SedNet Special Session

6 April 2011

Sediment in a Changing Environment

Who were involved:

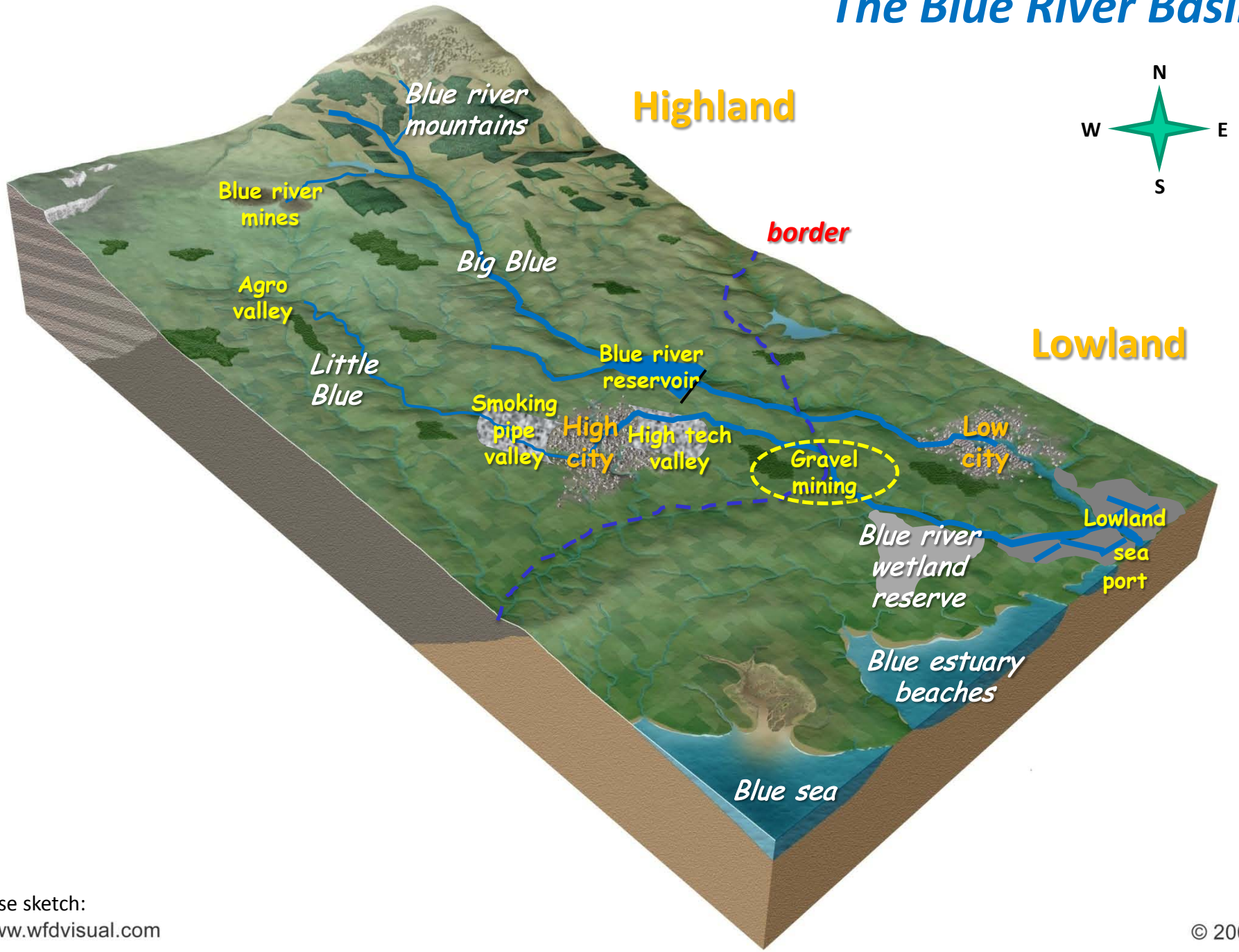
Invited experts: Sabine Apitz, Tim Iannuzzi, Dick Bakker, Andrew Hursthouse, David Paterson, Günther Eichweber

The reporters

The audience volunteering to dehydrate during a two hour discussion in the garden and refusing to rehydrate at the start of the green cocktail

Eric de Deckere & Susanne Heise

The Blue River Basin



Base sketch:
www.wfdvisual.com

Highland

-snow melt

-rainfall patterns

-> increased erosion

-> fluctuating discharges

-...

Large scale-processes

bound to change due to CC

Lowland

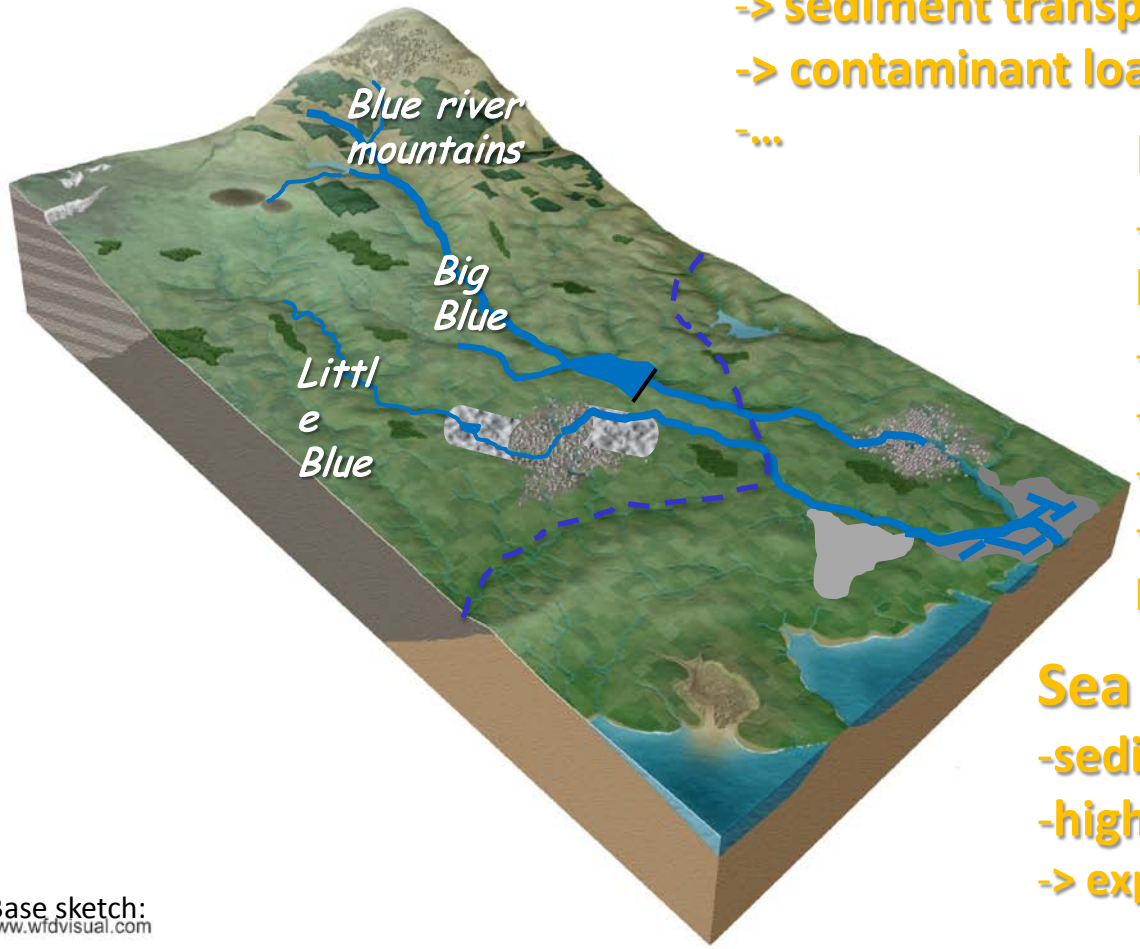
-water discharges and sediment loads

-> floodings <-> drought periods

-> sediment transport patterns

-> contaminant loads

-...



Base sketch: www.wfdvisual.com

Estuary

- water discharges and sediment loads

- tidal hydrodynamic

-> salinity gradients

->exposure of intertidal areas

-> sedimentation/resuspension patterns

Sea

-sediment input from land

-higher sealevels

-> exposure of intertidal areas

Large scale processes

Micro-scale changes

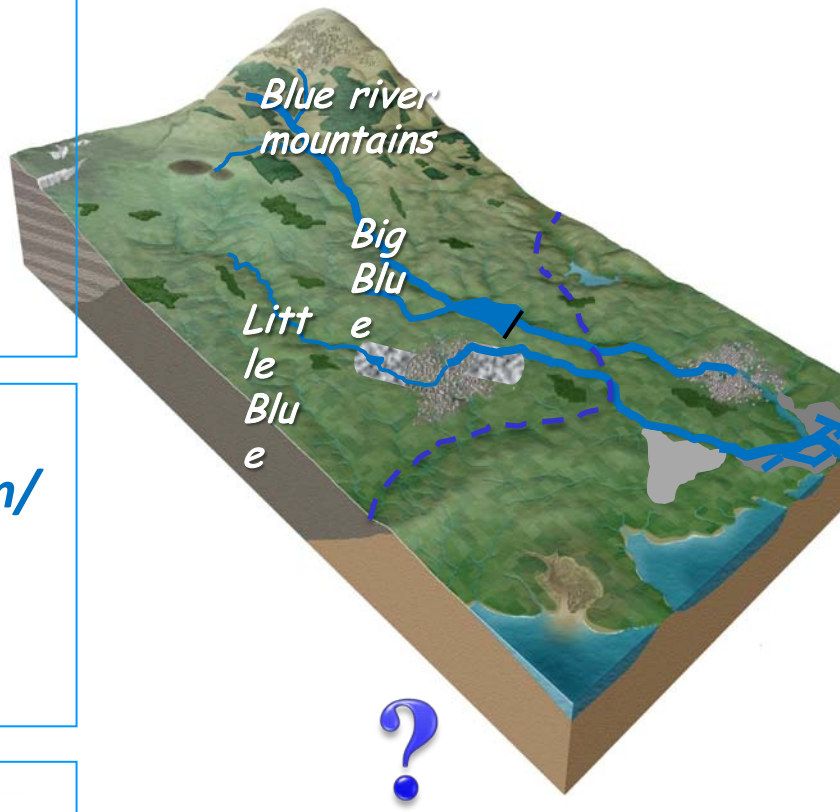
Direct impacts

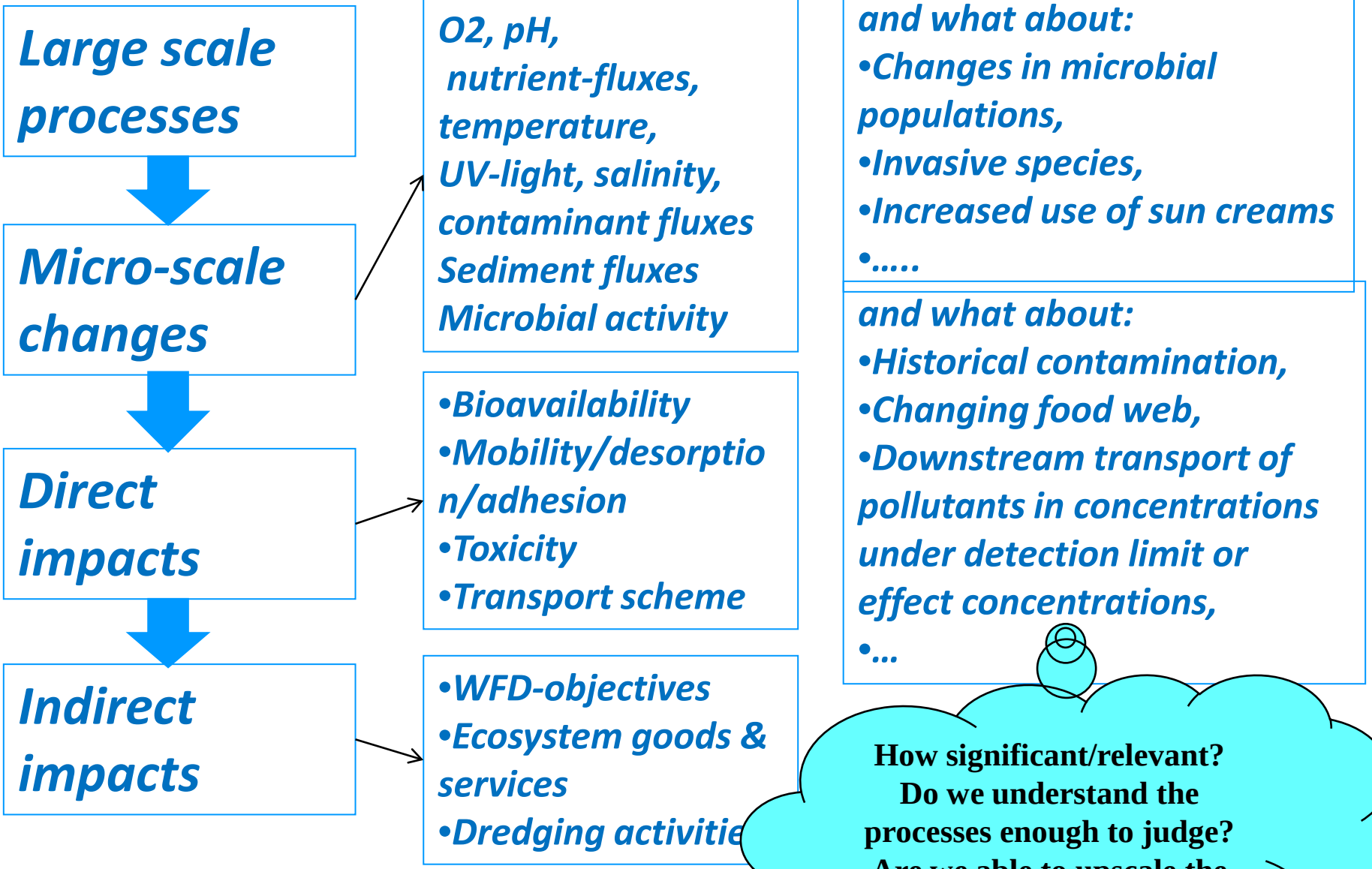
Indirect impacts

O2, pH, nutrient-fluxes, temperature, UV-light, salinity, contaminant fluxes Sediment fluxes Microbial activity

- **Bioavailability**
- **Mobility/desorption/ adhesion**
- **Toxicity**
- **Transport scheme**

- **WFD-objectives**
- **Ecosystem goods & services**
- **Dredging activities**




Large scale processes
Micro-scale changes
Direct impacts
Indirect impacts
O2, pH, nutrient-fluxes, temperature, UV-light, salinity, contaminant fluxes Sediment fluxes Microbial activity
•Bioavailability
•Mobility/desorption/adhesion
•Toxicity
•Transport scheme
•WFD-objectives
•Ecosystem goods & services
•Dredging activitie
and what about:
•Changes in microbial populations,
•Invasive species,
•Increased use of sun creams
•.....
and what about:
•Historical contamination,
•Changing food web,
•Downstream transport of pollutants in concentrations under detection limit or effect concentrations,
•...
How significant/relevant?
Do we understand the processes enough to judge?
Are we able to upscale the microscale processes to estimate impacts?

Things coming out of the discussion
(1/2)

❖ Extreme events have a big impact large-scale processes but:

- What do we consider to be an extreme event
- extreme events might become regular events due to CC

❖ Can we downscale the impact of ‘extreme’ events to micro-scale processes?

- measuring processes during peak discharges seems to be a practical problem

❖ Can we downscale the impact of large scale processes to micro-scale processes?

- range of uncertainty / selection of scenarios

Things coming out of the discussion
(2/2)

❖ Can we upscale the impact of micro-scale-processes to large-scale impacts?

- •Which micro-scale processes are relevant?
- • how to include the relevant processes and heterogenity of ecological processes in models?

❖Transboundary links

- •Impact of resuspension/sedimentation cycles
- •Desorption of contaminants
- •Responsibilities of water managers

Understand today: Predict tomorrow

Anticipated main outcome

- An active discussion group is formed
- Outline for a review on impact of changing conditions on bioavailability/mobility of particle bound contminants
- Session report in (suggestion) the SedNet associated Journal of Soils and Sediments
- Brief version of that report in the SedNet e-newsletter and/or overall conference report
- Basis for future project proposals focusing on sediments in a changing environment