## Habitat and aquatic invertebrate changes in the Rottal Burn since restoration





## Anna Doeser Supervised by Dr Nigel Willby

### Why does it have to be so complicated



### Why does it have to be so complicated

INVITED FEATURE

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# Twenty years of stream restoration in Finland: little response by benthic macroinvertebrate communities

Pauliina Louhi,<sup>1,6</sup> Heikki Mykrä,<sup>2</sup> Riku Paavola,<sup>3</sup> Ari Huusko,<sup>4</sup> Teppo Vehanen,<sup>5</sup> Aki Mäki-Petäys,<sup>5</sup> and Timo Muotka<sup>1,2</sup>

Freshwater Biology (2010), 55 (Suppl. 1), 205-222

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# River restoration, habitat heterogeneity and biodiversity: a failure of theory or practice?

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## Why does it have to be so complicated

Reality can be so complex that equally valid observations from differing perspectives can appear to be contradictory.



### Rottal Burn restoration



"if you build it, they will come....."

> Research Questions Have we built it? Have they come?

## Sampling Design

**Spatial scale:** High resolution sampling 10 samples in restored and unrestored

Invertebrate and Environment data from the same place

**Temporal** Spring and Autumn 2013, 2014... 2015



Map credit: Katheleen Stosch

### Data Collection

- Kick samples
- Pebble count and Percent cover estimates
- Fine sediment
- RHS survey categorical data
  - Bank features
  - Channel flow type
  - Channel and bank material







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### The invertebrates

- ID to species
- Mayflies, Stoneflies and Caddisfly larva (EPT)
- 21,736 individuals





## River Habitat Survey

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### Sodimont Data



### Alpha Diversity

#### Richness – Rarefied Richness – Shannon Diversity



Species Richness



### Alpha Diversity

#### Richness - Rarefied Richness - Shannon Diversity



Species Richness rarefied to lowest sample abundance



### Alpha Diversity

#### Richness – Rarefied Richness – Shannon Diversity



### Beta Diversity





Baselga 2015 – methodsblog.wordpress.com

Beta Diversity

### **Community variability**



### Sampling Period



### **Community Composition**

Ordination

CA of EPT all Rottal Sites



CA1



# Conclusions

Restoration =

Fewer habitat features Finer sediment Different habitat character Greater heterogeneity of habitat





# Conclusions

Restoration =

**Higher richness** and diversity(in final time period)

**Higher beta** diversity (in spring)

**Different** community reflecting different habitat





### Thanks for listening!

### Questions please...

Thanks to: Lab and Field work: Melissa Shaw, Adam Welsh, David Eastwood, Ross Hepburn, David Garica, Clara Gajas, Megan Layton, Lois Campbel Steve Hawkins+ Marshal Halliday (ERFT)