



## Lower Snake River Juvenile Salmon Migration Feasibility Study

### Power System Analysis

*The U.S. Army Corps of Engineers (Corps) is conducting a feasibility study of ways to improve juvenile salmon migration through the hydropower system on the lower Snake River. The study focuses on how the lower Snake River dams can be changed to improve survival and recovery prospects for Snake River salmon stocks listed under the Endangered Species Act.*

*Three major pathways are being evaluated for the four lower Snake River dams: maintain the existing system with planned improvements; make major system improvements to bypass facilities; and natural river drawdown, commonly referred to as dam breaching. The Corps is preparing a draft Feasibility Report/Environmental Impact Statement (FR/EIS) for release for public review in Fall 1999.*

*The Drawdown Regional Economic Workgroup (DREW) was established to develop a comprehensive social and economic analysis (which includes recreation and tourism) for this feasibility study. The DREW includes economists from Federal agencies, the Northwest Power Planning Council, states, tribes, contractors, and other regional stakeholders. Although the Corps acquired this document as part of its EIS process, the opinions and/or findings expressed in the report do not necessarily reflect the official policy or position of the Corps.*

#### **Power System Analysis:**

The Hydropower Impact Team (HIT), a DREW subgroup, has completed their technical report on the economic effects associated with changes in hydropower production at the four lower Snake River dams under the different pathways described

in the *Lower Snake River Juvenile Salmon Migration Feasibility Report and Environmental Impact Statement.*

This preliminary draft report will become the basis of a chapter on hydropower

impacts of the Economic Appendix of the *Lower Snake River Juvenile Salmon Migration Feasibility Report and Environmental Impact Statement*. It is important to note that this analysis is still preliminary data, and is subject to review and revision, based on comments received as part of the reviews of the DREW team and the Independent Economic Analysis Board (IEAB).

Hydropower is an authorized project purpose at each of the four dams. The hydropower produced at the Corps of Engineers' dams is sold by Bonneville Power Administration (BPA). The table below shows the combined capacity and energy of the 24 power generating units (six per dam), and their share of BPA and the regional power system.

Capacity is in megawatts (MW- [megawatts]). Energy is in average megawatts (aMW)				
	Maximum Generating Capacity		Energy (Average Water Year)	
	MW	% of Total	aMW	% of Total
Lower Snake Dams	3,483		1,231	
Total Federal System	23,824	15%	11,136	11%
Total Regional System	47,859	7%	24,479	5%

The analysis of economic effects is conducted using results from three different power system models, with a range of high-medium-low forecasts of future economic conditions and three different interest rates. This fact sheet presents only the medium forecast, at 6-7/8% interest rate. The purpose of the analysis is to identify costs associated with meeting the demand for electricity in the Pacific Northwest (PNW) and the Pacific Southwest (PSW) with different levels of hydropower output with the different alternatives. For example, if the four Snake River dams are breached, 1,231 aMW of hydropower would be lost on an average annual basis. To meet the demand for electricity on the West Coast, the lost hydropower would need to be replaced by

increasing the operation of existing thermal powerplants and building additional natural gas fired combined-cycle combustion turbine plants. The added cost to operate and build more costly thermal plants represents the majority of the economic effects. The loss of hydropower generation at the four Snake River dams would also have an effect on BPA's ability to transmit electricity throughout the PNW and PSW. Costs associated with improving the transmission system to maintain reliability are also identified in the analysis. Of the three pathways examined, the dam breaching alternative has the major hydropower impacts. The plans that maintain the existing dams and improve fish bypass facilities have minor benefits

(reduced economic costs) of about \$7 to \$10 million annually. The total hydropower costs with the dam breaching alternative (as compared to the base condition) are estimated at \$251 to \$291 million under the medium forecast scenario, and consist of the following elements:

- Increased costs to replace lost hydropower - \$221 to \$255 million annually.
- Costs to reinforce the transmission system and ensure system reliability - \$22 to \$28 million per year.

- Lost in ancillary benefits - \$8 million yearly.

These economic costs to the power system would likely be passed on to the consumers of electricity. However, because of several uncertainties, the analysis is unable to predict exactly who would pay for these costs. As such, the analysis examines a wide range of possible scenarios on rate impacts, depending on how dam removal costs are assigned to hydropower and PNW ratepayers. The possible rate impacts are shown in the following table:

<b>Estimated Effects on Northwest Electricity Bills of Breaching the Four Lower Snake River Dams</b>				
<i>Based on a variety of assumptions, the table shows the estimated change in the average monthly bill for residential, commercial and industrial customers assuming the lower Snake River dams are breached</i>				
	<b>Residential</b>	<b>Commercial</b>	<b>Industrial (Non-DSI)</b>	<b>DSI-Industrial</b>
<b>Monthly consumption</b>				
Average monthly energy consumption by customer class in kilowatt-hours	1,115	6,200	281,000	161,000,000
<b>Change in customer bills</b>				
Estimated change in average monthly bill by customer class in dollars	\$1.50 - \$5.30	\$9 - \$29	\$387 - \$1,326	\$222,000 - \$758,000

In summary, the hydropower analysis identifies economic costs associated with changes in hydropower production from the four lower Snake River dams with each pathway. The major system improvement

pathway would slightly increase the system hydropower generation, and would result in estimated benefits of \$7 to \$10 million annually. The dam breaching alternative (natural river drawdown pathway) would result in economic costs of \$251 to \$291

million annually.

To get more detailed information on the [power system analysis](#) see the Walla Walla District home page, [www.nww.usace.army.mil](http://www.nww.usace.army.mil).

For additional information, contact the DREW chair, Dennis Wagner, at the Corps' Northwestern Division Office (503-808-3854).