

16 | Wetlands

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Risk protection	2/3
Durability	3/3
Affordability	2/3

Intro

Wetlands are areas that show moist or saturated surface conditions throughout the year or during parts of it. Mostly linked to groundwater-, stream- or coastal systems, wetlands infiltrate, clean, store, and slowly release water. Wetland types range from upland rain-fed wetlands and wet grasslands to peatlands. They also include coastal and river-fed floodplains. Restoring wetlands is, therefore, closely linked to floodplain restoration (see Measure [19]). Due to their capability to store and manage water, wetlands are also measures for surface water management (see Category II).

Benefits and Risk

Highly important for the hydrological cycle, wetlands positively affect the surrounding soils, vegetation, and wildlife. They serve as a natural sponge, which enables them to reduce riverine and pluvial flood volumes. The moist ecosystems can mitigate droughts by slowly releasing water flows during dry periods. Coastal wetlands are buffers from extreme weather events such as storms or waves. Healthy salt marshes, coral reefs, mangroves, or seagrass can play an essential role here. Wetlands, especially peatlands, mangroves, and seagrass, function as highly effective carbon sinks by absorbing and storing greenhouse gases.

On the other hand, draining wetlands causes a massive release of stored CO₂. Another critical aspect is that, depending on context and type, wetlands can have less storage capacity and, therefore, even increase water overflows or flooding, such as in the case of the all-year saturated upland rain-fed wetlands. Finally, land use changes and coastal, rural, or urban development may harm and transform the hydrology of the location.

Good practice

Originally a natural oasis in a hot and dry desert environment, the Azraq wetland and basin have become the subject of disproportionate water overuse and drilling since 1980. That is especially due to urban expansion and agricultural practice, causing around 25 km² of wetland to dry up and increasing floods in the area. The wetland lies adjacent to the town of Azraq and the Al-Azraq Refugee Camp, which is home to around 38'000 Syrian refugees.

The massive depletion encouraged the restoration of the wetland in the past 30 years. In 2020, three water pools that had existed earlier in the reserve were rehabilitated. Yet the pools faced an increase in phosphorus rate because non-native fish and algae had become rampant. This made the water inhabitable for endemic species such as the Azraq killifish. Therefore, the three pools were purposely dried out, and their slopes strengthened with topsoil while controlling the bulrush and reeds. Afterward, the small basins were again supplied with water. In addition, the native killifish were reintroduced to the pools, attracting the common kingfisher and other migratory birds.

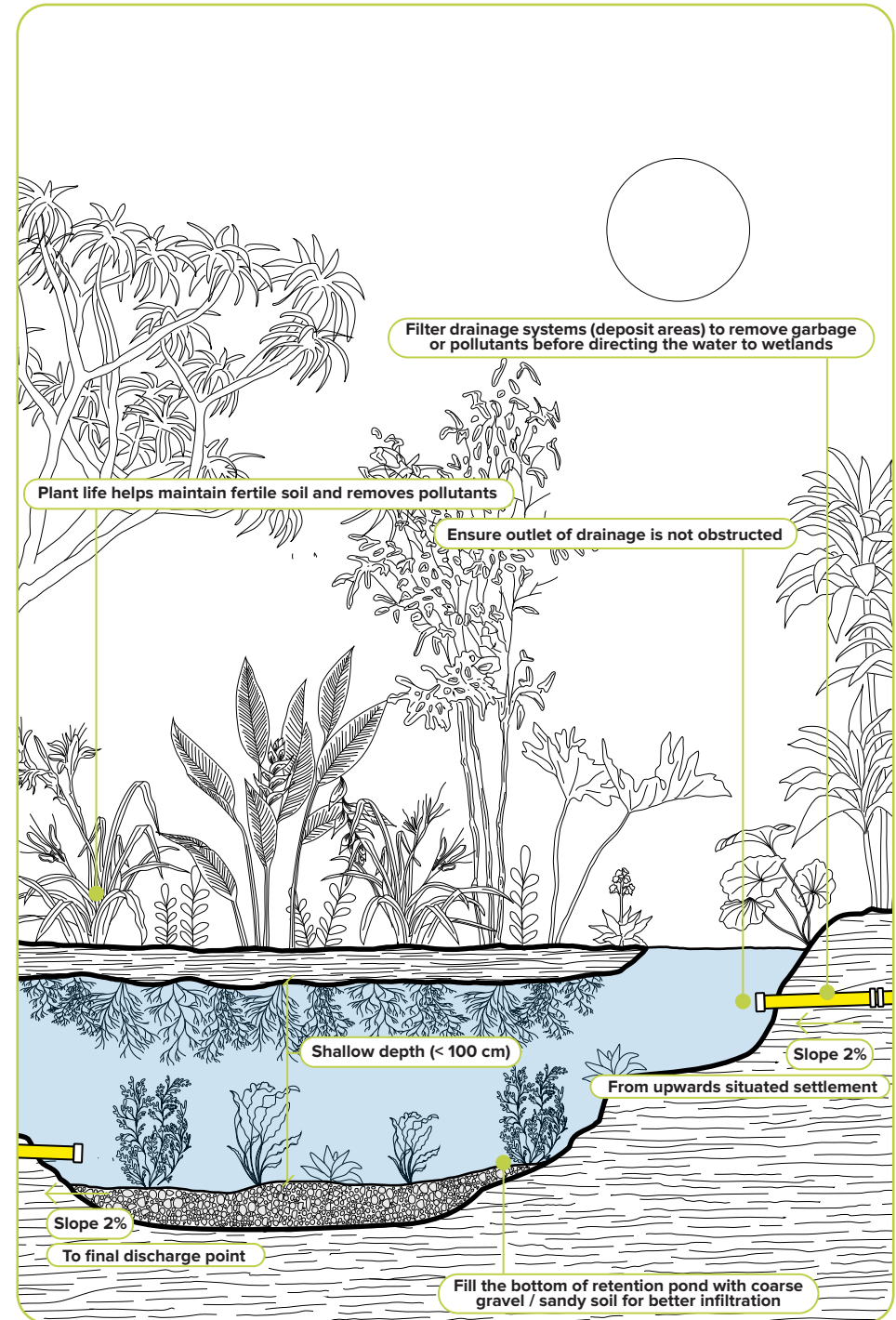




Fig. 16: Bird hides pool three months after the first restoration phase of the Azraq wetlands in 2020. Hazem Hreisha 2020.

Overview of Criteria

Type of Intervention:

Nature-based, Hybrid.

Scale of Intervention:

Supra-settlement.

Materials:

Wood, (Sandy) Soil, Coarse Gravel, Native Vegetation.

Environmental Impact:

Wetlands store great amounts of carbon and have, therefore, a negative CO2 Footprint. In return, the destruction of wetlands can release great amounts of carbon. For example, 10 percent of global carbon emissions result from draining or burning peatlands (Ramsar 2019).

Targeted Natural Hazard:

Pluvial Flood, Coastal / Riverine Flood.

Targeted Vulnerable Assets:

Buildings, Transport.

Strategy Type:

Reduce Hazard Magnitude.

Implementation Time:

Medium (1 month - 1 year)

Effect Duration:

Long-term (>10 years).

Investment Costs:

Medium.

Wetland restoration projects differ in cost depending on their location, landscape, and complexity. Example: A restoration project in Nova Scotia, Canada, describes restoration costs of \$3-10 Canadian Dollars per square meter of restored wetland (Nova Scotia n.y.).

Maintenance Costs (yearly):

Low (<10% investment costs).

Nova Scotia:
Wetland Compensation -
What's Required and What Are My Options?
Available online at
https://novascotia.ca/nse/wetland/docs/Wetland_Compensation.pdf

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Calow, Roger; Mason, Nathaniel; Tanjangco, Beatrice (2021)
Nature-based solutions for flood mitigation.
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<https://bracc.kulima.com/sites/default/files/2022-03/NBS%20for%20Flooding%20discussion%20paper.pdf>

Mediterranean membership network of wetland managers (2021)
A success story: restoration of the Azraq Wetland, Jordan.
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Flood Risk in Humanitarian Settlements: Compendium of Mitigation Measures

Spatial Development and Urban Policy, SPUR

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