

Built Wetlands

A DOI Nature-Based Solutions Roadmap Fact Sheet



Built wetlands, also known as constructed, artificial, or treatment wetlands, are water treatment systems built with wetland soils and vegetation to mimic the ecological and biophysical processes that improve water quality in natural wetlands.¹ They are generally shallow channels or ponds with wetland plants into which wastewater or stormwater is directed for treatment.² They can remove a variety of pollutants including suspended solids, nitrogen, phosphorus, hydrocarbons, and metals.³

TECHNICAL APPROACH

General steps for creation of a built wetland are:⁴

- Excavate and level the project site to create a sloped wetland basin
- Fill the basin with a substrate that distributes flow, traps particles, allows vegetation rooting, and supports a microbial community
- Create inlet and outlet structures that allow effluent to flow into the wetland and treated water to flow out
- Establish vegetation by transplanting seedlings or plants or broadcasting seeds
- Introduce clean water into the system to support plant growth, and after plants are established increasing amounts of wastewater or stormwater effluent can be introduced

BENEFITS

Climate Threat Reduction

- Reduced flooding
- Drought mitigation

Social and Economic

- Aesthetics
- Recreational opportunities

Ecological

- Improved water quality
- Supports wildlife



Modified wetlands in the Jackson Bottom Wetlands Preserve are being tested for removing nutrients from treated effluent from water treatment plants. Photo credit: [born1945/flickr](https://www.flickr.com/photos/born1945/). CC BY 2.0 DEED.

SITE SUITABILITY FACTORS

- ✓ Historic, degraded wetland sites without a water source
- ✓ Locations with medium- to fine-textures soils
- ✗ Areas in a floodplain, floodway, or existing wetland complex
- ✗ Sites with highly permeable soils
- ✗ Sites with shallow bedrock
- ✗ Locations that discharge to fishery habitats

EXAMPLE PROJECT

The South Los Angeles Wetland Park was completed in 2011 to treat urban runoff from a 525 acre watershed.⁵ The park treats up to 14,000 gallons of stormwater runoff per day and helps remove oil, grease, bacteria, suspended solids, nitrates, and phosphorous. The built wetland sits on a former brownfield site and pre-treats stormwater runoff by circulating water through a built wetland with riparian and emergent marsh habitat. The park serves as a recreational resource by providing trails, boardwalks, observation decks, picnic areas, and educational signage.



The South Los Angeles Wetland Park. Photo credit: [Dave Vornberger](#)

KEY RESOURCES

Title and Link	Site Suitability	Design and Construction	Monitoring Guidance	Example Projects
Manual: Constructed Wetlands Treatment of Municipal Wastewaters	✓	✓	✓	✓
Constructed wetlands manual	✓	✓	✓	✓

LEARN MORE

Visit the DOI Nature-Based Solutions Roadmap for more information on built wetlands, other nature-based solutions, and principles and considerations broadly relevant for nature-based solutions projects. The built wetlands summary includes additional details on each section included in this fact sheet, plus information on operations and maintenance, common barriers, and more resources and example projects.

Explore the Roadmap



Full Roadmap Document



Built Wetlands Section

www.nicholasinstitute.duke.edu/roadmap

REFERENCES

- 1 US EPA, OW. 2023. "Constructed Wetlands." Overviews and Factsheets. 2023. <https://www.epa.gov/wetlands/constructed-wetlands>.
- 2 US EPA. 2000. "Guiding Principles for Constructed Treatment Wetlands." <https://nepis.epa.gov/Exe/ZyPDF.cgi/2000536S.PDF?Dockey=2000536S.PDF>.
- 3 Gelt, Joe. 1997. "Constructed Wetlands: Using Human Ingenuity, Natural Processes to Treat Water, Build Habitat." *Arroyo* 9 (4). <https://wrrc.arizona.edu/publication/constructed-wetlands-using-human-ingenuity-natural-processes-treat-water-build-habitat>.
- 4 UN. 2008. "Constructed Wetlands Manual." https://sswm.info/sites/default/files/reference_attachments/UN%20HABITAT%202008%20Constructed%20Wetlands%20Manual.pdf.
- 5 "South Los Angeles Wetland Park | Landscape Performance Series." 2016. October 10, 2016. <https://www.landscapeperformance.org/case-study-briefs/south-los-angeles-wetland-park>.

CITATION

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