

Environmental Flows

1 of 2

Caddo Lake and Lake o' the Pines Dam above Caddo Lake, Texas.¹

| DESCRIPTION | Management of reservoir releases to maintain or enhance benefits to the ecosystem while supporting flood risk management. | | |
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| HOW DOES IT MITIGATE FLOOD RISK? | <ul style="list-style-type: none"> + Flood storage: The holding of floodwaters during a flood which are then gradually released into the drainage system. + Flood attenuation: The reduction in peak discharge of a flood by temporary storage of water or the slowing of channel flows. | | |
| WHAT OTHER BENEFITS DOES IT PROVIDE? | <ul style="list-style-type: none"> + Habitat restoration/enhancement: Changing the physical, chemical or biological characteristics of a site with the goal of returning or improving the natural functions to the lost or degraded native habitat. + Improved water quality: Increasing suitability of water for a particular use based on selected physical, chemical and biological characteristics. + Streamflow regulation: Modulation of fluctuations in river flow by temporary storage. | | |
| SCALABILITY | Individual projects planned at scale can have watershed effects. | | |
| Advantages Relative to Traditional Flood Management | Potential Barriers or Issues Relative to Traditional Flood Management | Potential Synergies with other NBS | |
| Additional ecosystem restoration/enhancement benefits versus traditional reservoir operations. | <ul style="list-style-type: none"> + Challenge of balancing multiple uses of reservoir, especially during floods and droughts. + Unfamiliarity of reservoir managers/operators with potential benefits. + Complex tradeoffs among water uses, e.g., municipal and industrial water supply, irrigation, ecosystem and flood risk management. + Inability to predict the amount and timing of releases relative to multiple uses. | <ul style="list-style-type: none"> + Floodplain Restoration/Preservation. + Natural Channel Design. + Riparian Vegetation Restoration. | |

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2 of 2

| RESOURCES | |
|---|---|
| EVALUATION TOOLS | DESIGN SUPPORT |
| <ul style="list-style-type: none"> + National Stormwater Calculator: https://www.epa.gov/water-research/national-stormwater-calculator + HEC river models: https://www.hec.usace.army.mil/ + USACE Ecosystem Restoration Model Library: https://cw-environment.ercd.dren.mil/model-library.cfm?CoP=Restore&Option=Search&Type=Restore&Id=ALL + INVEST Habitat Quality: http://releases.naturalcapitalproject.org/invest-userguide/latest/urban_flood_mitigation.html + Automated Geospatial Watershed Assessment Tool: https://www.epa.gov/water-research/automated-geospatial-watershed-assessment-agwa-tool + Open Source Conservation Planning Software: https://www.landscapepartnership.org/maps-data/gis-planning/conservation-planning/conservation-planning-software | <ul style="list-style-type: none"> + A Practical Guide to Environmental Flows for Policy and Planning: https://www.conservationgateway.org/ConservationPractices/Freshwater/EnvironmentalFlows/MethodsandTools/ELOHA/Documents/Practical%20Guide%20Eflows%20for%20Policy-low%20res.pdf + Environmental Flows Methods and Tools: https://www.conservationgateway.org/conservationpractices/freshwater/environmentalflows/methodsandtools/Pages/environmental-flows-metho.aspx + Ecological Limits of Hydrologic Alteration: https://www.conservationgateway.org/ConservationPractices/Freshwater/EnvironmentalFlows/MethodsandTools/ELOHA/Pages/ecological-limits-hydrolo.aspx |
| CASE STUDIES | <p>Big Cypress Bayou – Caddo Lake: https://caddolakeinstitute.org/flows-project/ and https://www.iwr.usace.army.mil/sustainableivers/sites/bigcypress/</p> |



LOUISIANA
WATERSHED
INITIATIVE

1 <https://www.hec.usace.army.mil/sustainableivers/sites/bigcypress/>