

References and assessment of Biodiversity



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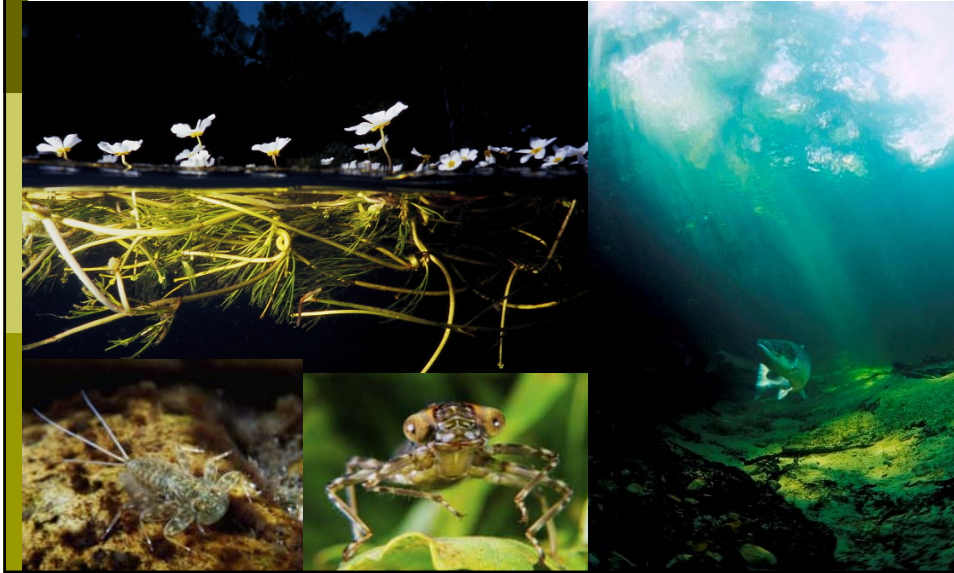


WFD reference conditions and Biodiversity

- ▣ The body of water in reference conditions must show no or only very minor signs of disturbance by impacts from pressures of an anthropogenic origin
- ▣ Aquatic Biodiversity under reference conditions constitute the best status achievable -the benchmark of the ecological status classification of the Water Framework Directive (WFD) for surface waters

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WFD Biological quality elements



Hydromorphological conditions

- ❑ The structure of riparian zones should be the type – specific
- ❑ They are measured as part of the Hydromorphological conditions accompanying the High status



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1. Reference conditions across Europe

- The Intercalibration exercise showed that it was possible to find agreed references from small to large rivers (around 2000 km²)
- Very large rivers and floodplains will need a special approach and criteria to reference conditions. Issue presently under study as a cross GIG intercalibration activity for 2011

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2. Mechanisms generating Biodiversity

- Regional historical factors: Biogeography
- Local ecological factors: Spatial heterogeneity
 - Basin
 - River
 - Reach

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Upper Miño Basin

- Non regulated
- Low intensity land uses
- Wide riparian corridors

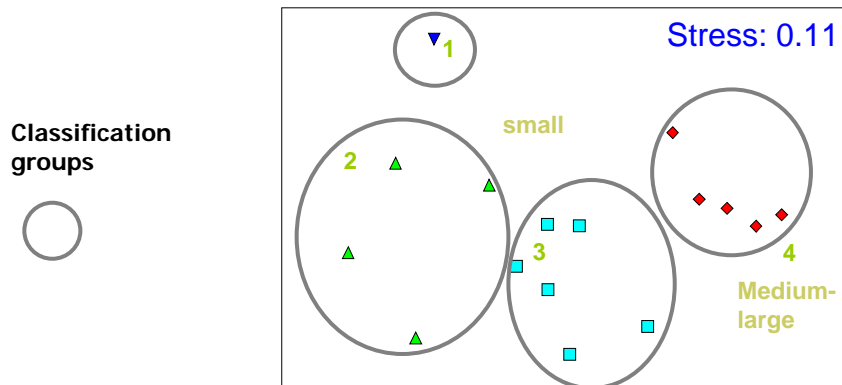


Order 2



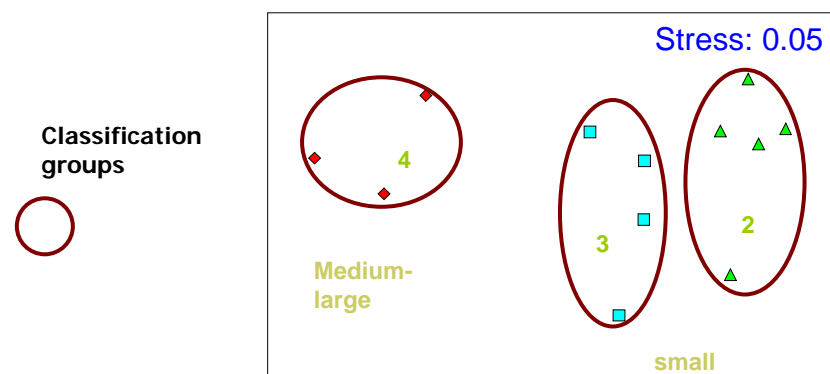
Basin scale: diversity of headwater streams and big rivers generating Biodiversity

Invertebrate composition in reference sites



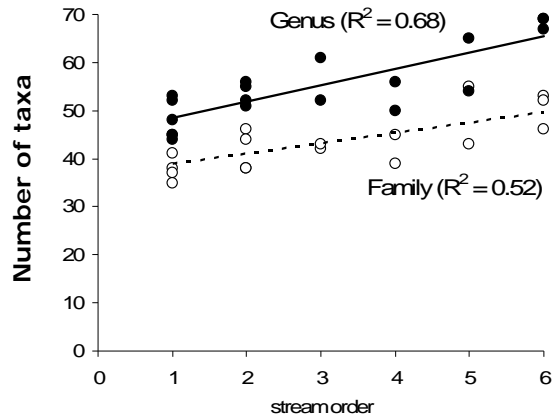
Basin scale: diversity of headwater streams and big rivers generating Biodiversity

Diatom composition in reference sites



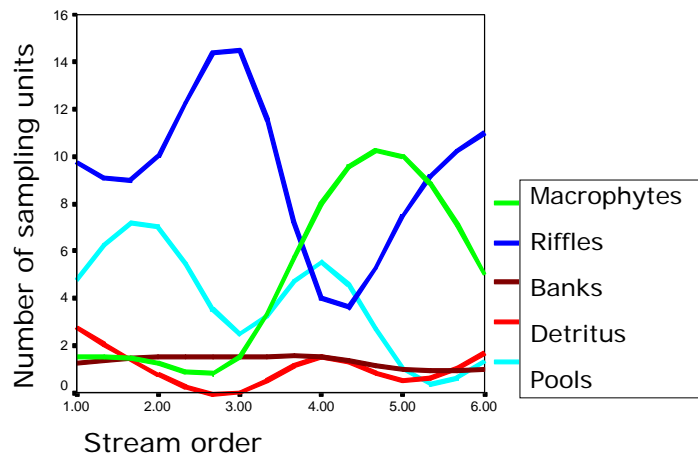
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River scale: Longitudinal variation in Biodiversity from small streams to rivers



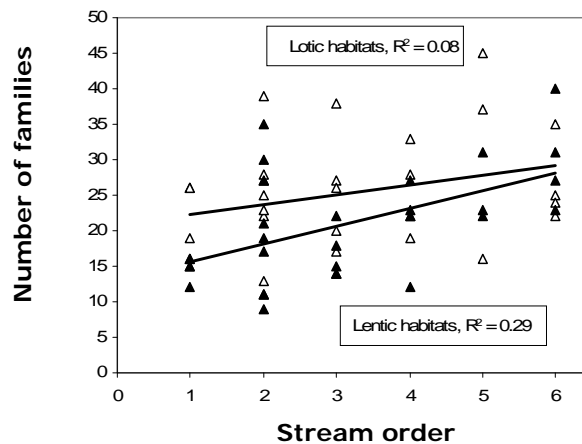
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Reach scale: mesohabitats and microhabitats influencing biodiversity



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3. Assessment of biodiversity of WFD reference conditions

1. Sampling approach and monitoring
2. Taxa identification level
3. Indicators
4. WFD Normative definitions
5. Classification systems

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3. Assessment of biodiversity of WFD reference conditions

1. Sampling at the reach scale:

- Standardised methods for comparable evaluation
- For **invertebrates**, multiple habitat approach, but samples are pooled as a representative sample, thus losing the habitat-species relationship
- For **diatoms**, single habitat sampling assures species-habitat relationships, but other habitats are not sampled
- **Fish** and **macrophytes**, are assemblages of few species, difficult to standardise sampling due to wider scales of distribution and the need to account for rare species

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3. Assessment of biodiversity of WFD reference conditions

2. Taxa identification level:

- Species vs superior level of identification:
 - Species: diatoms, macrophytes, fish
 - Species or superior: invertebrates
- Response to pressure should not only occur at lowest taxonomic levels
- BUT, if we do not identify at the lowest taxonomic level, we can not account for species biodiversity as taxa richness
- Scarcity of taxonomists/ taxonomic knowledge
- Difficulty in extensive monitoring programmes

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3. Assessment of biodiversity of WFD reference conditions

3. Indicators

- WFD indicates the biological quality elements (BQE)
- Bioindicators should measure the deviation from the reference biological condition
- The biological reference conditions is an assemblage of species sharing a non significantly disturbed habitat
- They include a number of very sensitive species

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3. Assessment of biodiversity of WFD reference conditions

4. Normative Definitions

- Assemblage parameters of BQE that need to be quantified to characterise the gradient of deterioration occurring in biological communities from High, to Good and to Moderate status
- Examples:
 - Species composition
 - Abundances
 - Relation between sensitive and tolerant taxa
 - Diversity

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3. Assessment of biodiversity of WFD reference conditions

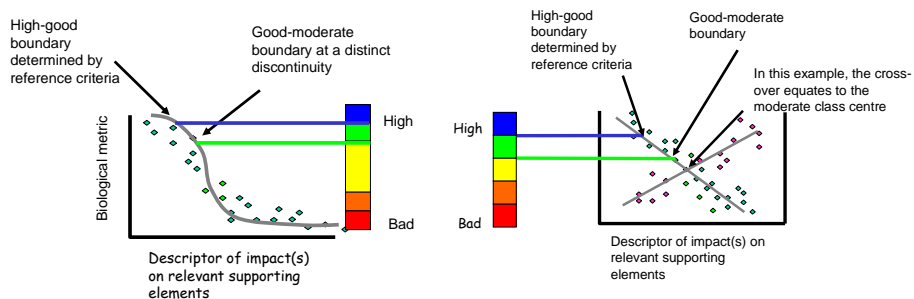
5. Classification systems:

- There are many types of Bioindicators included in classification systems, and presently not all them cover all biological parameters of ND
 - Biotic indices (IBGN, BMWP, ASPT)
 - Integrad Indices (sensitive/tolerance ratios), (Trophic Index of Diatoms, IPS)
 - Multimetrics (ICMs)
 - Predictive models (RIVPACS, BEAST)

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How Normative Definitions are presently used to define the Biological Reference condition?

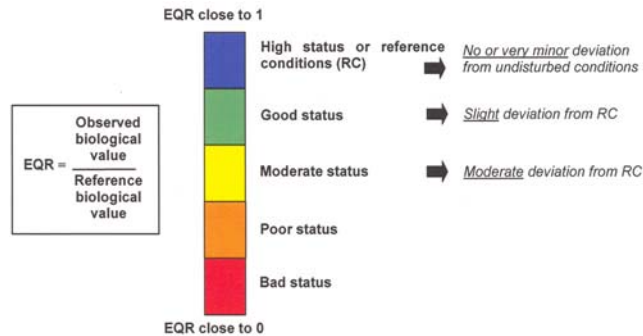
- The Boundary setting protocol (Pollard & van de Bund, 2005) was developed as an attempt to unify criteria in the establishment of ecological boundaries



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How Normative Definitions are presently used to define the Biological Reference condition?

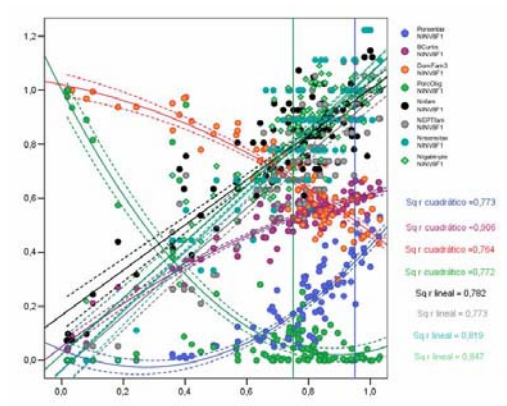
- Mainly have been boundaries numerically derived. To establish the reference condition (i.e. the median of the value of the bioindicator), and the ecological status class boundaries



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How Normative Definitions are presently used to define the Biological Reference condition?

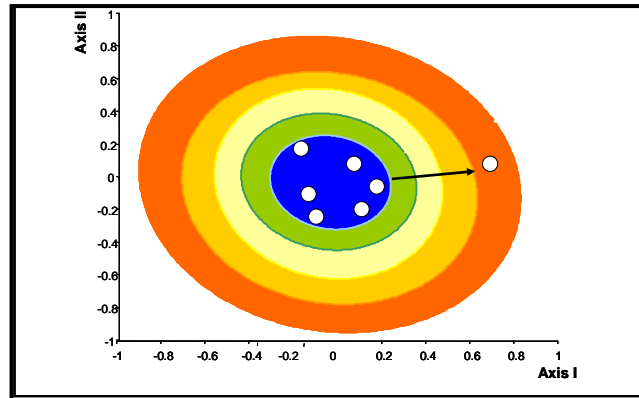
- How can we measure Biodiversity taking into account the ND? Taxa composition, richness and diversity



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Conclusions and Synergies

- Different conceptual approaches, nature protected areas vs reference conditions
- Similar objectives for conservation and restoration of basic ecosystem components: species, communities, aquatic habitats & riparian corridors
- Importance of reference sites for protection due to their importance at the European scale

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Conclusions and Synergies

- Common monitoring for protected areas: need for a convergence between sampling methodologies, level of identification, and indicators
- Approach at the community level, it also includes the evaluation of populations of sensitive species and their habitats
- How important is the level of identification for the assessment of Biodiversity of the ecological status and of conservation?

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Conclusions and Synergies

- Difficulty in finding a common European ecological interpretation for Biodiversity:
 - How much Biodiversity we loss along the gradient of disturbance?
 - How dissimilar from the reference condition a community has to be to belong to a moderate status?
- WFD implementation by MS and the future European intercalibration exercise should look for more consistent and comparable ways of estimating and quantify biodiversity loss in the aspects covered by the ND, of high importance for the convergence with the conservation objectives

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Thank you for your attention

