Ecological effects assessment

a combination of mechanistic and data driven modelling

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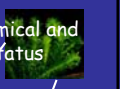
Introduction

- ✓ Recent EU legislation: WFD, REACH

- ✓Good chemical and biological status
- ✓Environmental effects assessment of chemical exposure



Research topic (e.g. terrestrial) - Contact@ugent.be

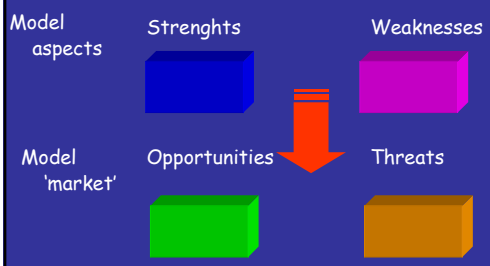
Introduction

- ✓ Ecological modelling = tool
- ✓ Different approaches
- ✓ Mechanistic
- ✓ Data driven

Goal

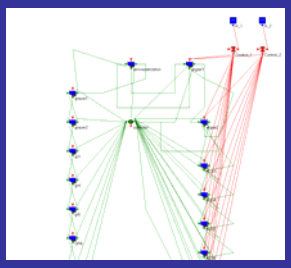
- ✓ SWOT of both techniques
- ✓ in relation with legislation
- ✓ combination of both techniques

Swot analysis



Mechanistic: Strengths:

- Knowledge: limits parameter values
- Transparency



Mechanistic: Weaknesses:

- Knowledge: overparametrized model
- How to estimate them? e.g. maximum PS rates
- Identifiable?

Mechanistic: Opportunities:

- REACH:
- Effect of chemical substance on environment?
- Current effect assessment:

  = sum of effects on populations
- Odum ('71): Additional characteristics

Mechanistic: Threats:

- Time
- Proper calibration tools
- GSA – GLUE (Ratto *et al.*, 2001): only joint PDF for all parameters

Data-driven: Strengths:

- Development time
- No knowledge necessary about the species
- Ease of interpretation for river managers (input – output)

Data-driven: Weaknesses:

- Transparancy
- General applicability
- Data (coverage, quantity and quality)
- Parameter settings (model stability)
- 'black' box

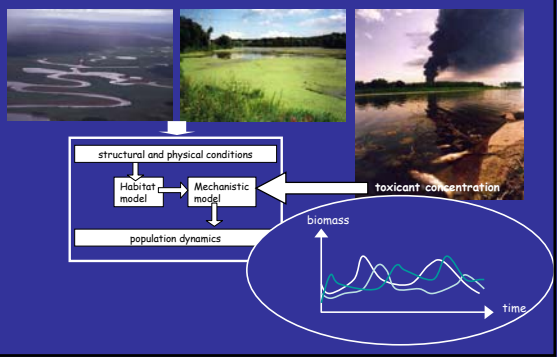
Data-driven: Opportunities:

- WFD
- Integrated water management
- Cost-benefit analyses: quantification in water management

Data-driven: Threats:

- Timing of WFD
- Available data (e.g. about rivers in good conditions)
- Acceptability by experts and river managers

How to combine both methods



Practical example: Brooks Zwalm river basin

Combined SWOT

- Strengths: Ecological relevance ↑
  - Better characterization of reference situation
- Weaknesses: Conflicting assumptions
- Opportunities: 1 tool for both uses
- Threats: time delay in calibration

Conclusions

- Integration of two concepts regarding:
  - environmental effects assessment
  - modelling approaches
- Possibilities for realistic ecological effects assessment