

✓Columbia River Water Management Summary

Key Legislative Authority:

- Reclamation Act (1902).
- Federal Power Act-Commission (1920).
- Bonneville Project Act and Amendments (1937).
- Separate Hydropower Project Authorization (power, navigation, irrigation, recreation, flood control).
- Canadian Treaty and Protocols (1964).
- Federal Columbia River Transmission System Act (1974).
- Northwest Power Planning and Conservation Act (1980).
- Endangered Species Act Application to Columbia River System (1992).

Key Agencies:

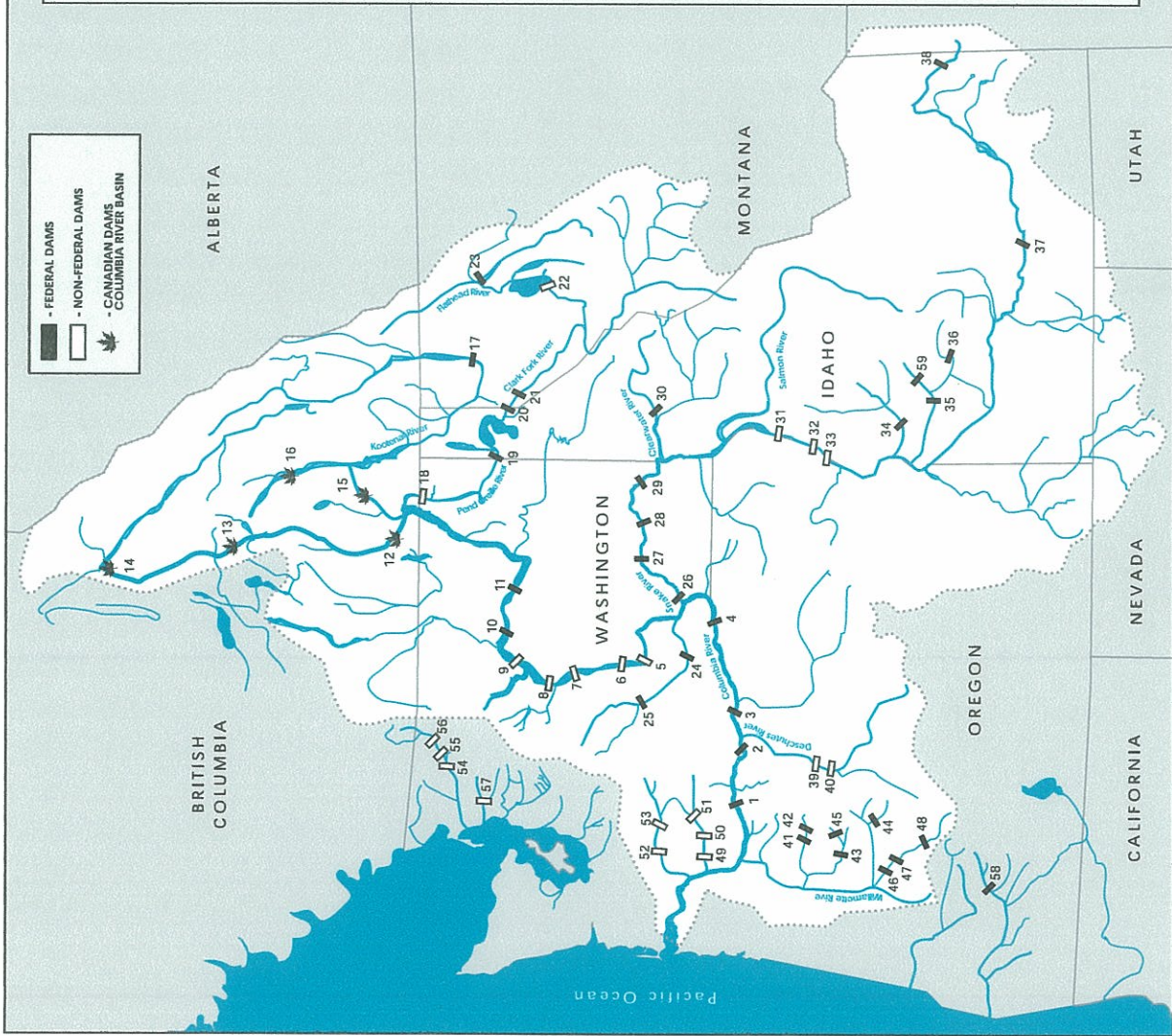
- Bonneville Power Administration.
- U.S. Army Corps of Engineers.
- U.S. Bureau of Reclamation.
- Private/Public Utilities with Hydro Projects.
- NOAA Fisheries (NMFS PNW Region).
- Federal Energy Regulatory Commission (Private/Public Utility Projects).
- Northwest Power and Conservation Planning Council (WA, OR, ID, MT).
- Northwest Columbia River Tribes.
- U.S. Dist. Of Oregon Judge James Redden (2004-2008 Litigation).

Implementation Policies/Provisions:

- The Council's Columbia River Basin Fish and Wildlife Program.
- NOAA Fisheries Hydro System Biological Opinion (BiOp).
- Federal Agency Water Management and BiOp Implementation Plans (annual review by Implementation/Technical Management Teams).
- Judge Redden's Operation Orders.

Major Northwest Dams

The dams on this map generally represent the largest projects and those that have a significant role in river system management. A complete list of projects in the basin can be found in Appendix A. Acronyms and abbreviations are defined on page 76.



| | | |
|--|---|--|
| 1. BONNEVILLE Columbia River, USACE | 21. NOXON RAPIDS Clark Fork River, WWP | 41. BIG CLIFF N. Santiam River, USACE |
| 2. THE DALLES Columbia River, USACE | 22. KERR Flahhead River, MPC | 42. DETROIT N. Santiam River, USACE |
| 3. JOHN DAY Columbia River, USACE | 23. HUNGRY HORSE Flahhead River, USBR | 43. FOSTER S. Santiam River, USACE |
| 4. MGMARY Columbia River, USACE | 24. CHANDLER Yakima River, USBR | 44. COUGAR McKenzie River, USACE |
| 5. PRIEST RAPIDS Columbia River, Grant Co, PUD | 25. ROZA Yakima River, USBR | 45. GREEN PETER M. Santiam River, USACE |
| 6. WANAPUM Columbia River, Grant Co, PUD | 26. ICE HARBOR Snake River, USACE | 46. DEXTER Willamette River, USACE |
| 7. ROCK ISLAND Columbia River, Chelan Co, PUD | 27. LOWER MONUMENTAL Snake River, USACE | 47. LOOKOUT POINT Willamette River, USACE |
| 8. ROCKY BEACH Columbia River, Chelan Co, PUD | 28. LITTLE GOOSE Snake River, USACE | 48. HILLS CREEK Willamette River, USACE |
| 9. WELLS Columbia River, Douglas Co, PUD | 29. LOWER GRANITE Snake River, USACE | 49. MERWIN Lewis River, PP&L |
| 10. CHIEF JOSEPH Columbia River, USACE | 30. DWORSHAK N.F. Clearwater River, USACE | 50. YALE Lewis River, PP&L |
| 11. GRAND COULEE Columbia River, USBR | 31. HELLS CANYON Snake River, IP | 51. SWIFT Lewis River, PP&L |
| 12. KEENLEYSIDE Columbia River, BC Hydro | 32. OSBOW Snake River, IP | 52. MAYFIELD Cowlitz River, TCL |
| 13. REVELSTOKE Columbia River, BC Hydro | 33. BROWNLEE Snake River, IP | 53. MOSSY ROCK Cowlitz River, TCL |
| 14. MICA Columbia River, BC Hydro | 34. BLACK CANYON Payette River, USBR | 54. GORGE Skagit River, SCL |
| 15. CORRA LINN Kootenay River, W. Kootenay | 35. BOISE RIVER DIVERSION Boise River, USBR | 55. DIABLO Skagit River, SCL |
| 16. DUNCAN Dumcan River, BC Hydro | 36. ANDERSON RANCH Boise River, USBR | 56. ROSS Skagit River, SCL |
| 17. LIBBY Kootenai River, USACE | 37. MINIDOKA Snake River, USBR | 57. GULMBACK Sultan River, Snohomish Co, PUD |
| 18. BOUNDARY Pend Oreille River, SCL | 38. PALSADES Snake River, USBR | 58. LOST CREEK Rogue River, USACE |
| 19. ALBENI FALLS Pend Oreille River, USACE | 39. PELTON Deschutes River, PGE | 59. LUCKY PEAK Boise River, USACE |
| 20. CABINET GORGE Clark Fork River, WWP | 40. ROUND BUTTE Deschutes River, PGE | 60. GREEN SPRINGS Emigrant Creek, USBR |

Upper Willamette Chinook and Steelhead

Ensure that voluntary spill will not result in unsafe TDG levels for juveniles rearing in shallow water areas.

1.1 Federal Columbia River Power System (FCRPS)

For purposes of this consultation, the Federal Columbia River Power System is defined as the operation and maintenance of 14 Federal projects as shown in Table 2. Various Congressional and Secretarial authorizations provide authority for the Corps of Engineers (Corps) and Bureau of Reclamation (Reclamation) to construct, operate, and maintain various water development facilities for multiple purposes, including flood control, irrigation, hydropower generation, navigation, recreation, fish and wildlife, water quality, and municipal and industrial water and other purposes. Similar authorizations provide authority for the Bonneville Power Administration (BPA) to market and distribute power generated by these projects. The Action Agencies continue to authorize, fund, and carryout the operation and maintenance of these projects.

Table 2. General Project Characteristics¹

| Project | Operator | Location | Year Completed | Type | Original Primary Authorized Purposes |
|------------------|-------------|---|----------------|---------------------------|--------------------------------------|
| Libby | Corps | Kootenai near Libby, Montana | 1973 | Storage | Flood control, power |
| Hungry Horse | Reclamation | South Fork for the Flathead, near Hungry Horse, Montana | 1953 | Storage | Flood control, power, irrigation |
| Albeni Falls | Corps | Pend Oreille, near Newport, Washington | 1955 | Storage | Flood control, power, navigation |
| Grand Coulee | Reclamation | Columbia, at Grand Coulee, Washington | 1942 | Storage | Flood control, power, irrigation |
| Chief Joseph | Corps | Mid-Columbia, near Bridgeport, Washington | 1961 | Run-of-river | Power |
| Dworshak | Corps | North Fork of the Clearwater, near Orofino, Idaho | 1973 | Storage | Flood control, power, navigation |
| Lower Granite | Corps | Lower Snake, near Almota, Washington | 1975 | Run-of-river | Power, navigation |
| Little Goose | Corps | Lower Snake, near Starbuck, Washington | 1970 | Run-of-river | Power, navigation |
| Lower Monumental | Corps | Lower Snake, near Kahlotus, Washington | 1970 | Run-of-river | Power, navigation |
| Ice Harbor | Corps | Lower Snake, near Pasco, Washington | 1962 | Run-of-river | Power, navigation |
| McNary | Corps | Lower Columbia, near Umatilla, Oregon | 1957 | Run-of-river | Power, navigation |
| John Day | Corps | Lower Columbia, near Rufus, Oregon | 1971 | Run-of-river ² | Flood control, power, navigation |

¹ Source: Table 3-1 from BPA *et al.* 1995.

² John Day has allocated flood control storage but is operated in a manner that is similar to other mainstem dams that are run-of-river projects.

| Project | Operator | Location | Year Completed | Type | Original Primary Authorized Purposes |
|------------|----------|---------------------------------------|----------------|--------------|--------------------------------------|
| The Dalles | Corps | Lower Columbia, at The Dalles, Oregon | 1960 | Run-of-river | Power, navigation |
| Bonneville | Corps | Lower Columbia, at Bonneville, Oregon | 1938 | Run-of-river | Power, navigation |

Table 2 presents general information for the FCRPS projects, including the projects' original primary authorized purposes. More specifically, the Corps and Reclamation operate the FCRPS and Reclamation projects as described below. The following list does not imply prioritization (which can vary seasonally and with other factors) and does not display the large numbers of significant activities that are currently taken to improve conditions for listed salmonids under the ESA:

- **Flood Control** – The Corps is authorized to direct flood control operations for specific Federal and non-federal storage projects, including Canadian projects subject to the Treaty, in the Columbia River basin. The management of damaging floodwaters for the protection of the cities of Portland and Vancouver was one of the original incentives for the construction of the storage projects.
- **Irrigation** – Reclamation is authorized to develop water resources for the irrigation of arid lands. Some Reclamation projects involved the development of full water supplies for the irrigation of new lands, others involved only the rehabilitation of privately developed facilities, while still others involved various combinations of full water supplies for new lands and full or supplemental water supplies for previously irrigated lands. Water supplies for these projects may include a single source or some combination of storage, natural flow, and ground water. Corps projects also may have irrigation storage space. Generally, Reclamation markets the irrigation space on behalf of the Corps.
- **Hydropower generation** – The Corps and Reclamation are authorized to generate electricity at their hydropower facilities. The federal dams in the Pacific Northwest supply more than one third of the region's power. BPA sells power from the dams and the power produced by certain other generating plants and constructs, operates, and maintains transmission lines to deliver the electricity.
- **Navigation** – The Corps is authorized to maintain navigation within the lower Columbia and Snake Rivers. Four lower Columbia River projects and the lower Snake River projects were constructed with navigation locks to allow passage for boats and barges to transport products from the Pacific Ocean to inland ports as far upstream as Lewiston, Idaho. Reclamation's Grand Coulee and Hungry Horse facilities are also authorized for navigation and provide flows in support of this function.
- **Recreation** – The reservoirs and project lands provide recreational opportunities for boaters, anglers, swimmers, hunters, hikers, and campers throughout the year.

Table 10, below, summarizes the PNW regional resource capacity and energy by generation type for OY 2008.

Table 10

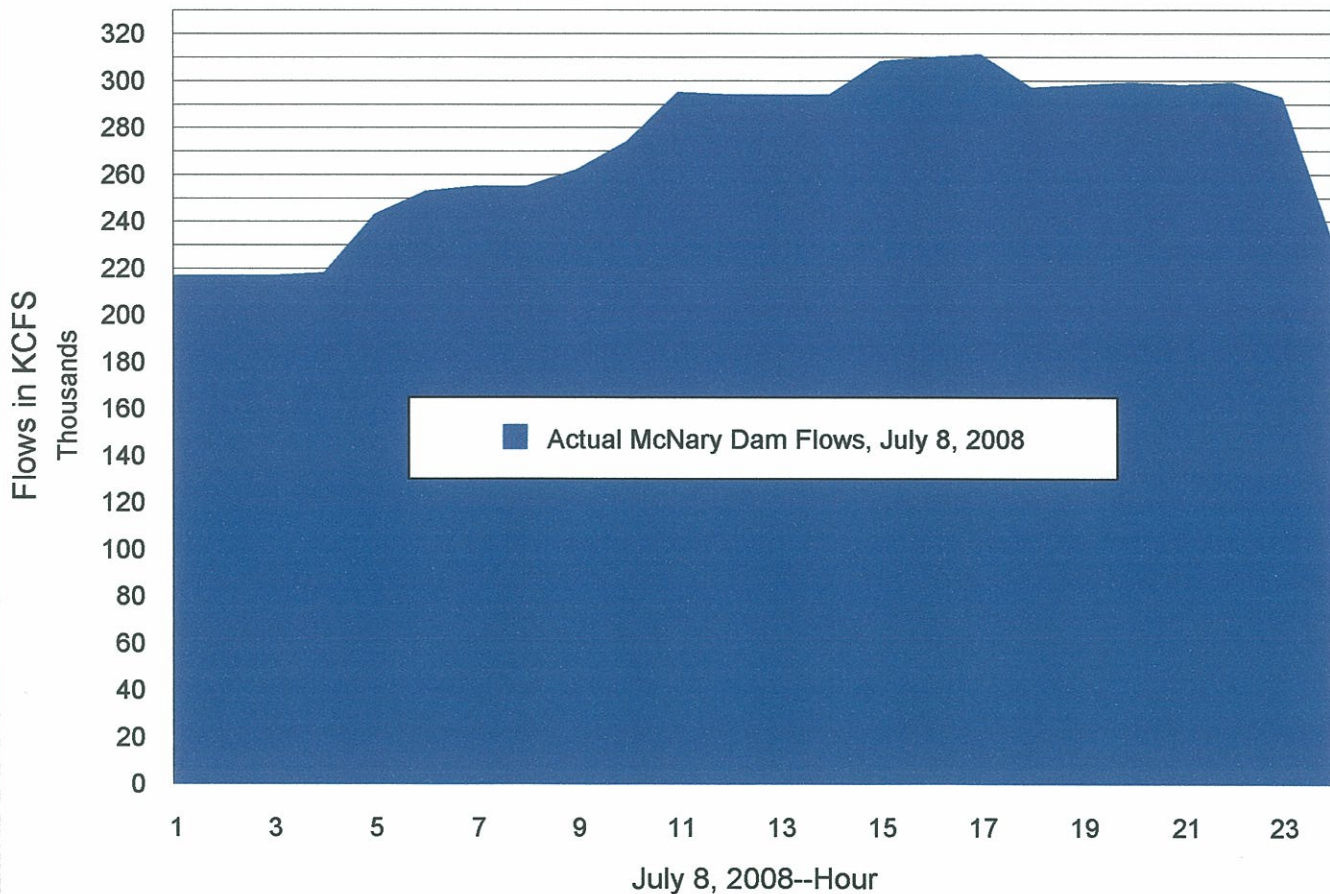
**Total Regional Firm Resources for OY 2008¹
Based on 1937-Critical Water Conditions**

| Project Type | 1-Hour Operational Peaking Capacity (January Peak MW) | Percent of Operational Peaking Capacity | Firm Energy (OY in aMW) | Percent of Firm Energy |
|-----------------------------|--|--|--------------------------------|-------------------------------|
| Hydro | 23,790 ² | 57.3% | 11,797 | 45.0% |
| Coal | 5,871 | 14.1% | 5,178 | 19.7% |
| Combustion Turbines | 5,154 | 12.4% | 3,227 | 12.3% |
| Cogeneration | 2,481 | 6.0% | 2,191 | 8.3% |
| Imports | 1,777 | 4.3% | 1,201 | 4.6% |
| Nuclear | 1,150 | 2.8% | 1,030 | 3.9% |
| Non-Utility Generation | 1,171 | 2.8% | 1,309 | 5.0% |
| Miscellaneous | 134 | 0.3% | 321 | 1.2% |
| Total Firm Resources | 41,528 | 100.0% | 26,254 | 100.0% |

¹ Regional firm resource estimates before adjustments for reserves, maintenance, and transmission losses.

² The hydroelectric capacity is reduced by an operational peaking adjustment, to estimate the monthly maximum operational capability that is available to meet the 1-hour expected peak load, for the 1937-critical water conditions. For January 2008, the reduction is -8,659 peak MW.

**Columbia River Flows:
Hourly Flows Past The McNary Project, July 8, 2008 (Tuesday)**



-- The Existing Daily Net Fluctuation of Flows at McNary Dam Is About 80 kcfs, or about 160,000 acre-ft. (per day).

Data Sources: Reservoir Control, U.S. Army Corps of Engineers, July 8, 2008 (project data);