

# Riverine Connectivity

## A DOI Nature-Based Solutions Roadmap Fact Sheet



**A riverine system** is a watershed-scale network of integrated aquatic habitats and hydrological processes.<sup>1</sup> The system functions as both a habitat and migration corridor, with connectivity projects enhancing the sustainability of both.<sup>2</sup> A well-connected river sustains natural riverine processes, including the unimpeded movement of fish, sediment, and nutrients to points further upstream and downstream.<sup>3</sup> Restoring riverine connectivity involves removing physical barriers, eliminating hypoxic zones, redesigning road stream crossings and reintroducing natural meanders back into river morphology.<sup>4</sup>

### TECHNICAL APPROACH

The following strategies are frequently used to restore riverine connectivity:

- **Dam removal:** To remove physical barriers, increase flow, decrease temperature, and increase oxygen levels
- **Invasive species removal:** To restore natural hydrology and ecology
- **Replacing culverts:** To allow migration of fish and other aquatic species
- **Redesigning road stream crossings:** To allow movement of wildlife up and downstream
- **Eliminating hypoxic zones:** to create beneficial conditions for aquatic organisms
- **Reintroducing natural meanders:** To enhance habitat diversity
- **Creating fish passage structures:** To allow fish migration

### BENEFITS

#### Climate Threat Reduction

- Reduced flooding
- Drought mitigation
- Sea level rise adaptation and resilience
- Carbon storage and sequestration

#### Social and Economic

- Increased property values
- Recreational opportunities
- Clean drinking water
- Jobs
- Mental health & wellbeing
- Resilient fisheries
- Cultural values

#### Ecological

- Improved water quality
- Enhanced biodiversity
- Enhanced genetic diversity
- Supports wildlife
- Increased primary productivity

## SITE SUITABILITY FACTORS

- ✓ Dams that are no longer in use
- ✓ Ample space between infrastructure and the river
- ✓ Near a restored wetlands or floodplains site
- ✓ Near the mouth of a river
- ✓ Sediment available
- ✗ Areas prone to erosion
- ✗ Densely populated urban areas
- ✗ Flood prone regions
- ✗ Areas with frequent commercial shipping

## EXAMPLE PROJECT

The Sabattus River Connectivity Project in Maine reconnected 9 miles of river by removing two failed dams that were blocking fish passage.<sup>7</sup> The US Fish and Wildlife Service joined with partners including the Maine Department of Natural Resources, the Atlantic Salmon Federation, and the Town of Lisbon to complete the project using Bipartisan Infrastructure Law Funds. Removing the aging dams also helped the town of Lisbon better manage stormwater runoff.



Construction crews demolishing a dam on the Sabattus River: [Catherine Birmingham/ASF](#)

## REFERENCES

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## CITATION

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## KEY RESOURCES

Title and Link	Site Suitability	Design and Construction	Monitoring Guidance	Example Projects
<a href="#">Stream and Watershed Restoration: A Guide to Restoring Riverine Processes and Habitats</a>	✓	✓	✓	—
<a href="#">American Rivers River Restoration Science Resources</a>	✓	✓	✓	✓

## LEARN MORE

Visit the DOI Nature-Based Solutions Roadmap for more information on riverine connectivity restoration, other nature-based solutions, and principles and considerations broadly relevant for nature-based solutions projects. The riverine connectivity restoration 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



Riverine Connectivity Section

[www.nicholasinstitute.duke.edu/roadmap](http://www.nicholasinstitute.duke.edu/roadmap)