



Ponderful
PONDS FOR CLIMATE

GERMANY 

PONDSCAPE : SCHÖNEICHE



Pond Ecosystems for Resilient Future Landscapes in a Changing Climate

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WHAT IS A PONDSCAPE ?

DEFINITION

A pondscape is a network of ponds with spatial proximity (“connectedness”) and the surrounding landscape matrix.

The boundaries of a pondscape may be determined by physical or ecological settings (a valley, a catchment, a set of ponds in a nature reserve) or even determined by societal or political criteria (urban ponds, provincial or national boundaries).

PRESSURE/THREATS ON PONDS AND PONDSCAPES

50-90% of pond losses in European countries over the past century. Furthermore, ponds are largely neglected in water- and nature-related national and EU policies and strategies, including the EU-WFD.

WHY IS IT IMPORTANT TO PROMOTE THEM ?



BIODIVERSITY ENHANCEMENT

Largely neglected and generally undervalued, ponds are remarkably important for biodiversity conservation. Pondscapes represent biodiversity hotspots.



DISASTER RISK REDUCTION

Ponds and pondscapes play a fundamental role in mitigating flooding and also constitute a water reserve to fight fires.



HUMAN HEALTH

Ponds and pondscapes provide a wide range of co-benefits for human societies such as support for human health and quality of life, spaces for physical activities, or social interaction, but also aesthetic experiences and educational and recreational activities.



CLIMATE CHANGE MITIGATION AND ADAPTATION

Given their abundance and their high productivity, ponds influence markedly the carbon cycle by acting as both carbon sinks and sources.



WATER MANAGEMENT

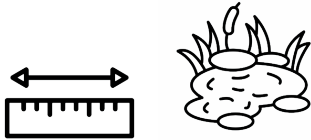
Pondscapes provide a water reserve that is particularly important in the context of water scarcity. It is particularly useful for watering animals and for irrigation.

CONTEXT



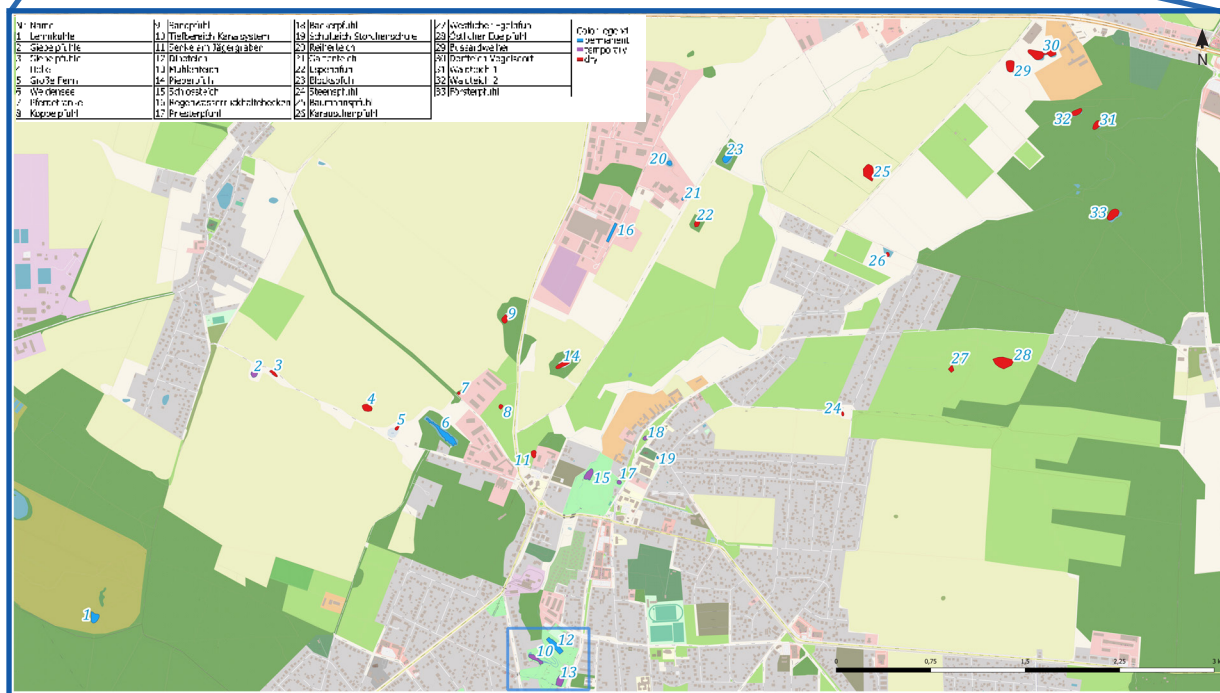
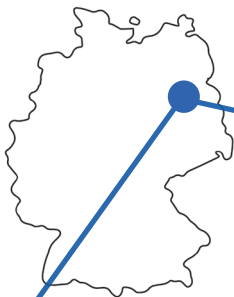
Name of the pondscape: Schöneiche
Name of neighboring large town (in a 30 km radius):
 Berlin (3'850'000 habitants)
Bioclimatic zone: Continental

Dominant land use:
 Pondscape - grassland and pasture
 Surrounding environment - agriculture and urbanization



Pondscape area: 16 km²
Ponds : number: 33 (18 of them completely dry)
density: 1.6/km²
surface areas : 170 to 5'770 m²
depths : 0.1 to 2.5 m
ages : mostly ~12.000 years

Land owner: Various public and private owners
Land manager: Various public and private owners
Public access: 90 % of the area is accessible
Public amenities: Central spot at Kleiner Spreewaldpark, several footpaths



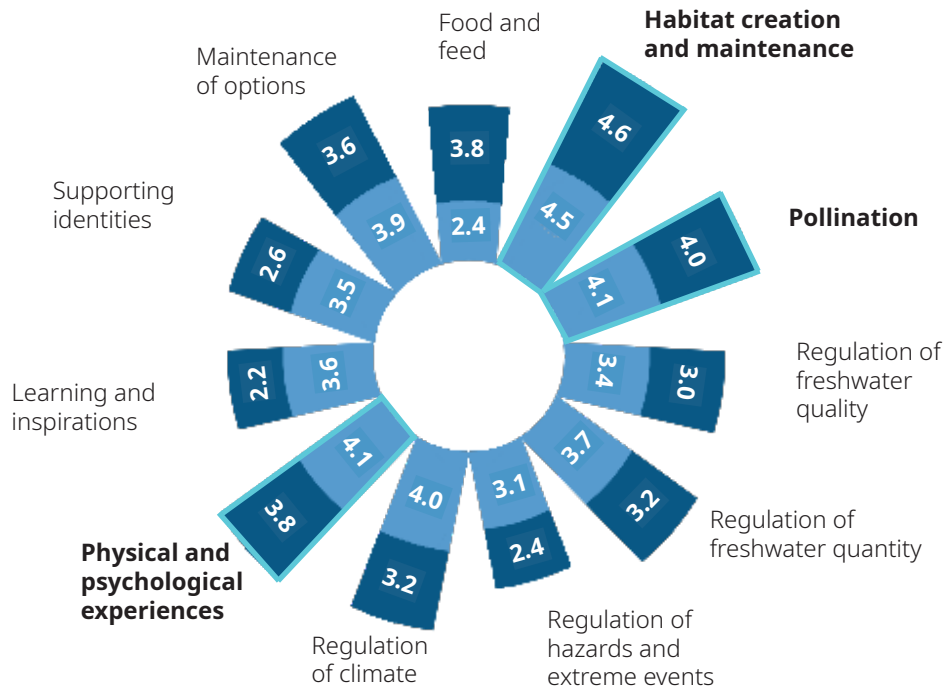
Map of Pondscape Schöneiche, with pond names. Ponds number 1-24, and 27 & 28 are part of the municipality Schöneiche. Ponds 25 & 26, and 29-33 are part of the municipality Vogelsdorf. The different hydroperiods are indicated by the color legend. The blue rectangle depicts the area of the Kleiner Spreewaldpark.

LOCAL COMMUNITY EXPECTATIONS

The 11 Nature-contribution to people (NCPs)

Scale : scores from 1 to 5

Public = 44
Stakeholders = 5



The expectations rely mainly on (i) the provision of habitats for biodiversity, (ii) pollination and (iii) the direct use of these natural areas by people (physical and psychological experiences).

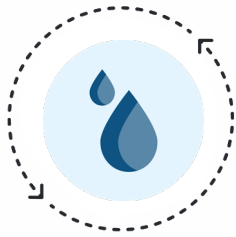
LOCAL POLICIES

Part of the pondscape Schöneiche comprises the southern area of the Natura 2000 FFH-area „Fredersdorfer Mühlenfließ, Breites und Krumpes Luch“ with the EU-Number 3448-302. However, while the Natura site focuses on the little river (Fredersdorfer Mühlenfließ) and its adjacent terrestrial vegetation, there is no formal protection status for the ponds of natural origin (post-glacial kettle holes) in Schöneiche, except the landscape around three ponds designed as “Natural Monument or Feature”. The dry ponds in the northern adjacent municipality Vogelsdorf are part of a Landscape Protection Site.

Local management approaches target the increasingly dramatic change in hydrological cycles, with negative balance between precipitation and evapotranspiration, and with lower groundwater tables. This regional trend induces massive permanent loss of ponds by complete dry-out. Key actions aim to collect rainwater and supply it to ponds located in the municipality of Schöneiche, to maintain aquatic habitats.

Stakeholder awareness and engagement is facilitated by a local NGO, which contributes to participatory decision processes in the municipality. The benefits of ponds and pondsapes as Nature-based Solutions are disseminated by educational formats to local school pupils and the wider public.

MAIN CHALLENGES AND OBJECTIVES



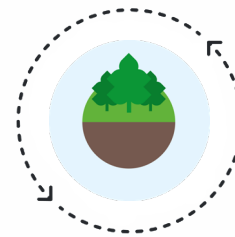
WATER MANAGEMENT

Retain water in the pondscape to prevent dry-out of ponds.



HUMAN HEALTH

A refreshing place to walk and relax, and to educate people about nature.



BIODIVERSITY ENHANCEMENT

Especially amphibians, insects, birds, and (semi-) aquatic vegetation.



NATURE BASED SOLUTIONS (NBS)

PONDS AND PONDSCAPE MANAGEMENT



- Rainwater collection from the roof of buildings for ponds in municipality (Bäckerpfuhl, Priesterpfuhl)
- Rainwater storage ponds in Gewerbegebiet connected to Blockspfuhl for water supply
- Annual water supply to Weidensee from Fredersdorfer Mühlenfließ
- Groundwater pump to provide water to Dinoteich in Kleiner Spreewaldpark



- Creation and maintenance of playground, paths and bridges in Kleiner Spreewaldpark
- Creation and maintenance of information boards



- Maintenance of minimum water level in some ponds to support aquatic biodiversity
- Documentation of emerging and potentially protected terrestrial plant and animal species on pond areas that dried out

NATURE CONTRIBUTIONS TO PEOPLE AND MEASURED INDICATORS



HABITAT CREATION AND MAINTENANCE

SPECIES RICHNESS

Aquatic plants: **32**
 including shoreline vegetation: **87**
 Amphibians: **4**
 Dragonflies: **3**
 Families of invertebrates: **15**

AMOUNT OF

Conservation priority species: **1**
 Invasive alien species: **3**

NATIVE AMPHIBIAN SPECIES :



Pelophylax lessonae



Pelobates fuscus



Lissotriton vulgaris



REGULATION OF CLIMATE

Capacity of annual carbon storage in the ponds (by primary production, by organic matter accumulation) (tons CO₂e/pondscape/year)

156t

17t

Realized carbon accumulation rate (tons of CO₂e/pondscape/year)

NATURE CONTRIBUTIONS TO PEOPLE AND MEASURED INDICATORS



PHYSICAL AND PSYCHOLOGICAL EXPERIENCE

Number of people visiting the Kleiner Spreewaldpark (centre of pondscape) (nb/year) **17'000**

90% Area inside the pondscape accessible to the public

Self-reported satisfaction well-being (scale 1 to 5) **3.2**

Most popular activities : relaxation (25%), wildlife observation (23%), ecological interest (21%) and hiking (20%)



LEARNING AND INSPIRATION

3000-4000

Number of pupils/students from school/university visiting the pondscape. (visits are only partly linked to ponds)



REGULATION OF WATER QUANTITY, LOCATION AND TIMING

27'000m³ Potential water storage capacity in all ponds (m³)

8 ponds out of 26 in Schöneiche are kept wet by external supply from river water, rainwater or groundwater **8 (31%)**

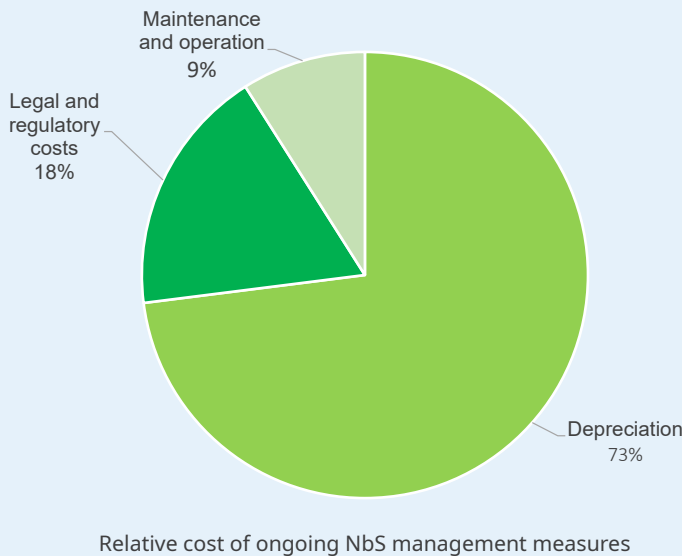
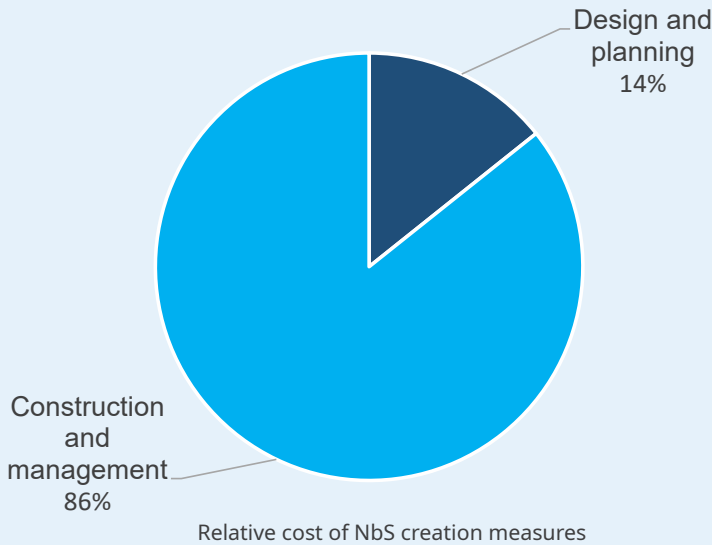


COSTS AND BENEFITS ANALYSIS

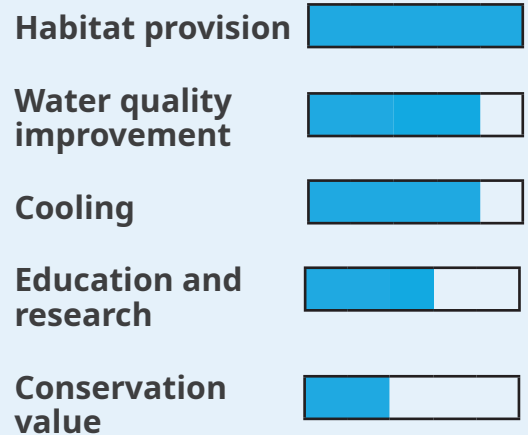
OVERALL COSTS ASSESSMENT



SHARE OF COSTS FOR NBS ACTION



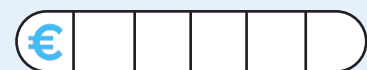
BENEFITS ASSESSMENT



SUITABLE FINANCE INSTRUMENTS TO REDUCE THE GAP

- ✓ 1. Voluntary contributions /donations
- ✓ 2. Grants
- ✓ 3. Other

FUNDING GAP ASSESSMENT



REMAINING THREATS

1. Changes in hydrology linked to climate change (timing and quantity of rainfall) and regional land management and agricultural practices. Further drawdown of groundwater levels due to sealed surfaces in urban areas and increased evapotranspiration by dominance of winter-green pine forests. More ponds are likely to dry out. This will impact aquatic biodiversity.
2. The impact of people on biodiversity, including introduction of exotic species (fish, amphibians and plants).

SUCCESS STORY AND TRANSFERABILITY

PREVENTING LARGE-SCALE POND DRY-OUT BY ARTIFICIAL WATER MANAGEMENT

The implementation of several measures to divert water into some of the ponds prevented the complete loss of the entire pondscape because none of the 26 ponds would keep water permanently without these measures. These actions include diversion of river water into one pond during high river water level, collection and supply of rainwater from roofs of municipality buildings into two central municipality ponds, and collection of rainwater from sealed surfaces in industrial area into storage ponds, from which water is supplied to one natural pond. As a consequence, aquatic biodiversity (amphibians, dragonfly larvae, birds) are still present in the pondscape. Keeping a minimum water level all year around is important because once water has disappeared from a pond for one or two years without re-wetting, the overgrowth of terrestrial vegetation prevents easy re-wetting even in years with strong rain.

Such NbS can be easily implemented in areas with large sealed surfaces (urban or industrial sites) close to the ponds. Construction costs may be high, while maintenance costs are relatively low.



DEVELOPMENT OF A NATURE EDUCATION CENTER ABOUT WATER AND PONDS IN THE MIDDLE OF THE MUNICIPALITY

The local NGO 'Naturschutzaktiv Schöneiche' has developed the Kleiner Spreewaldpark as a centre for education and inspiration. Local and regional inhabitants, in particular families, are attracted by footpaths along ponds and waterways, by a diverse fauna, and by activity opportunities (e.g. children's playground). Information boards educate the visitors.

The site is used for group visits of school pupils for nature education. The threats from global warming and change of land use on water availability in the area are directly visible from the drastic annual changes of water level in Kleiner Spreewaldpark. This may motivate municipality inhabitants to engage in actions to prevent further loss of local ponds from dry-out.

Such NbS is ideally implemented in areas where natural ponds can be found even in urbanized sites. The short distance to the education center from home of the inhabitants facilitates frequent visits and deeper understanding of annual changes of the systems.



HANDBOOK :



APPENDIX :



PHOTOS CREDITS

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AUTHORS

Mehner T., Mehner P.,
Lemmens P., von Plüskow L.M.

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