



**Nature-Based Hazard  
Mitigation Case Study:**  
*Rattlesnake Creek  
Dam Removal*

APRIL 2021

## Acknowledgements

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# Rattlesnake Creek Dam Removal

## Introduction

The Rattlesnake Creek dam, located in Missoula, Montana, was completed in 1904 and was removed in 2020. Restoration started at the site shortly after the dam was demolished.<sup>1</sup> The dam had been unused, inoperable, and in poor condition for decades, but was left in place as it was too costly to remove. Rattlesnake Creek dam was identified as posing a significant flood risk to downstream communities, and in Missoula County's 2017 update to its Pre-Disaster Mitigation Plan, it was listed for removal or mitigation. The City of Missoula applied for a Hazard Mitigation Grant from FEMA, and the dam removal process began in the summer of 2020. Removing the dam not only eliminates the required maintenance work and associated expenses, it also provides numerous environmental and social benefits.

## Rattlesnake Creek Dam History

The Rattlesnake Creek dam was completed in 1904.<sup>2</sup> It created a reservoir that served as the primary water source for the city of Missoula until 1983, when the water was contaminated with Giardia. The water company, Mountain Water Company, switched to a different water source but maintained the reservoir as a backup until 2017 when the City of Missoula acquired the company.<sup>3</sup> The lower-Rattlesnake Creek dam area was then designated as a park preserve.<sup>4</sup>

Despite keeping the reservoir as a water supply backup, the dam has been in poor condition for decades. In 1997, part of the dam's intake wall collapsed during snowmelt flooding. In 2017, high flow washed away a portion of the retaining wall, threatening a pedestrian bridge due to an upstream bank collapse. Maintenance projects were performed over the years, including the opening of the low-level gates of the dam in 2011 and 2012; however, the dam remained at risk of failure, which would have led to significant impacts on downstream property and infrastructure.

## The Project

As described on the FEMA Grant Application, this project removes all infrastructure from the Rattlesnake Creek dam site in order to address the main hazard: potential dam breach and/or failure leading to flooding.<sup>5</sup> The project proposal also includes rerouting approximately 1,200 feet of stream channel:

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<sup>1</sup> City of Missoula. Rattlesnake Reservoir Restoration. At <https://www.ci.missoula.mt.us/2384/Rattlesnake-Reservoir>; Subgrant Project Application (2019), Rattlesnake Dam Failure Mitigation Project, 5/28.

<sup>2</sup> Id.

<sup>3</sup> Project Proposal Document, Rattlesnake Creek, Clark Fork Watershed, Montana

<sup>4</sup> Draft Environmental Assessment Rattlesnake Creek Dam Removal Project Missoula, Montana. Available at [http://fwp.mt.gov/news/publicNotices/environmentalAssessments/developmentImprovementsAndEnhancements/pn\\_0411.html](http://fwp.mt.gov/news/publicNotices/environmentalAssessments/developmentImprovementsAndEnhancements/pn_0411.html)

<sup>5</sup> Subgrant Project Application (2019), Rattlesnake Dam Failure Mitigation Project, 6/28

The constructed channel would [will] meander into the floodplain located east of the existing channel. The historic channel would [will] be filled with excavated fill material and converted to off channel habitat features.<sup>6</sup>

Additionally, the project includes stream restoration projects. “Disturbed areas” will be revegetated with native plants species, and shrubbery that will be removed to make way for the constructed channel will be used to fill the existing channel.<sup>7</sup> Further, natural floodplain features will be constructed for natural water storage during high flows to mitigate potential impacts;<sup>8</sup> the area under the former reservoir will be turned into approximately four acres of wetlands.<sup>9</sup>

### *Impetus*

When the City of Missoula acquired the Mountain Water Company and control of the dam in 2017, it conducted a system-wide maintenance review, identifying the dam as a priority for removal or mitigation. The dam was then added to the 2017 update of Missoula’s Pre-Disaster Mitigation Plan:

Project 8.2.1 - Evaluate individual and cumulative risk of failure of Rattlesnake Wilderness Dams and the current Mountain Water Company Intake Dam (Rattlesnake Dam), and options for mitigation of identified risks.<sup>10</sup>

This project fell under a broader prioritization of the decommission of non-essential dams that presented risk of failure: “Objective 8.2: Conduct mapping/ analysis/ planning projects to reduce impacts from dam failure.”<sup>11</sup>

### *Partners*

The City of Missoula; Trout Unlimited; and Montana Department of Fish, Wildlife and Parks formed a partnership in 2017 and have been working together to prepare and remove the dam since then.<sup>12</sup>

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<sup>6</sup> Subgrant Project Application (2019), Rattlesnake Dam Failure Mitigation Project, 6/28.

<sup>7</sup> *Id.*

<sup>8</sup> *Id.*

<sup>9</sup> Missoula Current, March 4, 2020, Rattlesnake Dam removal poised to begin; creek to flow freely after 115 years. At <https://missoulacurrent.com/outdoors/2020/03/rattlesnake-dam-removal/>

<sup>10</sup> 2017 Update to Pre-Disaster Mitigation Plan - Missoula County, City of Missoula. At 5-22 (Table 5.5-2). Available at <https://www.missoulacounty.us/home/showdocument?id=25947>

<sup>11</sup> *Id.* at 5-22

<sup>12</sup> Engage Missoula. Rattlesnake Dam Removal Project. At <https://www.engagemissoula.com/rattlesnake-reservoir-restoration>

## *Funding*

According to FEMA, the total project cost estimate for the dam removal and stream restoration is \$955,120.00.<sup>13</sup> The City of Missoula applied for and received a \$716,340 Hazard Mitigation Grant from FEMA.

The estimate for the total project cost, including planning, design, and revegetation, may be closer to \$2 million.<sup>14</sup> Non-federal partners, including Trout Unlimited, the Montana Department of Fish, Wildlife and Parks, provided additional funds for the project.

## *Benefits*

In addition to reducing costs for annual maintenance and repairs, the removal of Rattlesnake Creek dam also provides multiple environmental and social benefits. The four acres of wetlands and floodplains created in the old reservoir are projected to increase biodiversity of the area and provide migrating wildlife with cover and a corridor.<sup>15</sup> Establishing a natural river connection between the Rattlesnake Wilderness headwaters and the Clark Fork River will reconnect 26 miles of habitat for fish and wildlife.<sup>16</sup> Additionally, while the area surrounding the dam has been closed to the public for safety reasons, the dam removal and restoration will allow areas to reopen and provide recreational opportunities to the community.

## *Timeline and Current Status*

The project began in mid-2020. Dam demolition took place in August 2020, and in September 2020, restoration projects were under way.<sup>17</sup>

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<sup>13</sup> OpenFEMA Dataset: Hazard Mitigation Assistance Projects - v2 Available at <https://www.fema.gov/openfema-data-page/hazard-mitigation-assistance-projects-v2>.

<sup>14</sup> Laura Lundquist, Rattlesnake Dam removal poised to begin; creek to flow freely after 115 years, Missoula Current (Mar. 4, 2020) <https://missoulacurrent.com/outdoors/2020/03/rattlesnake-dam-removal/>

<sup>15</sup> Missoula Current, March 4, 2020, Rattlesnake Dam removal poised to begin; creek to flow freely after 115 years. At <https://missoulacurrent.com/outdoors/2020/03/rattlesnake-dam-removal/>

<sup>16</sup> City of Missoula. Rattlesnake Reservoir Restoration. At <https://www.ci.missoula.mt.us/2384/Rattlesnake-Reservoir>

<sup>17</sup> Engage Missoula. Rattlesnake Dam Removal Project. At <https://www.engagemissoula.com/rattlesnake-reservoir-restoration>