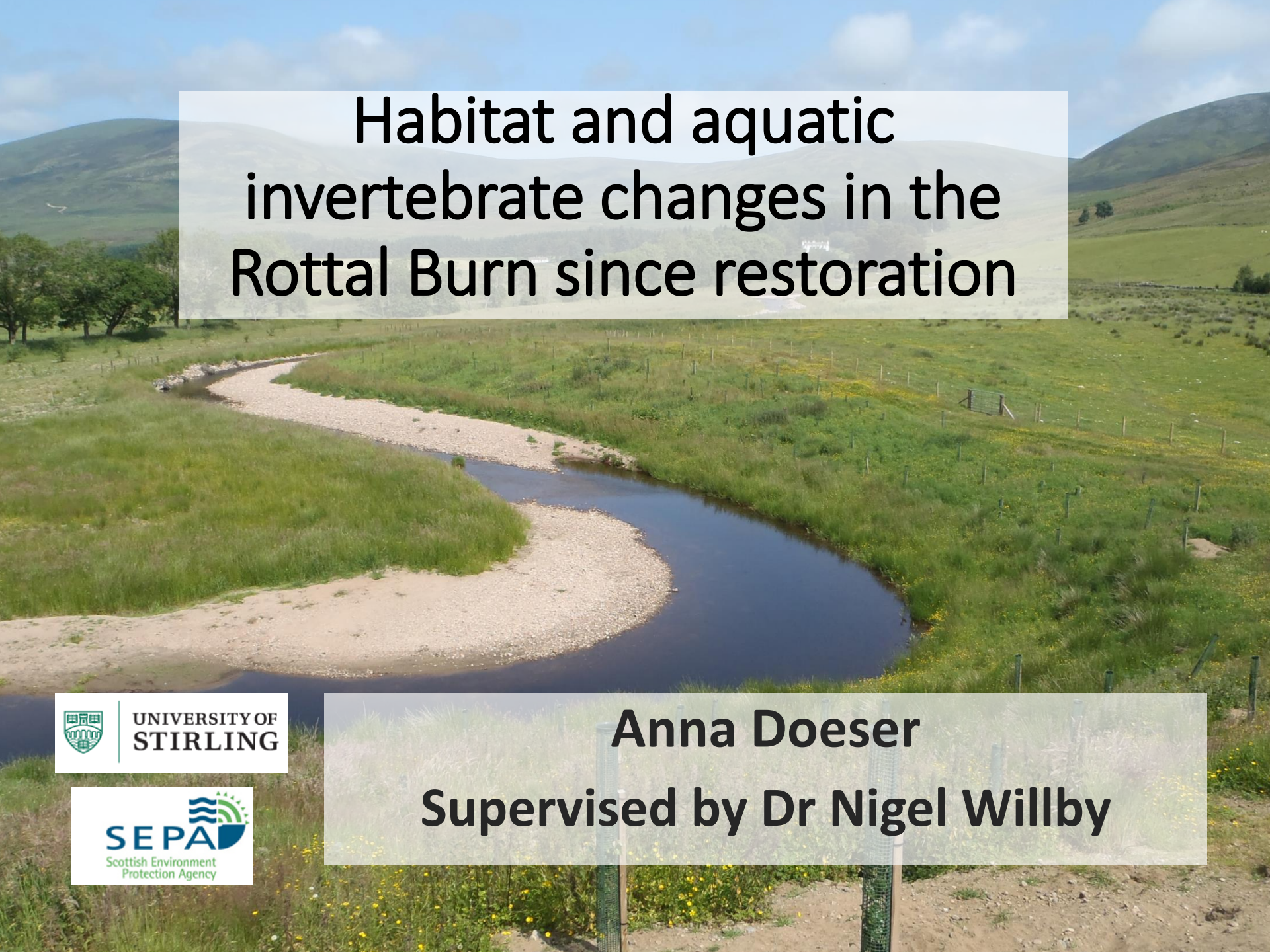


Habitat and aquatic invertebrate changes in the Rottal Burn since restoration

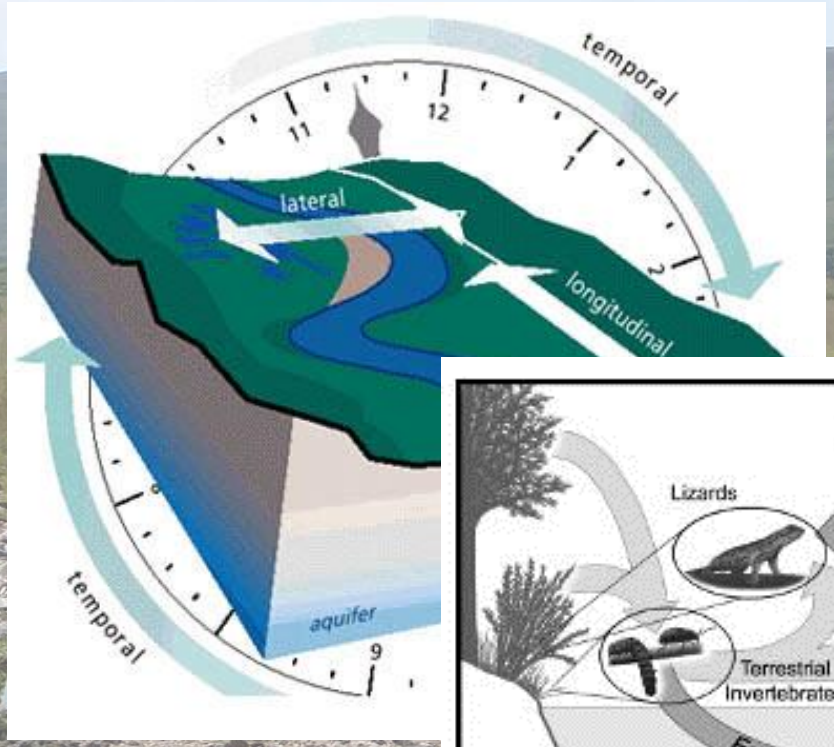
UNIVERSITY OF STIRLING

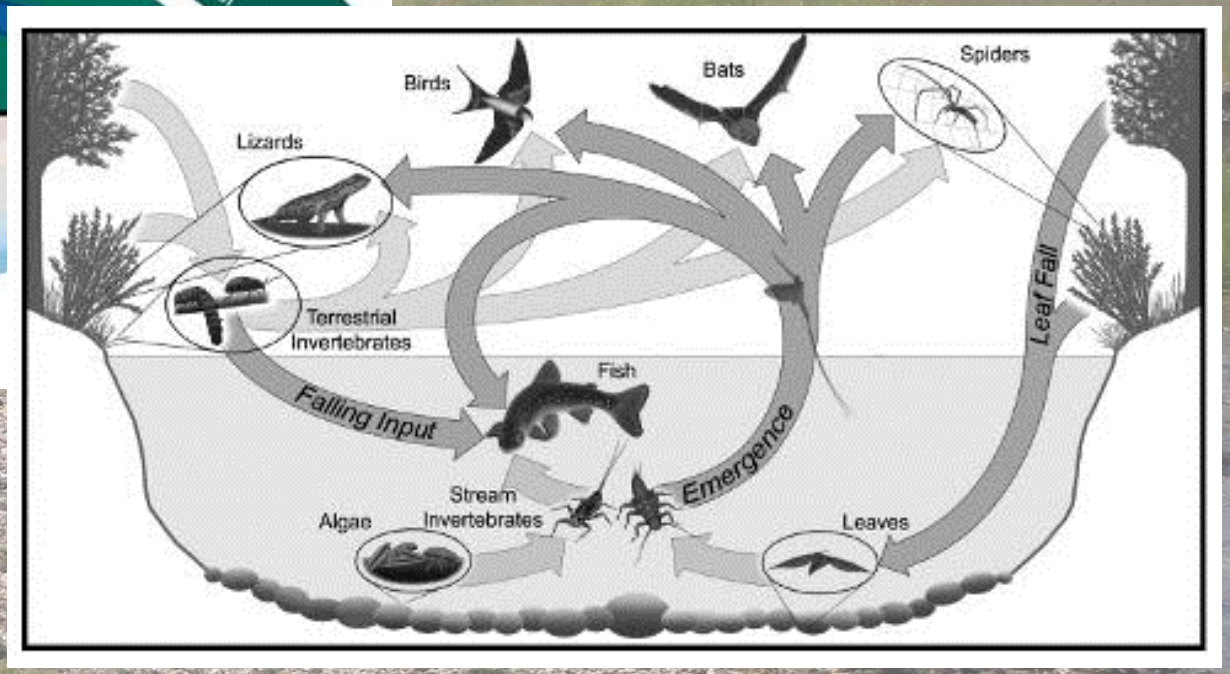
SEPA Scottish Environment Protection Agency

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

Ecological Applications
Vol. 21, No. 6

Ecological Applications, 21(6), 2011, pp. 1950–1961

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

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

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

doi:10.1111/j.1365-2427.2009.02372.x

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

MARGARET A. PALMER*,†, HOLLY L. MENNINGER‡ AND EMILY BERNHARDT§

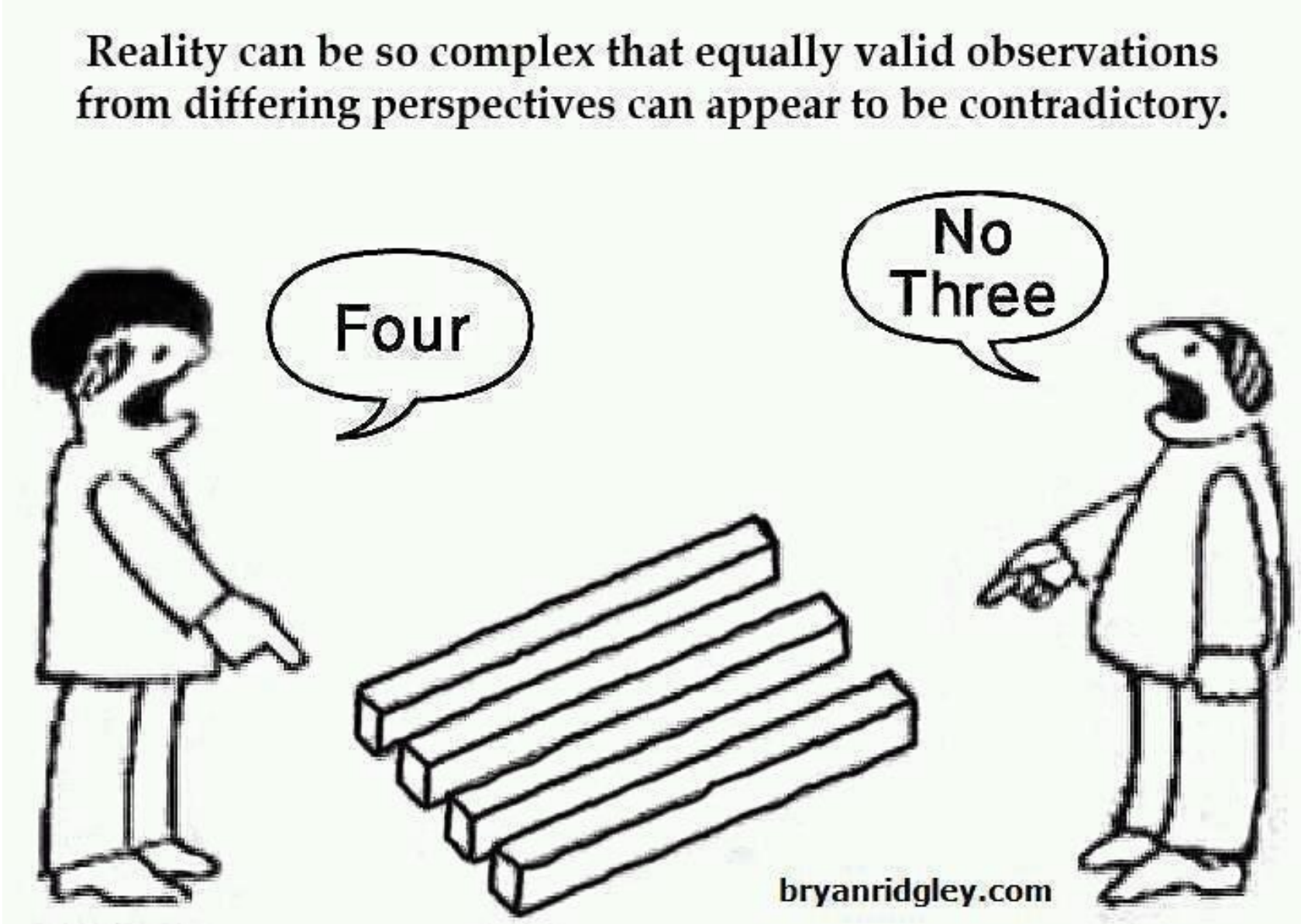
*Chesapeake Biological Laboratory, University of Maryland Center for Environmental Science, Solomons, MD, U.S.A.

†Department of Entomology, University of Maryland, College Park, MD, U.S.A.

‡NY Invasive Species Research Institute, Cornell University, Ithaca, NY, U.S.A.

§Department of Biology, Duke University, Durham, NC, U.S.A.

Why does it have to be so complicated



Rottal Burn restoration

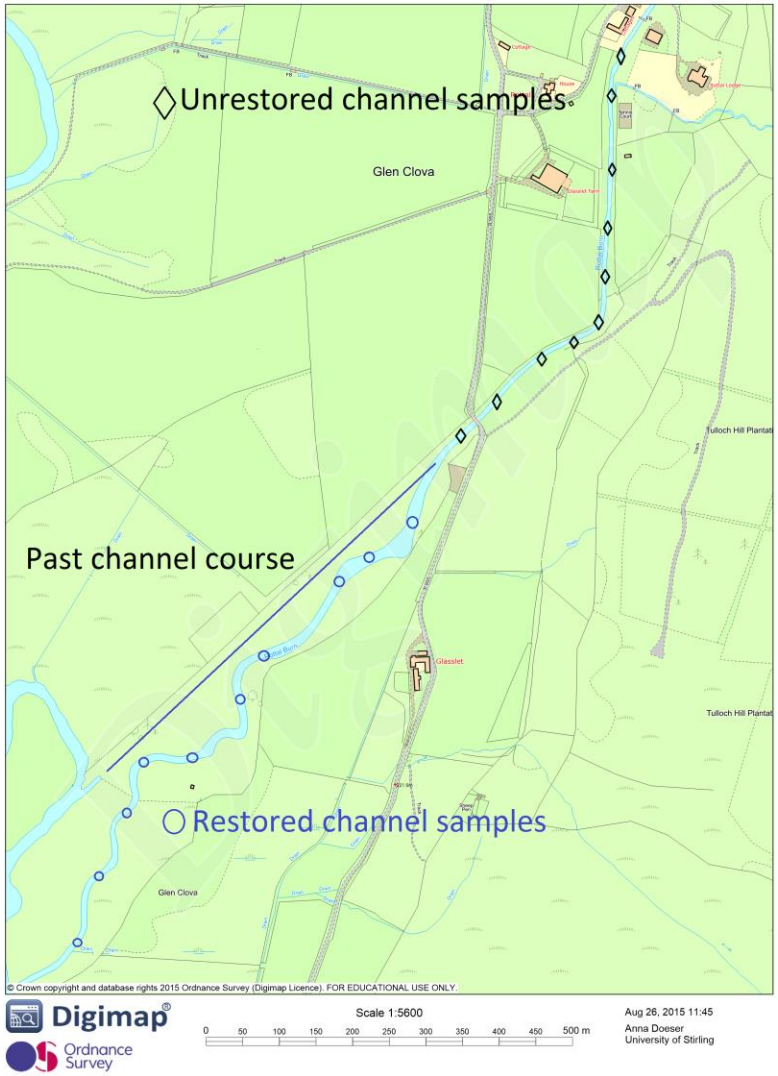

"if you build it, they will come....."
Research Questions
Have we built it?
Have they come?

Sampling Design

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

Invertebrate and Environment data from the same place

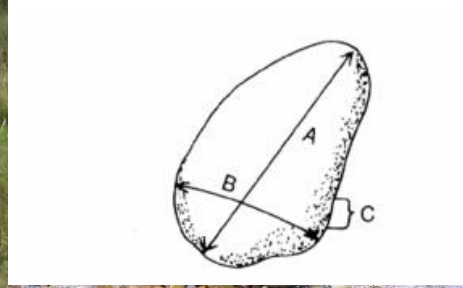
Temporal
Spring and Autumn
2013 , 2014… 2015



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



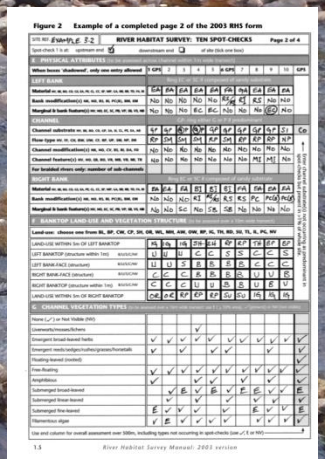
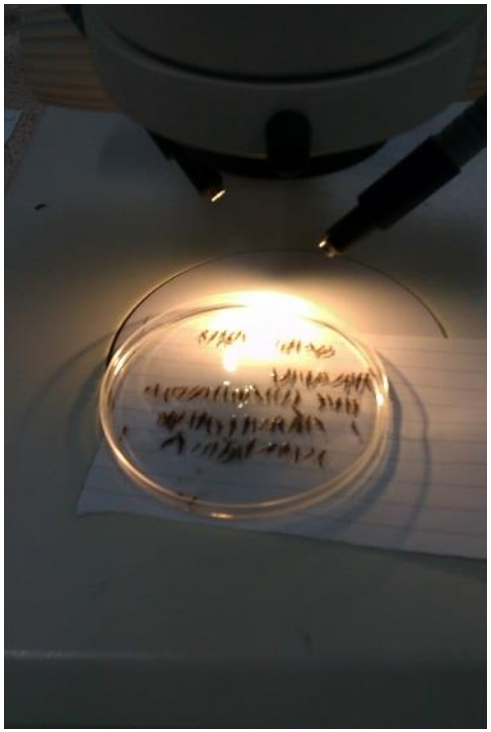


Figure 2 Example of a completed page 2 of the 2003 RHS form

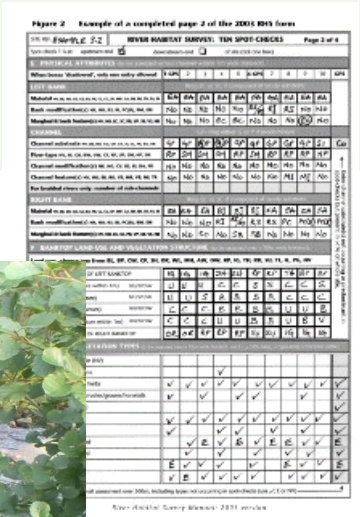
RIVER HABITAT SURVEY: TEN SPOT-CHECKS Page 2 of 4

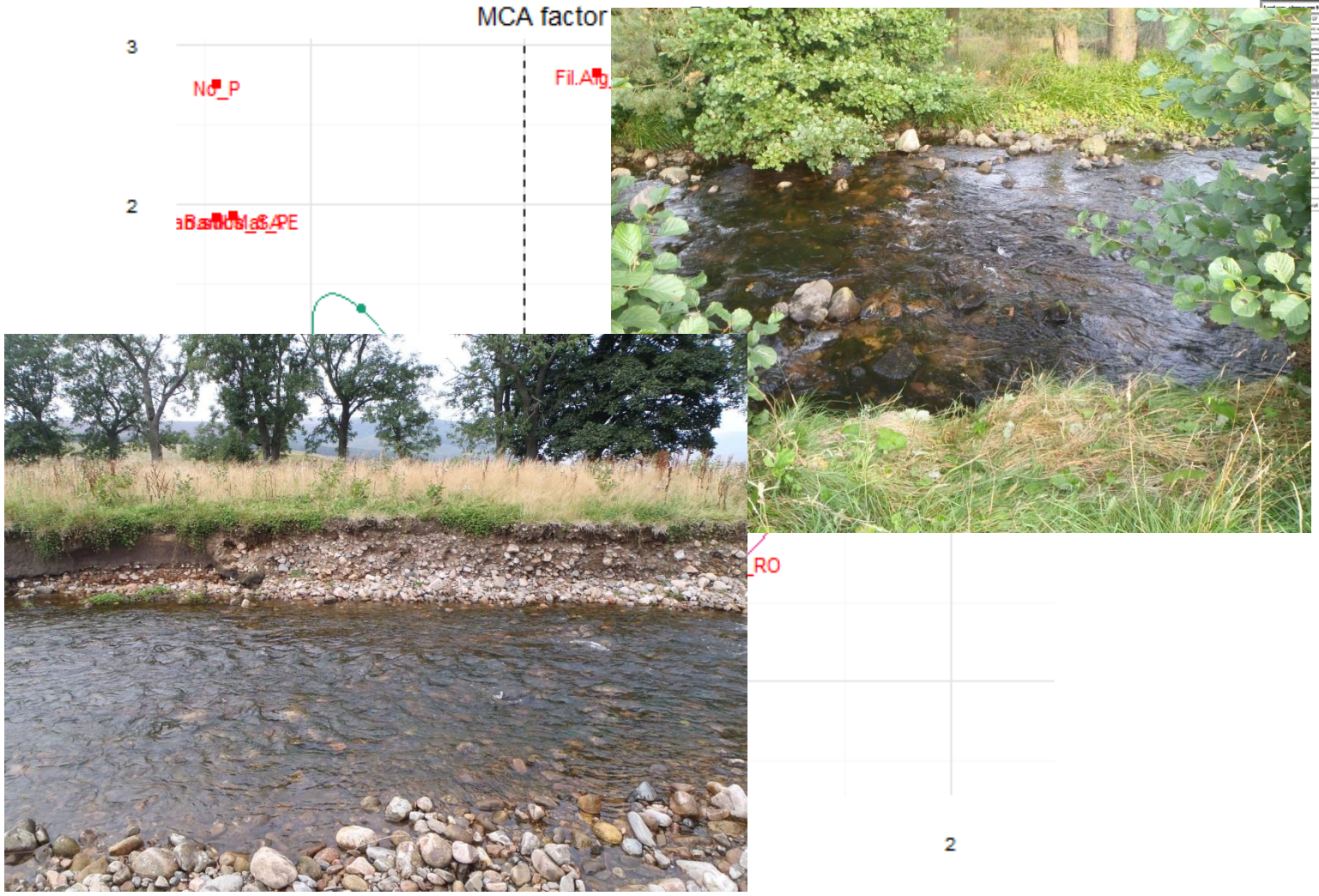
The invertebrates

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

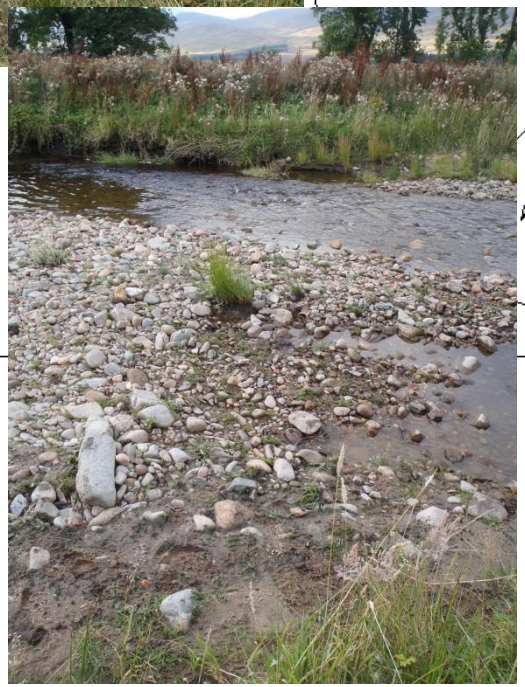


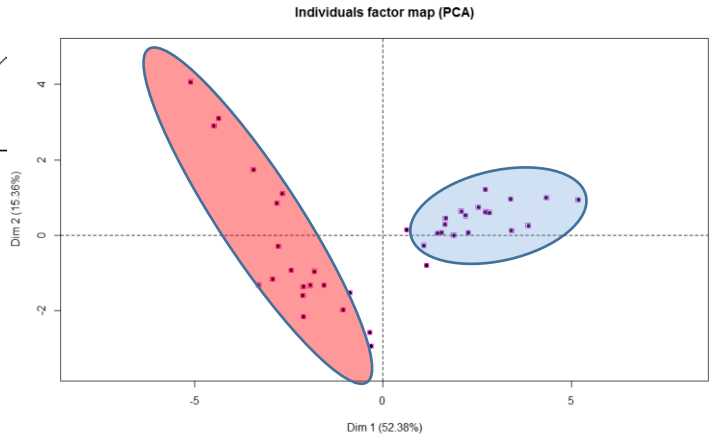
River Habitat Survey





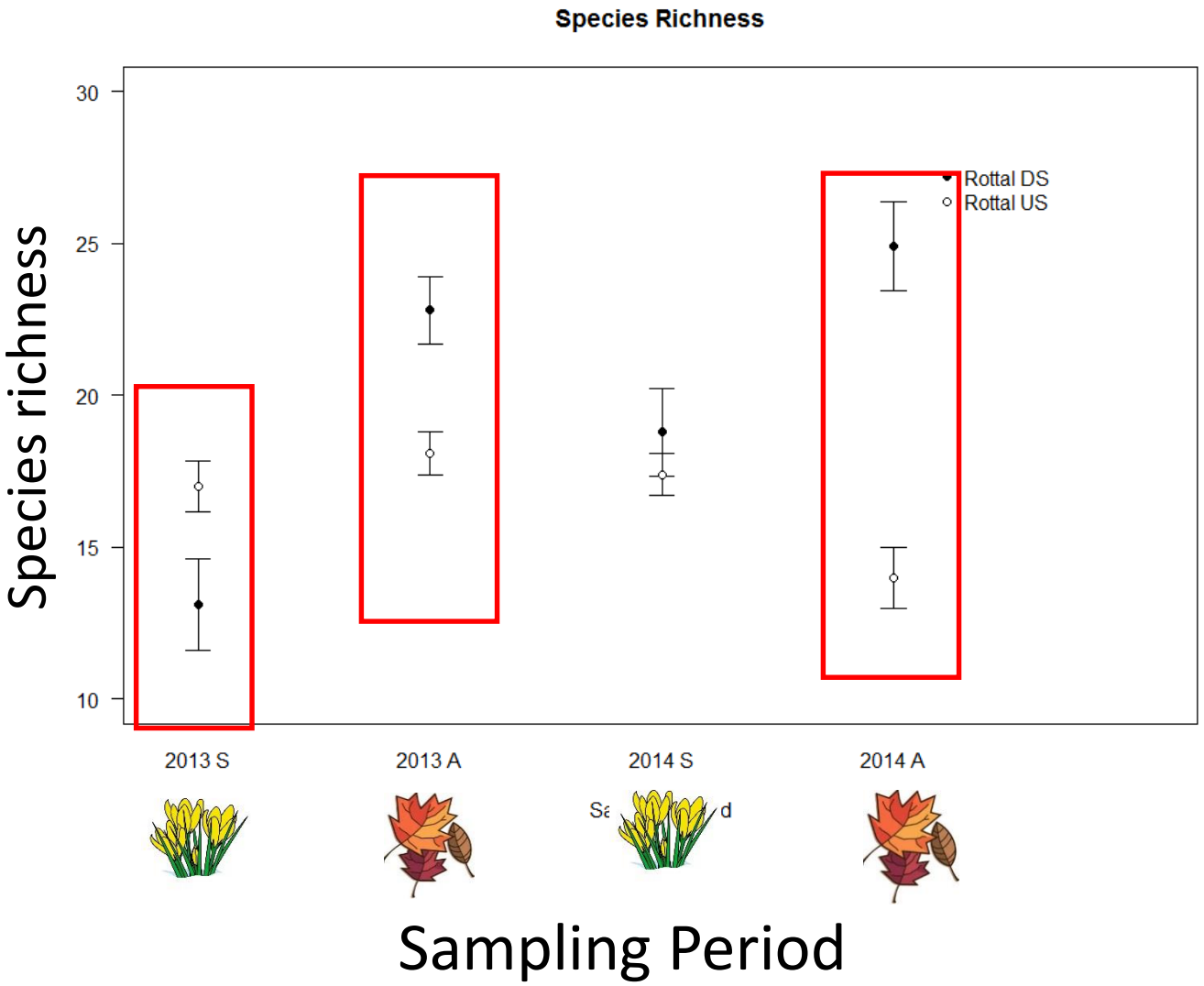
Sediment Data





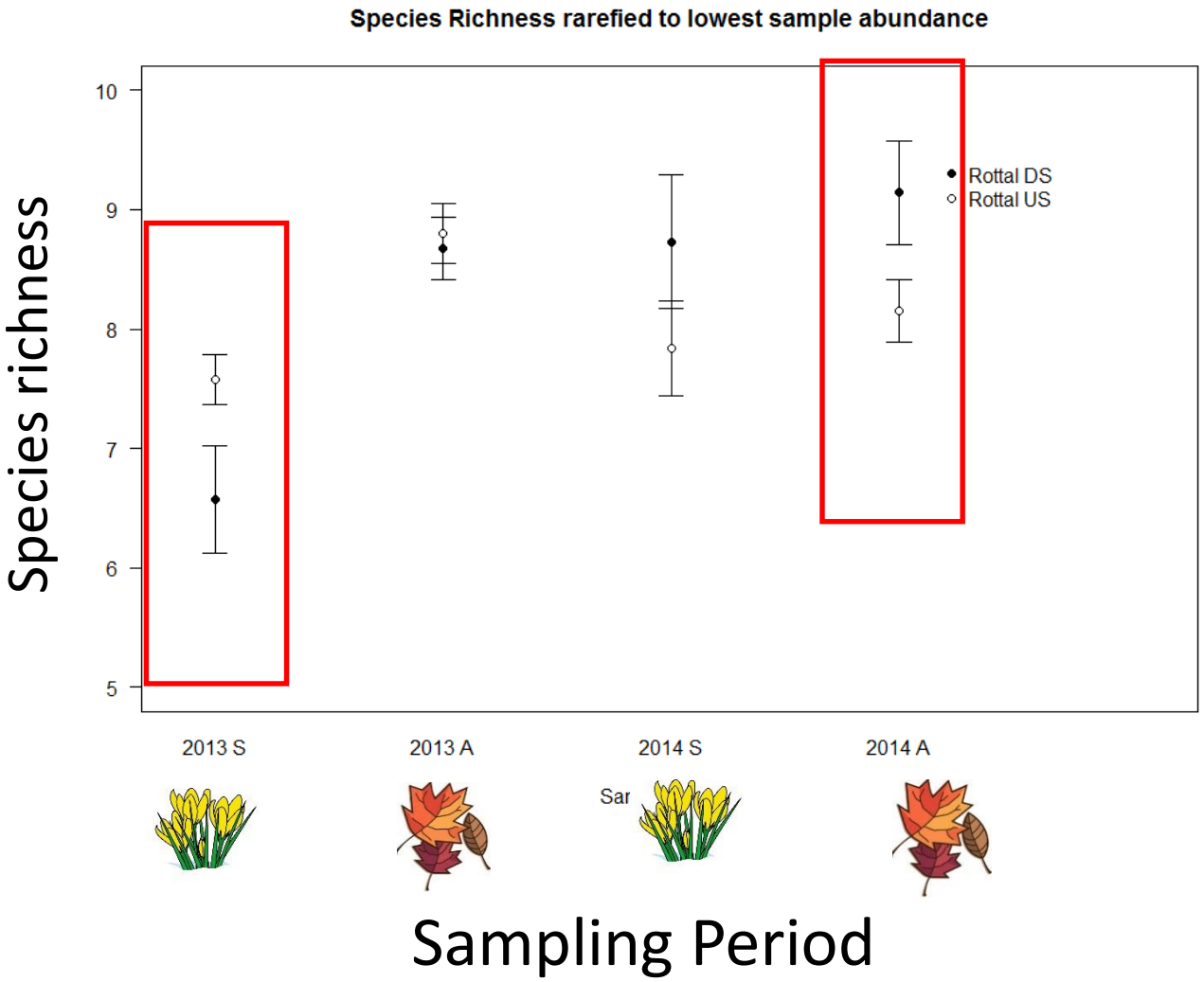
Alpha Diversity

Richness – Rarefied Richness – Shannon Diversity



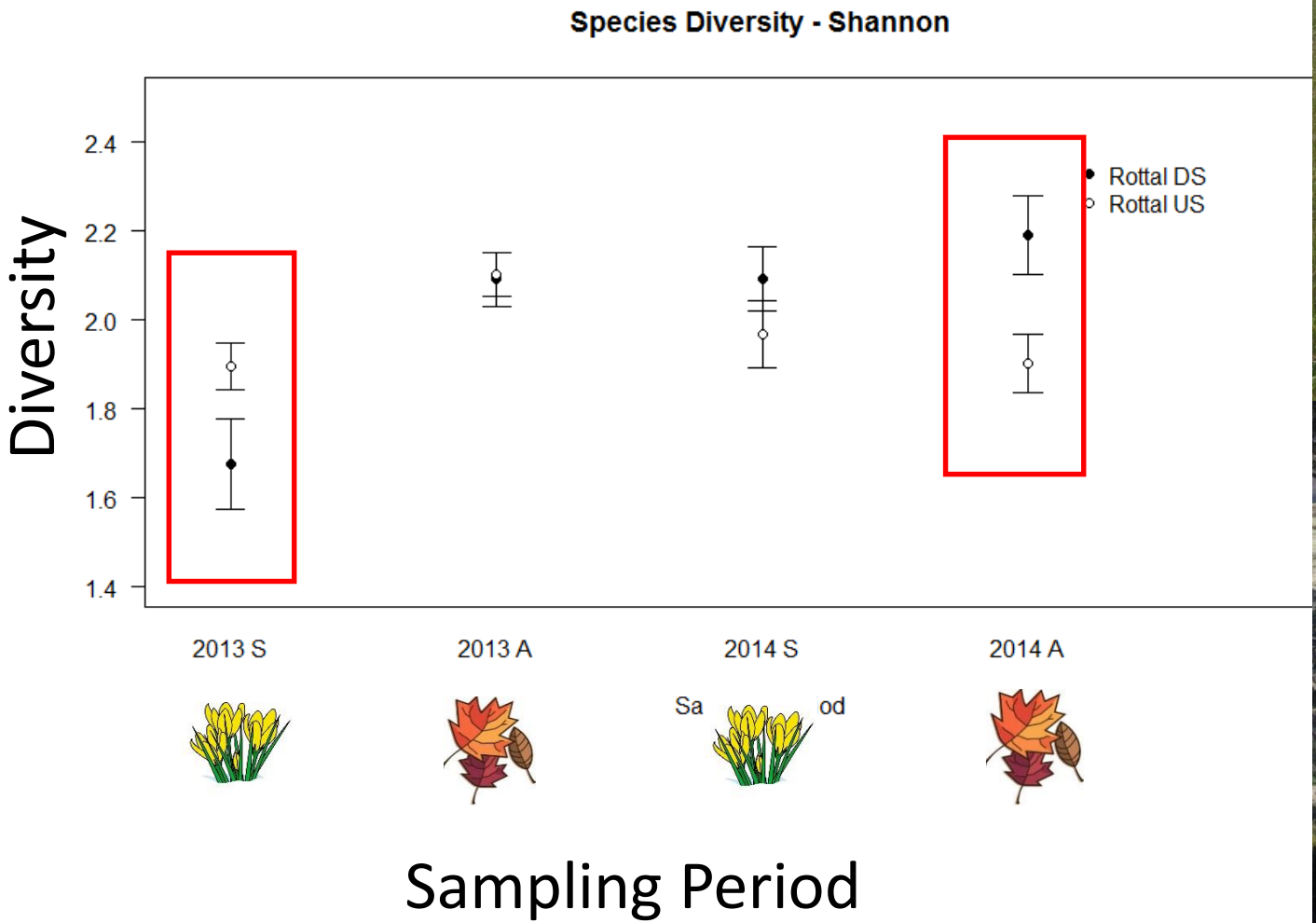
Alpha Diversity

Richness – **Rarefied Richness** – Shannon Diversity

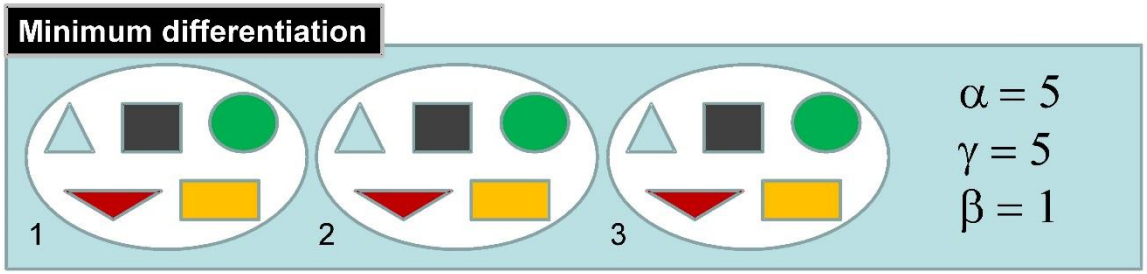


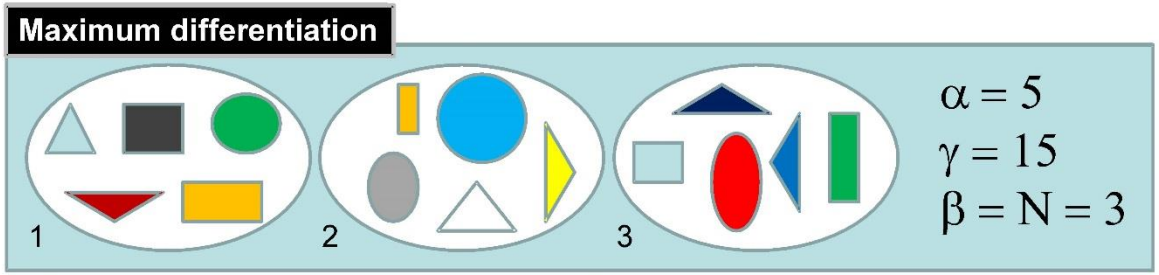
Alpha Diversity

Richness – Rarefied Richness – **Shannon Diversity**



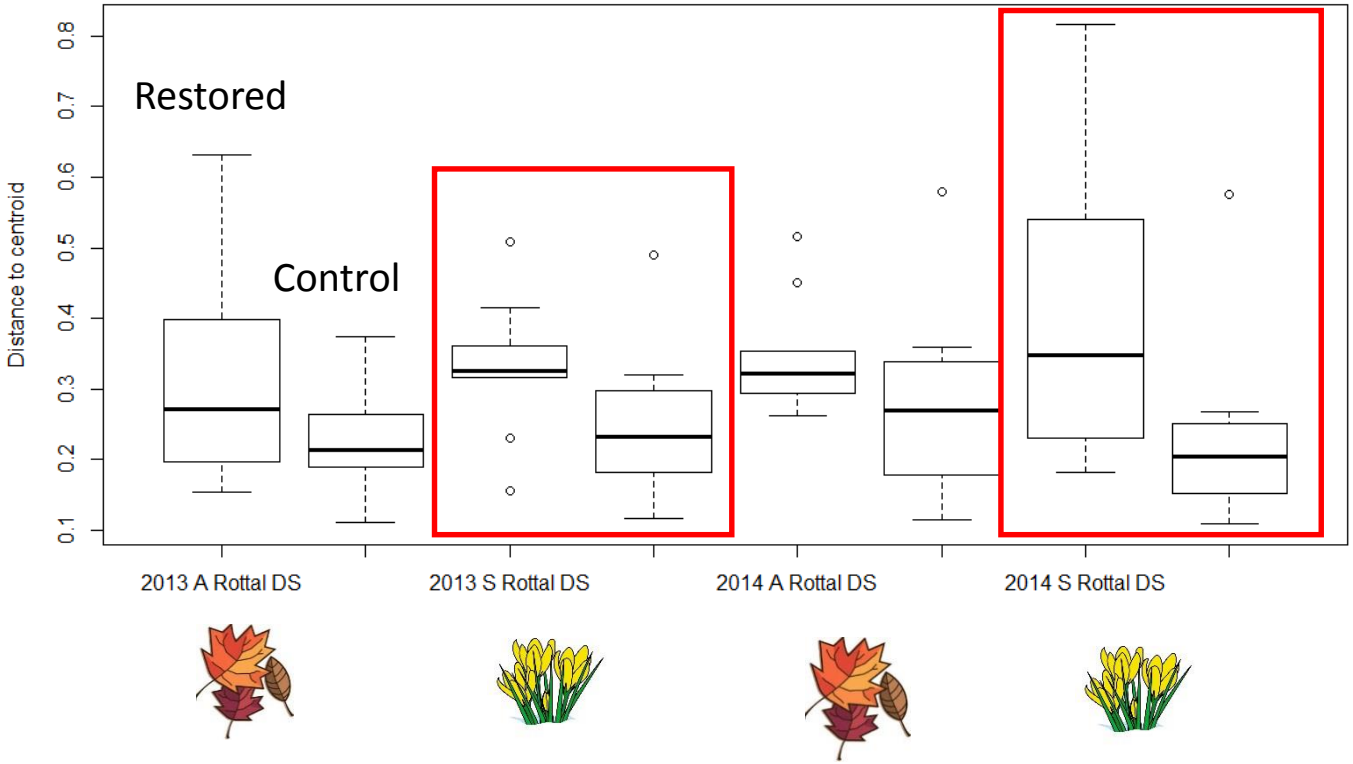
Beta Diversity





Beta Diversity

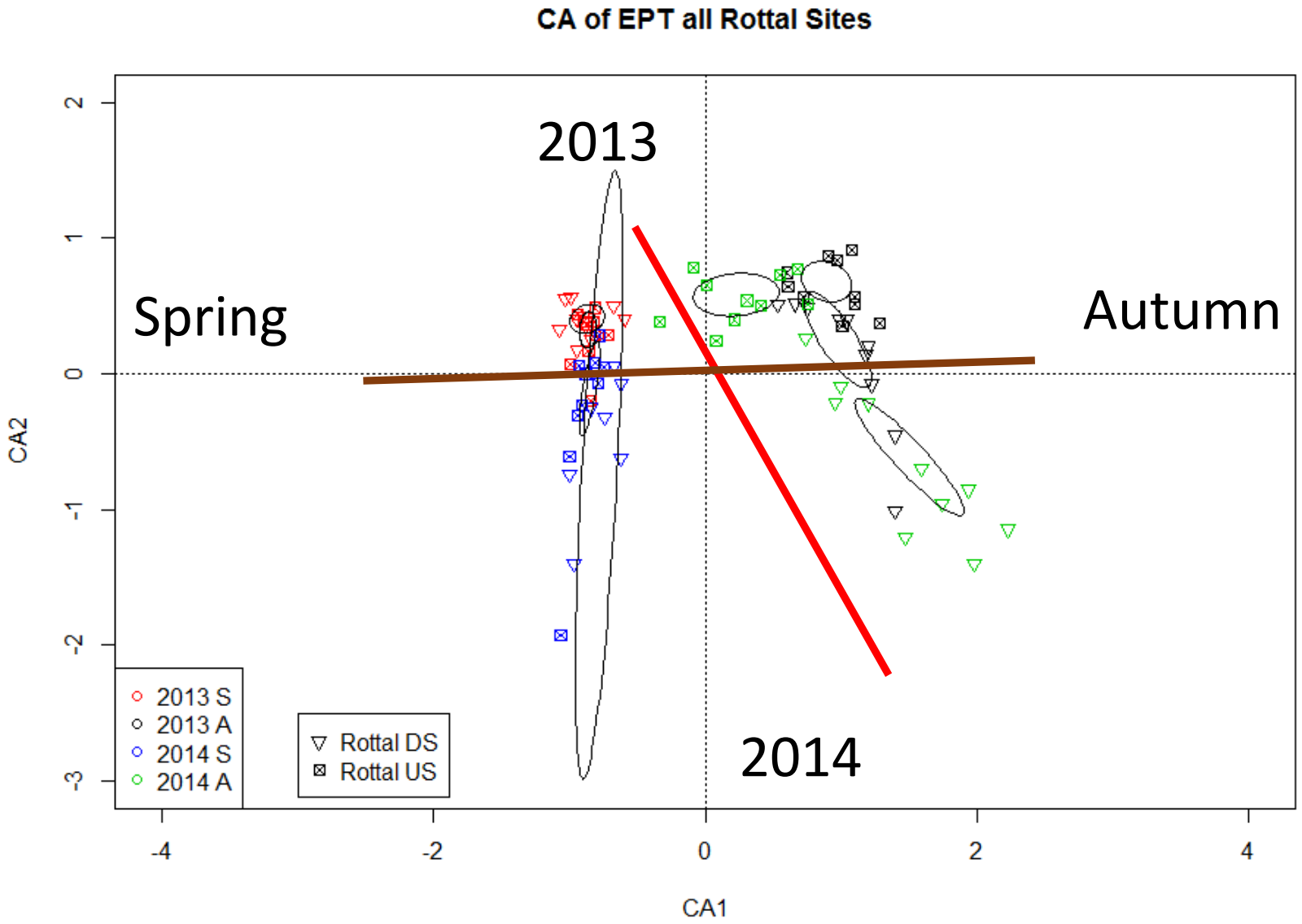
Community variability



Sampling Period

Community Composition

Ordination



Rhithrogena semicolorata

CA of EPT all Rottal Sites

2013

Baetis rhodani
Leuctra inermis

2014

CA2

CA1

Anabolia nervosa

Ecclisopteryx guttulata

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)