Reference status and WFD assessment of river macrophytes in Flanders (Belgium)

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A reference is what we can only imagine...

The ecological quality gradient is not just ‘clean – polluted’ or ‘nutrient poor – nutrient rich’
Macrophyte references

- no actual spatial references
- historical trends in species distributions and vegetations (ranking; dangerous to link former vegetations or syntaxa to ‘references’)
- autecology (relation to stressors)
- basic principles of functional ecology (relation to processes, habitat structures)
- synthesis by expert judgement (iterative, ongoing): general characteristics, species lists ► confront with real world
Reference concept and assessment are linked

- consider all reference attributes that can be quantified and implemented as an EQR
- all reference attributes need to be present to reach high status
- the assessment should focus on the ‘qualities’ of macrophytes relative to other elements: add info, not duplicate what can be done better…
- the water body does not stop at the observed water margin - (part of) banks count also: macrophytes are the best interface
- implicit logic, transparent
Type-specific reference attributes

- appropriate *species composition*
- *disturbance indicators* scarce
- appropriate *functional diversity*
- appropriate *abundance submerged vegetation*

(one out – all out)
1.1 Species composition: premises

- most species are not restricted to a single water type
- most species are not restricted to the reference condition of the type(s)
- presence/absence of (few) ‘positive reference indicators’ is also influenced by processes/conditions unrelated to the quality of the water body – their presence is not guaranteed at reference
1.2 Species composition: assessment

- all species *possibly* occurring at reference are type specific (≠ reference species s.s. Expert List) – decide which are ‘indigenous’
- EQR: relative abundance-weighted representation
- 0 and 1 logically constrained; no truly objective delimitation of class limits possible: equal widths
- useful for inundated channel and banks
- insufficient as ‘stand alone’
2.1 Disturbance indicators: premises

- macrophytes provide some integrated signal of chemical and physical disturbances
- rather few specific indicators
- low abundance (not necessarily absence) expected at reference
- allow for natural dynamics and stress
- for macrophytes ‘trophic status’ mostly means ‘base status’
- typological gradient is a confounding natural trophic gradient
2.2 Disturbance indicators: assessment

- EQR: relative abundance-weighted representation of most reliable indicators
- 0 and 1 are logically constrained; boundaries preliminary: relate class limits with response to pressures ► input from intercalibration/monitoring
- useful for inundated channel and banks
- insufficient as stand alone
3.1 Appropriate functional diversity: premises

- major growth forms are possible basis
- difficult to specify abundances (natural variation, lack of knowledge)*: presence/absence
- a minimal type-specific standard has to be met

* proliferation of certain growth forms due to disturbance is covered at species level by previous EQR
3.2 Appropriate functional diversity: assessment

- EQR: relative distance to minimal expectations
- 0 and 1 logically constrained; class limits based on ecological relations
- Sensitive growth forms and species are more important; these compensate lack of diversity
- Only useful for inundated channel
- Insufficient as stand alone
4.1 Abundance submerged vegetation: premises

“no significant change from average abundance”:
- only for some types (not for headwaters or downstream parts)
- increased and lowered abundance indicate deviation
4.2 Abundance submerged vegetation: assessment

- very robust classification; emphasis on extremes
- class limits ideally determined by response to stressors; now ‘expert judgement’
- essential to rule out misclassifications
Data needed

• several 100 m stretches / water body
• preconditions for site selection
• separate relevés for *inundated channel* and *exposed banks* (left + right)
• all vascular hydrophytes & phreatophytes + some non-phreatophytes, all charophytes, some mosses...
Intercalibration? Yes!

- results for stretches are only a basis for methods not for outcomes at WB level: 100 m ≠ water body
- ICMs for ‘sensitivity’ (based on ‘reference species s.s. Expert List’) are biased to reflect trophic status only (natural + anthropogenic)
- only intercalibration of corresponding metrics: i.e. ‘disturbance’ with ‘sensitivity’, ‘functional diversity’ with ‘growth forms’
- compile common criteria for representation of type-specific taxa, growth forms & disturbance indicators at H and G status for IC types from data and expert opinion…