Mud Mountain Dam

Mud Mountain Dam controls floods in the lower White and Puyallup River valleys! The U.S. Army Corps of Engineers built the dam on the White River in the 1940's. The Corps also made channel improvements and built levees on the lower Puyallup River. Together, these structures have saved an estimated $308 million in flood damages. The project currently helps protect the homes and businesses of about 400,000 people. The dam regulates flooding by holding back water from heavy rains and melting snow in the reservoir, then releasing it slowly back into the river. The reservoir is usually empty, except for the normal flow of the White River.

Completely filled, the reservoir would stretch 5.5 miles and cover 1,200 acres.

Aerial view

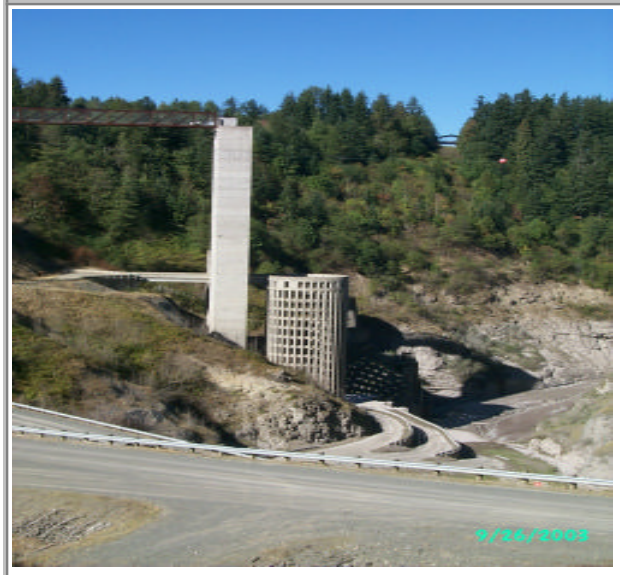
Building the Dam

Congress authorized construction of Mud Mountain Dam with the Flood Control Act of June 22, 1936. Work began on August 25, 1939, but was halted by World War II. Construction resumed in 1947, and the dam was completed in 1948. At that time, it was the highest rock and earth-filled dam in the world. Fishway facilities in Buckley were finished in 1949, and the Rim Trail and picnic areas were added in 1980. The core of the dam is a compacted blend of sand, gravel and glacial till. Upstream and downstream sides of the dam are crushed rock covered by large quarry rocks. The massive weight of the rock holds the core firmly in place. Two tunnels channel the river around and under the dam. A 9-foot-wide tunnel passes normal flows. A 23-foot-wide tunnel is used during periods of high flows and during floods. The dam has a spillway near the right bank of the White River that will allow excess floodwaters to be released. This will prevent water from reaching the top of the dam, which could possibly damage or destroy it. These pictures below show the White River at normal elevation and the most recent flood event in Novemebr 2006.

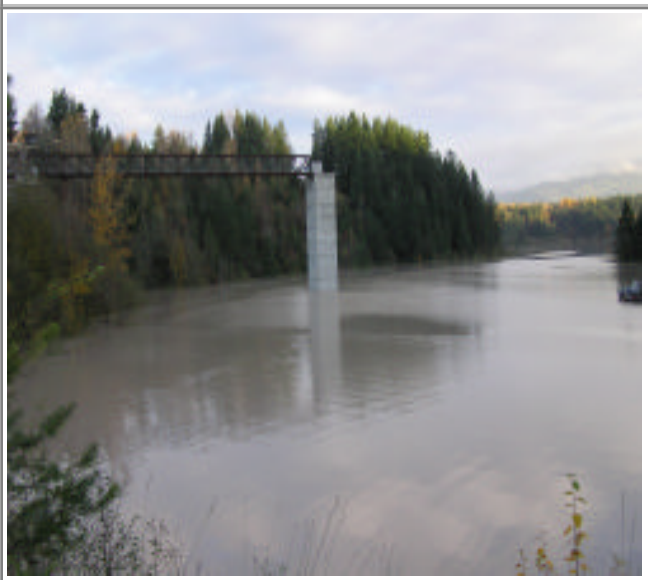
These pictures below show the White River at normal elevation and the most recent flood event in Novemebr 2006.

View from the Vista Deck during normal pool (Sep 2003)

View from the Vista Deck during high pool (Nov 2006)



View from Dam during normal pool (Sep 2003)



View from Dam during high pool (Nov 2006)

Historical Pictures

In 1933, this area saw a flood event. This was prior to the dam being built.

1933 Flood Pic1 1933 Flood Pic2

1933 Flood Pic3 1933 Flood Pic4

1933 Flood Pic5 1933 Flood Pic6

1933 Flood Pic7 1933 Flood Pic8

1933 Flood Pic9 1933 Flood Pic10

1933 Flood Pic11 1933 Flood Pic12

1933 Flood Pic13 1933 Flood Pic14

1933 Flood Pic15 1933 Flood Pic16

1933 Flood Pic17

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Project Information

- Length of Dam Crest: 810 ft (247 m)
- Dam Width at Base: 1,600 ft (488 m)
- Dam Height: 432 ft (132 m)
-

Dam Elevation at Crest: 1257 ft msl (383 m)
- Spillway Length: 1,200 ft (366 m)
- Spillway Width at Crest: 315 ft (96 m)
- Total Outlet Capacity: 17,600 cfs (499 cu m/s)
- Reservoir Drainage Area: 402 sq mi (1287 sq km)
- Reservoir Length: 5.5 mi (9 km)
- Reservoir Storage Capacity: 106,000 acre-feet (130 million cubic meters)

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Improving Dam Safety

Over time, varying pool elevations have caused water to seep through the dam. This seepage carried off some of the fine material from the core, creating a void which weakened the dam. In 1986, under the Dam Safety Assurance Program, construction began on a concrete cutoff wall extending through the core of the dam and 15 feet into bedrock. This 42-inch-thick wall is made up of 67 vertical panels. It spans 808 feet from the left bank of the dam into the spillway near the right bank. The deepest panel is 402.5 feet, a world record at the time of construction. After the cutoff wall was completed in 1990, construction began on the new intake works. The new 365-foot high intake tower includes a trash rack to keep debris out of the tunnels, a combination elevator shaft and stair tower, and a vent shaft. A pedestrian bridge leads from the right bank to the top of the vent shaft, which houses an extra hydraulic unit. This allows us to continue operating the dam even if a catastrophic flood were to overtop the spillway and flood the mechanical and electrical rooms. At the same time, the penstocks (large pipes) and control valves were removed from the 23-foot-wide tunnel. The river is now regulated with radial gates that have been installed in the gate chamber of the new intake works. Dam operators control these gates from a remote computer in our project operations office. They can also control the gates from the mechanical room of the intake structure. Improvements associated with the Dam Safety Assurance Program were completed in September of 1995 at a cost of $71 million. As a result, the dam has a greatly improved resistance to earthquakes and floods, ensuring continued protection from the devastating effects of floods.

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Intake Works Improvements

Click here for more information about the Intake Works Improvements.

The "new" Mud Mountain Dam intake works, completed in 1995, consist of a single intake tower, replacing the structures originally built with the dam in the 1940s, and two new tunnels, which are connected within the dam to the original tunnels. The entrances to both new tunnels are located in the new intake tower. Also, as part of the tower contract, a new outlet structure was constructed at the end, or outlet, of the original tunnel alignment. These features are currently used to control project discharges, and have done so since the 1995 flood season. This work was done as part of an overall Dam Safety Assurance Program at Mud Mountain Dam, which also included a concrete diaphragm (cutoff) wall installed along the axis of the original dam embankment in 1990.

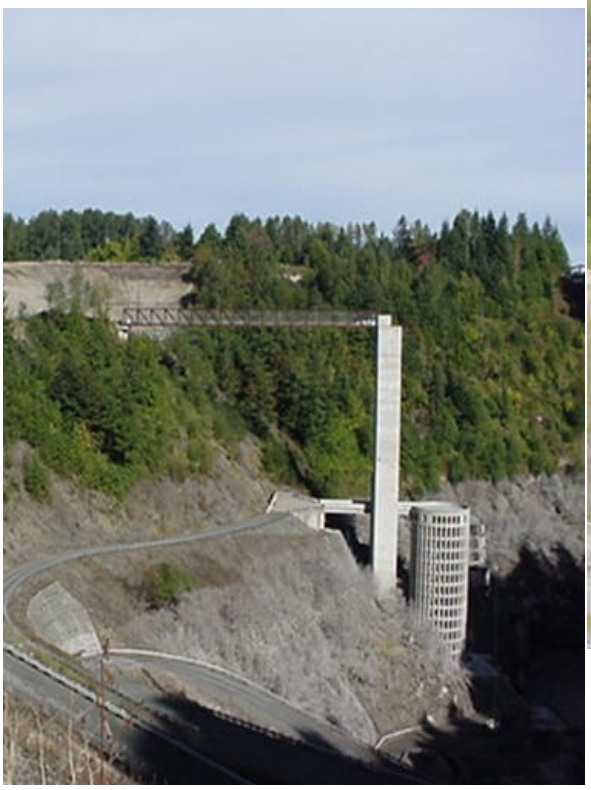
Within weeks of initial service of the new intake works two floods of record occurred,

one in November 1995 and another in February 1996 (See Below). These floods not only tested and proved the effectiveness and safety of the new intake works, they also revealed some improvements that could be made. These improvements are also the result of "lessons learned" from nearly 8 years of operating the project for flood control since the new intake works were completed. Some necessary repairs have also been identified. Some of the work on improvements and repairs has been completed, while other improvement work is currently underway at Mud Mountain Dam or planned for the future. In the photo, the new intake tower trashrack (lower right) can be seen, and on the left, the higher vent shaft with pedestrian bridge leading from right embankment. The old intake structures for the 9-foot and 23-foot diameter tunnels are below the new one, obscured by the shadow in this photo. Some of the more visible future work at the dam will be demolition of both of the old intake structures.

Among completed work is the bank excavation, visible just below the horizon on the left in the photo. About 200,000 cubic yards of material was removed to stabilize this slope, which removes a potential earthquake slide hazard to dam operation. Less visible at the project is the effort to line portions of the concrete tunnels and surfaces of the trashrack with steel plate to protect them against excessive erosion from the bed load (river bed rock, gravel, silt and other debris) that moves through the dam. It's an unusual item of interest that Mud Mountain Dam reservoir is normally almost empty and all river bed load moves through the tunnels, making for a very difficult engineering problem.

Floods during winter 1995/1996
In the winter of 1995/1996 flows in the White River exceeded 29,700 cubic feet per second, surpassing the record flood of 1933. Mud Mountain Dam is credited with preventing over $146,060,000 in flood damage.

The 365 Foot Intake Structure



The Log Bronc and debris barge at work during High Pool

LogBronc at Work.jpg

The Rising Pool Looking Upstream

Fish

We help migrating fish (coho, chinook and pink salmon and steelhead) return to their natural spawning grounds by collecting them in a trapping facility near Buckley, WA. We then haul the fish upstream of the dam in a specially-equipped tanker truck and release them back into the White River. After the fingerlings hatch, they pass through the tunnels of the dam heading for Puget Sound. Removal of the penstocks and control valves from the intake works and installation of the new radial gates significantly improve their chances of survival. Click on the links below to view spreadsheets of our fish counts.

Note the Pink Salmon returns every other odd year. In 2003 we had 13,190 pinks, in 2005 we had 33,337 pinks and in 2007, to date, we had 127,541pinks!!

From sunrise to sunset, the crews at Mud Mountain Dam are hauling fish. And hauling fish. And hauling fish. And hauling fish. Thousands of pink salmon, also known as "humpies", are making their way from their ocean voyage up the White River. To circumvent Mud Mountain Dam and get to the final spawning grounds, the Corps corrals the fish in a special diversion facility and hauls them in special oxygenated trucks to the other side of the dam. They had made more than 470 trips in the month of September and transported more than 120,000 pink salmon. They made 644 trips the entire calendar year thus far. That does not include the coho, chinook or steelhead they are also moving. In total there is nearly 140,000 fish that have been moved since early August. Pink salmon are new pioneers to the White River, meaning that historically the species has not inhabited this body of water. But in and around the Puget Sound, they have been long-time residents. Corps

fish biologist say there's no good evidence why the pinks are converging at this spot, but everyone is working to get the job done. The Muckleshoot and Puyallup Tribes partner with the Seattle District Corps of Engineers to count and move their hatchery fish. The hatchery is located across the White River from the Mud Mountain Fish Facility. When manual sorting can be accomplished, the Corps staff and the Tribes work together to get the fish where they belong. In early August the Tribes said they were able to fill their hatchery with the Chinook that had returned. Pink salmon are cyclic and in 2009 we could see even more. FLAGSHIP Seattle District September - October 2007

- **HowWe Trap and Haul Fish**

For related information and resources:

- US Fish and Wildlife Service Home Page
- Washington State's Environmental and Natural Resources Home Page

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Recreation Opportunities

- **Cayuse Shelter**
- **Chinook Shelter**
- Kids by Wading Pool
- **International Festival**

While you're here, be sure to take in the panoramic view of the **White River Canyon** from our upper vista deck. At certain times of the year you can see **elk** herds in the valley. Many wild animals make their homes in this area, like:

- **Eagles**
- **Owls**
- **Beavers**

Trails for hiking and mountain biking! If you're ambitious, there's a nature trail which begins behind the upper vista deck and winds about a quarter mile down the canyon wall to the lower vista deck. From here you can view and photograph the dam. **Hikers** and mountain bikers will enjoy the 3.5-mile **Rim Trail,** which starts out in Mud Mountain Dam's day-use area. This is an excellent hike, with terrain that is gentle to slightly sloping. This trail offers spectacular views of the White River canyon and neighboring mountains. Hikers and bikers can also join horse riders on the River Trail. This 6.5-mile trail begins near the equestrian parking lot, about 2 miles north of the day-use area. You'll wander down through mature and transitional stands of forest on a trail that gradually opens into meadows along the banks of the **White River**. This trail offers unobstructed **scenic views**, abundant wildlife, and access to the White River. Find out more: **Washington Parks and Recreation. Watchable Wildlife Program**. Camping Information Please note that Mud Mountain Dam is a day use park and does not have overnight camping facilities. For nearby camping please visit **Go Camping in America or Washington Parks and Recreation.**

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Related Online Resources

US Army Corps of Engineers. We are part of the Seattle District of the US Army Corps of Engineers, located in Seattle, Washington. Visit the site for information on:

- Historic Preservation
- Jobs
- Upcoming Contract/Bid Openings
- Environmental Planning
- Weather Conditions
- Construction

The Seattle District is part of the Northwest Division of the US Army Corps of Engineers in Portland, Oregon. The US Army Corps of Engineers Headquarters is located in Washington, DC.

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2007 Pink Salmon run at at record high!

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