

Creation of Cost-Efficient Program of Water Protection Measures Supported by Multi-Criteria Decision Analysis

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OUTLINE



≡ Description of the case study

- Support the selection of cost-efficient water protection measures for the River Kyrönjoki Water Management plan

≡ The approach

- Multi-criteria decision analysis (MCDA)
- Phases of the approach
- Results

≡ Conclusions

Description of the case study – River Kyrönjoki



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OBJECTIVE:

- ≡ to help the preparation of program of measures for the River Kyrönjoki Water Management plan

MEANS:

- ≡ Multi-criteria decision analysis (MCDA)
 - to produce overall ecological effectiveness indexes for the water protection measures
 - Indexes are used in the identification of cost-effective measures to improve the ecological state of River Kyrönjoki
 - Software: Web-HIPRE (www.hipre.tkk.fi)

The Approach



MCDA

- Value-tree analysis (Multi-Attribute Value Theory, Keeney & Raiffa 1976)
- Web-HIPRE software

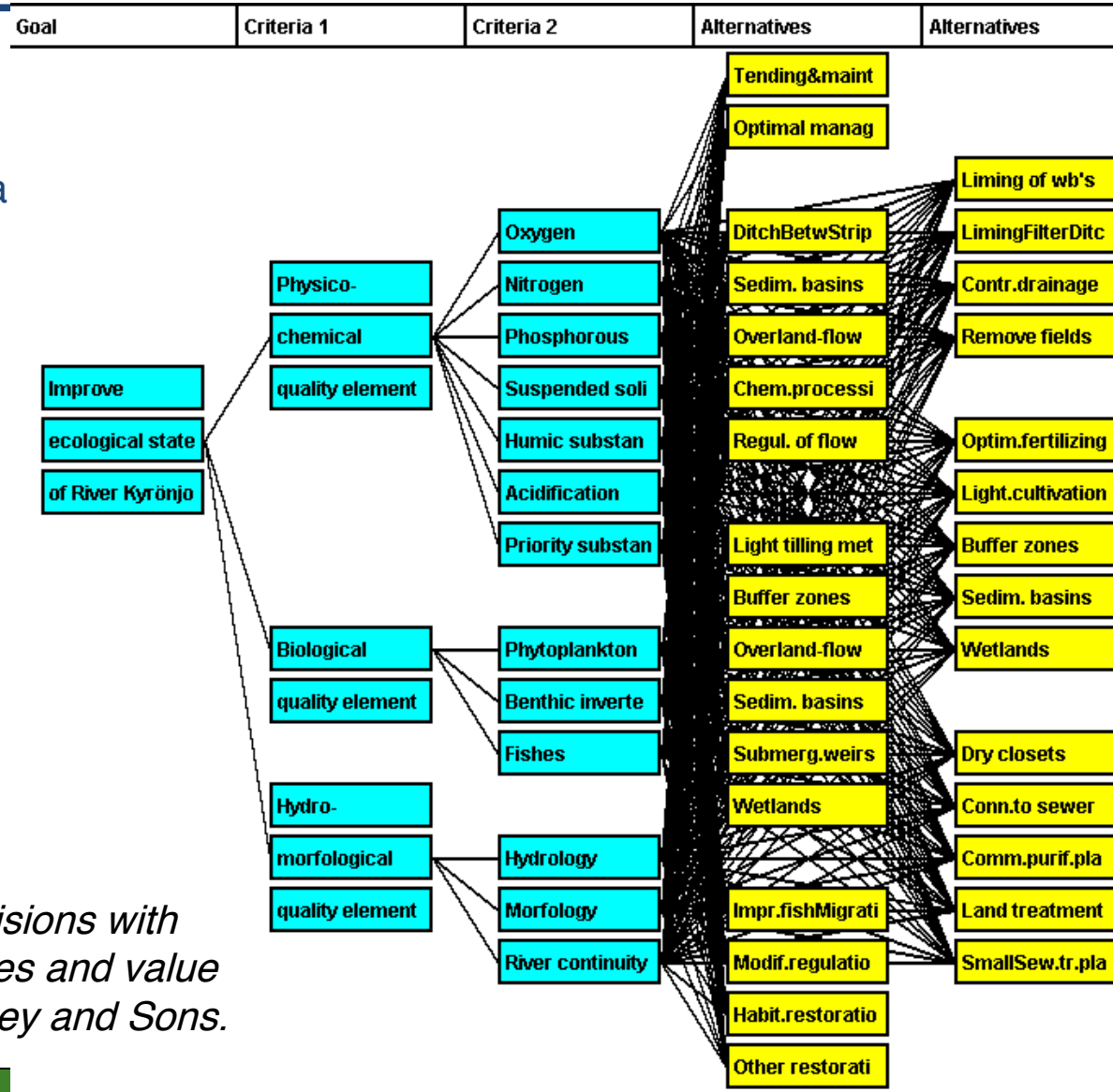
Two phases

- Measures impact assessment
- Criteria weight assessment

The analysis was carried out by River Kyrönjoki Work Group

- Representatives and experts from authorities, actors and NGO's

Keeney R.L., Raiffa H. 1976. *Decisions with multiple objectives: Preferences and value tradeoffs*. New York: John Wiley and Sons.



The Approach – Weight assessment



≡ "Give ordinal rankings to the ecological quality elements according to their importance when improving the ecological condition of River Kyrönjoki"

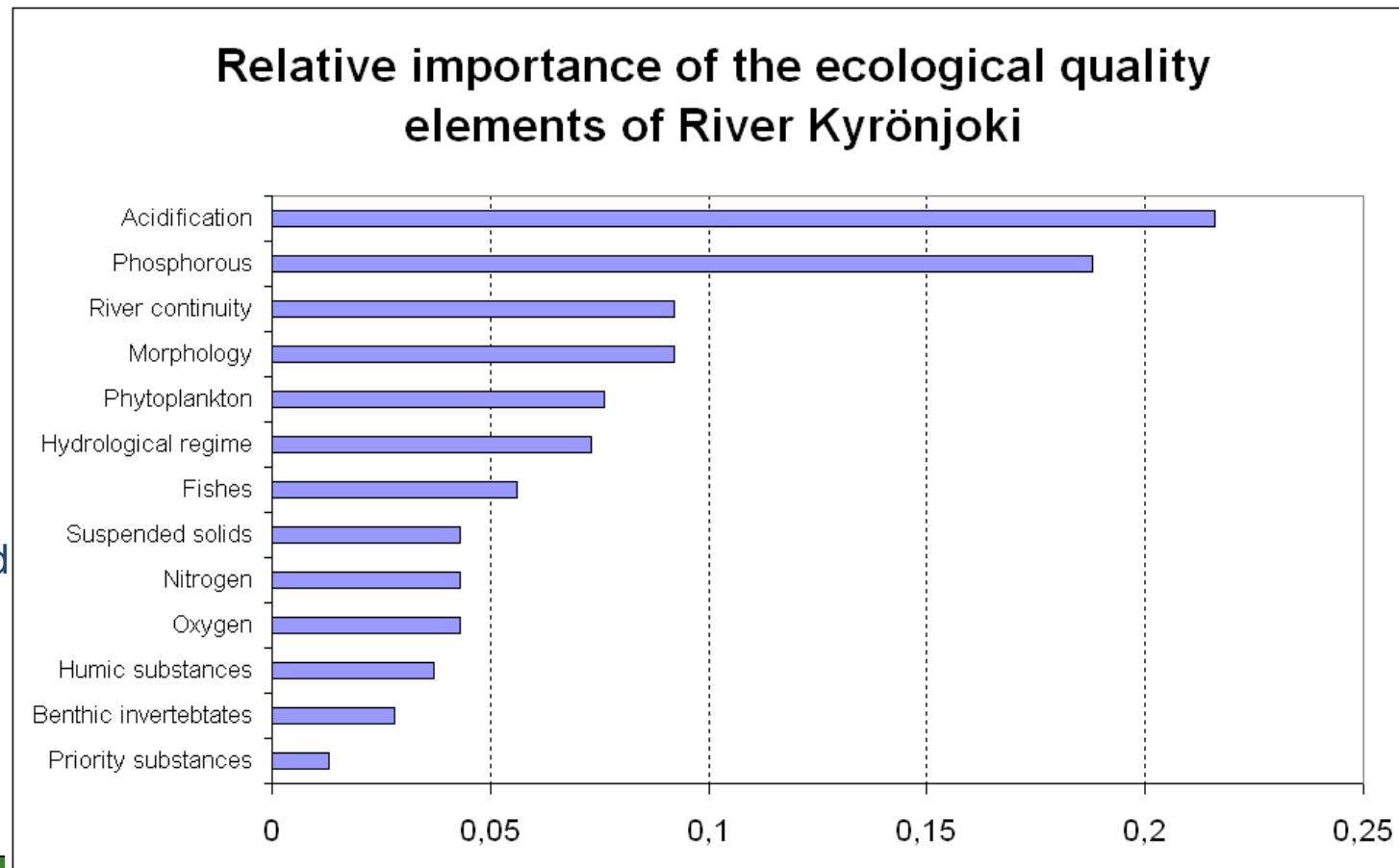
≡ Ordinal rankings was transferred to points

- 1. = 100 p
- 2. = 80 p
- 3. = 60 p
- 4. = 40 p
- 5. = 20 p

≡ Points were normalized so that the sum of points is 1

≡ Importance were discussed in group and adjustments were made

→ **Consensus result**



The Approach – Result of the analysis



- ≡ Web-HIPRE software combines
 - the impacts of the measures and
 - the relative importance of the ecological quality elements
 - Relative effectiveness indexes

- ≡ The indexes describe the relative effectiveness of measures to improve the ecological condition of River Kyrönjoki

Conclusions



- ≡ The approach was found useful to
 - calculate and compare measures' overall impacts on different and incommensurable criteria
 - stimulate discussion about quality elements' importance and priorities and various impacts of the measures
 - create a common language and understanding of the problem
 - give a holistic view to the problem

- ≡ The approach gives support to the preparation of program of measures for River Kyrönjoki
 - The relative effectiveness indexes are used in the cost-efficiency analysis
 - The indexes are illustrative and understandable and can be used to explain and to justify the results to stakeholders