

## Arrowrock Dam: A Century of Service

[water rushing]

**KELSEY DONCASTER:** Arrowrock Dam, in my opinion, is Idaho's eighth wonder of the world.

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**NARRATOR:** Completed in 1915, Arrowrock Dam has provided a century of service to the American people. Included on the National Register of Historic Places in 1972, the engineering marvel stands as a testament to human ingenuity.

**KELSEY:** Arrowrock Dam was the tallest concrete dam in the world when built in 1915. Reclamation, through its dam-building program was able to harness a river and to use that power and water to transform the Treasure Valley into an agricultural paradise. Without Arrowrock Dam, we would not be where we are today.

**JERRY GREGG:** This October, 2015, Arrowrock will have provided very important benefits to the people in Treasure Valley for a hundred years. Without it a lot of the farmers were out of water by mid-June. And so Arrowrock provides the water to grow the crops from June to the first part of October.

**LORRI LEE:** So what Arrowrock brings is a steady flow of water throughout the year. It's just really essential for this community. It brings hydropower, clean generation of power, it brings flood control, it brings irrigation, and it brings recreation, which is a really important piece, especially for the Boise community. The river is the heart of Boise for many folks, and if you ever have a question about that, go down on a hot summer day and see how many inner tubes with folks on it are floating down the river.

**NARRATOR:** Located 22 miles east of Boise on the Boise River, Arrowrock Dam was constructed to supply consistent water to the Treasure Valley. It is the first of three storage facilities that serve the Boise Project, including Anderson Ranch Dam and the Deer Flat Dams.

**JERRY:** And they provide water to over 277,000 acres of irrigated land through the whole Treasure Valley, really from Boise all the way to the Snake River.

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**NARRATOR:** Like many Western towns, Boise got its start with gold.

**SEAN HESS:** People were starting to find gold in the Boise foothills, and that really added to the initial economic base of the city of Boise. But then, as time went on, people started to notice that irrigation could be one of the keys to opening up Boise to more development. So by 1864, they were really starting to develop some early irrigation canals coming off of the Boise River.

**NARRATOR:** Early private ventures attempted to build large-scale irrigation systems, but the project proved too massive. The newly formed U.S. Reclamation Service, now called the Bureau of Reclamation, stepped in to help.

**KELSEY:** So, many of the prominent engineers within Reclamation realized that there was great economic potential, not only for development in transforming the arid land, but also for growth in population and development in agriculture industry.

**JERRY:** By bringing irrigation to the area, it really prompted growth of the valley.

**SEAN:** It was a key achievement of the US Reclamation Service at an early part of its history. This was a brand new agency just in its infancy, and it had the audacity to go out and build the world's tallest dam in the middle of nowhere.

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**KELSEY:** Arrowrock Dam is a very unique concrete, gravity-arch structure that was built from 1911 to 1915.

**LORRI:** This is really an engineering marvel. When it was finished in 1915, it was the tallest dam in the world, and it also allowed engineers and construction professionals to try out techniques that were later then perfected and used at Owyhee and facilities like Hoover Dam.

**SEAN:** Arrowrock Dam is kind of the grandfather for a lot of these other dam designs.

**NARRATOR:** Arrowrock Dam was built at a pivotal point in engineering history. Construction power was moving from man to machine, and Reclamation engineers devised cutting-edge technologies to build the world's tallest dam. Construction began with a relatively new method for dewatering the damsite.

**SEAN:** They dug a tunnel around the dam site so that they could reroute the river into the tunnel and have it flow past where they were going to put the dam. That's exactly the same technique that they used to Hoover and many of our later dams.

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**KELSEY:** Reclamation knew when it designed Arrowrock Dam, it needed to have a power source, and because this was a modern dam, this was built with electricity.

**SEAN:** Prior to building Arrowrock, they built the Boise powerhouse at the Boise Diversion Dam. They then utilized that electrical power, running up a long transmission line to the Arrowrock Dam

site. And it was that electrical power that was utilized for the electrical motors that were powering the really big pieces of equipment.

**KELSEY:** Electricity was needed for powering the drills to be able to blast down to bedrock, and especially for things such as the Crowe cableway system. That had never been used before.

**NARRATOR:** Reclamation Engineer, Frank Crowe, invented a Concrete Cableway Delivery System specifically for the construction of Arrowrock Dam.

**KELSEY:** Because of Arrowrock's height and the narrow canyon that it was situated in, they had to devise a system to deliver the over 600,000 cubic yards of concrete to build this dam.

**SEAN:** A cableway enables you to move elevated loads a long distance, be able to get them to another spot and then purposefully control how you dump. Crowe went on to utilize cableways at Hoover, at Shasta. Cableways became part of the Reclamation construction process.

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**NARRATOR:** Though Arrowrock was built with electricity, the dam was designed to be controlled manually to ensure safety and continuity of operations. Ensign valves were installed to pass water through the dam.

**ERNIE:** The Ensign valves were a very ingenious design. They were actually designed by Ensign, who was a mechanical-electrical engineer over a hundred years ago. They were operated by water pressure. So they are actually a very effective valve. There are no mechanical gears or anything like that operating them.

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**KELSEY:** It's the only dam built by Reclamation with 25 outlets in it. Arrowrock has 25 because, when the engineers looked at designing the dam, they would have to increase its spillway greatly in size. This spillway would not be feasible. They thought they could save money, and they did, by increasing the number of outlets to release water through the dam instead of over the spillway.

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**KELSEY:** Concrete was a somewhat newer technology, and Reclamation was one of the leaders in concrete production.

**NARRATOR:** Reclamation experimented with concrete formulas for the dam. With Arrowrock located in a remote area, materials were difficult to transport.

**KELSEY:** Even though this was 22 miles from Boise, the only way to get there was by wagon road. They devised a way that they could actually use the pulverized granite out of the spillway and mix it with Portland cement to make a sand-concrete mixture. That saved them \$250,000 in 1911. That would be equivalent to probably about \$8 million today.

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**NARRATOR:** Reclamation devised other creative solutions for their remote project such as building the first ever government–owned common carrier railroad. The 17 mile track transported much needed materials to the damsite.

**SEAN:** The main purpose of the train route going out was to deliver the bulky supplies that were needed for construction of the dam. But at the same time, there was also a passenger service that people could take.

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**NARRATOR:** Despite its remote location, Arrowrock was quite the tourist attraction.

**KELSEY:** Over 89,000 people were delivered via the train to see the development of Arrowrock Dam. If you think about that, that is four times the population of Boise at that time. They knew it when they built it. It was going to be the tallest. This was a big deal.

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**KELSEY:** Not only did they have to build a dam and the railroad to get to it, they built a town for over a thousand men. Reclamation wanted to make sure that this was a pleasing, and safe environment for its workers who could focus on the dam.

**NARRATOR:** At its peak, about 1,400 people lived in the camp, including 200 families, in bunkhouses, dormitories, and cottages.

**SEAN:** It was kind of a communal living situation in most cases, although for some of the people who were with the Bureau of Reclamation, they actually lived out there on site 24/7 along with their families.

**KELSEY:** Even though it contained 8 bunkhouses for men, it was very much a family oriented town. People had gardens, they had flowers. You know, it was a semi-permanent town. It was there for four years.

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**NARRATOR:** Arrowrock City included construction infrastructure such as a cement plant and workshops as well as amenities for the population.

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**NARRATOR:** The self-sufficient town included a post office, hospital, butcher shop, bakery, general store, and even a YMCA. It also had a sewer system, indoor plumbing, a fire-suppression system, and steam heat.

**KELSEY:** These were things that you did not get normally in the arid West unless you were in a large city.

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**KELSEY:** Arrowrock Dam was built with American labor. This was seen as a steady job at a time when jobs were not always steady, provided adequate housing, a day off a week, six days of work, three square meals a day. While the men went to the mess hall, where they could serve 600 men at a time, the engineers and office staff had their own private mess hall.

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**NARRATOR:** Arrowrock Supervisory Engineer, Frank Weymouth, recruited some great minds from his Alma Mater back east. Frank Crowe, Frank Banks, and Charles “Boss” Paul worked alongside Weymouth to build the world’s tallest dam. These four engineers went on to be a core part of the Bureau of Reclamation and helped build the west.

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**NARRATION:** A few changes have been made over the years. The dam was re-surfaced and raised 5 feet in the 1930s. Clamshell Gates replaced the lower ensign vales in 2004. And 95 years after initial construction, a powerplant was added by the Boise Project Board of Control, who operates and maintains the plant.

**JERRY:** So the Boise Board of Control obtained a authorization from the federal government to build a private powerplant on a federal facility.

**RICK MARTIN:** The power plant was built almost 100 years after the original dam was put in place. It produces 81,000 megawatt hours of production per year and produces enough power for about 20,000 households per year.

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**SEAN:** This dam was like a template for so many of our later dams. It was a training ground for the leadership of the US Reclamation Service that carried us throughout the rest of the heyday of dam construction.

**KELSEY:** This was a massive undertaking through engineering to develop the Treasure Valley into what it is today.

**LORRI:** Arrowrock has served this community faithfully for 100 years and expected to serve well into the future.

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