Methodological Framework for Participatory Integrated River Basin Management Planning (IRBMP)

Alfred Becker
Potsdam Institute for Climate Impact Research

Work Package 3 of Harmoni-CA (leader)

Case study:

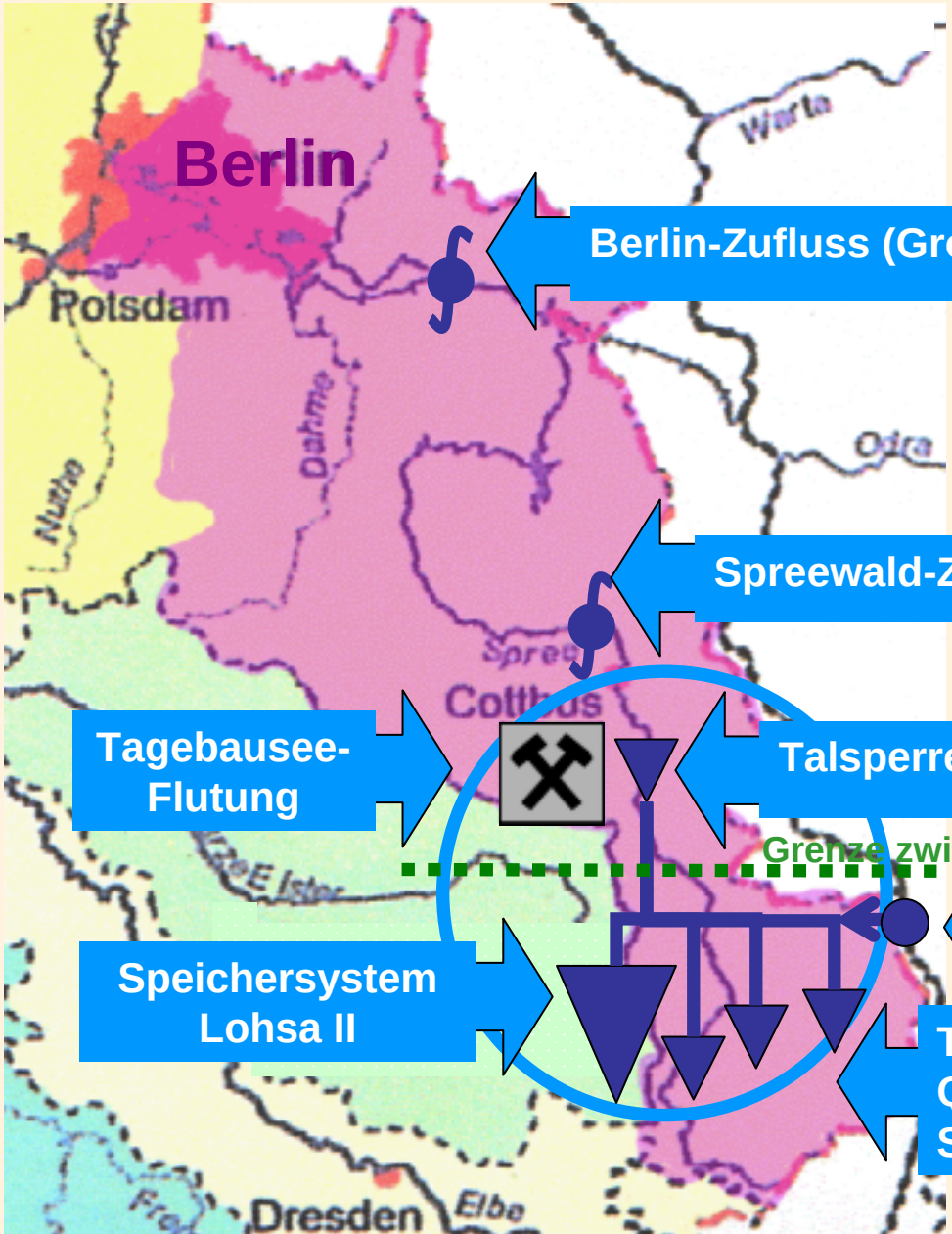
Elbe river basin

Problems and Conflicts

1. Water shortage during summer and other dry periods: standing water, no or backward flows in some lowland downstream river reaches in and around Berlin, in particular in summer

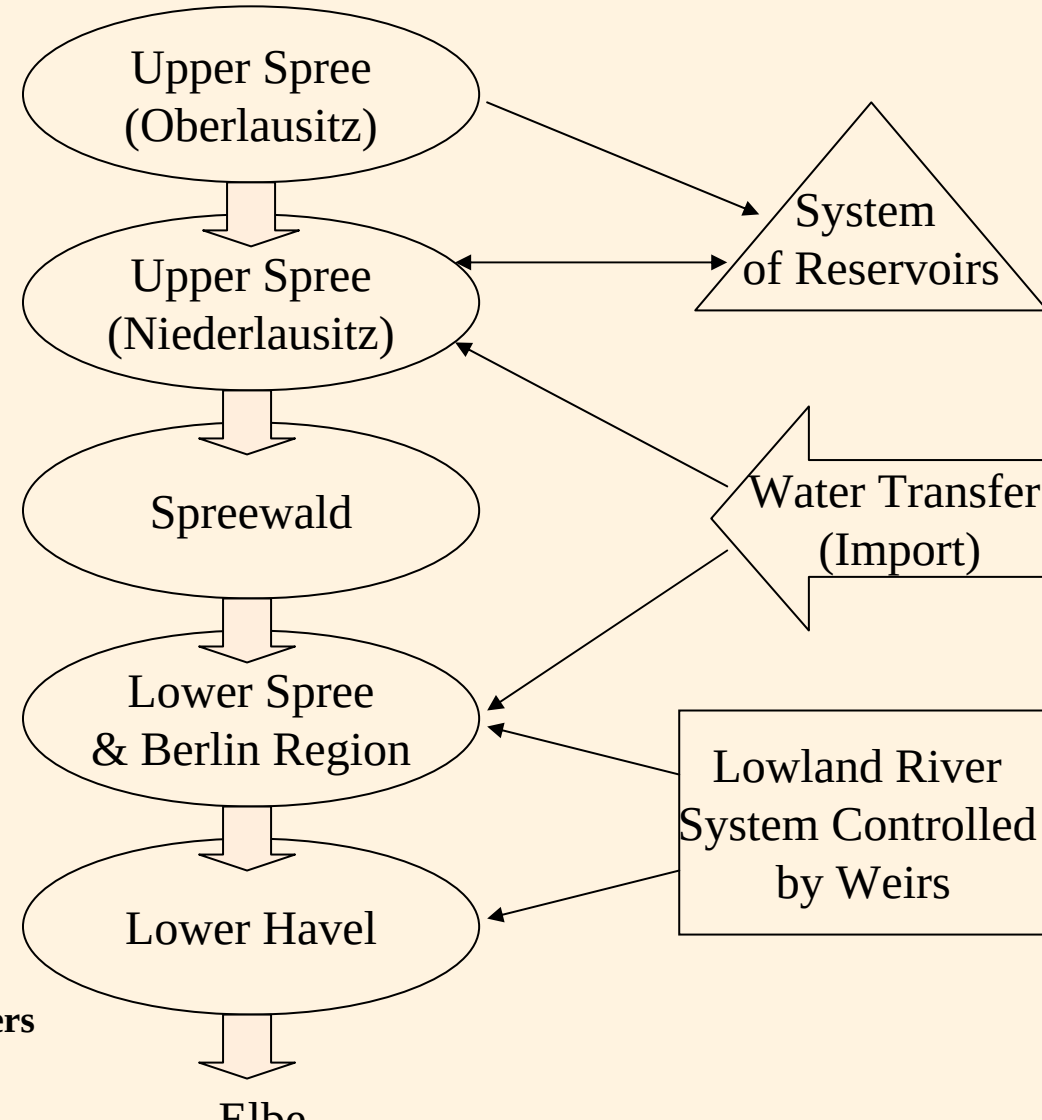
2. Several associated water quality problems, especially in 3 subregions
   a. The mining area of lower Lusatia
   b. The wetland area and Biosphere reserve of the Spreewald
   c. The distributed surface water system with many lakes and connecting lowland rivers and channels in the Berlin area, most of them dependent on sufficient in- and through-flow

Spree river basin



General Scheme of IWRM in the Spree / Havel River Basin

- **Headwaters (near Natural)**
- **Strong Human Impacts, (Open Pit Coal Mining)**
- **Intensive Water Use and Management**
- **Wetland Area with Interlinked Channels**
- **Biosphere Reserve, Parts Protected**
- **Lowlands of Brandenburg Including the Urban Region of Berlin with**
  - **Interlinked Lakes**
  - **Intensive Water Use**
  - **Protected Areas near the Rivers and Lakes Systems**



Primary Task

To solve the water availability and supply problem on a large (regional) scale and provide sufficient inflow to all the three subregions.

Subtasks:

1. Assessment of available water resources in their spatial and temporal variability (status quo) from available hydrological records (water levels and discharges)
2. Estimation of future changes of water availability due to expected climate change (precipitation and temperature change)
3. Using hydrological models (N-A-models) to estimate changes in runoff and river discharge in the entire basin
4. Using these predicted inputs in a detailed regional scale water balance and management model to fulfill the demands as far as possible and to register statistically the deficiencies (demand minus supply) on a monthly basis
5. Find out better options of managing the available system to fulfill best the demands (perhaps with additional control structures and measures; planning studies)

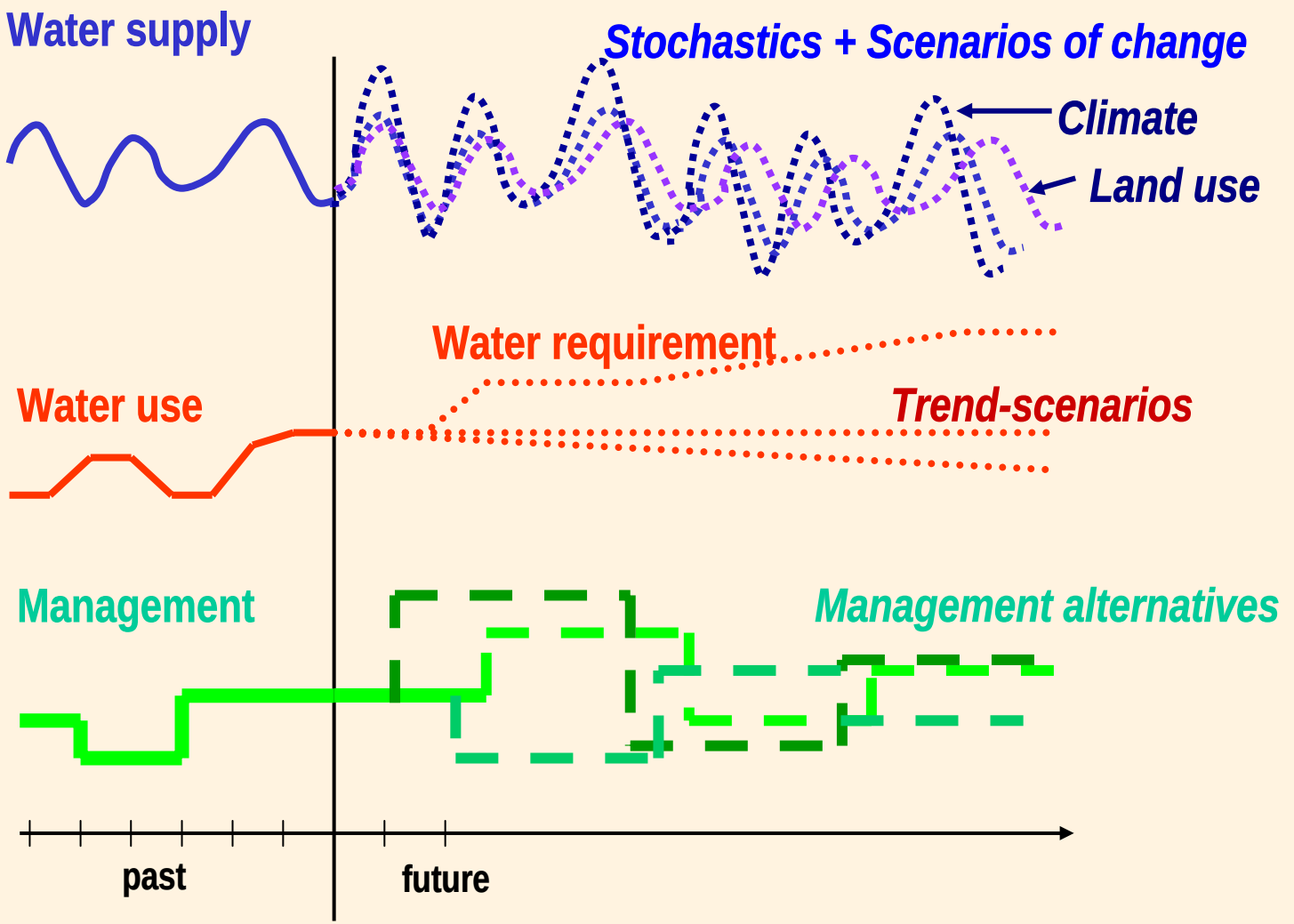
GRM

A large scale water balance and management model (GRM) was developed already in the early 1990‘s to perform these studies

It considered:
400 water user
•170 balance points
•14 reservoirs
•50 dynamical elements
•200 values to be registered

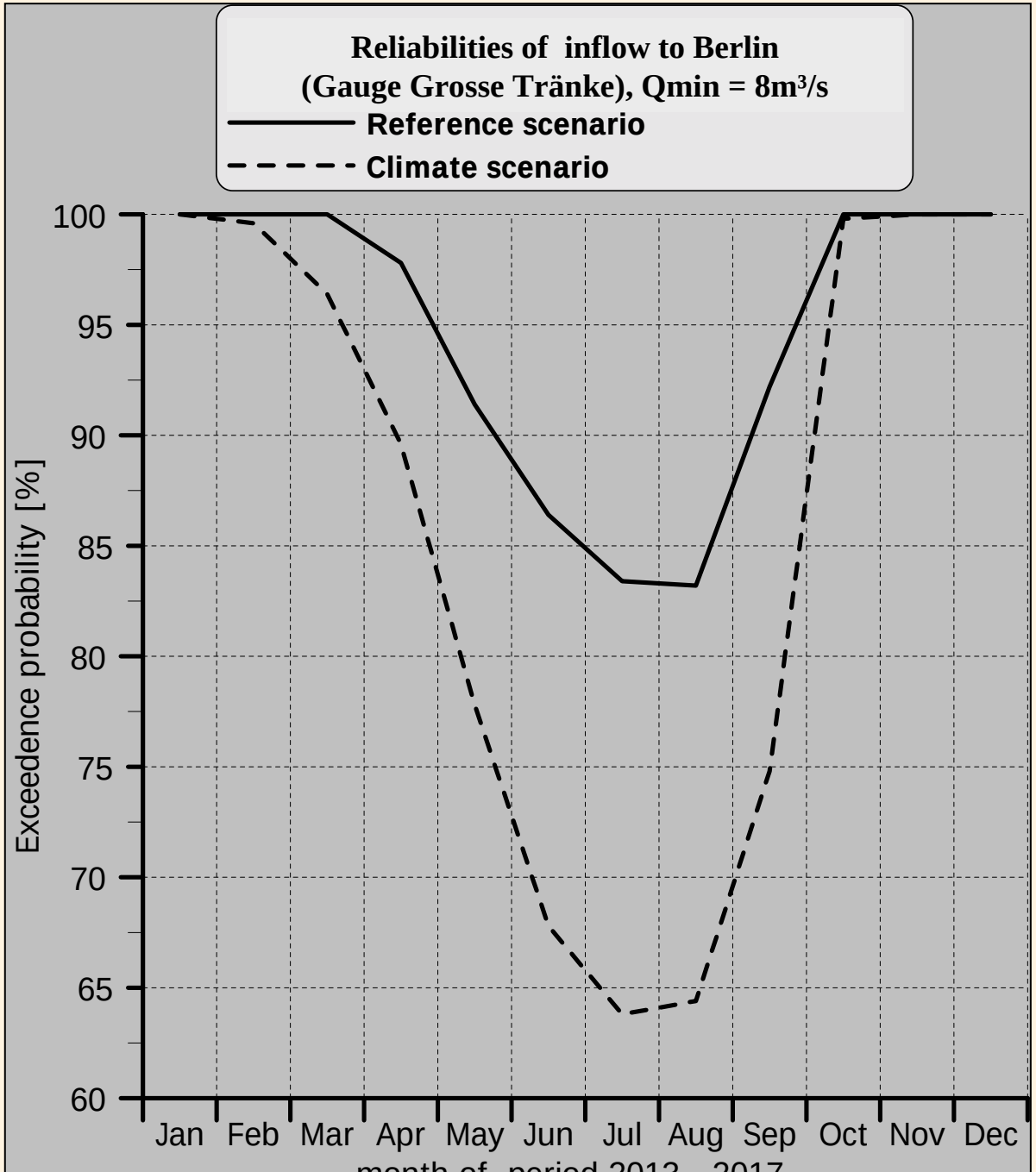
It incorporates the ***DPSIR*** scheme of Drivers, Pressures, States, Impacts and Responses of the EEA as a key element, and is thus consistent with EEA-approaches.

Planning of Water Management



Influence of Climate Change [+1.4 K, ..]

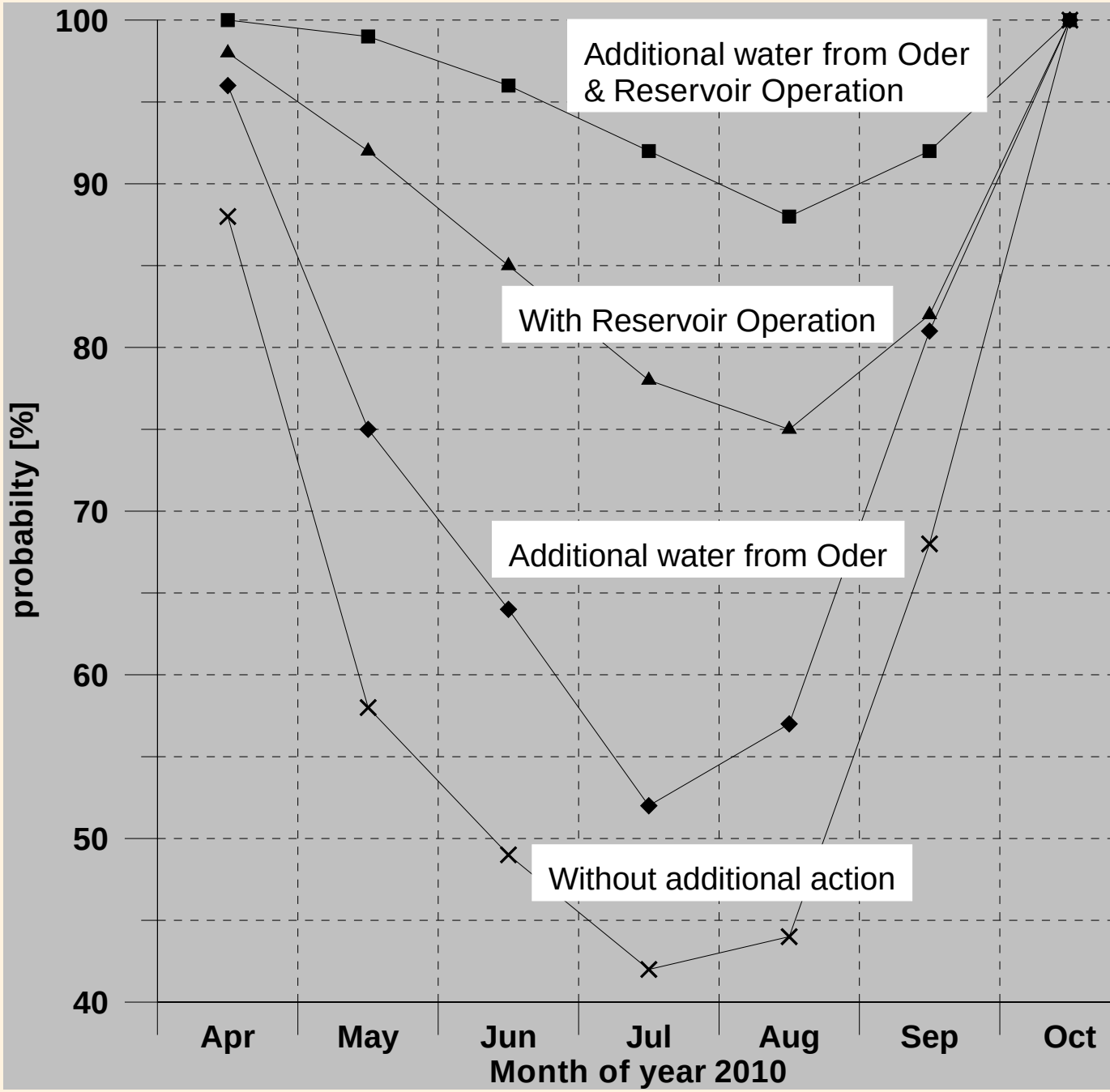
rünewald et. al 2001



Reliabilities of Berlin inflow

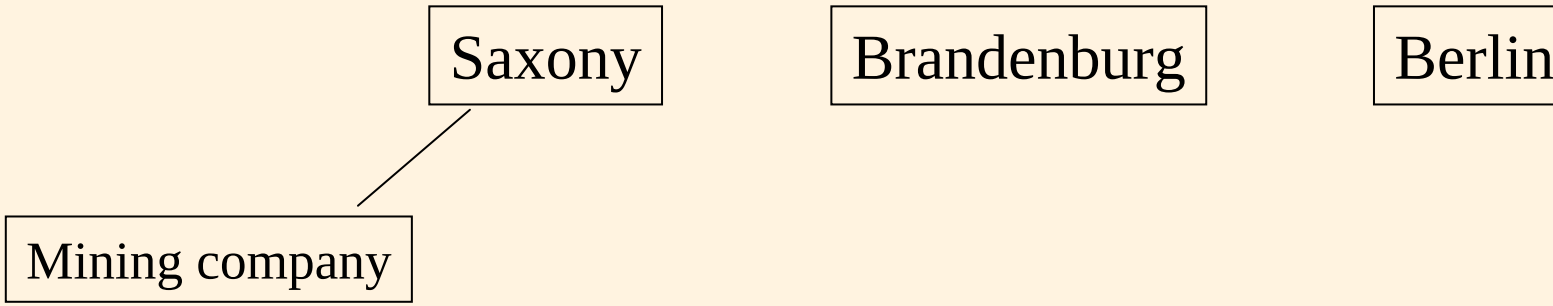
(reference year 2010)

rünewald et. al 2001



Stakeholder Involvement in the Decision-Making Process (very high level)

Working group of government representatives of the three participating countries:



Decisions:

1. Wich solution to be selected?
2. Where to do investments?
3. How to finance it?
4. How to operate?

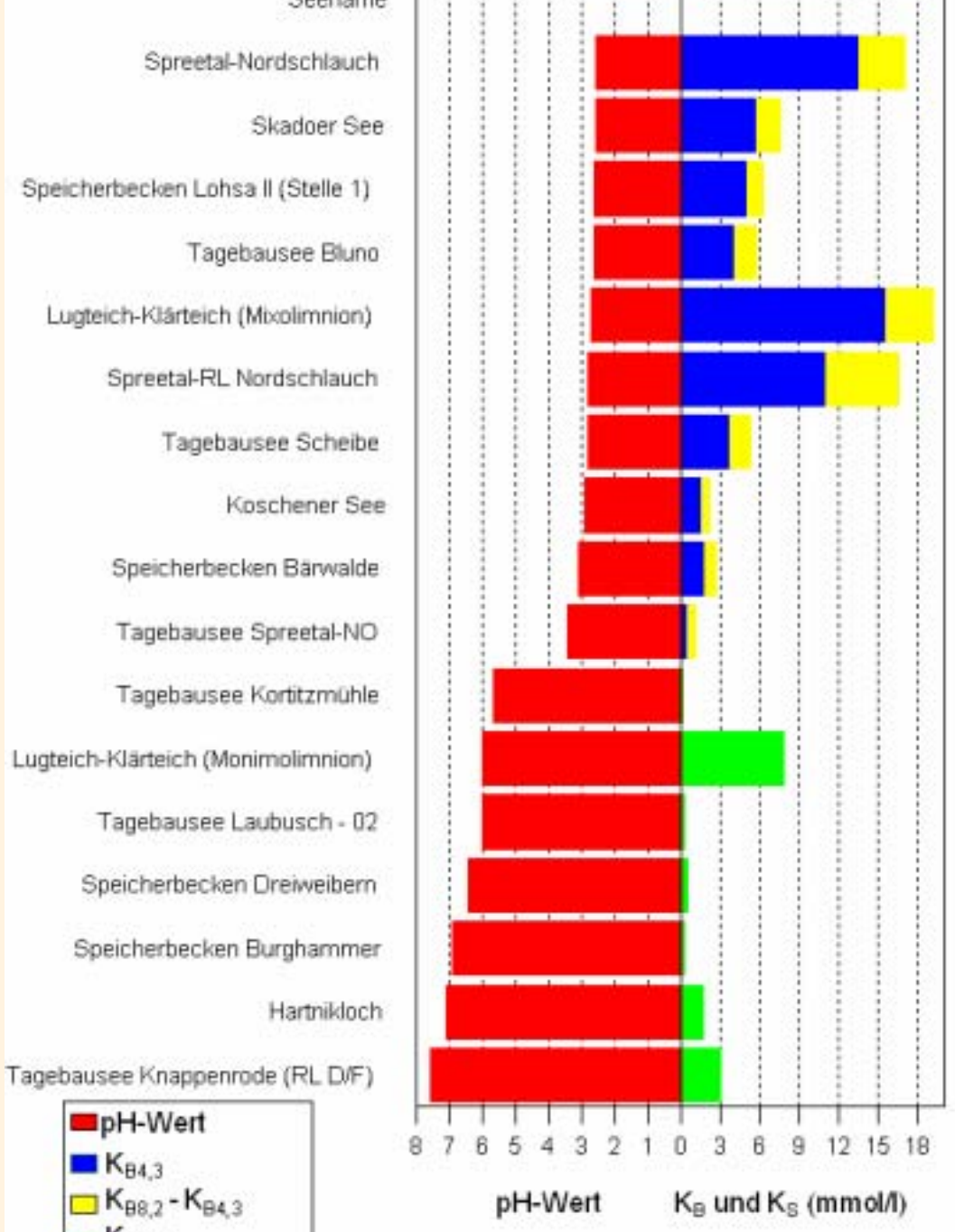
Nested Studies in subareas (sub-basins)

A) Upper Spree with the Mining Area in Lower Lusatia
- 800 km² Mining Area, influenced by open pit mines (+180 km²)
- 2100 km² extension of groundwater depression cone (13 Mio m² groundwater deficiency)
- Acidification of lakes in the refilling open pit mines. Surface flow demanded

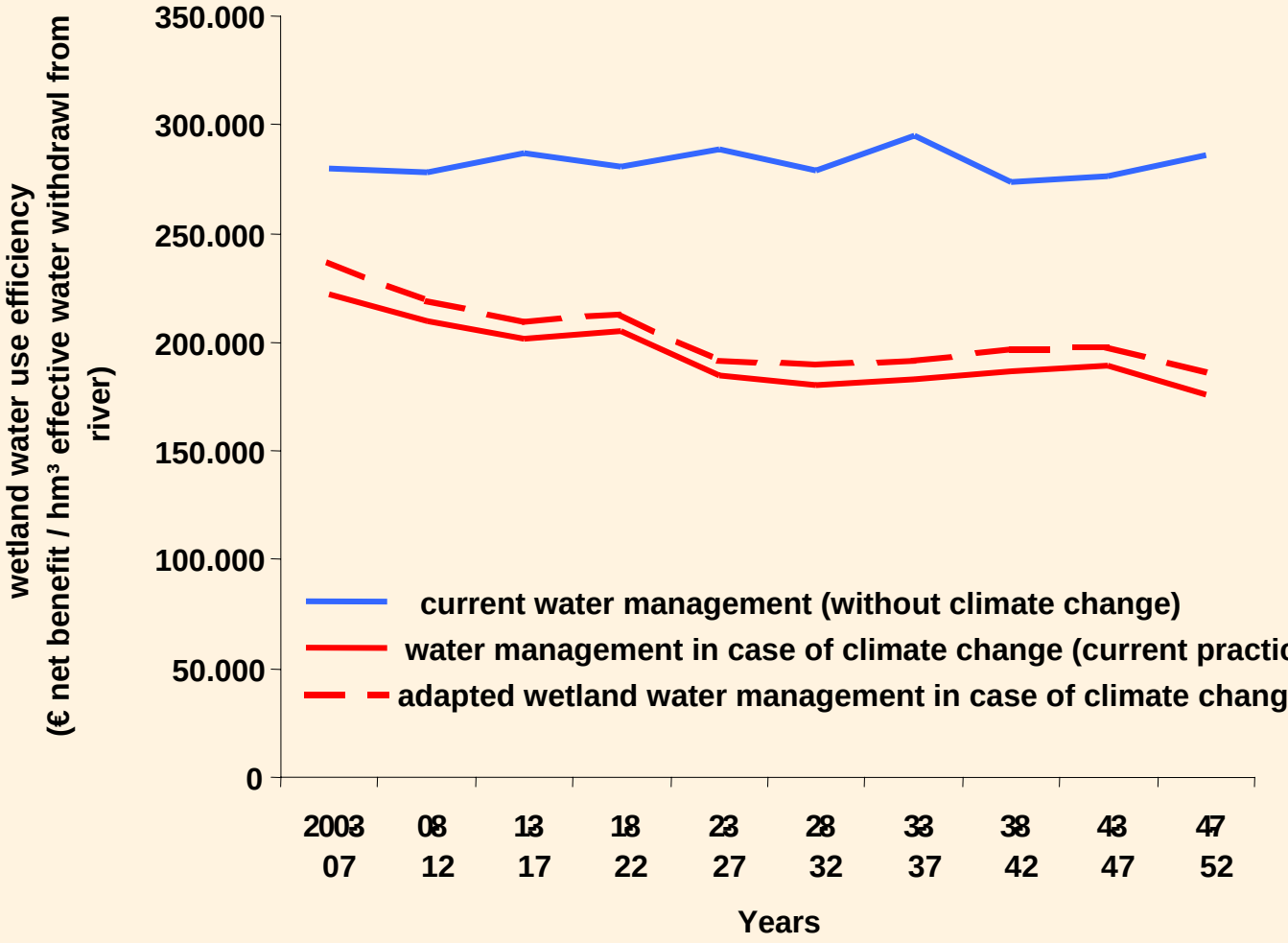
B) Spreewald (Wetland, Protected Area, Biosphere Reserve)
- stable inflow of about 5-7 m² required
- Keeping groundwater levels high enough

C) Berlin (Lower Spree, urban agglomeration)
- further reduction of waste water inflow (from upstream 265 t/a, from treatment plants 112 t/a, from canalisation 38 t/a)
- ensuring required minimum monthly flows and water quality limits (avoiding O2-break-downs, trying to keep bathing water quality)

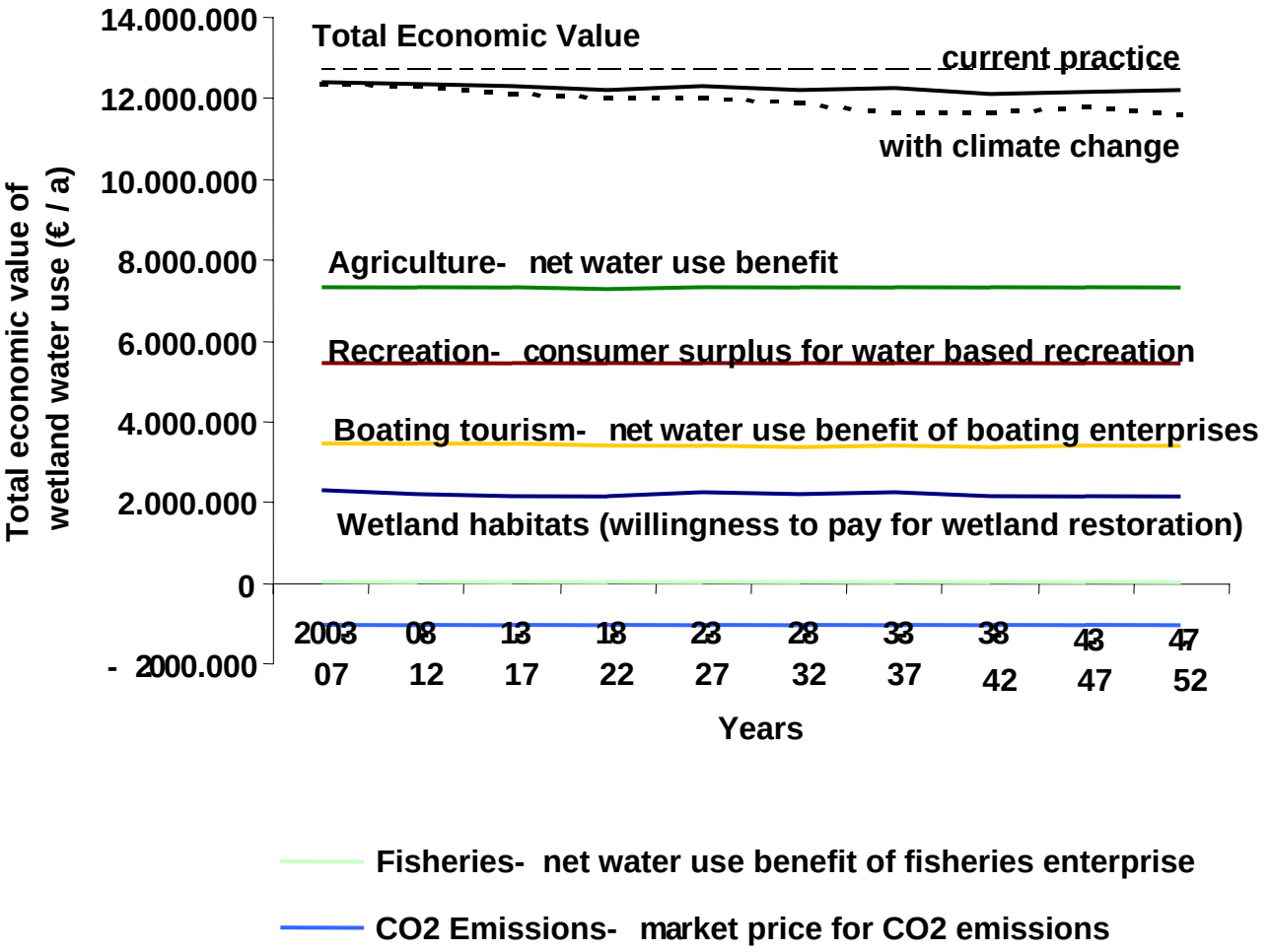
Acidification of Lakes (Open Pit Mines)



Wetland water use efficiency

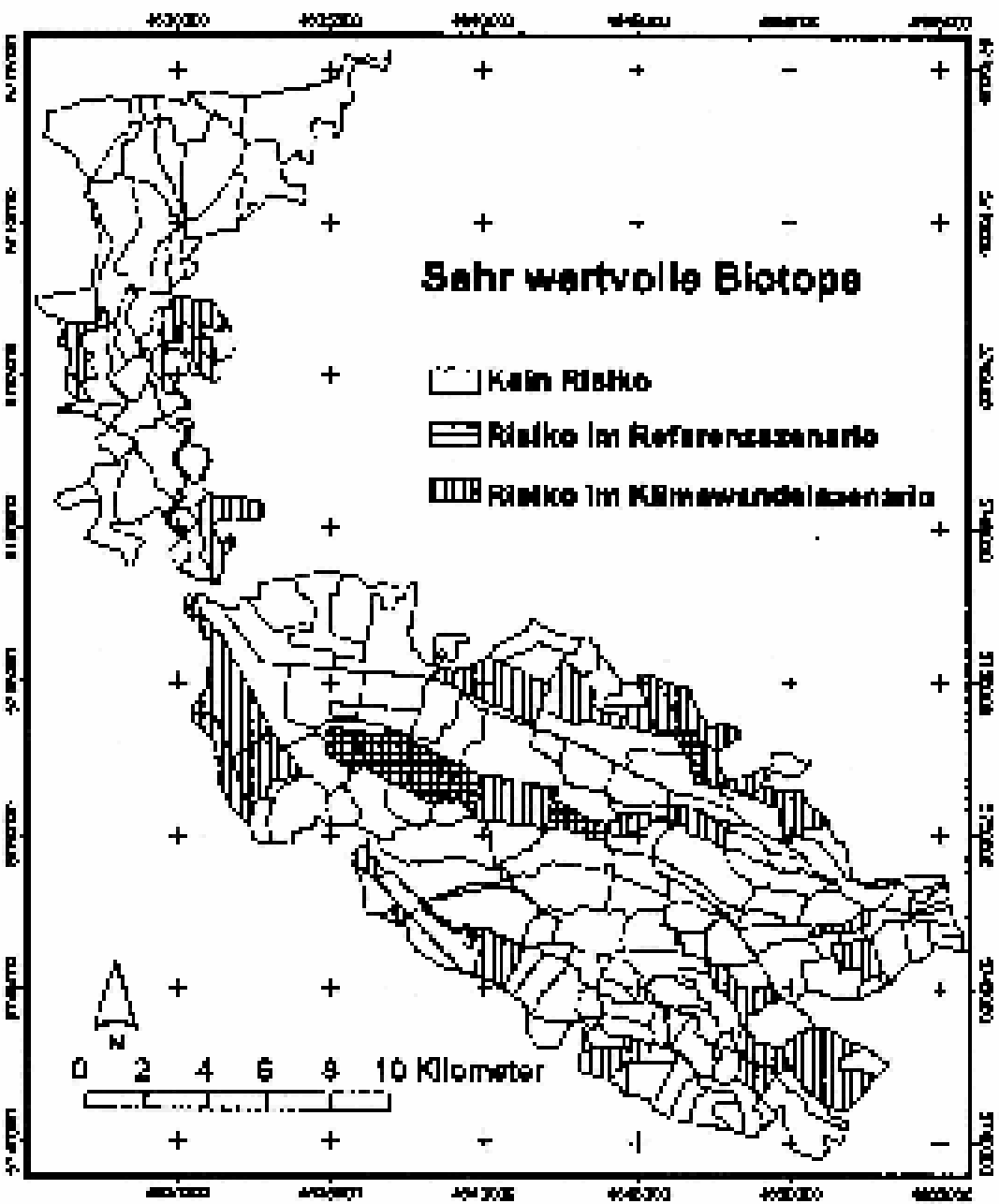


Total economic value of wetland water use



Threatened Landscape Elements in the Spreewald

(197 Elements)



Present state of Analysis

A ***Guidance Document 11*** has been already produced in March 2003 by CIS-WG2.9

It defines the scope, components and steps of the planning process and informs on various other details and specifics, including types, stiles and variations of it.

It serves not only the implementation of the WFD in normal cases (standard planning), but it also represents an excellent basis for the further proceeding.

New Challenges in the planning process

- Integration with various aspects and requirements
- Participation of stakeholders, including the public
- Incorporation of Global Change processes
- Assessment of risks and uncertainties

Developments in Harmoni-CA, WP3

Six European projects (five national, one EU-funded) leading in the required direction were identified and studied in detail: 1-Spree/Havel, 2-Berlin, 3-Verbano, 4-Mantra East, 5-Möll, 6-Witte Nete

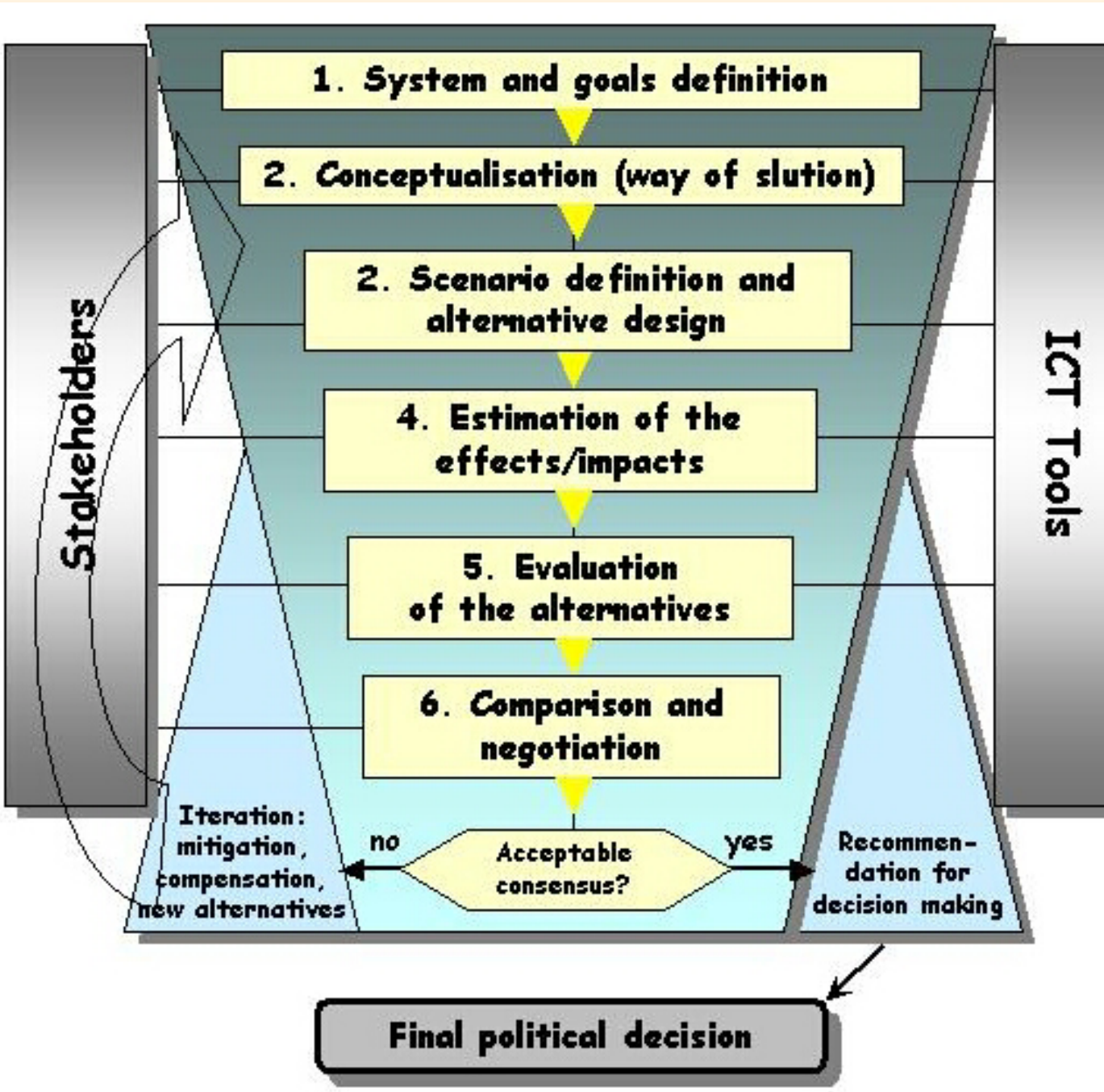
Improved and completed procedure for integrated planning

Two of these case studies served for the development of improved approaches and related structural schemes for the planning process:

- the Integrated Methodological Approach ***IMA*** in the German project GLOWA-Elbe
- the Participatory Integrated Planning Procedure ***PIP-P*** in the tansboundary Swiss-Italian project Verbano.

Both were introduced shortly after each other and were found in principle identical, at least so similar, that the possibility of merging the two into one unified general scheme ***IMA-PIP*** (Figure 1) was obvious.

IMA-PIP


1. System and goals definition
2. Conceptualisation (way of slution)
2. Scenario definition and alternative design
4. Estimation of the effects/impacts
5. Evaluation of the alternatives
6. Comparison and negotiation
Acceptable consensus?
no
yes
Iteration: mitigation, compensation, new alternatives
Recommen-dation for decision making
Final political decision
Stakeholders
ICT Tools

Core of the “General Methodological Framework”

The successful application of the IMA-PIP has indicated its general applicability and flexibility under various conditions in different environments.

Therefore it is now suggested to become core of the ***“General Methodological Framework for Participatory Model-supported Integrated River Basin Management Planning (IRBMP)”***

(to be provided by Harmoni-CA WP3).