Evaluation and adjustment of Dutch assessment methods for the WFD

ROYAL HASKONING

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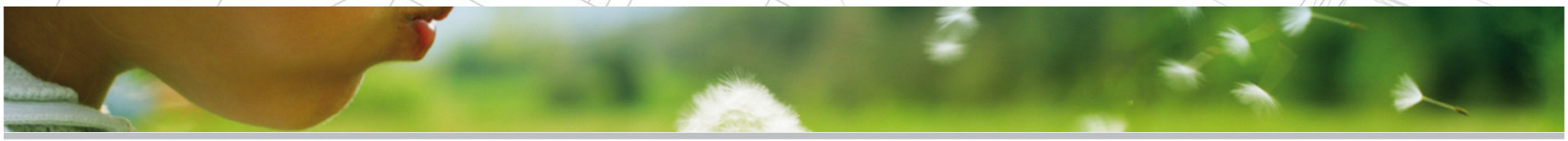
6 september 2010

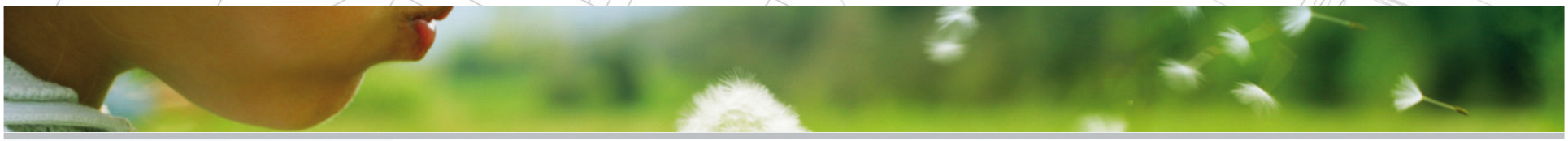
Content



- **Project purpose**
- **Methods**
- **Results:**
  - **Phytoplankton**
  - **Macrophytes en Phy**
  - **Macro invertebr**
  - **Fish**
  - **Physic** **ity**
- **First** **s**
- **Propositions**

Work in progress

Project purpose



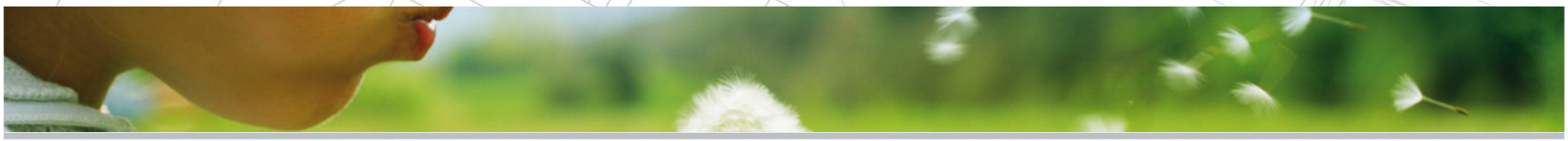
2 goals:

1. **Assess suitability and applicability of the WFD metrics**
2. **Evaluate distraction ecological objectives**

Result: concrete suggestions for improvement

Discus today: goal nr 1

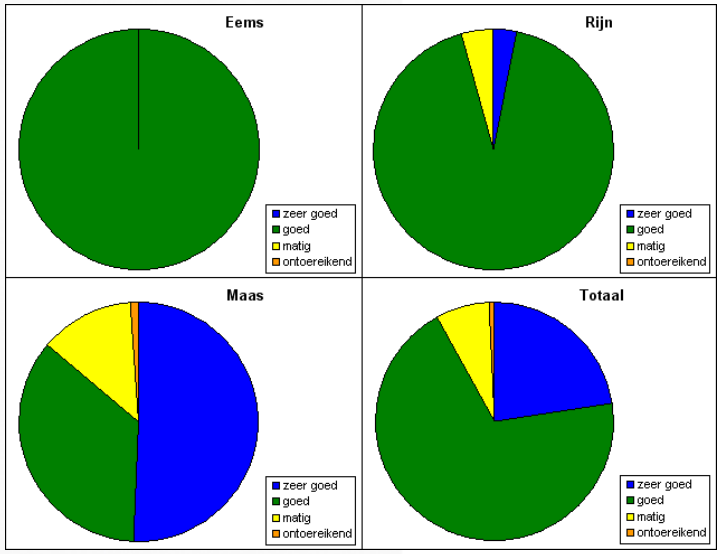
Methods



- **Interviews with experts per biological group**

- **Digital survey to all users**

- **Data analysis of the WFD objectives**

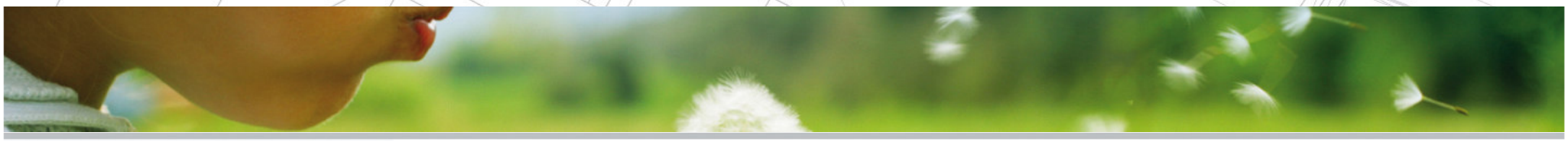


Persoonlijke gegevens			
Organisatie			
Naam invuller			
functie			
Telefoon		E-mail	
Ervaring met maatlatten met name opgedaan als:	☐ Opsteller (expert) ☐ Gebruiker (waterbeheerder)		

1	Afbakening beantwoording vragenlijst							
a.	Op welk kwaliteitselement hebben uw antwoorden betrekking?							
	☐ fytoplankton ☐ Overige waterflora: macrofyten ☐ Overige waterflora: fytobenthos ☐ Overige waterflora: macro algen en angiospermen ☐ Macrofauna ☐ Vis							
b.	Op welk(e) watertype(n) hebben uw antwoorden betrekking? (meerdere antwoorden mogelijk)							
	☐ M1	☐ M2	☐ M3	☐ M6	☐ M7	☐ M8	☐ M10	☐ M12
	☐ M14	☐ M20	☐ M21	☐ M23	☐ M27	☐ M30	☐ M31	☐ M32
	☐ R4	☐ R5	☐ R6	☐ R7	☐ R8	☐ R12	☐ R13	☐ R14
	☐ R15	☐ R16	☐ R17	☐ R18	☐ O2	☐ K1	☐ K2	☐ K3
	Soorte voor toelichting:							

2	Gebruik van de maatlat
a.	Heeft u voor de bepaling van de huidige toestand (**3GBP 2009**) gebruik gemaakt van de landelijke maatlat voor het betreffende watertype?
	☐ Ja, voor alle waterlichamen ☐ Ja, maar niet voor alle waterlichamen ☐ Nee, voor geen van de waterlichamen
b.	Hoe heeft u de toestand bepaald voor waterlichamen waarbij u geen gebruik van de landelijke maatlat heeft gemaakt?
	☐ Met een afwijkende maatlat (voor een ander watertype) ☐ Met een eigen maatlat ☐ Op basis van expertkennis ☐ Anders, namelijk:

Phytoplankton



The metric:

- **2 submetrics**
  - **Species composition**
  - **Abundance of algae**

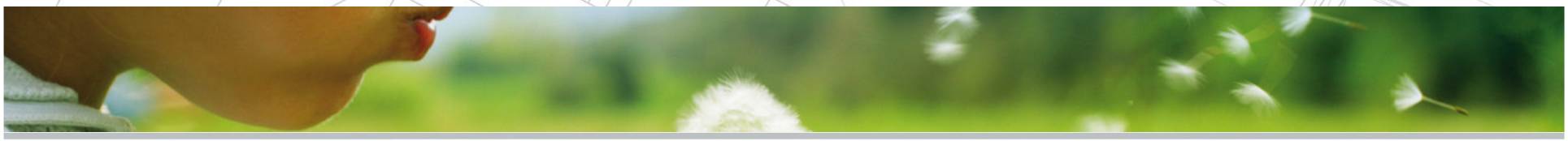
Species composition

- **Planktonic bloom**
- **EQR: List of species with bloom criteria**

Abundance of algae

- **EQR: Concentration of chlorophyll a**

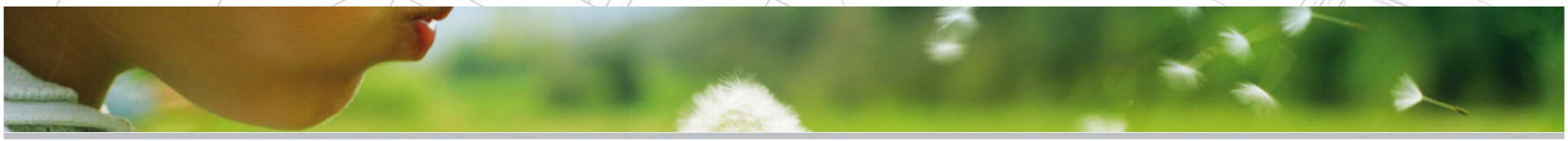
Phytoplankton



Suggestions for improvement:

- **Validate chlorophyll a for brackish waters**
- **Intercalibrate submetrics chlorophyll en *Phaeocystis* in coastal waters**
- **Chlorophyll metric for transitional waters dependent on the salinity**

Macrophytes and Fytobenthos



The metric:

- **3 submetrics**
  - **Abundance of macrophytes**
  - **Species composition of macrophytes**
  - **Species composition of diatoms**

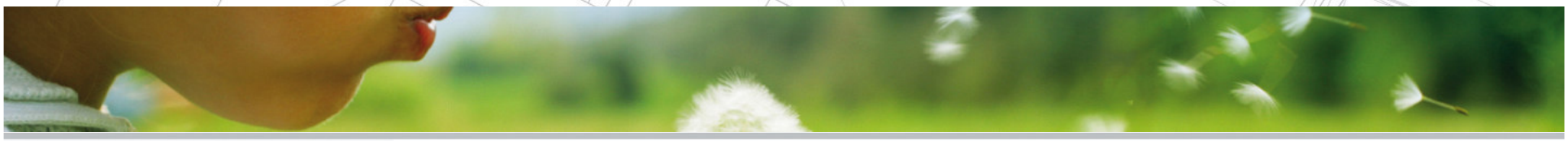
Abundance of macrophytes

- **Growth forms (submersed, emergent, etc.)**
- **EQR: Coverage rate of these growth forms**

Species composition of macrophytes

- **Water type characteristic species**
- **EQR: Number of species with indicator value depending on the coverage**

Macrophytes and Fytobenthos

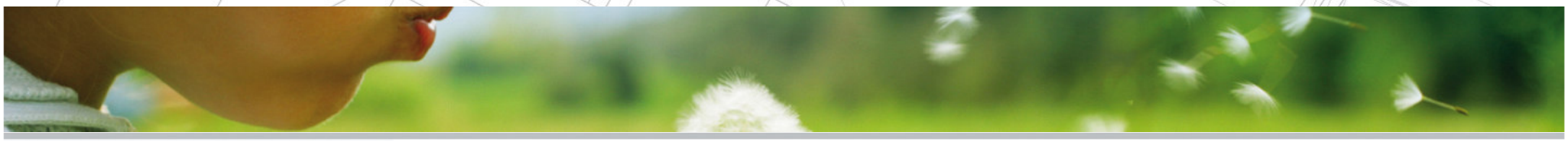


Suggestions for improvement (macrophytes):

- **Metric less sensitive for monitoring intensity**
- **Make metric usable for site assessment (instead of water body)**

- **Clear definitions of potentially vegetated area and riparian vegetation, including situation in the past (natural) vs today (heavily modified)**
- **Clear definition of good developed emergent vegetation in lakes**

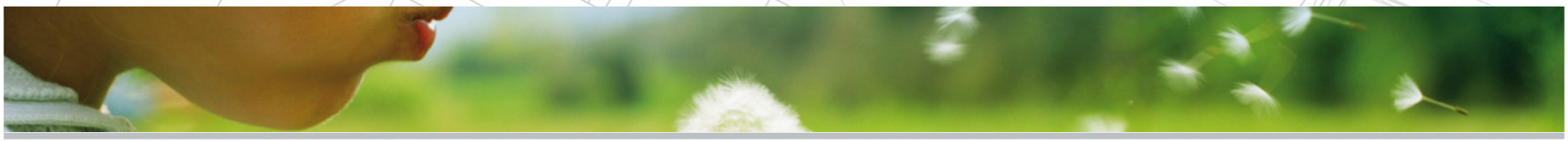
Macrophytes and Fytobenthos



- **Validate parameter riparian vegetation in large rivers with tide**

- **Adjust reference description in coastal waters (for heavily modified status)**

Macrophytes and Fytobenthos



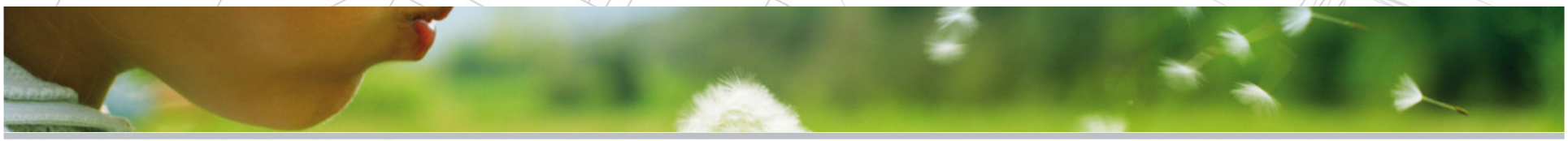
Species composition of diatoms

- **Only in rivers at this moment**
- **IPS method (Indece de Polluosensitivité Spécifique)**
- **Diatom species, sensitivity value, indicator value**

- **EQR derived with a formula**

$$IPS = 4{,}75 \times \frac{\sum_{i=1}^{n} a_i \times s_i \times v_i}{\sum_{i=1}^{n} a_i \times v_i} - 3{,}75$$

Macrophytes and Fytobenthos

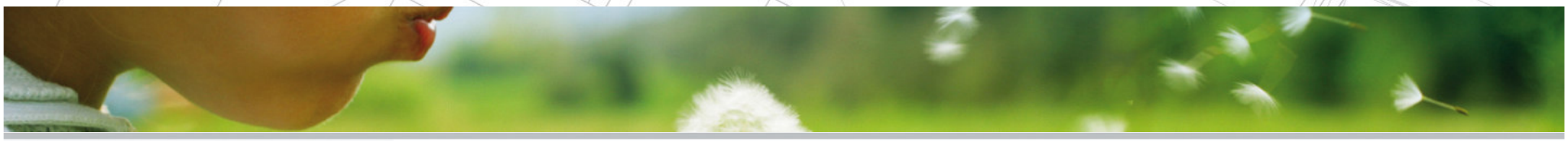


Suggestions for improvement (diatoms):

- **Validate metric for different river water types. Instead of using the same metric for all rivers**

- **Development metric for lakes and brackish waters if necessary for EC**

Macro invertebrates



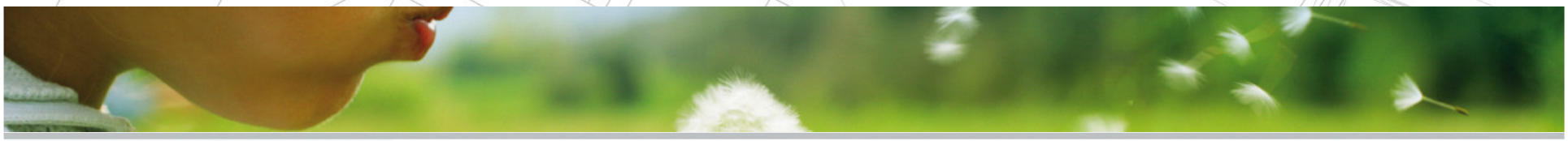
The metric:

- **3 parameters (no real submetrics)**
  - **Dominant negative species (DN)**
  - **Dominant positive species (DP)**
  - **Characteristic species (KM)**

- **EQR: List of macro invertebrate species for each parameter and a formula**

EQR = { 200*(KM%/KMmax) + 2*(100-DN%) + (KM%+DP%) }/500

Macro invertebrates



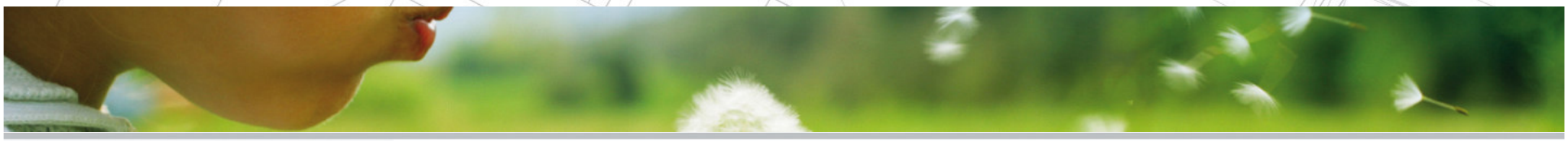
Suggestions for improvement:

- **Validate metrics for different water types (KMmax)**
- **KMmax in brackish waters dependent on the salinity**

- **Review species lists and revise where necessary**
  - **Taxonomic**
  - **Consistent for similar water types**

- **Adjust metric in coastal and transitional waters for the use in heavily modified water bodies**

Fish



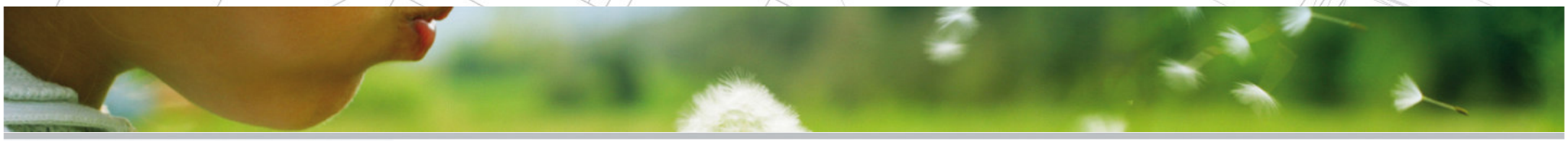
The metric:

- **3 submetrics**
  - **Abundance**
  - **Species composition**
  - **Age structure**

Abundance

- **Relative biomass/number of characteristic groups of species: different for each water type**
  - **for example bream in Lakes and reophilic species in Rivers**
- **EQR: using a rating table**

Fish



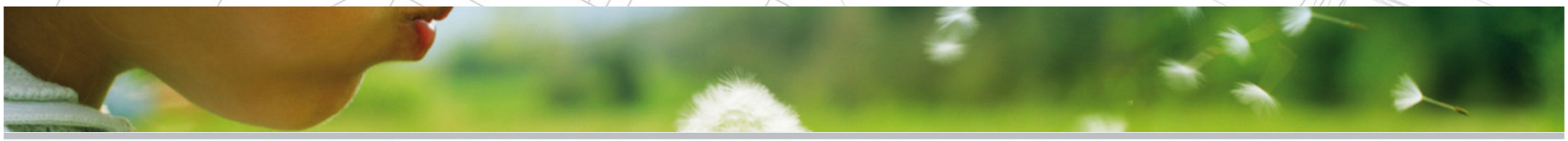
Species composition

- **Number characteristic species: different for each water type**
- **EQR: using a rating table**

Age structure

- **Only derived for very large lakes (IJsselmeer and Markermeer) and in transitional waters**
- **In lakes: Biomass of large eels and zander**

Fish



Suggestions for improvement:

- **Number characteristic species relative to sample size**
- **Validate reference values for submetrics**

Rivers:

- **Expand species list of R12**

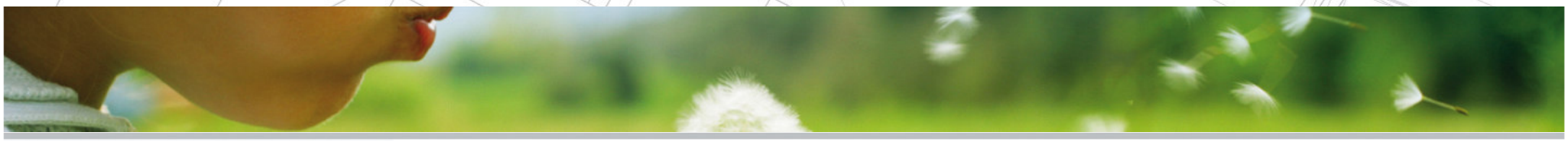
Lakes:

- **Add carp in the submetric for bream and explain reference value**

Artificial waters:

- **Minor changes in the species list (for stickleback)**

Fish



Suggestions for improvement:

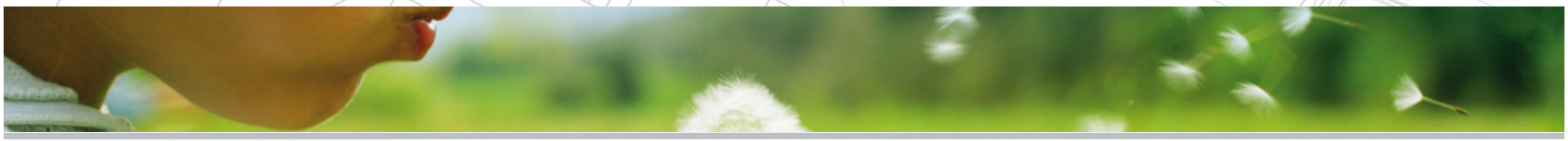
Brackish waters

- **Metric dependent on the salinity and isolation**

Coastal and Transitional waters

- **Derive a metric voor transistional waters other than Eems-Dollard**
- **Evaluate current sampling methods for use in the metric**

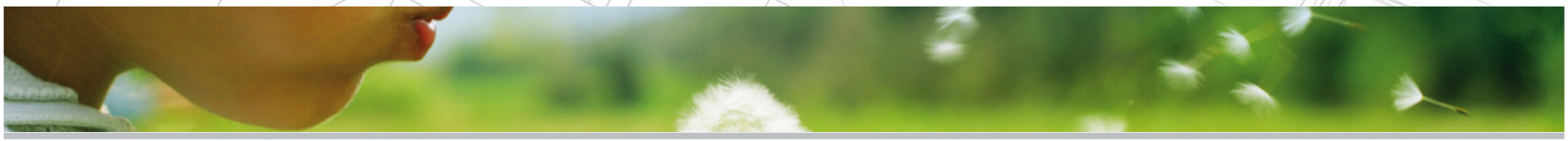
Physico-chemical quality



The metric:

Thermal conditions	Maximum temperature
Oxygenation	Summer average oxygen saturation
Salinity	Summer average chloride concentration
Nutrient status	Summer average total phosphorus and total nitrogen)
Acification status	Summer average pH
Transparency	Summer average in meters

Physico-chemical quality

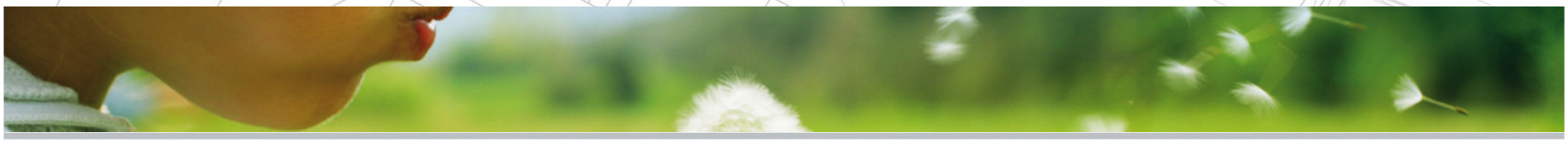


Suggestions for improvement: :

- **Nutrient status and Transparency**
  - **Stricter standards for nutrients in rivers and artificial waters**
  - **Less strict standards for nutrients and transparency in brackish waters**

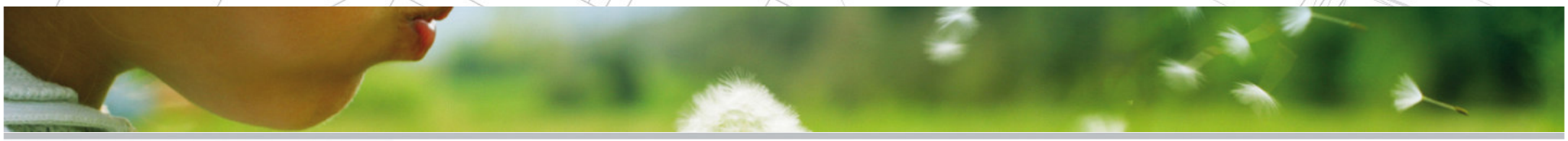
- **Oxygenation and Acification status**
  - **Instead of summer average use extreme values (max-min)**

First conclusions



- **The quality of the metrics differ per element and water type**
- **Many (conflicting) views on the necessary adjustments**
- **Simplification is generally not possible without quality degradation**
- **Changes also have many indirect consequences:**
  - **Derived measures**
  - **Standards for physico-chemical quality**
  - **National studies/tools such as the ex ante evaluation and the WFD explorer**

First conclusions



- **Some wanted adjustments are actually due to problems in the deriving of objectives for heavily modified water bodies (MEP/GEP) (especially in coastal en transitional waters).**