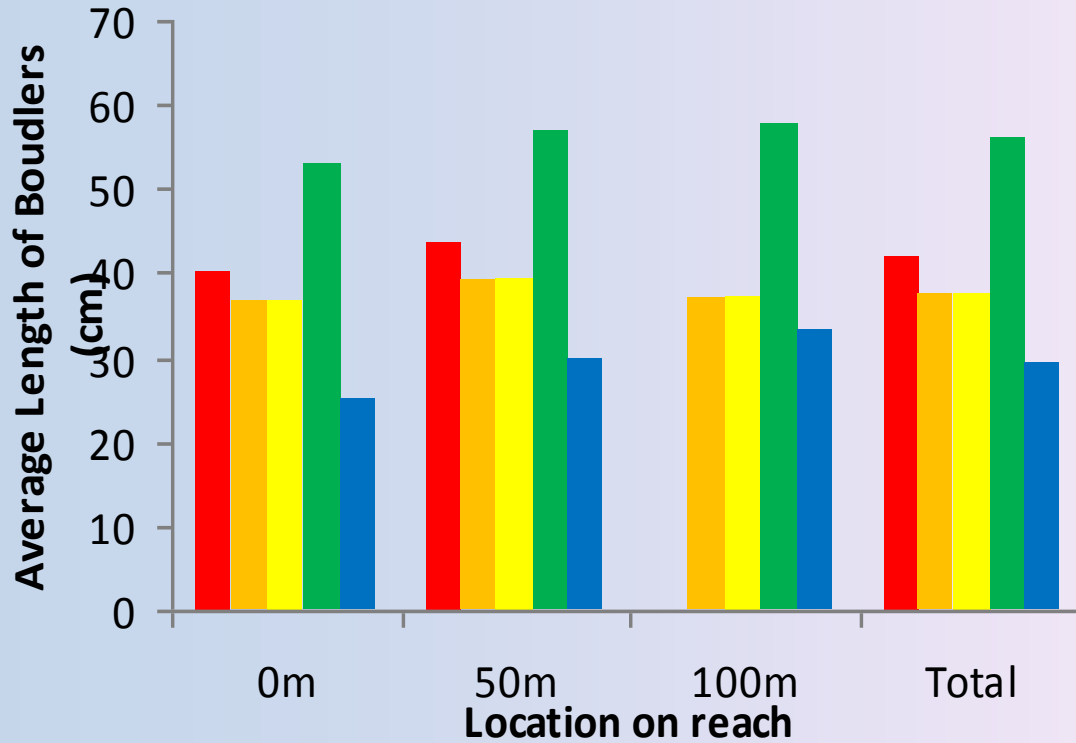


Froude No – integrates velocity and depth and measure of flow type

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Findings

Hydraulic habitat assessment



- UP3
- UP2
- UP1
- A9
- DS

Findings

Fisheries assessment

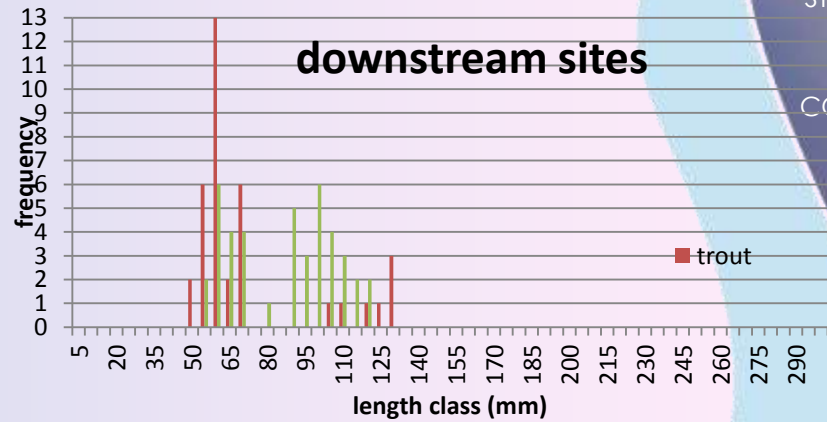
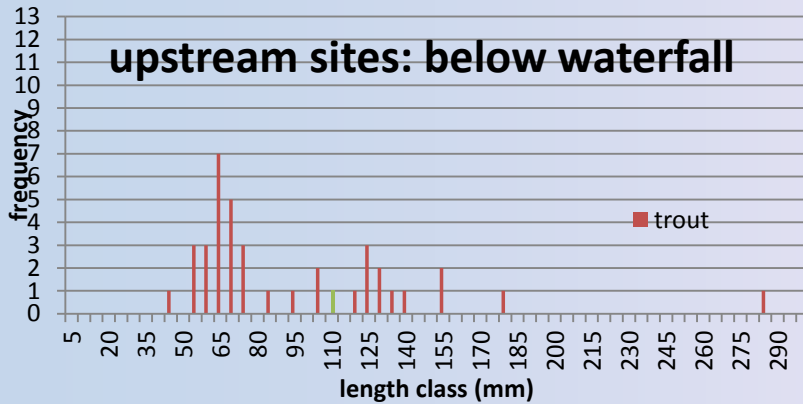
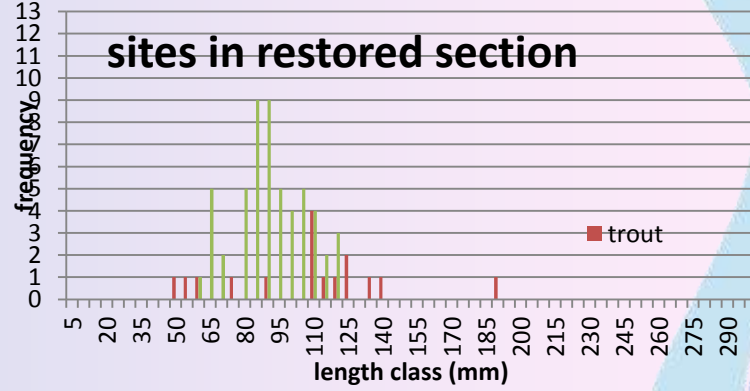
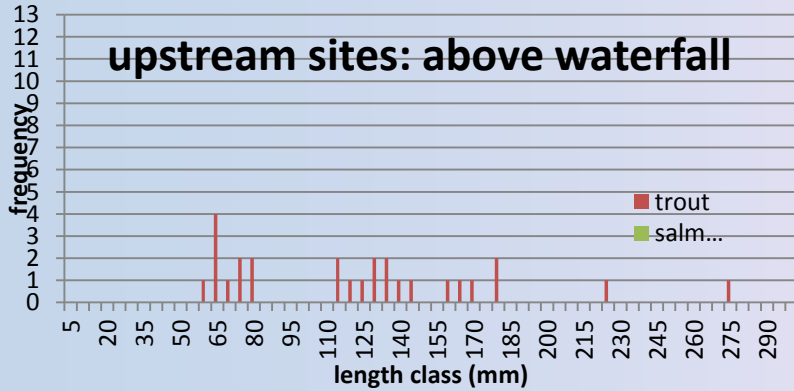
	Trout	Salmon	Eel	Stoneloach
upstream sites above waterfall	27	0	1	0
upstream sites below waterfall	38	1	3	0
sites within restored section	16	54	0	0
sites downstream	36	42	3	1



- 4 species encountered (trout, salmon, eel, stoneloach)
- Trout found at all sites
- Eels present upstream from restored section
- Juvenile salmon present in the short restored section and downstream in similar numbers.
- Masonry-culvert beneath railway line possible impairment to migratory fish
- The presence of natural waterfall provides impairment to migratory salmonids

Findings

Fisheries assessment



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Conclusions

- Successfully restored hydraulic habitat
- Salmonids colonising restored reach
- Salmon passage upstream impaired
- Post-project appraisal critical
- Need for adaptive management
- Need for application of fish passage porosity tool for waterfall/railway culvert and possible “works” (e.g. boulder placement/baffles)
- Value of “citizen” (student) science in post-project appraisal

