



Factsheets of Nature-based Solutions for Water Security

INTRODUCTION AND SCOPE

The factsheets aim to provide an initial overview of key characteristics of 12 selected Nature-based Solutions for Water Security (NbS-WS). They are intended to guide potential financiers of Watershed Investment Programs and others interested with respect to the typical properties of each NbS-WS, such as Water Security Challenges (WSCs) addressed, other benefits, costs, and risks. Though the selected NbS-WS are widely different, an important commonality is the dependence of their key properties on the local context. The factsheets are therefore not suitable to be directly applied to any specific project, but should be interpreted as a preliminary indication of aspects to consider when contemplating a certain NbS-WS.

METHODOLOGY

The factsheets were compiled by exploring a range of information sources, including technical reports, policy documents, operational protocols and guidelines for NbS implementation, and academic literature. They deliberately integrate information from practical projects and research studies implemented around the globe and across different spatial scales. Where possible, data from empirical evidence were preferred, though for certain aspects (e.g., long-term benefits of certain NbS) the scarce available information comes from predictive modelling. In factsheets that bundle a number of management practices (such as Agricultural, Forestry and Ranching Best Management Practices), any bias towards individual practices was attempted to be avoided; where emphasis is placed on specific practices, this is caused primarily by availability of literature.

OVERVIEW OF SELECTED NBS-WS

The table below lists the Nbs-WS that are addressed in the factsheets. Nbs-WS can be complementary, e.g., when restoration efforts are implemented on the watershed scale across different land cover types.

INTERVENTION CATEGORY	LANDSCAPES		DESCRIPTION & ASSOCIATED INTERVENTIONS
Protection	<i>An intervention that prevents (or greatly limits) overexploitation of natural resources to achieve the long-term conservation of nature with associated ecosystem services and cultural values.</i>		
1	Targeted habitat protection	Healthy forests, grasslands, shrublands, riverine, lake and wetlands	Broad term for all conservation activities to protect target ecosystems. Includes preventative measures (e.g. easements, land rentals, funding of park guards) to reduce future adverse land use changes.
Restoration	<i>An active or passive intervention that involves returning degraded, damaged, or destroyed ecosystems to pre-disturbance state. Considered synonymous with reclamation, reforestation, rehabilitation, revegetation and reconstruction.</i>		
2	Revegetation	Degraded forests, grasslands, shrublands	Restoration of native habitat via either active planting (e.g., seedlings) or passive measures (creating suitable enabling environment for regeneration). Includes reforestation.
3	Riparian restoration	Riparian areas	Restoring natural habitat that act as interface between land and water along the banks of a river, stream, or lake. Often referred to as 'riparian buffers'.
4	Wetlands restoration	Wetlands	Re-establishment of the hydrology, plants and soils of former or degraded wetlands.
5	Floodplain restoration	Floodplains	Removing barriers along the edges of a river to re-establish its natural course and re-establish storage capacity.
Management	<i>Natural resource management approaches other than restoration or protection. Examples include ecosystem-based fire management and actions characterized as forestry or forest management.</i>		
6	Agricultural Best Management Practices (BMPs)	Cropland	Land management changes that reduce impacts of agricultural & ranching activities by taking steps to incorporate aspects of previously naturally occurring ecosystems. Related measures include cover crops, contour farming, hedgerows, conservation tillage, agroecology, water-smart agriculture, agroforestry and edge of field buffers.
7	Ranching BMPs	Rangeland	Land management changes that reduce impacts of ranching or grazing activities. Related measures include grazing management, silvopasture and land treatment, e.g. range seeding, brush management.
8	Forestry BMPs	Forests	Measures to protect water quality while undertaking silviculture practices; includes forest thinning, forestry under sustainable management plans.
9	Fire Management	Forests (primarily)	Measures to protect water quality by employing nature-based solutions to reduce the frequency and intensity of fires. Includes: prescribed burning, tree thinning.
Created Habitats	<i>Interventions involving the establishment, protection or management of artificial ecosystems. This includes non-natural tree stands created or managed to address climate impacts, artificial grasslands, created wetlands (not restored), etc. This also includes most agricultural, fisheries and livestock farming approaches, including pastoralism.</i>		
10	Artificial wetlands	Urban (primarily)	Treatment systems that use natural processes involving wetland vegetation, soils, and their associated microbial assemblages.
11	Sustainable Urban Drainage Systems (SuDS)	Urban	Urban water management practices that are designed to align modern drainage systems with natural water processes. Examples include bioswales, green roofs, permeable pavements, sediment traps, retention basins and rainwater harvesting.

NBS-WS CHARACTERISTICS

Below, further guidelines are given to interpret some of the NbS-WS aspects presented in the factsheets.

WATER SECURITY CHALLENGES ADDRESSED

Impacts on WSCs are evaluated based on published literature, focusing on water availability, disaster (flood) risk, and water quality aspects. The magnitude of these impacts, as well as the depth of the evidence base to substantiate their assessment, is presented by a star ranking:

RANKING	MAGNITUDE OF IMPACT	DEPTH OF EVIDENCE BASE
☆☆☆	No impact	Non-applicable
★☆☆	Limited	Limited evidence
★★☆	Moderate	Moderate, or highly variable impacts observed
★★★	High	Strong evidence

Figure 1 below provides a summary of these findings across the fact sheets.

WATER SECURITY CHALLENGE	WATER AVAILABILITY		DISASTER RISK	WATER QUALITY		POTENTIAL FOR OTHER BENEFITS
	Dry season flows	Groundwater recharge	Flood risk	Erosion & sediment	Nutrients & pollutants	
Ecosystem benefit						
Protection						
1. Targeted habitat protection	✓	✓	✓✓	✓✓	✓	
Restoration						
2. Revegetation	✓	✓	✓✓	✓✓	✓	
3. Riparian restoration	✓	✓	✓	✓✓	✓✓	
4. Wetlands restoration	✓	✓	✓✓	✓	✓✓	
5. Floodplain restoration	✓	✓	✓✓	✓✓	✓	
Management						
6. Agricultural Best Management Practices (BMPs)		✓		✓✓	✓✓	
7. Ranching BMPs	✓	✓		✓	✓	
8. Forestry BMPs	✓			✓	✓	
9. Fire Management			✓✓	✓✓	✓	
Created Habitats						
10. Artificial wetlands	✓	✓	✓	✓	✓✓	
11. Sustainable Urban Drainage Systems (SuDS)	✓✓	✓	✓✓	✓	✓✓	

LEGEND	LOW	MEDIUM	HIGH
Magnitude of benefit			
Depth of evidence		✓	✓✓
Potential for multiple other benefits			

FIGURE 1. Summary of NbS and their potential benefit