



Optimising the configuration of woody riparian buffer strips along rivers to enhance biodiversity and ecosystem services



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BiodivERsA COFUND Call (2015-2016)

« Understanding and managing biodiversity dynamics to improve ecosystem functioning and delivery of ecosystem services in a global change context: the cases of soils and sediments, and land- river- and seascapes »



CONSORTIUM DESCRIPTION

Partner 1 (coordinator): University of Duisburg-Essen, Germany
water temperature, biodiversity, case studies in Germany, scenarios



Partner 2: IRSTEA (France)
water temperature, biodiversity, case studies in France



Partner 3: Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Germany
nutrients, scenarios



Partner 4: Norwegian University of Life Sciences, Norway
ecosystem services

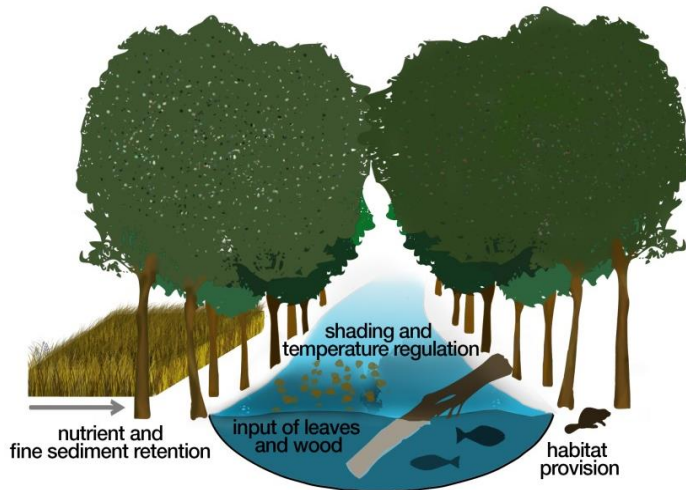


PROJECT AIMS

Effects of woody riparian buffers investigated in OSCAR

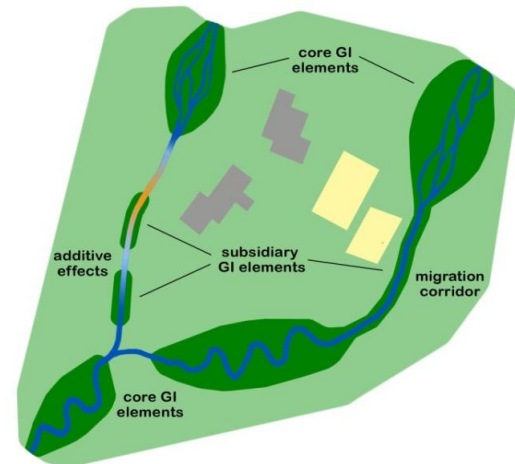
- Local effects (4 responses)

- Nutrient and fine sediment retention
- Water temperature (shading)
- Biodiversity (ecological status)
- Ecosystem services



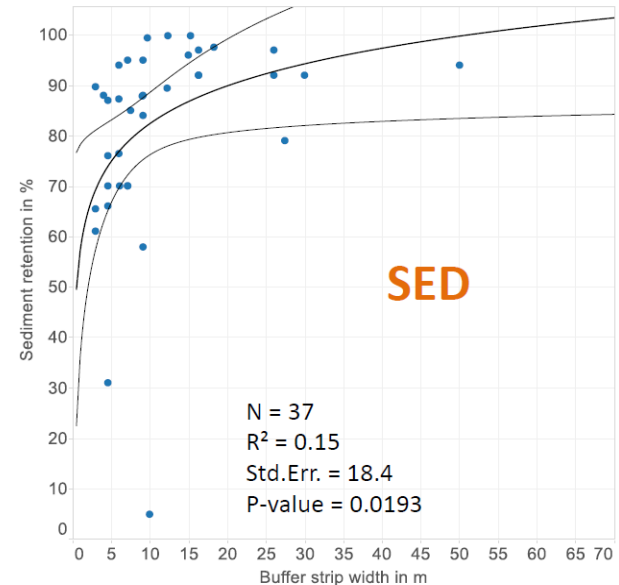
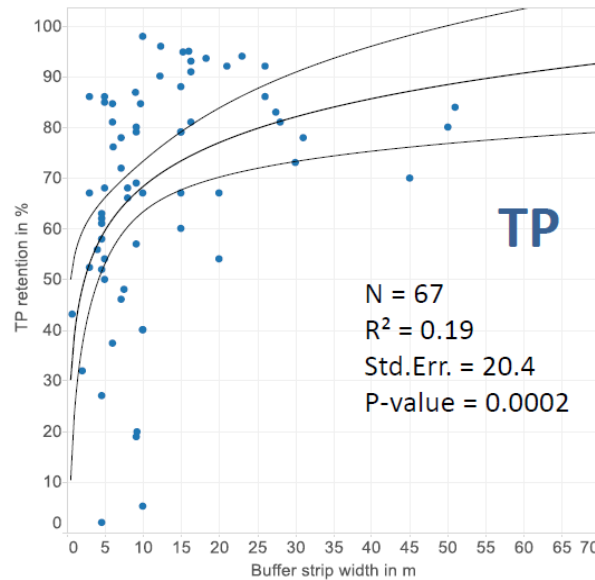
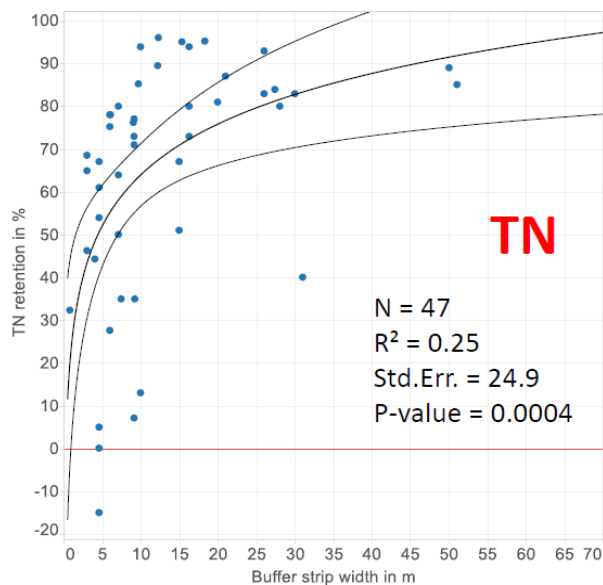
- Large-scale effects

- Spatial arrangement
 - Downstream propagation
 - Effect of upstream conditions
 - Catchment-scale effects in case-studies
- Migration corridor

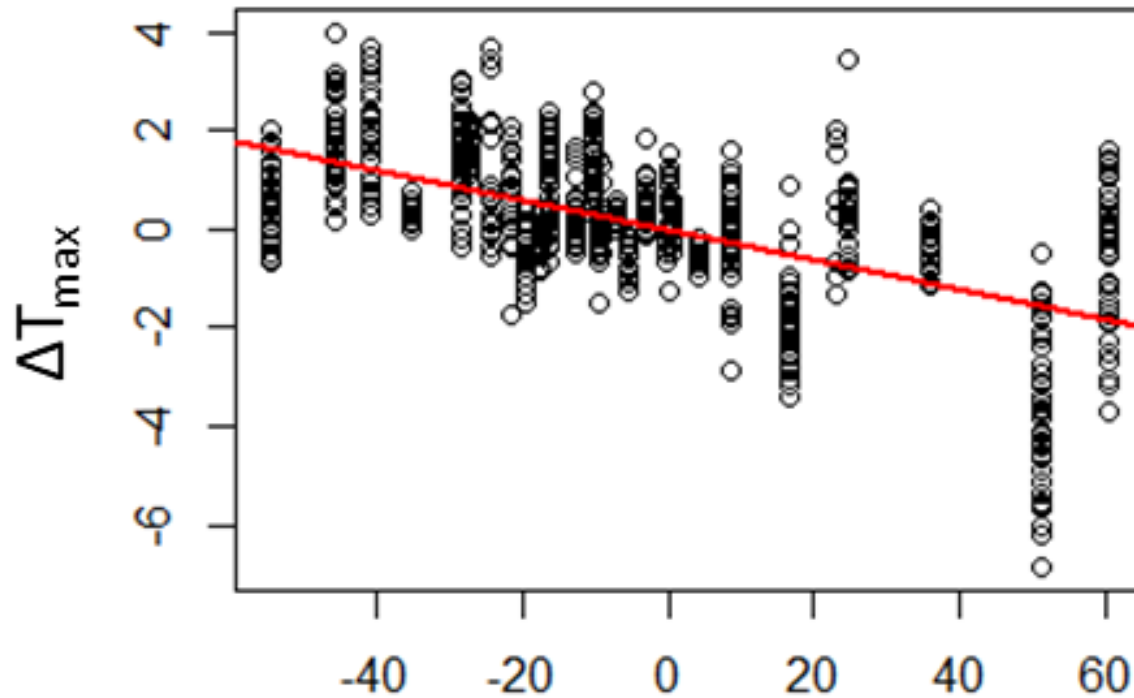


NUTRIENTS FINE SEDIMENTS

- Retention increases with width of buffer strip
- High variability
- 10 m width: 70% retention of nutrients in surface runoff

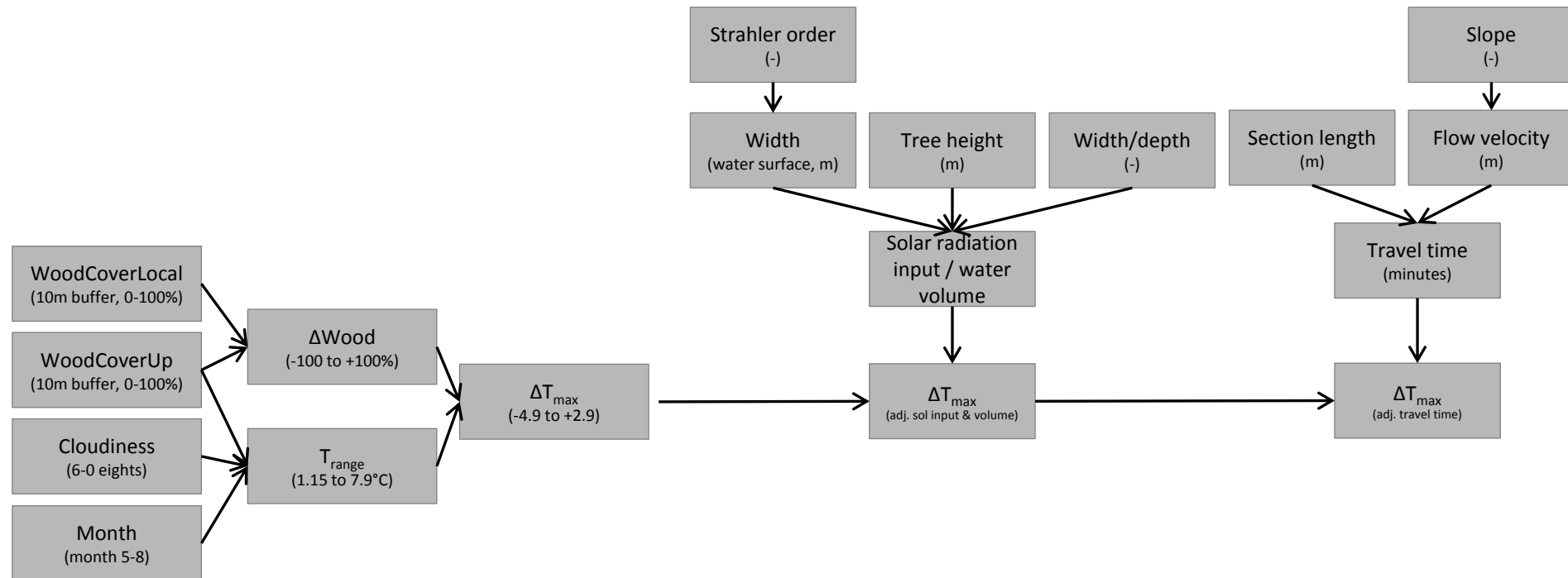


WATER TEMPERATURE

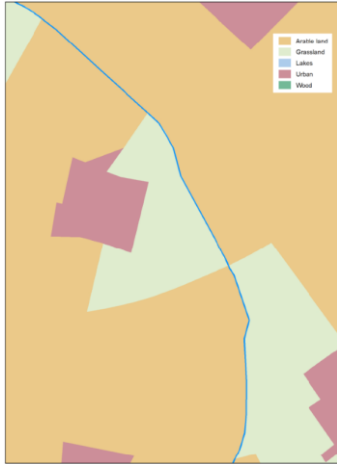


Differences in woody riparian cover

WATER TEMPERATURE BAYESIAN MODEL

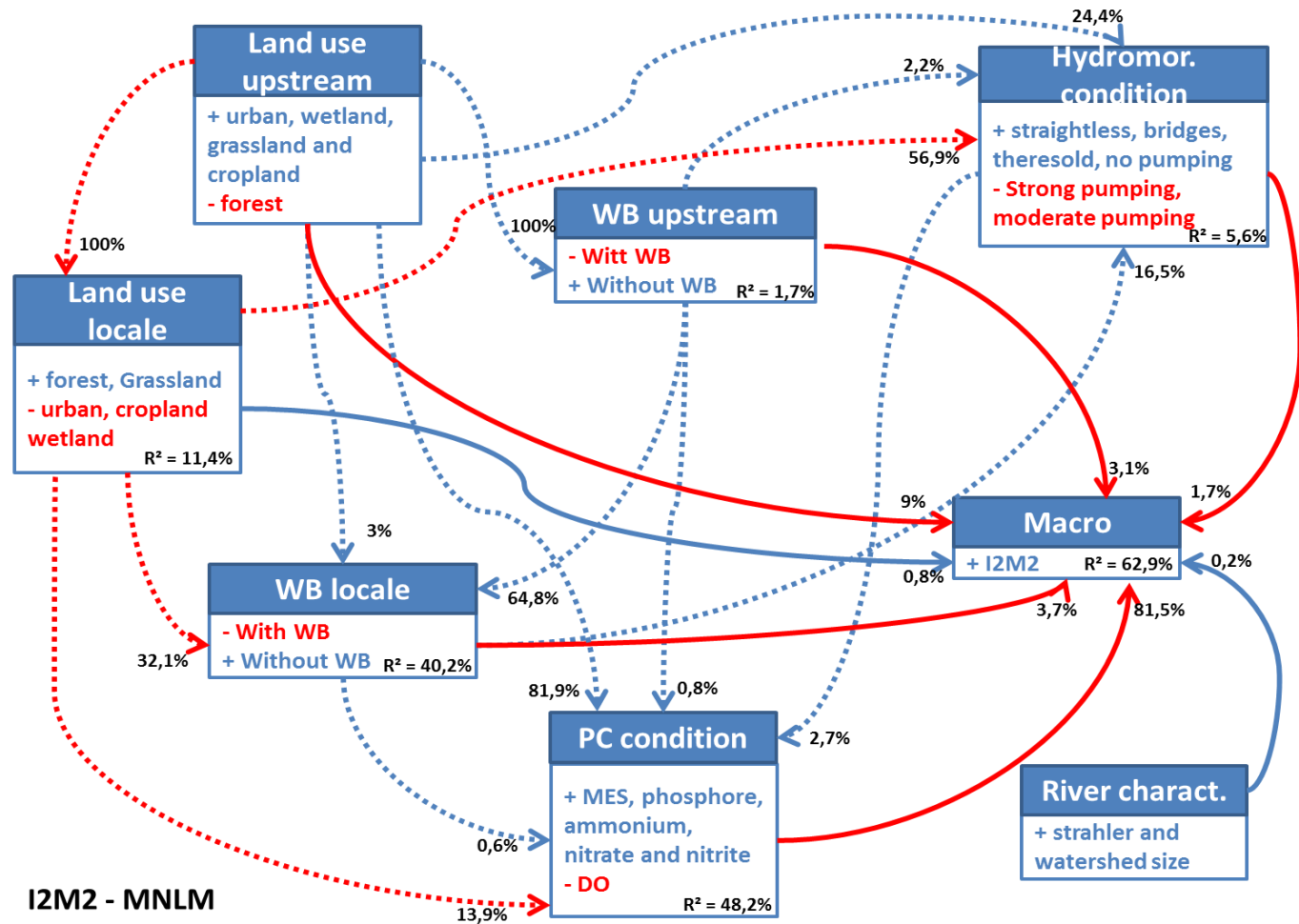
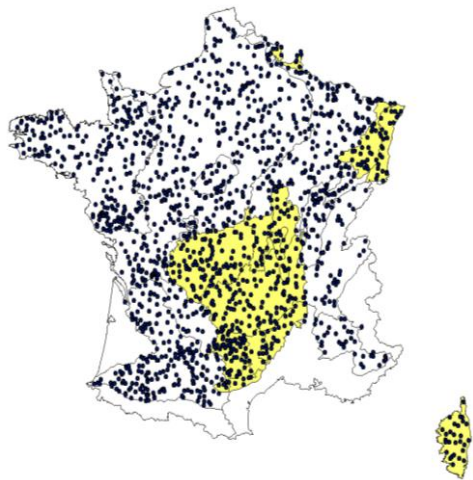


BIODIVERSITY



Quantification of woody buffers in upstream reaches of nearly 9,000 sampling sites.

BIODIVERSITY STRUCTURAL EQUATION MODEL

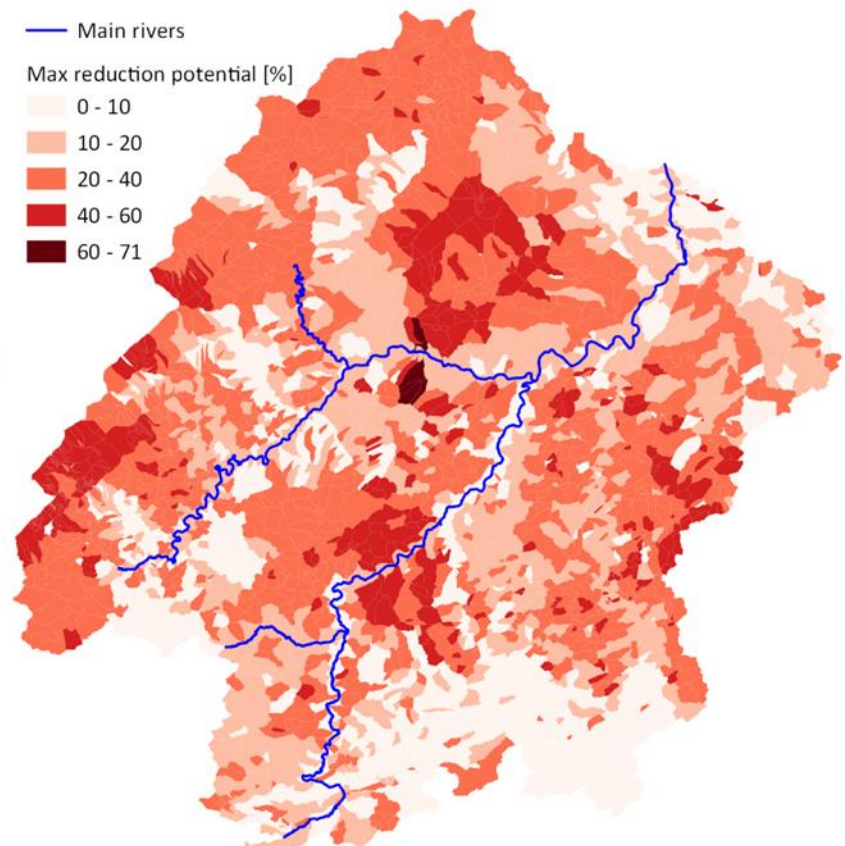
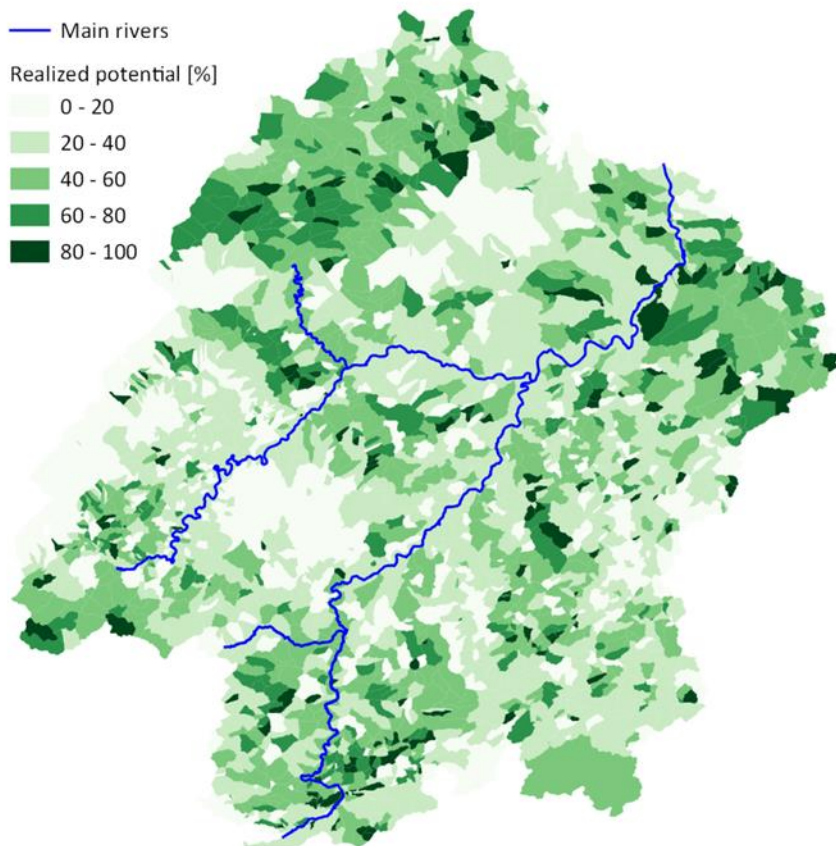




SCENARIOS

- Three stakeholder workshops in four catchments (two in France, two in Germany)
- Participants: Water and land management agencies, Administration for Agriculture, river basin managers
- Development of three scenarios per catchment
- Scenario runs for nutrients, temperature, biodiversity and ecosystem services (...still running...)

NUTRIENT SCENARIOS NAHE CATCHMENT





SOCIETAL / POLICY OUTPUTS

- Local scale:
 - Workshops with stakeholders in four catchments to develop scenarios
 - Workshops with stakeholders to discuss scenario results and measures for the third River Basin Management Plans
- National scale:
 - Presentation on national meetings of water managers (Germany: Working Group of Federal States on Water Problems; various meetings at levels of Federal States; Essener Tagung = main water management meeting with about 1,000 attendees)
- European scale:
 - Presentation on ECOSTAT meeting in April 2020 scheduled



PRELIMINARY SUMMARY

Impact of woody riparian buffer strips (compared to natural floodplain forest)

(Will eventually look like this, please do not take the values too serious!)

Function	5 m width	10 m width	30 m width
Input of leaves and wood	?	~50%	~100%
Water temperature	?	~80%	~100%
Nutrient retention in surface water runoff	-20 % to ~50%	~70%	~80-90%



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Biodiversity			
Ecosystem services			

ACKNOWLEDGEMENTS

GEFÖRDERT VOM



Bundesministerium
für Bildung
und Forschung

