

Report for: Project JHI-D2-2 AiM NBS, WP3 River corridors.

## **Easter Beltie Restoration Project: Ecological monitoring 2022-23**

Susan Cooksley (James Hutton Institute) and Jennifer Dodd (Edinburgh Napier University)

February 2023

---

### **Background**

River restoration projects have become widespread across Scotland in the last few years, and their number is set to increase greatly benefitting from the new Scottish Government Nature Restoration Fund which enables more projects to be delivered than has ever been seen before. Establishing effective monitoring techniques was identified as vital in the last RESAS programme, which initiated the most powerful long term study in river restoration monitoring to date.

### **The restoration**

The morphology of the Easter Beltie river channel was significantly altered in autumn 2020 to reverse historic channelisation, funded by the Scottish Government Biodiversity Challenge Fund. The new burn is now doubled in length, fully connected to its floodplain, is highly sinuous and includes three extensive on-line ponds, 15 large woody structures installed in 2022 and widespread riparian tree planting. In autumn 2022 a new active travel path was installed alongside the restoration site. The project won the 2021 Nature of Scotland Climate and Nature Award and has been featured on Landward, Out of Doors, Countryfile and in national and local press. A pictorial report and short [film](#) showcase the works.

### **Research**

Multiple meta-analyses<sup>1</sup> have highlighted the poor response of macroinvertebrates as an indicator of change in a river restoration context. However, the degree to which this is an issue of study/experimental design has not been explored. The study design employed in the Easter Beltie project is highly robust and the early evidence we are gaining from this project is providing keen insight to the ecological response of the river to habitat rehabilitation.

In order to evaluate the ecological impacts of the restoration we have been sampling macroinvertebrates annually using a full BACI design using this new study design.

### **Work undertaken on 2022-23**

Samples were collected to assist in the monitoring and assessment of the response of the macroinvertebrate community to changes in channel morphology. A technician was employed at Napier to undertake invertebrate ID work and support fieldwork.

### **Results to date**

Samples collected in April 2022 have been identified at Napier University. Species richness per sample ranges from 3 species (recorded at Easter Beltie and Positive Control) to 27 species recorded from a sample collected from the Positive Control). Early analysis indicates that the macroinvertebrate community at the Easter Beltie is still recovering from the impacts of channel straightening and restoration (Figure 1).

There is no statistical difference between the Easter Beltie and the Negative Control, however, several samples collected from the Easter Beltie did have a richness level more akin to that recorded at the Positive Control, indicating that some recovery is happening. Figure 1 is a “violin plot” which nicely shows the distribution of the Species Richness recorded from each sample. The Positive Control shows a relatively simple distribution, while the two sites which have been historically impacted show a more complex distribution.

---

<sup>1</sup> e.g. <https://doi.org/10.1016/j.ecohyd.2019.11.001>

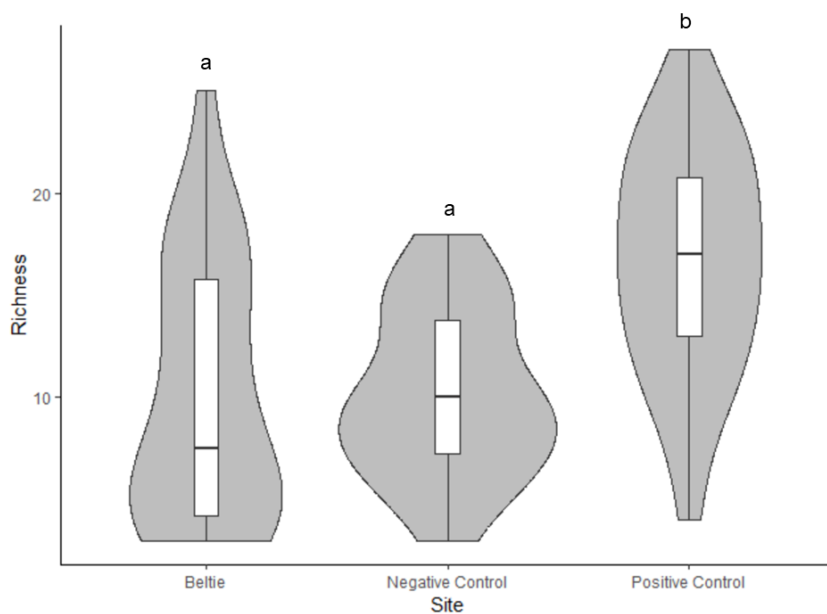


Figure 1: Differences in macroinvertebrate community richness between the restoration site (Beltie) and two controls. Negative Control are samples collected from a straightened section of river, representing the condition of the macroinvertebrate community in degraded river channel. Positive Control is a channel with more natural morphology, representing the condition of the macroinvertebrate community in a relatively unimpacted river channel. The alpha-characters represent statistical difference at  $p=0.05$ .

### Communications

- Dr Jennifer Dodd gave a presentation to the Royal Entomological Society Aquatic Insects Special Interest Group on 10<sup>th</sup> May with a follow up article in the Roy Ent Soc magazine.
- Widespread coverage of the installation of large wood structures in [Scotsman](#) and local media
- Media coverage of the new active travel path in the [Scotsman](#) and local media
- [Film](#) produced by the Dee Catchment Partnership working with Scotland the Big Picture
- Upcoming feature on Countryfile
- Interpretation boards highlighting this action research project are under construction
- Extensive social media coverage from Dee Catchment Partnership channels

### Next steps

The next sample collection period will take place in April 2023 at which point we will have sufficient data to report on the impact of the restoration on early colonisation by macroinvertebrates, and advise on the robustness and efficiency of the new sampling protocol developed in this research.

### Contact

Dr Susan Cooksley (restoration project, communications) [susan.cooksley@hutton.ac.uk](mailto:susan.cooksley@hutton.ac.uk)

Dr Jennifer Dodd (macroinvertebrate sampling and analysis) [j.dodd@napier.ac.uk](mailto:j.dodd@napier.ac.uk)

