Connecticut River Aquatic Habitat Connectivity

Fish Passage in the White River Watershed

Marsh Brook on Marsh Brook Rd Road, Rochester Vermont

Before

After

Left: *A view of the Marsh Brook culvert outlet on Marsh Brook road showing the undersized culverts with minimal fish or aquatic organism passage.* ***Right:*** *New Marsh Brook culvert at the Marsh Brook road crossing designed for fish and aquatic organism passage as well as flood resiliency.*

Site description: Marsh Brook in Rochester Vermont is a headwater tributary to the White River and supports a thriving fishery including Atlantic salmon and a wild brook trout population. In combination with the repairs to another road crossing structure downstream on Marsh Brook, this new culvert will allow native brook trout to access over 2.5 miles of critical thermal refugia and spawning habitat.

Problems / history: Multiple culverts in Rochester Vermont were in need of emergency repair following the flooding from tropical storm Irene in August of 2011. Following tropical storm Irene many of the emergency fixes were designed to quickly open roads for vehicle traffic, but not always allow for fish and aquatic organism passage. Working closely with FEMA and the town of Rochester the US Fish and Wildlife Service has provided technical assistance, engineering designs, and project over site to ensure projects allow both fish and aquatic organism passage.

Partners and Funding: Funding and support for this project came from the US Forest Service, FEMA, Town of Rochester, White River Partnership, and the US Fish and Wildlife Service.

Cost:	Town	WRP	USFWS	FEMA	TOTAL
	$5,000	$2,000	$5,000	$132,000	$144,000

Connecticut River Aquatic Habitat Connectivity

Fish Passage in the White River Watershed

Nason Brook at the Moose Run, Rochester Vermont

Before

After

Left: *A view of the Nason Brook culvert outlet at Moose Run road showing the emergency replacement culvert with zero fish or aquatic organism passage.* ***Right:*** *Nason Brook Bridge at Moose Run road allowing for aquatic organism passage and flood resiliency.*

Site description: Nason Brook in Rochester Vermont is a headwater tributary to the White River and supports a thriving fishery including Atlantic salmon and a wild brook trout population. This new bridge allows native brook trout to access 1.1 miles of critical thermal refugia and spawning habitat.

Problems / history: Multiple culverts in Rochester Vermont were in need of emergency repair following the flooding from tropical storm Irene in August of 2011. Following tropical storm Irene many of the emergency fixes were designed to quickly open roads for vehicle traffic, but not always allow for fish and aquatic organism passage. Working closely with FEMA and the town of Rochester the US Fish and Wildlife Service has provided technical assistance, engineering designs, and project over site to ensure projects allow both fish and aquatic organism passage.

Objective and Method: Tropical Storm Irene devastated much of the White River basin. Our objective is to insure that brook trout habitat is available and healthy post flooding. Our goal is to maintain healthy, sustainable brook trout populations. Proactively assisting towns will lead to projects large enough to sustain future catastrophic events while maintaining the exceptional fishery.

Fish and AOP Passage: Before culvert replacement began fish biologists from the US Fish and Wildlife Service captured and marked fish downstream from the culvert with a fin clip.

Partners and Funding: Funding and support for this project came from the US Forest Service, FEMA, Town of Rochester, White River Partnership, and the US Fish and Wildlife Service.

Cost:	USFWS	FEMA	USFS	TOTAL
	$79,705.26	$625	$56,739.74	$137,070

Connecticut River Aquatic Habitat Connectivity

Fish Passage in the White River Watershed

Marsh Brook on North Hollow Road, Rochester Vermont

Before After

Left: *A view of the Marsh Brook culvert outlet on North Hollow road showing two undersized culverts with minimal fish or aquatic organism passage.* ***Right:*** *New Marsh Brook culvert at the North Hollow road crossing designed for fish and aquatic organism passage as well as flood resiliency.*

Site description: Marsh Brook in Rochester Vermont is a headwater tributary to the White River and supports a thriving fishery including Atlantic salmon and a wild brook trout population. This new culvert will allow native brook trout to access the entire headwaters which contain critical thermal refugia and spawning habitat.

Problems / history: Multiple culverts in Rochester Vermont were in need of emergency repair following the flooding from tropical storm Irene in August of 2011. Following tropical storm Irene many of the emergency fixes were designed to quickly open roads for vehicle traffic, but not always allow for fish and aquatic organism passage. Working closely with FEMA and the town of Rochester the US Fish and Wildlife Service has provided technical assistance, engineering designs, and project over site to ensure projects allow both fish and aquatic organism passage.

Partners and Funding: Funding and support for this project came from the US Forest Service, FEMA, Town of Rochester, White River Partnership, and the US Fish and Wildlife Service.

Cost:	Town	WRP	USFWS	FEMA	USFS	TOTAL
	$3,000	$2,000	$8,000	$63,000	$5,000	$81,000

Fish and AOP Passage: Before culvert replacement began fish biologists from the US Fish and Wildlife Service captured and marked fish downstream from the culvert with a fin clip. Just three weeks after the new culvert was installed biologists returned and found that over half of the brook trout collected in the first 100ft upstream from the culvert had a fin clip showing that they had passed through the culvert.

Pre-construction: 15-Aug
86 Brook Trout collected
Adipose clipped
Capture/Release within 100ft downstream

Post-construction: 26-Sept
18 Brook Trout collected
10 with Adipose clip
Collected within 100ft upstream

Connecticut River Aquatic Habitat Connectivity

Fish Passage in the White River Watershed

Nason Brook at the Woodlawn Cemetery, Rochester Vermont

Before After

Left: *A view of the Nason Brook culvert outlet showing the damage from TS Irene.* ***Right:*** *Nason Brook Bridge allowing for aquatic organism passage and flood resiliency.*

Site description: Nason Brook in Rochester Vermont is a headwater tributary to the White River and supports a thriving fishery including Atlantic salmon and a wild brook trout population. This new bridge allows native brook trout to access 4 miles of critical thermal refugia and spawning habitat.

Problems / history: Multiple culverts in Vermont were in need of emergency repair following the flooding from tropical storm Irene in August of 2011. Following tropical storm Irene many of the emergency fixes were designed to quickly open roads for vehicle traffic, but not always allow for fish and aquatic organism passage. Working closely with FEMA and the town of Rochester the US Fish and Wildlife Service has provided technical assistance, engineering designs, and project over site to ensure projects allow both fish and aquatic organism passage.

Objective and Method: Tropical Storm Irene devastated much of the White River basin. Our objective is to insure that brook trout habitat is available and healthy post flooding. Our goal is to maintain healthy, sustainable brook trout populations. Proactively assisting towns will lead to projects large enough to sustain future catastrophic events while maintaining the exceptional fishery.

Partners and Funding: Funding and support for this project came from the US Forest Service, FEMA, Town of Rochester, White River Partnership, and the US Fish and Wildlife Service.

Cost:	USFWS	FEMA	TOTAL
	$14,925	$29,950	$40,875