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Written Testimony
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Thank you for this opportunity to testify. The United Power Trades Organization represents the Trades and Crafts non-supervisory employees at U.S. Army Corp of Engineers hydroelectric projects in Washington, Oregon, Idaho and Montana. These hydroelectric projects make up a portion of the Northwest Division of the U.S. Army Corps of Engineers and are divided up into the Portland, Seattle and Walla Walla Districts. The Walla Walla District includes four hydroelectric projects on the lower Snake River that seem to be the target of most dam removal proponents.

The Northwest Division of the U.S. Army Corps of Engineers is a major employer and a huge contributor to the economy of the Pacific Northwest with an annual budget of over $3 billion and a professional workforce of nearly 4,800. The members of the United Power Trades Organization include the men and women who maintain and operate the equipment at the hydroelectric projects and number over 600. But this number doesn't include the engineers, administrators, biologists, park rangers and the hundreds of others whose jobs are directly connected to the dams, associated lands and reservoirs. Nor does it include the many private companies who by contract, also rely on the existence and operation of the dams for their employment.

High technology firms such as Apple, Amazon, Intel, Google and Facebook have located facilities in the Northwest because of the availability of reliable, clean hydropower, creating jobs and boosting local economies. Traditional energy-intensive industries, such as timber, paper, chemical, food processing, aluminum and manufacturing all representing hundreds of thousands of Northwest jobs, continue to rely on low-cost hydro to stay in business and prosper.

The dams of the Columbia-Snake River system are multipurpose in that they provide hydropower, flood control, navigation, irrigated agriculture and recreation. The benefits of the dams cannot be measured by megawatts alone but in the overall value they provide the region.

Hydropower is clean, renewable and plays a significant role in Pacific Northwest power production. Northwest residents and businesses enjoy lower power bills when compared to other regions of the United States which is directly attributable to hydropower. The dams of the Columbia-Snake River system alone produce enough power to meet the needs of more than 13 million homes with the surplus exported, providing additional economic importance to the Northwest. Only hydropower has the instantaneous capability to meet peak demands and provide power for heat when temperatures are frigid or sustain power for cooling on exceptionally hot days. Hydropower costs much less to produce than any other source such as nuclear, coal or natural gas and is pollution free, with zero emissions. The firm power alone provided by the dams of the Columbia-Snake River system keeps close to 30 metric tons of CO2 out of the air. This is similar to taking nearly 6 million cars off the road.

Hydropower is clean, carbon-free, renewable and reliable. Hydro supports wind and other renewables by providing the peaking power necessary to meet demand. Hydropower turbines are capable of converting 90 percent of available energy into electricity, which is more efficient than any other form of generation. Even the best fossil fuel power plant is only about 50 percent efficient. Wind has about 30 percent efficiency. After hydropower, 83 percent of the region's energy production is from fossil fuels coal or natural gas.

Considering the four Lower Snake River dams alone, it would take 2 nuclear, 3 coal-fired, or 6 gas-fired power plants to replace their annual power production. It would take 3 nuclear, 6 coal-fired, or 14 gas-fired power plants to provide the

peaking capacity of these four dams. It has been estimated that the cost to replace these dams with natural gas-fired generation would be $444 million to $501 million a year. It has also been estimated that it would cost $759 million to $837 million a year if these dams were replaced with a combination of wind, natural gas and energy efficiency. Electricity from the Northwest hydropower facilities typically cost three to ten times less (per megawatt hour) than nuclear, coal and natural gas. It is also cheaper than wind and solar. The cost to operate the Snake River dams is about 65 million dollars per year which is relatively inexpensive considering the return on this investment is over 200 million dollars annually.

Hydropower is not only measured by the total energy produced. It also stabilizes the transmission system and keeps it reliable. High-voltage transmission lines require a steady back and forth electric flow, and flexible hydro generation meets the changing conditions to ensure reliability.

Navigation is a major benefit of the Columbia-Snake River system of dams. They provide 365 miles of navigable water from Portland/Vancouver to Lewiston, Idaho. Barging is the lowest cost, most fuel efficient and least polluting transportation mode. Each year, barging keeps 700,000 trucks off the highways through the Columbia River Gorge. The facts speak for themselves. The Columbia -Snake River system is the number one wheat export gateway in the United States and the third largest grain export gateway in the world, with over ten million tons of wheat exported annually through Columbia River ports. It is the number one barley export gateway in the United States. It is number one in West Coast paper and paper products exports. It is number one in West Coast mineral bulk exports and number two in West Coast auto imports. Every year, more than 50 million tons of commercial cargo moves up and down the Columbia and Snake rivers between Astoria, Oregon and Lewiston, Idaho. The Snake River averages 3.5 million tons of cargo per year valued at an average of over 1.5 billion dollars.

Navigation through the Columbia-Snake River system provides a vital transportation link for the states of Idaho, Montana, Oregon and Washington. The economies of these four states rely on the trade and commerce that flows up and down the most important commercial waterway of the Northwest. Navigation is fuel efficient. A ton of commodity goods can move 524 miles by barge on one gallon of fuel, compared to 202 miles by rail and 59 miles by truck. The average

barge can transport 3500 tons of wheat which would require 35 jumbo rail cars or 134 trucks. The economic benefit of the Columbia-Snake River system cannot be doubted. A study by the Columbia River ports identified 40,000 port-related Northwest jobs. Firms that ship cargo via the Columbia River employ an additional 59,000 workers annually. Cruise ships carry 15,000 passengers a year on five to seven-day tours on the river, bringing an estimated $15 million to $20 million in revenue to local economies. A total volume of waterborne trade is expected to expand at an average annual rate of 1.7 percent per year through 2030.

Irrigated Agriculture is the economic powerhouse of the West. The net value of irrigated agriculture to all western states is over $60 billion. Net earned income from agricultural production in the three Northwest states exceeds $8 billion annually. Northwest states are the leading U.S. producers of apples, potatoes, raspberries, blackberries, asparagus, currants, hops, lentils, concord grapes, sweet cherries, spearmint and peppermint oil, pears, sweet corn, and frozen peas. All of these crops are grown on irrigated land. Northwest exports of irrigated agricultural products exceed $1.4 billion annually. Food processing in the Northwest adds another $6 billion in sales value just for fruit, vegetables and specialty products. Food processing is the largest manufacturing employment sector in the state of Idaho and the second largest in both Washington and Oregon. The net direct value to the economy of one-acre foot of water, when used for irrigation is over $60 per acre-foot. The Columbia Basin Project alone supplies about 2.6 million acre feet per year. It is the dams that provide the water for irrigation and as a direct result help sustain the economy of the Northwest.

Annual net earned income from agricultural production in the Northwest states exceeds $8 billion and Pacific Northwest food processing is the third-largest manufacturing sector, with annual revenues of $17 billion and more than 100,000 employees.

The Walla Walla District employs over 1100 people, with over 400 working at the hydroelectric projects McNary, Ice Harbor, Lower Monumental, Little Goose, Lower Granite and Dworshak. In addition to being a major employer, the District pumps millions of dollars into the local economies. The fiscal year 2017 budget for the District was $240 million with about 60 percent of this funding coming directly from the Bonneville Power Administration (BPA). The power produced by the District dams, like other projects in the Northwest, is sold by BPA who, in turn,

direct funds the operation and maintenance of the dams, plus provides additional funding for major work. This means that over $100 million annually is provided the area economy as a result of the power sales of these District hydroelectric projects.

Removal of the Snake River dams would be a detriment to a large amount of irrigated agriculture, would eliminate barging from Pasco to Lewiston, Idaho, and would damage the electrical infrastructure that relies on these generating units not only for power production, but for reactive support that helps to stabilize the electrical grid of the Northwest. While BPA markets power from 31 federal dams, only the 10 largest dams keep the federal power system operating reliably through Automatic Generation Control (AGC) which includes the four Lower Snake River projects. Under AGC, when total generation in the power system differs from the total load being consumed, automatic signals go to these few dams to increase or decrease generation. This is especially critical when generating facilities are suddenly added or dropped from the system. Removal of the dams would cost hundreds if not thousands of jobs. Jobs at the dams themselves would be lost, contracting jobs would be lost, farm jobs would be lost as a result of a large decrease in the amount of irrigated agricultural lands, and jobs related to the barging of commodities would be lost. The impact on the region would be devastating.

The fact is that science does not support the position that the lower Snake River dams need to be removed in order to aid in fish survival. Scientists using special acoustic tags planted in fish found that the survival rate of Idaho juvenile salmon reaching the ocean identical to migrating salmon that originate in the Yakima drainage in Washington. In other words, juvenile salmon passing through the four Snake River dams suffered no higher mortality rate than those that did not. Even more surprising is findings that show the survival rate of both Yakima and Clearwater fish was the same as survival measured in the Fraser River in British Columbia, a river with no dams. In addition, another finding from the research revealed that juvenile salmon transported by fish barges survived from Lower Granite Dam to the northern tip of Vancouver Island at five times the rate of fish that were not barged. This information strongly contradicts any claims by environmental groups that the removal of the dams is necessary for fish to survive and that barging juvenile salmon through the dams is ineffective.

It is time to eliminate dam removal from the discussion on the best way to support migrating fish. Studies have shown that adult fish have no problem passing through the dams at extremely high survival rates. Studies have also shown that the vast majority of juvenile fish migrating downstream are near the surface, so screens at the intakes of generators are positioned to direct them into bypass channels where they are collected for barge transport or bypassed back to the river. Weirs are in place on the spillways that allow for spilling water directly from the surface, thus providing another effective bypass for juvenile fish traveling downstream. It is the existence of these spillway weirs that make any additional spilling unnecessary and, in fact, can have an adverse effect on fish due to the increase in dissolved gases that result when spilling from bays that don't have the spillway weir. Fish passage plans are in place at each facility and overseen by federal and state biologists to assure that hydro plants are operated in criteria most advantageous to fish passage.

"The utter disappearance of the salmon fishery of the Columbia is only a question of a few years." That prediction was made by Hollister McQuire, Oregon Fish and Game Protector in '94. What makes this quote newsworthy is that it was made in 1894, long before the first dam was constructed on the Columbia-Snake River system. The decline of Columbia River salmon began in the 1800's and was originally attributed to two factors: over fishing and environmental degradation from such human activities as mining and logging. Millions of dollars have been spent during the last couple of decades studying the problem and millions more have been spent on making hydroelectric facilities as fish friendly as possible, even though studies have shown very little difference, if at all, between the decline of salmon runs on rivers with and without dams. Too much blame has been placed on the dams when it is obvious that no single factor caused the salmon decline.

And no single factor will solve the problem. Solutions must look at all factors impacting salmon decline, including dam operations, fish harvest levels, hatchery practices, degradation of habitat where salmon lay their eggs and the impact of ocean conditions. R. Hilborn from the University of Washington was quoted as saying "Any attempts to understand the impact of in-river action on survival will be confounded by changes in ocean conditions. The poor returns of Chinook salmon in the early 1990's are to a large extent almost certainly due to poor ocean survival, whether or not they encounter dams." My point here is that

increasing and maintaining fish runs is a multifaceted problem that requires solutions to many different factors. Since studies have shown that the survival rate of migrating fish is the same on rivers with dams as they are without, the focus should be on ocean conditions and their impact rather than dam removal which would provide no benefit.

The dams have been upgraded extensively at great cost and the improvements work. Dam operation now maximizes attraction water for adult fish and improves downstream migration due to flow augmentation that also serves to cool the reservoirs during low water months. Rotating screens at the turbine intakes direct fish to bypass channels where they are collected for barging or bypassed back to the river. And spillway weirs are strategically placed to provide a gentle “slide” for juvenile fish to travel downstream unharmed. Since removal of the dams would provide no benefit to fish survival, it makes absolutely no sense to continue studying or considering a non-solution.

The residents of the Northwest have made their opinion clear. The results of a poll administered in 2015 shows that three-quarters of the people recognize that hydropower generated by the Northwest dams is a renewable energy source. Forty-five percent agree hydropower is the region’s most practical source for meeting energy needs, with wind trailing at 17% and solar at 9%. Two thirds favor hydropower being declared a renewable resource by state legislatures and Congress, similar to wind and solar energy. A large and increasing majority (70%) agree that the dams on the Lower Snake River are critical to the Northwest’s energy picture and 77% agree that it is critical that dams and salmon co-exist.

As president and spokesman for the United Power Trades Organization, I can say our organization overwhelmingly supports hydropower and the dams of the Lower Snake River. But I am not only just dam employee representative. I am a Senior Power Plant Operator and have been working at one of the Lower Snake River Dams, Lower Monumental, since 1986. As a power plant operator, I run the turbine generator units, the spill gates, plus the adult and juvenile fish passage equipment.

As a power plant operator for over 30 years, I have personally seen all of the improvements made at our facility to increase fish survival and been the recipient of instructions to operate the dam in accordance with the fish passage plan or

Biological Opinion (BiOp). Unlike most outside interests, I actually understand how the new technologies installed have benefitted fish passage and how the BiOp works to maximize fish survival. Almost every operation performed requires adherence to the fish passage plan, including which generating units to run, at what power load they are operated at, what spill pattern to use and how much spill to release through those spill gates.

It is troublesome to those of us that know what works to receive operating instructions that are not beneficial to fish and may even be detrimental. For example, it is a scientific fact that migrating juvenile fish travel close to the surface of the river. That is why the fish slides installed are so successful in providing a means that allow the fish a gentler transition from the pool at the top of the dam to that below. Rotating screens are installed in the intakes of all of the turbine generators that direct the fish into a collection channel where ultimately they can be loaded onto barges for transport or bypassed back to the river far below the dam. However, because of pressure from outside interests, additional spill is ordered that requires spill through spill gates that don't have the fish slides installed. This forces the fish down through restricted openings at the bottom of the spill gates which is not only harmful to fish in the transition but causes significant increases in supersaturation of nitrogen in the water resulting in gas bubble trauma.

In addition, when fish are transitioned via spill, less are collected at each dam's fish facility for transport via the barge transport program which has proved highly successful. Fish transported by barge survive at five times the rate as those that traverse the river. Additional water spilled not only is detrimental to the fish because of the non-fish slide transition but this results in less water available for generation, less generating units running and less fish collected for transport via fish barge. Spilled fish are also more susceptible to predatory birds and fish that congregate below the spillway areas. More spill does not make sense economically in that generating revenues are lost, it doesn't help the fish, and may even have a negative effect on fish survival.

The BiOp is working despite faulty non-scientific reports given by outside interests. The radical changes proposed make absolutely no sense. Fish returns are higher than what they were prior to the first dam built on the Columbia-Snake river system and although hatchery fish are returning in large numbers, natural

fish return is increasing as well. Fish survival through the Columbia-Snake River dams are at levels that meet or exceed those on rivers that don't have dams.

The current BiOp is the most science-based, comprehensive and expensive effort to restore and endangered species in the nation. $1.6 billion have been invested in new technologies and the eight federal dams on the Columbia-Snake system and operational changes are helping young salmon survive at very high rates and helping adult fish return to their spawning grounds. This unprecedented and massive program has also restored more than 10,000 acres of habitat in the Columbia Basin that has been providing incredible results.

Despite the plan's demonstrated success, environmental and commercial fishing groups continue to challenge the plan in court, as they have done for over two decades. These groups thrive on lawsuits and they will continue to sue, no matter what the facts say. They continue to press for extreme changes in dam operations, including requiring more spill which would increase Northwest energy costs and provide no additional benefit to fish.

Recent misinformation provided by outside interests blame the dams for excessive water temperatures on the Snake River and claim the dams must be removed to restore acceptable conditions. In fact, the opposite is true. Snake River water temperature data from 1952-1957 shows the average high water temperature to be over 74 degrees. High water temperature is actually better controlled by reservoir regulation and supplemental discharge of cooler water upstream.

It is true that record high temperatures in 2015 created a thermal barrier at the Lower Granite Dam fish ladder that impeded adult fish migration. This problem was fixed in 2016 with an "intake chimney" that provided cool water to the adult fish ladder.

It has been proven that the dams and fish can co-exist. Historical data shows fish counts for all species has increased dramatically since counts on the Snake River began in 1975. For example, the 1975 fish count showed a total of 209 Sockeye passing through Lower Granite Dam in 1975. In 2014, that count was 3,219. In 1975 28,460 Chinook passed through Lower Granite. The count was

195,167 in 2014. In 1975 17,311 Steelhead were counted passing through Lower Granite Dam. The count was 164,106 in 2014.

Yes, the last couple of years has shown a decline in returning fish. However, due to ocean conditions, there have been declines in numbers of fish everywhere on the pacific coast including Alaska. A warming trend in the pacific has been the culprit and can't be blamed on the dams. Recent data shows that warming trend may be reversing so runs will again return to historic numbers as ocean conditions improve.

Thank you again for this opportunity to testify before the committee.

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