

## **APPENDICES**

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## APPENDIX A

### GLOSSARY

The following glossary contains an alphabetical listing of most of the key technical terms used in operational hydrology. For a graphic illustration of reservoir terms see Figures A1 and A2.

**ACRE-FOOT** - a unit of volume equal to one acre of area by one-foot depth (equal to 43,560 ft<sup>3</sup> or 325,872 gallons). This unit is generally used to measure the volumes of water used or stored in reservoirs. Also used are thousands of acre-feet (kaf) and millions of acre-feet (maf).

**ACTIVE STORAGE** - water occupying active storage capacity of a reservoir.

**ACTIVE STORAGE CAPACITY** - the portion of the live storage capacity in which water normally will be stored or withdrawn for beneficial uses, in compliance with operating agreements or restrictions.

**ADJUSTED STREAMFLOW** - observed streamflow adjusted to eliminate effects of specified controls.

**ADVERSE HISTORICAL STREAMFLOW SEQUENCE** - see critical streamflow period.

**ASSURED REFILL CURVE (ARC)** - indicates the end-of-month storage content which would assure refill of a seasonal reservoir based on a specified historical volume of inflow for the whole or remaining portion of the refill period. The specified historical value for most projects in the Columbia basin is the second lowest of historical record. The year 1931 represents the second lowest of historical January-July volume inflows for the system as measured at The Dalles, Oregon.

**ASSURED SYSTEM CAPACITY** - the dependable capacity of system facilities available for serving system load after allowance for required reserve capacity, including the effect of emergency interchange agreements and firm power agreements with other systems.

**AVERAGE** - the sum of the items divided by the number of items; for other than the 1961-90 normal period. See also NORMAL.

**AVERAGE STREAMFLOW** - the average rate of flow at a given point during a specified period.

**BANKFULL STAGE** - The stage at which a stream first overflows its natural banks. (See also FLOOD STAGE. Bankfull stage is a hydraulic term whereas flood stage implies damage.)

**BASE ENERGY CONTENT CURVE** - The higher of the assured refill curve and the first year critical rule curve.

**BASE LOAD** - the minimum load in a stated period of time.

**BASE LOAD PLANT** - a power plant that is normally operated to carry base load and which, consequently, operates essentially at a constant load.

**BASE POWER FLOW** - observed streamflow adjusted to eliminate the effects of reservoirs, controlled lake regulation, and actual Grand Coulee pumping and then further adjusted to a given level of irrigation development.

**BIOLOGICAL OPINION** - A set of recommendations from NMFS defining what operations the Columbia River system operation should be in order to ensure that the endangered species are not placed into jeopardy.

**BRIGHT** - a fall chinook salmon that spawns in the upper river, say, above the Umatilla River, that enters the lower Columbia River in a bright silver condition but that has not yet begun its spawning metamorphosis. See also Tule.

**CAPABILITY** - the maximum load which a generator, turbine, transmission circuit, apparatus, station, or system can supply under specified conditions for a given time interval, without exceeding approved limits of temperature and stress.

**CAPACITY** - the load for which a generator, turbine, transformer, transmission circuit, apparatus, station, or system is rated. Capacity is also used synonymously with capability. NOTE: For definitions pertinent to the capacity of a reservoir to store water, see Reservoir Storage Capacity.

**CONNECTED LOAD** - the sum of the ratings of the electric power consuming apparatus connected to the system, or part of the system, under consideration.

**COLUMBIA BASIN TELECOMMUNICATIONS (CBT)** - the CBT is a medium speed leased line teletype

communication system between major power producing projects, and the operating/forecasting agencies. This system is used to transmit hydrologic data and reservoir operating instructions necessary for efficient project operation. This system replaced the older Columbia Basin Teletype network (CBTT) in 1983.

**COORDINATED SYSTEM RESERVOIRS** - the agencies of the Pacific Northwest who have ratified the Pacific Northwest Coordination Agreement, a formal contract for coordinating the seasonal operation of the generating resources of the member systems for the best utilization of their collective reservoir storage. Finalized in mid-August 1964, the Agreement became effective on January 4, 1965, and terminates on June 30, 2003. The member agencies are:

|                                 |                                     |
|---------------------------------|-------------------------------------|
| Bonneville Power Administration | The Montana Power Company           |
| Corps of Engineers              | Pacific Power and Light Company     |
| Bureau of Reclamation           | Pend Oreille County PUD #1          |
| Chelan County PUD #1            | Portland General Electric Company   |
| Colockum Transmission Company   | Puget Sound Power and Light Company |
| Cowlitz County PUD #1           | Seattle City Light                  |
| Douglas County PUD #1           | Tacoma City Light                   |
| Eugene Water and Electric Board | The Washington Water Power Company  |
| Grant County PUD #2             |                                     |

**CONTINUOUS POWER** - hydroelectric power available from a plant on a continuous basis under the most adverse hydraulic conditions contemplated.

**CRITICAL PERIOD** - period when the limitations of hydroelectric power supply due to water conditions are most critical with respect to system load requirements. This is the 42-1/2 month historical sequence of streamflows that occurred from August 16, 1928, through February 29, 1932. Also called Critical Hydro Period and Critical Streamflow Period.

**CRITICAL RULE CURVE (CRC)** - a schedule or budget of seasonal reservoir drafts, with respect to time, as determined from analysis of estimated loads and calculated resources based on critical flow water supply for the period. In the analysis, consideration is given first, to providing power so as to meet system firm loads; second, to economy of operation; and third, to providing power to meet interruptible loads. The schedule or budget of reservoir draft may be shown as a plot of reservoir elevation with respect to time, energy producible from reservoir draft with respect to time or by other similar means.

In multiple-year critical periods there will be a Critical Rule Curve for each corresponding year of the critical period, the first year's curve being the highest in indicated storage energy, the second year's being the next highest, etc.

**CUBIC FEET PER SECOND (cfs)** - unit of measure expressing rates of discharge. Also expressed as thousand cubic feet per second (kcfs).

**DEAD STORAGE** - the volume in a reservoir below the invert of the lowest controllable outlet.

**DEAD STORAGE CAPACITY** - the volume of a reservoir that is below the invert of the lowest outlet and cannot be evacuated by gravity.

**DEMAND** - the rate at which electric energy is delivered to or by a system, part of a system, or piece of equipment, expressed in kilowatts or other suitable unit, at a given instant or averaged over any period of time.

**DEPLETIONS** - Over the past 50 or more years, the natural streamflow patterns in the Columbia Basin have been altered by the gradual development of nearly 43 million acre-feet (53,000 hm<sup>3</sup>) of reservoir storage and by nearly 8 million acres (3,240,000 hm<sup>2</sup>) of land for irrigation. Storage reduces high flows when reservoirs are filling and increases low flows when storage is released. Irrigation not only alters the stream flow pattern by withdrawing water from the rivers but also depletes the water supply through evaporation and infiltration. Consequently, to more accurately compare historical streamflow records, these changes must be taken into consideration. This is done by the "depletions" process in which streamflow data are modified, on a monthly basis, by adjusting flows for both the storage changes in all major lakes and reservoirs and for the irrigation adjustments to a common time of development. The historical records for the Columbia basin have been "depleted" by the Depletions Task Force (DTF) of the CRWMG.

**DISCHARGE** - the rate of flow of a river or stream measured in volume of water per unit of time. The standard

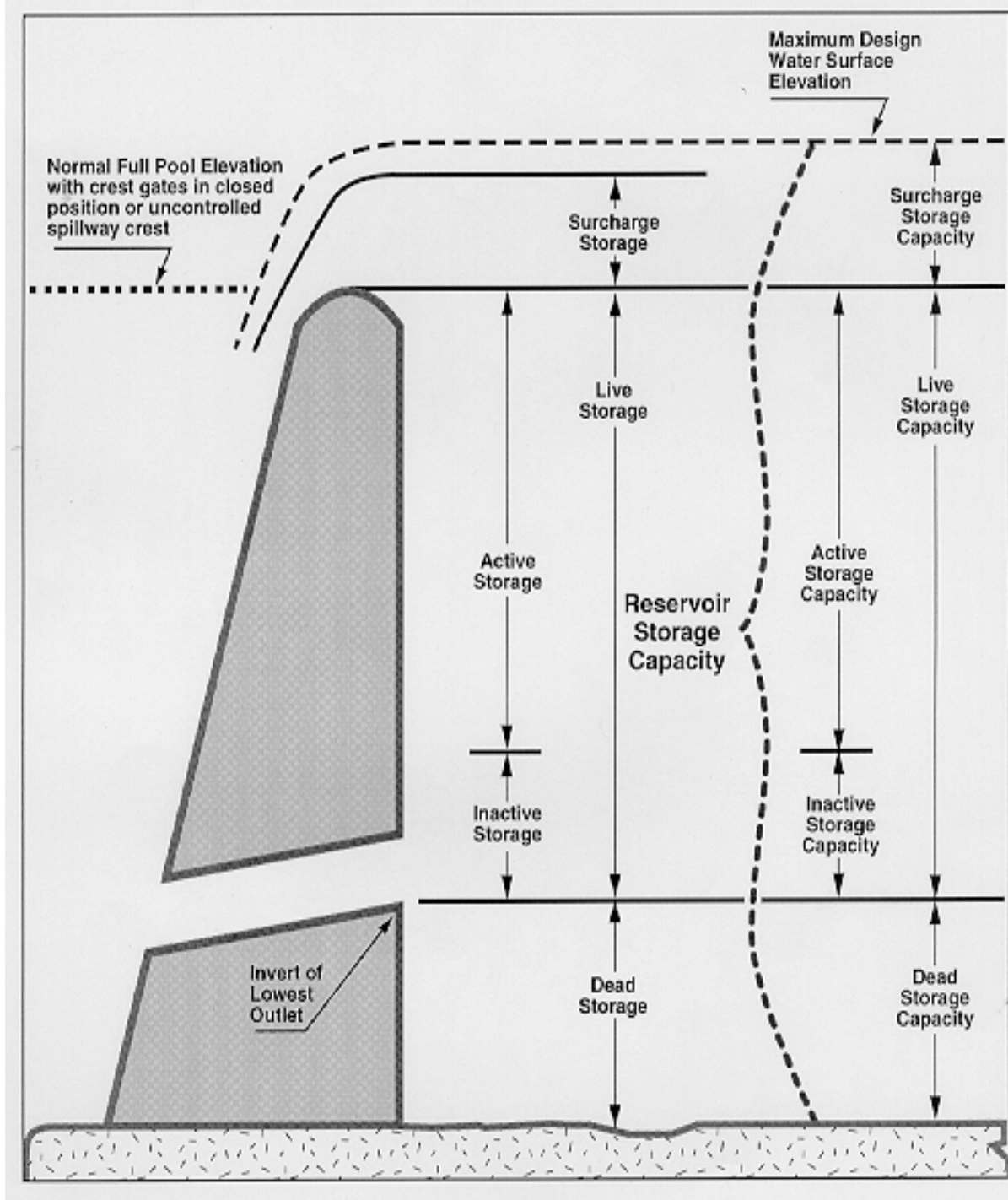
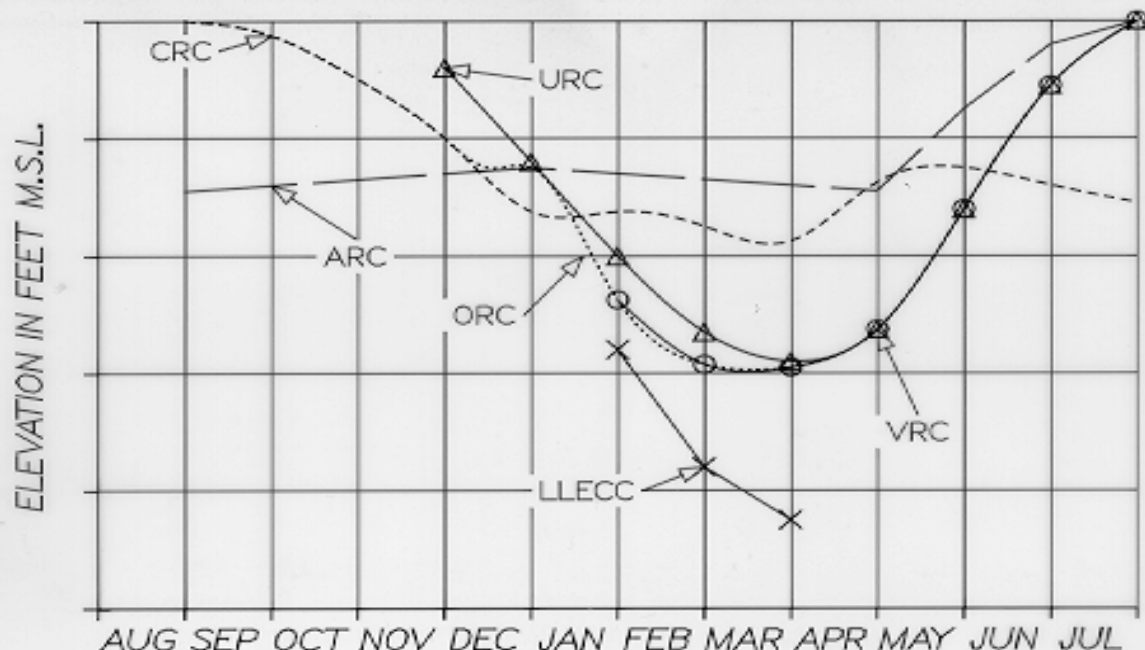


Figure A-1. ILLUSTRATION OF RESERVOIR TERMS



1. **CRITICAL RULE CURVE (CRC).** This curve is actually a family of one to four curves depending on the length of the critical period. These curves are developed in July of each operating year from historical flows and based on operating under adverse flow conditions.

2. **ASSURED REFILL CURVE (ARC).** This curve is the elevation that each project can refill if the second lowest historical water year (1931), January thru July run-off should occur.

3. **VARIABLE REFILL CURVE (VRC).** This curve depicts the reservoir elevation needed to refill with 95 % assurance based on the current run-off forecast.

4. **UPPER RULE CURVE (URC).** This curve for the period August thru December is based on historical flows and for the period January thru July is based on forecast flows. The URC reflects the amount of storage space needed to protect against a flood.

5. **LOWER LIMIT ENERGY CONTENT CURVE (LLECC).** This curve serves as a limit on the project draft in January, February, and March to protect the system's capability to meet firm loads until the start of the spring runoff. Limits are determined by using 1936-1937 water year to meet the system's firm energy loads.

6. **OPERATING RULE CURVE (ORC).** (August thru December) The ORC is the higher of the ARC or the CRC unless the URC is lower, then it controls. (January thru March) The ORC method is the same as August thru December period unless the VRC is lower, then it controls. When the VRC controls the ORC can be higher than the URC. But in no case can the ORC be lower than the LLECC. (April thru July) The ORC method is the same as January thru March period, except without the LLECC consideration.

Figure A-2. RULE CURVE DEFINITIONS

units of measure are cubic feet per second (cfs) or thousand cubic feet per second (kcfs).

**DIVERSION DEMAND** - the amount of water withdrawn from surface or groundwater sources.

**DRAWDOWN** - the distance that the water surface of a reservoir is lowered from a given elevation as the result of the withdrawal of water.

**EFFICIENCY, STATION OR SYSTEM** - the ratio of the energy delivered from the station or system to the energy received by it under specified conditions.

**ELECTRIC POWER** - a term used in the electric power industry to mean inclusively power and energy.

**ENDANGERED SPECIES** - any species which, as determined by the Fish and Wildlife Service, is in danger of extinction throughout all or a significant portion of its range other than a species of the class Insecta determined to constitute a pest whose protection would present an overwhelming and overriding risk to man.

**ENERGY** - that which does or is capable of doing work. It is measured in units of the work; electric energy is usually measured in kilowatt-hours.

**ENERGY CONTENT CURVE (ECC)** - provides sufficient storage at all times so that the Coordinated System will be able to generate its Firm Energy Load Carrying Capability under a recurrence of any historical streamflow sequence. The ECC is obtained the same way as the Operating Rule Curve (defined in Figure A-2) except the proportional draft point needed to generate the Firm Energy Load Carrying Capability is also part of the ECC.

The curve is a guide to the use of storage water from each reservoir and is used to define certain operating rights, obligations and limitations. The ECC for each reservoir consists of a graphic, tabular or other representation of reservoir elevations at the end of specified periods.

**EXTRA HIGH VOLTAGE (EHV)** - a term applied to voltage levels of transmission lines which are higher than the voltage levels commonly used. At present, the electric industry generally considers EHV to be any voltage greater than 230,000 volts.

**FEDERAL COLUMBIA RIVER POWER SYSTEM RESERVOIRS** - the Federally owned projects that generate hydroelectric power include the following existing and planned projects:

|  |  |
|--|--|
| Albeni Falls   | Hungry Horse   |
| Anderson Ranch   | John Day   |
| Big Cliff  | Ice Harbor   |
| Black Canyon   | Libby  |
| Boise Diversion  | Little Goose   |
| Bonneville   | Lookout Point  |
| Chandler   | Lost Creek   |
| Chief Joseph   | Lower Granite  |
| Cougar   | Lower Monumental   |
| Detroit  | McNary   |
| Dexter   | Minidoka   |
| Dworshak   | Palisades  |
| Foster   | Roza   |
| Grand Coulee, incl<br>Pumped Storage and<br>Third Powerplant | Strube (Cougar Reregulator) <sup>1</sup><br>Teton <sup>2</sup><br>The Dalles |
| Green Peter  |  |
| Green Springs  | <sup>1</sup> Planned.  |
| Hills Creek  | <sup>2</sup> Status undetermined.  |

**FINGERLING** - Trout, salmon, or steelhead whose size ranges from approximately 1 to 3 inches.

**FIRM ENERGY** - electric energy which is intended to have assured availability to the customer to meet all or any agreed upon portion of his load requirements.

**FIRM ENERGY LOAD CARRYING CAPABILITY (FELCC)** - the firm energy load that a system is able to supply in any period after deducting the required energy reserve and Forced Outage Reserve.

**FIRM POWER** - power intended to have assured availability to the customer to meet all or any agreed upon portion of his load requirements.

**FISHPASS** - a computer model developed by the Corps of Engineers to simulate anadromous smolt migration and survival as they travel through a river system. It allows analysis of the impacts of proposed migration such as the Water Budget fish screens, fish spill, and fish transportation on juvenile fish survival through river systems

and past dams.

**FLASH FLOOD** - a flood with a very rapid rate of rise that is generally caused by intense rainfall, failure of ice jams or dams, etc. They occur in small drainages and the time between the peak rate of rainfall and the peak discharge is very small.

**FLOOD CONTROL RULE CURVE** - a curve or family of curves of reservoir contents, with respect to time, indicating space required to control flood flow. These curves are determined from analysis of magnitude, duration, and potential damage of flood flows throughout the year or for certain periods during the year. Also called Mandatory Rule Curve (MRC).

**FLOOD PLAIN** - the low lands adjoining the channel of a river, stream, watercourse, lake, or ocean that have been or may be inundated by floodwaters and other areas subject to flooding.

**FOREBAY** - that area of a reservoir immediately upstream of a dam and in the vicinity of the outlet structures.

**FLOOD STAGE** - The stage at which the overflow of the natural banks of a stream begins to cause damage in the reach in which the elevation is measured. (See BANKFULL STAGE.)

**FORCED OUTAGE** - the shutting down of a generating unit, transmission line, or other facility, for emergency reasons.

**FRY** - The stage in the life of a fish between the hatching of the egg and the absorption of the yolk sac. From this stage until they attain a length of one inch the young fish are considered advanced fry.

**FUEL REPLACEMENT ENERGY** - electric energy generated at a hydroelectric plant as a substitute for energy that would otherwise have been generated by a thermal-electric plant.

**GENERATING UNIT** - an electric generator together with its prime mover.

**GENERATION** - act or process of producing electric energy from other forms of energy; also the amount of electric energy so produced.

**HABITAT** - the natural abode of a plant or animal, including all biotic, climatic, or soil conditions or other environmental influences affecting life.

**HATCHERY FISH** - fish that are reared from fertilization in a hatchery environment.

**HISTORICAL STREAMFLOW** - synonymous with observed streamflow over the period of record.

**HYDROELECTRIC PLANT** - an electric power generating plant in which turbine-generator units are driven by falling or running water.

**INACTIVE STORAGE** - water occupying inactive storage capacity of a reservoir.

**INACTIVE STORAGE CAPACITY** - the portion of live storage capacity from which water normally will not be withdrawn, in compliance with operating agreements.

**INSTALLED CAPACITY** - the total of the capacities as shown by the nameplates of similar kinds of apparatus such as generating units, turbines, synchronous condensers, transformers, or other equipment in a station or system.

**INTERCHANGE ENERGY** - electric energy received by one electric utility system usually in exchange for energy delivered to the other system at another time or place. Interchange energy is to be distinguished from a direct purchase or sale, although accumulated energy balances are sometimes settled for in cash.

**INTERRUPTIBLE LOAD** - electric power loads that may be curtailed at the supplier's discretion, or in accordance with a contractual agreement.

**INTERRUPTIBLE POWER** - power made available under agreements that permit curtailment or cessation of delivery by the supplier.

**LINE LOSS** - energy loss and power loss on a transmission or distribution line.

**LIVE STORAGE** - water occupying live storage capacity of a reservoir.

**LIVE STORAGE CAPACITY** - the volume of a reservoir exclusive of dead and surcharge storage capacity.

**LOAD** - the amount of electric power delivered at a given point.

**LOAD FACTOR** - the ratio of the average load over a designated period to the peak-load occurring in that period.

**MANDATORY RULE CURVE** - same as Flood Control Rule Curve.

**MAXIMUM STREAMFLOW** - the maximum rate of flow at a given point during a specified period.

**MEDIAN STREAMFLOW** - the rate of flow at a given point for which there are equal numbers of greater and lesser flow occurrences during a specified period.

**MINIMUM STREAMFLOW** - the minimum rate of flow at a given point during a specified period.

**MODIFIED FLOW** - the observed or historical flow which has been adjusted to a common level of development

by correcting for the effects of diversion demand including evaporation, return flow, and changes in storage of upstream reservoirs and lakes. As used in this report, a modified flow is corrected to a 1990 level of irrigation development, and is the flow available for power generation.

**NATURAL STREAMFLOW** - is the rate of flow at a given point of an uncontrolled stream, or streamflow adjusted to eliminate the effects of all man-made development.

**NET ENERGY FOR SYSTEM** - the electric energy requirements of a system, including losses, defined as: (1) net generation of the system, plus (2) energy received from others, less (3) energy delivered to other systems for resale.

**NONFIRM ENERGY** - electric energy having limited or no assured availability.

**NONFIRM POWER** - power which does not have assured availability to the customer to meet his load requirements.

**NORMAL** - the average value on an element over the fixed period 1961-90.

**OBSERVED STREAMFLOW** - is the amount of water that has been historically measured or otherwise determined to have occurred at a specified point in the stream system.

**ONE PERCENT ANNUAL CHANCE FLOOD** - a flood of a magnitude that has a one-percent chance of being equaled or exceeded in any given year; often referred to as the 100-year flood.

**OPERATING RULE CURVE** - a curve, or family of curves, indicates how a reservoir is to be operated under specific conditions to obtain best or predetermined results.

**OPERATING YEAR** - The period from August 1 through July 31 of the following calendar year. The operating year is the time base used in energy production. Prior to the operating year ending on July 31, 1991, the operating year had been defined as the period from July 1 through June 30 of the following calendar year. This revised definition is based upon an agreement between the signatories to the Pacific Northwest Coordinating Agreement (PNCA).

**OUTAGE** - the period during which a generating unit, transmission line, or other facility, is out of service.

**OVERLOAD CAPABILITY** - the maximum load that a machine, apparatus, or device can carry for a specified period of time under specified conditions when operating beyond its normal rating but within the limits of the manufacturer's guarantee, or in the case of expiration of the guarantee, within safe limits as determined by the owner.

**PEAK LOAD** - the maximum load in a stated period.

**PEAKING CAPABILITY** - maximum peak load that can be supplied by a generating unit, station, or system in a stated time period. It may be the maximum instantaneous load or the maximum average load over a designated interval of time.

**PEAKING CAPACITY** - generating equipment normally operated only during the hours of highest daily, weekly, or seasonal loads. Some generating equipment may be operated at certain times as peaking capacity and at other times to serve loads on a round-the-clock basis.

**PEAK LOAD PLANT** - a power plant which is normally operated to provide power during maximum load periods.

**PLANT FACTOR** - the ratio of the average load on the plant for the period of time considered to the aggregate rating of all the generating equipment installed in the plant.

**POTENTIAL HYDRO ENERGY** - the aggregate energy capable of being developed over a specified period by practicable use of the available streamflow and river gradient.

**POWER** - the time rate of transferring energy. NOTE: The term is frequently used in a broad sense, as a commodity of capacity and energy, having only general association with classic or scientific meaning (see also "Electric Power").

**POWER STORAGE** - that portion of the active storage, designated to be used for generating electric energy. Sometimes referred to as the power pool.

**PRIMARY ENERGY** - hydroelectric energy available from continuous power.

**PRIME POWER** - same as continuous power.

**PUMPED STORAGE PLANT** - a power plant using an arrangement whereby electric energy is generated for peak load by using water pumped into a storage reservoir usually during off-peak periods. A pumped storage plant may also be used to provide reserve-generating capacity.

**RECURRENCE INTERVAL** - the average interval in which a flood of a given size is equaled or exceeded as an annual maximum.



**REDD** - a type of fish-nesting area of a gravel streambed scoured out by salmonids for spawning.

**REFILL YEAR** - the period from August 1 through July 31 of the following year. The refill year is used in energy production studies.

**REGULATED STREAMFLOW** - the controlled rate of flow at a given point during a specified period resulting from an actual reservoir operation (observed streamflow below the project), or a theoretical operation.

**RESERVE GENERATING CAPACITY** - extra generating capacity available to meet unanticipated demands for power or to generate power in the event of loss of generation resulting from scheduled or unscheduled outages of regularly used generating capacity.

**RESERVOIR STORAGE** - the volume of water in a reservoir at a given time. Also Reservoir Contents.

**RESERVOIR CONTENT CAPACITY** - same as Reservoir Storage Capacity.

**RESERVOIR STORAGE CAPACITY** - the volume of a reservoir available to store water.

**RETURN FLOW** - that portion of the diversion demand that is returned to the stream system and is available for further downstream use.

**REVERSIBLE TURBINE** - a hydraulic turbine, normally installed in a pumped storage plant, which can be used alternately as a pump and prime mover.

**RUN-OF-RIVER PLANT** - a hydroelectric power plant using pondage or the flow of the stream as it occurs.

**SCHEDULED OUTAGE** - the shutdown of a generating unit, transmission line, or other facility, for inspection or maintenance, in accordance with an advance schedule.

**SEASONAL STORAGE** - water held over from the annual high-water season to the following low-water season.

**SECOND-FOOT DAY** - volume of water equal to one cubic foot per second flowing continuously for one day of 24 hours.

**SECONDARY ENERGY** - all hydroelectric energy other than primary energy.

**SECTION 7 PROJECTS** - those projects that qualify under Section 7 of the Flood Control Act approved 22 December 1944 (58 stat. 890; 33.U.S.C. 709). The Federal Power Act was approved 10 June 1920 (41 Stat. 1063; 16 U.S.C. 79(a)), and other references apply. See list in Appendix C.

**SMOLT** - an anadromous fish that is physiologically ready to undergo the transition from fresh water to salt water; age varies depending upon species and environmental conditions.

**SPAWNING** - the laying of eggs, especially by fish.

**SPILL** - the discharge of water through gates, spillways, or conduits that bypass the turbines of a hydroplant.

**STAGE** - the height of the water surface in a river or body of water measured above an arbitrary datum, usually at or near the river bottom. Measurements of reservoirs are generally measured above sea level.

**STANDARD PROJECT FLOOD** - a very large (low frequency) design flood standard applied to the design of major flood control structures and representing the most severe combination of meteorological and hydrological conditions considered reasonably characteristic of a particular region.

**STORAGE CAPACITY** - same as Reservoir Storage Capacity.

**STREAMFLOW** - the rate at which water passes a given point in a stream usually expressed in cubic feet per second.

**STREAMFLOW DEPLETION** - that portion of diversion demand that is permanently removed from the stream system.

**SURCHARGE STORAGE CAPACITY** - the volume of a reservoir between the crest of an uncontrolled spillway, or the volume between the normal full pool elevation with the crest gates in the normal closed position, and the maximum water surface elevation for which the dam is designated.

**SURPLUS CAPACITY** - the difference between assured system capacity and the system peak load for a specified period.

**SURPLUS ENERGY** - generally energy generated that is beyond the immediate needs of the producing system. Specifically for BPA, electric energy generated at Pacific Northwest hydroelectric projects of the Government that would otherwise be wasted because of the lack of a market therefore at any established rate. This energy is frequently sold on an interruptible basis.

**TAILWATER** - that portion of a river or water body immediately downstream of a dam or powerhouse.

**TULE** - a fall chinook salmon that spawn in the lower Columbia River that enters the river system in the spawning metamorphosis state and has already lost its shiny silver color.

**UNREGULATED STREAMFLOW** - regulated stream-flow adjusted to eliminate the effects of reservoir regulation, but reflecting the effects of natural storage in lakes and river channels.

**UPPER RULE CURVE (URC)** - same as Flood Control Rule Curve.

**VALLEY STORAGE** - the natural storage capacity in a given reach of a stream both within and without the banks. It varies with the position of the water surface.

**VARIABLE ENERGY CONTENT CURVE (VECC)** - determined for certain large reservoirs that do not have all storage drafted to normal bottom elevation by Base Energy Content Curves. The Variable Energy Content Curves provide for drafts below the Base Energy Content Curve by the amount the forecasted volume inflow is in excess of total requirements for refill of the reservoir, minimum discharge requirements, non-owner requirements for water at-site and upstream, and water required to refill upstream reservoirs. The inflow volume at each reservoir may be reduced by deducting the 95% confidence forecast error, power discharge requirement, non-power requirements upstream (if any), and water required for refill at upstream reservoirs.

The rights, obligations and limitations are the same as those defined by the Energy Content Curve.

**VARIABLE REFILL CURVE (VRC)** - is the elevation needed to refill a reservoir with 95 percent assurance based on the current runoff forecast.

**WATER BUDGET** - a specific volume of water set aside in reservoirs to be released in a manner and at a time to provide benefit to the migration of salmonids.

**WATER YEAR** - The period from October 1 through September 30 of the following calendar year. It is the time base used in hydrology.

**WILD FISH** - fish that are spawned and reared in natural redds, as opposed to hatchery produced stock.

## APPENDIX B

### ABBREVIATIONS

|                   |   |             |  |
|-------------------|---|-------------|--|
| ab or abv         | - above   | IDWR        | - Idaho Department of Water Resources    |
| AER               | - actual energy regulation                        | IJC         | - International Joint Commission         |
| af                | - acre-feet                                       | IPC         | - Idaho Power Company                    |
| AOP               | - assured operating plan                          | kaf         | - thousand acre-feet                     |
| ARC               | - assured refill curve                            | kcfs        | - thousand cubic feet per second         |
| BC Hydro          | -British Columbia Hydro                           | ksfd        | - thousand second-foot days              |
| & Power Authority |   | LARC        | - limited automatic remote collector     |
| BDT               | - binary decimal transmitter                      | LLECC       | - lower limits energy content curve      |
| BIA               | - Bureau of Indian Affairs                        | m           | - meter                                  |
| BiOp              | - Biological Opinion                              | Maf         | - million acre-feet                      |
| bl or blw         | - below   | mcy         | - million cubic yards                    |
| BLM               | - Bureau of Land Management                       | MF          | - Middle Fork                            |
| Bonneville        | -Bonneville Power Administration                  | mg/l        | - milligrams per liter                   |
| BPA               | - Bonneville Power Administration                 | mm          | - millimeters                            |
| BWMP              | - base water monitoring program                   | MRC         | - mandatory rule curve                   |
| CAFE              | - CROHMS automatic front end                      | MSL         | - mean sea level                         |
| CBIAC             | - Columbia Basin Inter-Agency Committee           | MWh         | - MegaWatt-hours                         |
| CBTT              | - Columbia Basin Teletype Circuit                 | NASA        | - National Aeronautics and Space Admin   |
| CBT               | - Columbia Basin Telecommunications               | NF          | - North Fork                             |
| CF                | - Coast Fork                                      | NPD         | - North Pacific Div, Corps of Engineers  |
| cfs               | - cubic feet per second                           | NPP         | - Portland District, Corps of Engineers  |
| COE               | - Corps of Engineers                              | NPPC        | - Northwest Power Planning Council       |
| COFO              | - Committee on Fishery Operation                  | NPS         | - Seattle District, Corps of Engineers   |
| Corps             | - Corps of Engineers                              | NPW         | - Walla Walla Dist, Corps of Engineers   |
| CPO               | - coordinated plan of operation                   | nr          | - near                                   |
| CRC               | - critical rule curve                             | NRCS        | - Natural Resources Conservation Service |
| CRFS              | - Columbia River Forecast Service                 | NRFC        | - Northwest River Forecast Center        |
| CRITFC            | - Columbia River Inter-Tribal Fish Commission     | NWS         | - National Weather Service               |
| CROHMS            | -Columbia River Operational Hydromet              | ODFW        | - Oregon Department of Fish and Wildlife |
| Management System |   | ORC         | - operating rule curve                   |
| CRT               | - cathode ray tube                                | PNCA        | - Pacific Northwest Coordination Agrem't |
| CRWMG             | - Columbia River Water Management Group           | PNRBC       | - Pacific Northwest River Basins Com     |
| DO                | - dissolved oxygen                                | PUD         | - Public Utility District                |
| DTF               | - Depletions Task Force                           | Puget Power | - Puget Sound Power and Light Company    |
| ECC               | - energy content curve                            | R           | - river                                  |
| EHV               | - extra high voltage                              | RCC         | - Reservoir Control Center, NPD, COE     |
| EPA               | - Environmental Protection Agency                 | Reclamation | - US Bureau of Reclamation               |
| FCRC              | - flood control rule curve                        | RM          | - river mile                             |
| FDR Lake          | - Franklin D Roosevelt Lake                       | SF          | - South Fork                             |
| FELCC             | - firm energy load carrying capability            | sfd         | - second-foot day                        |
| FERC              | - Federal Energy Regulatory Commission            | SI          | - System International d'Unites          |
| FLCC              | - firm load carrying capability                   | Seattle     | - City of Seattle, Department of Light   |
| FPC               | - Fish Passage Center                             | Tacoma      | - City of Tacoma, Department of Light    |
| GOES              | - Geosynchronous Orbiting Environmental Satellite | URC         | - upper rule curve                       |
| HDC               | - Hydromet Data Committee                         |             |  |

|        |   |
|--------|---|
| USBR   | - US Bureau of Reclamation                        |
| USDA   | - US Department of Agriculture                    |
| USFS   | - US Forest Service                               |
| USGS   | - US Geological Survey                            |
| VECC   | - variable energy content curve                   |
| VRC    | - variable refill curve                           |
| WDOE   | - Washington Department of Ecology                |
| WF     | - West Fork                                       |
| WQI    | - water quality index                             |
| WY     | - Water Year (Oct 1 - Sep 30)                     |
| YRBWEP | - Yakima River Basin Water<br>Enhancement Project |

**NOTE:** Additional abbreviations and their definitions will be found on page 140 of Appendix C.

## APPENDIX C

### PERTINENT DATA ON SELECTED DAMS AND RESERVOIRS

This appendix provides a comprehensive list of dams and reservoirs in the Columbia and coastal basins. The criteria for selecting the listed projects were to include all impoundments having 5,000 af or more of active storage or a minimum of five MegaWatts of hydroelectric generating capacity.

Reference sources used were:

1. RECLAMATION PROJECT DATA. United States Department of Interior.
2. RESERVOIRS AND HYDRO-ELECTRIC STATIONS. Northwest Power Pool.
3. ELECTRIC POWER PLANTS IN THE PACIFIC NORTHWEST AND ADJACENT AREAS.
4. COLUMBIA-NORTH PACIFIC REGION COMPREHENSIVE FRAMEWORK STUDY. Pacific Northwest River Basins Commission, Sept 1972.
5. PROJECT DATA AND OPERATING LIMITS, Columbia River and Tributaries Review Study (CRT) 49 (Revised), Book 1; and (CRT) 69, Book 2; both dated July 1989.
6. Other miscellaneous reports.

The pertinent data given in this appendix are the most complete information available at the time of publication. Any additions or corrections to the tabulation will be noted in further publications. Pertinent data included in the tabulations are:

1. CBT Identifiers. The three or four letter abbreviation used to identify projects when data are reported on the Columbia Basin Telecommunications and CROHMS data collection systems. For additional information consult the CBT USER'S MANUAL published by the North Pacific Division, Corps of Engineers, at the address inside the back cover of this report.
  2. Year of Completion. Usually, the year the project began controlling the impoundment of water. This is usually prior to the completion of the installation of all the powerhouse generators. In some cases the date of completion is the date of the latest modification or installation of the last generator unit.
  3. River. River on which the project is located, or, for off-stream impoundments, the stream from which the major water supply is derived.
  4. River Mile. The distance, in statute miles, from the mouth of the river, on which the project is located, to the axis of the dam, as measured along the main river channel.
  5. Owner or Operator. These include both publicly owned projects (Federal or other governmental bodies) and privately owned projects. Abbreviations are explained in last page of tabulations.
- For additional information on the following projects

privately owned projects. Abbreviations are explained in last page of tabulations.

6. Remarks. Self-explanatory.
7. Project Functions. Water resource uses for which the project is authorized and operated. The major functions include one or more of the following: flood control, energy generation, irrigation, navigation, recreation, conservation, etc. Abbreviations are explained on last page of tabulation.
8. Normal Maximum Forebay. The top of the normal operating pool range, expressed in feet of elevation above mean sea level. Some projects may have surcharge above the listed maximum forebay elevation, either by adding flashboards or because the added head is required to pass inflow through the outlet structure. Some large natural lakes such as Kootenay, Pend Oreille, Coeur d'Alene and Flathead, will experience involuntary storage above the listed normal maximum pool during periods of unusually high inflows due to the constriction at the natural outlet of the lake.
9. Normal Minimum Forebay. The bottom of the normal operating range, expressed in feet of elevation above mean sea level. Under special conditions some reservoirs may be drawn below this level for a limited period of time.
10. Storage In 1,000 Acre-Feet. Active storage between normal maximum and normal minimum forebay elevations.
11. Top Foot Storage. The volume of storage, in 1,000 acre-feet, in the top foot of the reservoir.
12. Installed Generation. Number of units. The number of existing units or the number being installed under existing contracts.
13. Generation Capacity of all installed hydroelectric turbines, in cfs, rated according to the rate of water usage.
14. Generation Capacity of all installed hydroelectric generators, in MegaWatts, rated according to the amount of Power they can generate. (Nameplate capacity and Station service capacity if applicable, but not including Overload capacity.)
15. Normal Maximum Head. The difference, in feet, between the normal maximum forebay and the average tailwater elevation with all units operating. The heads shown in this preliminary tabulation are those given in the Northwest Power Pool list of projects or the Reclamation Project Data publication.
16. Average Annual Discharges. Update to 25-year averages, where available.

consult the **Project Data and Operating Limits**, CRT 49

Book 1 (Revised), and **Project Data and Operating Limits**, CRT 69 Book 2, both dated July 1989, published by the NPD, Corps of Engineers, address on the inside of the back cover.

## PERTINENT DATA INDEX

The following table alphabetizes the projects listed in the Pertinent Data table at the end of this appendix. This latter table lists projects in downstream order whereas the former table cross references these projects numerically for quicker reference.

### UPPER COLUMBIA

| <u>No.</u> | <u>Project</u>       | <u>No.</u> | <u>Project</u>         | <u>No.</u> | <u>Project</u>    |
|------------|----------------------|------------|------------------------|------------|-------------------|
| 5          | Aberfeldie           | 22         | Hungry Horse           | 33         | Ninepipe          |
| 39         | Albeni Falls         | 24         | Kerr                   | 37         | Noxon Rapids      |
| 23         | Ashley Lake          | 32         | Kicking Horse          | 27         | Pablo             |
| 35         | Black Lake           | 12         | Kootenay Canal         | 20         | Painted Rock Lake |
| 43         | Boundary             | 6          | Libby                  | 47         | Post Falls        |
| 41         | Box Canyon           | 25         | Little Bitterroot Lake | 40         | Priest Lake       |
| 16         | Brilliant            | 53         | Little Falls           | 2          | Revelstoke        |
| 38         | Cabinet Gorge        | 52         | Long Lake              | 44         | Seven Mile        |
| 21         | Como Lake            | 14         | Lower Bonnington       | 15         | South Slokan      |
| 11         | Corra Linn           | 28         | Lower Crow             | 8          | Smith Creek       |
| 10         | Duncan               | 34         | Lower Jocko Lake       | 42         | Sullivan Lake     |
| 9          | Erickson             | 31         | McDonald               | 30         | Tabor             |
| 18         | East Fork Rock Creek | 1          | Mica                   | 36         | Thompson Falls    |
| 17         | Flint Creek          | 29         | Mission                | 46         | Twin Lakes        |
| 54         | Grand Coulee         | 50         | Monroe Street          | 13         | Upper Bonnington  |
| 48         | Hayden Lake          | 7          | Moyie Upper            | 49         | Upper Falls       |
| 26         | Hubbart              | 19         | Nevada Creek           | 45         | Waneta            |
| 4          | Hugh Keenleyside     | 51         | Nine Mile              | 3          | Whatshan          |

### MID-COLUMBIA

| <u>No.</u> | <u>Project</u> | <u>No.</u> | <u>Project</u>        | <u>No.</u> | <u>Project</u> |
|------------|----------------|------------|-----------------------|------------|----------------|
| 23         | Bumping Lake   | 26         | Naches                | 10         | Salmon Lake    |
| 28         | Chandler       | 2          | Nile Valley           | 16         | Snow Lakes     |
| 14         | Chelan Lake    | 1          | North Dam - Dry Falls | 4          | Soda Lake      |
| 7          | Chief Joseph   | 5          | O-Sullivan            | 9          | Spectale Lake  |
| 22         | Cle Elum       | 6          | Owhi                  | 25         | Tieton         |
| 24         | Clear Lake     | 3          | Pinto                 | 18         | Wanapum        |
| 11         | Conconully     | 19         | Priest Rapids         | 13         | Wells          |
| 20         | Keechelus      | 17         | Rock Island           | 8          | Zosel          |
| 21         | Lake Kachees   | 15         | Rocky Reach           |            |                |
| 12         | Leader Lake    | 27         | Roza                  |            |                |

### UPPER SNAKE

| <u>No.</u> | <u>Project</u> | <u>No.</u> | <u>Project</u>       | <u>No.</u> | <u>Project</u>     |
|------------|----------------|------------|----------------------|------------|--------------------|
| 54         | Agency Valley  | 3          | Henrys Lake          | 43         | Owyhee             |
| 13         | American Falls | 60         | Horseshoe Bend       | 64         | Paddock Valley     |
| 46         | Anderson Ranch | 49         | Hubbard              | 2          | Palisades          |
| 43         | Antelope       | 4          | Island Park          | 57         | Payette Lake       |
| 47         | Arrowrock      | 1          | Jackson Lake         | 50         | Pleasant Valley    |
| 5          | Ashton         | 58         | Lake Fork            | 12         | Portneuf           |
| 63         | Black Canyon   | 45         | Little Camas         | 11         | Ririe              |
| 10         | Blackfoot      | 29         | Little Wood          | 61         | Sage Hen           |
| 35         | Bliss          | 65         | Lost Valley          | 21         | Salmon Falls Creek |
| 55         | Bully Creek    | 34         | Lower Malad          | 20         | Shoshone Falls     |
| 66         | C Ben Ross     | 28         | Lower Salmon Falls   | 52         | Silver Creek       |
| 37         | C J Strike     | 48         | Lucky Peak           | 38         | Swan Falls         |
| 59         | Cascade        | 25         | Mackay               | 16         | Twin Falls Creek   |
| 22         | Cedar Creek    | 32         | Magic                | 31         | Twin Lakes         |
| 42         | Chimney Creek  | 68         | Mann Creek           | 33         | Upper Malad        |
| 67         | Crane Creek    | 18         | Milner               | 27         | Upper Salmon A     |
| 60         | Deadwood       | 14         | Minidoka             | 26         | Upper Salmon B     |
| 51         | Deer Flat      | 36         | Mountain Home        | 53         | Warm Springs       |
| 6          | Falls River    | 39         | Mountain View        | 40         | Wild Horse         |
| 30         | Fish Creek     | 24         | Mud Lake             | 56         | Willow Creek #3    |
| 8          | Gem State      | 19         | Murtaugh             | 17         | Wilson Lake        |
| 7          | Grassy Lake    | 15         | Oakley               | 41         | Wilson River       |
| 9          | Grays Lake     | 23         | One Thousand Springs |            |                    |

### LOWER-MIDDLE SNAKE

| <u>No.</u> | <u>Project</u> | <u>No.</u> | <u>Project</u>   | <u>No.</u> | <u>Project</u> |
|------------|----------------|------------|------------------|------------|----------------|
| 4          | Brownlee       | 14         | Ice Harbor       | 5          | Oxbow          |
| 8          | Brundage       | 11         | Lower Granite    | 3          | Thief Valley   |
| 10         | Dworshak       | 13         | Lower Monumental | 1          | Unity          |
| 7          | Goose Lake     | 12         | Little Goose     | 9          | Wallowa Lake   |
| 6          | Hells Canyon   | 2          | Mason            |            |                |



### LOWER COLUMBIA

| <u>No.</u> | <u>Project</u>  | <u>No.</u> | <u>Project</u> | <u>No.</u> | <u>Project</u> |
|------------|-----------------|------------|----------------|------------|----------------|
| 12         | Arthur B Bowman | 10         | Haystack       | 15         | Pelton         |
| 19         | Bonneville      | 6          | John Day       | 17         | Powerdale      |
| 22         | Bull Run        | 30         | Mayfield       | 14         | Round Butte    |
| 20         | Bull Run #1     | 3          | McKay          | 23         | Swift #1       |
| 21         | Bull Run #2     | 2          | McNary         | 24         | Swift #2       |
| 4          | Cold Springs    | 26         | Merwin         | 16         | The Dalles     |
| 18         | Condit          | 1          | Mill Creek     | 11         | Wasco          |
| 7          | Crane Prairie   | 29         | Mossyrock      | 8          | Wickiup        |
| 9          | Crescent Lake   | 13         | Ochoco         | 5          | Willow Creek   |
| 28         | Cowlitz Falls   | 27         | Packwood       | 25         | Yale           |

### WILLAMETTE

| <u>No.</u> | <u>Project</u> | <u>No.</u> | <u>Project</u>      | <u>No.</u> | <u>Project</u> |
|------------|----------------|------------|---------------------|------------|----------------|
| 18         | Big Cliff      | 25         | Faraday             | 26         | River Mill     |
| 11         | Blue River     | 14         | Fern Ridge          | 19         | Scoggins       |
| 7          | Carmen         | 16         | Foster              | 8          | Smith          |
| 5          | Cottage Grove  | 15         | Green Peter         | 22         | Stone Creek    |
| 10         | Cougar         | 1          | Hills Creek         | 21         | Timothy Lake   |
| 17         | Detroit        | 12         | Leaburg             | 9          | Train Bridge   |
| 3          | Dexter         | 2          | Lookout Point       | 20         | T W Sullivan   |
| 6          | Dorena         | 24         | North Fork          | 13         | Walterville    |
| 4          | Fall Creek     | 23         | Oakgrove Powerhouse |            |                |

# PERTINENT DATA FOR SELECTED DAMS AND RESERVOIRS

|                                     |                   | CBTT<br>IDENT | YEAR<br>COMP-<br>LETION | L O C A T I O N   |        | OWNER OR<br>OPERATOR | REMARKS                           |
|-------------------------------------|-------------------|---------------|-------------------------|-------------------|--------|----------------------|-----------------------------------|
|                                     | DAM               |               |                         | RIVER             | MILE   |                      |                                   |
| U P P E R C O L U M B I A R I V E R |                   |               |                         |                   |        |                      |                                   |
| 1                                   | MICA              | MCDB          | 1973                    | COLUMBIA          | 1018.0 | B C HYDRO            | KINBASKET LK FORMLY MCNAUGHTON LK |
| 2                                   | REVELSTOKE        | REVB          | 1983                    | COLUMBIA          | 934.0  | B C HYDRO            |                                   |
| 3                                   | WHATSHAN          | WSHB          | 1971                    | WHATSHAN          | 5.0    | B C HYDRO            |                                   |
| 4                                   | HUGH KEENLEYSIDE  | ARDB          | 1968                    | COLUMBIA          | 780.0  | B C HYDRO            | ARROW LAKE                        |
| 5                                   | ABERFELDIE        | ABEB          | 1922                    | BULL              | 8.4    | B C HYDRO            |                                   |
| 6                                   | LIBBY             | LIB           | 1973                    | KOOTENAI          | 221.9  | COE                  | LAKE KOOCANUSA                    |
| 7                                   | MOYIE UPPER       |               | 1941                    | MOYIE             | 1.8    | B FERRY              |                                   |
| 8                                   | SMITH CREEK       |               | 1990                    | SMITH CREEK       |        | SMITH                |                                   |
| 9                                   | ERICKSON          |               | 1933                    | GOAT              | 7.7    | W KOOTENAY           |                                   |
| 10                                  | DUNCAN            | DCDB          | 1967                    | DUNCAN            | 8.3    | B C HYDRO            | DUNCAN RESERVOIR                  |
| 11                                  | CORRA LINN        | CORB          | 1932                    | KOOTENAY          | 16.1   | W KOOTENAY           | KOOTENAY LAKE                     |
| 12                                  | KOOTENAY CANAL    |               | 1975                    | OFF KOOTENAY      | -      | B C HYDRO            | DIVERTS WATER FROM KOOTENAY LAKE  |
| 13                                  | UPPER BONNINGTON  |               | 1907                    | KOOTENAY          | 14.8   | W KOOTENAY           |                                   |
| 14                                  | LOWER BONNINGTON  |               |                         | KOOTENAY          | 14.3   | W KOOTENAY           | RUN-OF-RIVER PROJECTS D/S CORB    |
| 15                                  | SOUTH SLOCAN      |               | 1928                    | KOOTENAY          | 13.4   | W KOOTENAY           |                                   |
| 16                                  | BRILLIANT         | BRDB          | 1944                    | KOOTENAY          | 1.9    | COMINCO              |                                   |
| 17                                  | FLINT CR          |               | 1901                    | FLINT CR          | 38.8   | MONTANA              | GEORGETOWN LAKE                   |
| 18                                  | EAST FORK ROCK CR |               | 1937                    | E F ROCK CR       | 9.7    |                      |                                   |
| 19                                  | NEVADA CR         |               | 1938                    | NEVADA CR         |        | S MONTANA            |                                   |
| 20                                  | PAINTED ROCK LAKE |               | 1940                    | W F BITTERROOT    | 19.8   |                      |                                   |
| 21                                  | COMO              | CMO           | 1910                    | ROCK CR           | 5.0    | USBR/BID             |                                   |
| 22                                  | HUNGRY HORSE *    | HGH           | 1953                    | S F FLATHEAD      | 5.2    | USBR                 | GENERATOR UPGRADE 1993            |
| 23                                  | ASHLEY LAKE       |               |                         | ASHLEY CR         | 26.2   | ASH                  |                                   |
| 24                                  | KERR *            | KER           | 1938                    | FLATHEAD          | 72.0   | MONTANA              | FLATHEAD LAKE                     |
| 25                                  | L BITTERROOT LAKE |               | 1918                    | LITTLE BITTERROOT | 70.3   |                      |                                   |
| 26                                  | HUBBART           |               | 1924                    | LITTLE BITTERROOT | 55.8   |                      |                                   |
| 27                                  | PABLO             |               | 1914                    | FLATHEAD          |        | BIA                  |                                   |
| 28                                  | LOWER CROW        |               | 1933                    | CROW CR           | 3.4    | BIA                  |                                   |
| 29                                  | MISSION           |               | 1935                    | MISSION CR        | 16.7   | BIA                  |                                   |
| 30                                  | TABOR             |               | 1919                    | DRY CR            |        |                      | ST MARYS LAKE                     |
| 31                                  | McDONALD          |               | 1919                    | POST CR           | 12.4   | BIA                  |                                   |
| 32                                  | KICKING HORSE     |               | 1930                    | CROW CR           |        | BIA                  |                                   |
| 33                                  | NINEPIPE          |               | 1911                    | FLATHEAD          |        | BIA                  |                                   |
| 34                                  | LOWER JOCKO LAKE  |               | 1937                    | N F JOCKO         | 15.0   | BIA                  |                                   |
| 35                                  | BLACK LAKE        |               | 1967                    | JOCKO CR          |        | BIA                  |                                   |
| 36                                  | THOMPSON FALLS    | TOM           | 1917                    | CLARK FORK        | 208.0  | MONTANA              |                                   |
| 37                                  | NOXON RAPIDS      | NOX           | 1959                    | CLARK FORK        | 169.7  | WWP                  |                                   |
| 38                                  | CABINET GORGE     | CAB           | 1953                    | CLARK FORK        | 149.9  | WWP                  |                                   |
| 39                                  | ALBENI FALLS      | ALF           | 1955                    | PEND OREILLE      | 86.9   | COE                  | LAKE PEND OREILLE                 |
| 40                                  | PRIEST LAKE       | PSL           | 1951                    | PRIEST            | 42.0   | WWP                  | STORAGE FOR D/S POWER             |
| 41                                  | BOX CANYON        | BOX           | 1955                    | PEND OREILLE      | 34.5   | PEND                 |                                   |
| 42                                  | SULLIVAN LAKE     |               | 1931                    | OUTLET CR         | 5.0    | PEND                 | TRIBUTARY TO SULLIVAN CR          |
| 43                                  | BOUNDARY          | BDY           | 1967                    | PEND OREILLE      | 17.0   | SEATTLE              |                                   |
| 44                                  | SEVEN MILE        |               | 1979                    | PEND d'OREILLE    | 6.0    | B C HYDRO            |                                   |
| 45                                  | WANETA            | WANB          | 1954                    | PEND d'OREILLE    | 0.5    | COMINCO              |                                   |
| 46                                  | TWIN LAKES        |               |                         | STRANGER CR       |        |                      |                                   |
| 47                                  | POST FALLS        | POS           | 1906                    | SPOKANE           | 102.1  | WWP                  | COEUR D'ALENE LAKE                |
| 48                                  | HAYDEN LAKE       | HAD           | 1948                    | HAYDEN CR         |        | HAYDEN               |                                   |
| 49                                  | UPPER FALLS       |               | 1922                    | SPOKANE           | 74.2   | WWP                  | DAM ADDED                         |
| 50                                  | MONROE STREET     |               | 1890                    | SPOKANE           | 74.2   | WWP                  |                                   |
| 51                                  | NINE MILE         | NIN           | 1908                    | SPOKANE           | 58.1   | WWP                  | POWERHOUSE REPLACED 1992          |
| 52                                  | LONG LAKE         | LLK           | 1915                    | SPOKANE           | 33.9   | WWP                  | LAKE SPOKANE                      |
| 53                                  | LITTLE FALLS      | LIT           | 1910                    | SPOKANE           | 29.3   | WWP                  |                                   |
| 54                                  | GRAND COULEE *    | GCL           | 1942                    | COLUMBIA          | 596.6  | USBR                 | FRANKLIN D ROOSEVELT LAKE         |

**PERTINENT DATA FOR SELECTED DAMS AND RESERVOIRS**

| DAM                                 | FUNC-<br>TION | NORMAL<br>MAXIMUM<br>FOREBAY | NORMAL<br>MINIMUM<br>FOREBAY | STORAGE      |        | INSTALLED GENERATION |               |              | NORMAL<br>MAXIMUM<br>HEAD | AVE ANN<br>DISCHARGE<br>(CFS) |
|-------------------------------------|---------------|------------------------------|------------------------------|--------------|--------|----------------------|---------------|--------------|---------------------------|-------------------------------|
|                                     |               |                              |                              | (1000 AC FT) |        | NO OF<br>UNITS       | CAP IN<br>CFS | CAP IN<br>MW |                           |                               |
|                                     |               |                              |                              | ACTIVE       | TOP FT |                      |               |              |                           |                               |
| U P P E R C O L U M B I A R I V E R |               |                              |                              |              |        |                      |               |              |                           |                               |
| MICA                                | FP            | 2475.0                       | 2320.0                       | 12046.0      | 106.00 | 4                    | 41,600        | 1,740        | 615                       | 20,510                        |
| REVELSTOKE                          | FP            | 1880.0                       | 1830.0                       | 1276.0       |        | 4                    | 56,000        | 1,800        | 425                       |                               |
| WHATSHAN                            | P             | 2104.0                       | 2084.0                       | 83.8         | 4.36   | 1                    | 1,330         | 50.0         | 677                       |                               |
| HUGH KEENLEYSIDE                    | FRPNI         | 1444.0                       | 1377.9                       | 7257.0       | 128.90 | 0                    |               | 0.0          | 69                        | 40,100                        |
| ABERFELDIE                          | P             | 2880.0                       |                              |              |        |                      |               | 5.0          | 275                       |                               |
| LIBBY                               | FPrC          | 2459.0                       | 2287.0                       | 4979.5       | 46.40  | 5                    | 24,100        | 525.0        | 337                       | 11,350                        |
| MOYIE UPPER                         | P             | 2035.3                       |                              |              |        |                      |               | 2.0          | 200                       |                               |
| SMITH CREEK                         | P             |                              |                              |              |        | 3                    |               | 38           |                           |                               |
| ERICKSON                            | P             |                              |                              |              |        |                      |               | 1.3          | 65                        |                               |
| DUNCAN                              | FPI           | 1892.0                       | 1794.2                       | 1398.6       | 18.25  | 0                    |               | 0.0          | 120                       | 3,534                         |
| CORRA LINN                          | PFI           | 1745.3                       | 1733.3                       | 673.0        | 111.67 | 3                    | 12,600        | 40.5         | 58                        | 27,570                        |
| KOOTENAY CANAL                      | P             | 1745.3                       | 1729.0                       |              |        | 4                    | 26,000        | 528          | 245                       |                               |
| UPPER BONNINGTON                    | P             | 1682.7                       |                              |              |        | 6                    | 13,500        | 60.0         | 71                        |                               |
| LOWER BONNINGTON                    | P             |                              |                              |              |        | 3                    | 9,500         | 41.0         | 66                        |                               |
| SOUTH SLOCAN                        | P             | 1543.5                       |                              |              |        | 3                    | 10,500        | 54.0         | 72                        |                               |
| BRILLIANT                           | PFI           | 1477.0                       | 1472.0                       |              |        | 4                    | 18,000        | 108.8        | 98                        | 30,650                        |
| FLINT CREEK                         | PR            | 6429.5                       | 6398.0                       | 31.0         | 3.00   | 2                    | 30            | 1.1          | 717                       | 30                            |
| EASTFORK ROCK CR                    | I             | 6055.5                       | 5990.0                       | 16.0         | 0.44   |                      |               |              |                           | 148                           |
| NEVADA CREEK                        | IR            | 4616.0                       | 4551.5                       | 12.6         | 0.38   |                      |               |              |                           | 37                            |
| PAINTED ROCK LAKE                   | IR            | 4725.5                       | 4625.5                       | 31.7         | 0.66   |                      |               |              |                           | 294                           |
| COMO                                | I             | 4242.7                       | 4188.5                       | 35.1         | 0.94   |                      |               |              |                           | 148                           |
| HUNGRY HORSE *                      | FPIrc         | 3561.0 %                     | 3336.0                       | 3161.0       | 23.91  | 4                    | 8,900         | 428.0        | 484                       | 3,517                         |
| ASHLEY LAKE                         | I             |                              |                              | 30.0         | 3.00   |                      |               |              |                           | 29                            |
| KERR *                              | PFR           | 2893.0                       | 2883.0                       | 1218.7       | 125.56 | 3                    | 14,346        | 168.0        | 187                       | 11,550                        |
| L BITTERROOT LAKE                   | I             | 3906.5                       | 3898.0                       | 26.0         | 2.90   |                      |               |              |                           |                               |
| HUBBART                             | IR            | 3219.0                       | 3140.0                       | 12.1         | 0.46   |                      |               |              |                           |                               |
| PABLO                               | I             | 3210.2                       | 3179.0                       | 27.1         | 2.04   |                      |               |              |                           |                               |
| LOWER CROW                          | I             | 2877.0                       | 2800.0                       | 10.4         | 0.34   |                      |               |              |                           |                               |
| MISSION                             | I             | 3406.0                       | 3340.7                       | 7.3          | 0.29   |                      |               |              |                           |                               |
| TABOR                               | I             | 4024.0                       | 3911.5                       | 23.3         | 0.29   |                      |               |              |                           |                               |
| McDONALD                            | I             | 3598.0                       | 3545.0                       | 8.2          | 0.20   |                      |               |              |                           |                               |
| KICKING HORSE                       | I             | 3061.9                       | 3042.0                       | 8.4          | 0.79   |                      |               |              |                           |                               |
| NINEPIPE                            | C             | 3010.0                       | 2895.4                       | 14.9         | 1.60   |                      |               |              |                           |                               |
| LOWER JOCKO LAKE                    | IR            | 4340.0                       | 4267.0                       | 6.4          | 0.12   |                      |               |              |                           |                               |
| BLACK LAKE                          | I             |                              |                              | 5.1          |        |                      |               |              |                           |                               |
| THOMPSON FALLS                      | P             | 2396.0                       | 2380.0                       | 15.0         | 1.45   | 6                    | 11,100        | 52.6         | 63                        | 19,820                        |
| NOXON RAPIDS                        | P             | 2331.0                       | 2295.0                       | 231.0        | 7.93   | 5                    | 50,000        | 396.9        | 156                       | 19,370                        |
| CABINET GORGE                       | P             | 2175.0                       | 2160.0                       | 42.8         | 3.19   | 4                    | 35,700        | 200          | 111                       | 21,850                        |
| ALBENI FALLS                        | FPNrc         | 2062.5                       | 2051.0                       | 1155.2       | 94.60  | 3                    | 33,000        | 42.6         | 30                        | 25,340                        |
| PRIEST LAKE                         | PF            | 2437.6                       | 2434.6                       | 71.3         | 23.8   | 0                    |               |              |                           | 1,180                         |
| BOX CANYON                          | P             | 2030.7                       | 2014.0                       | 6.9          | 2.78   | 4                    | 28,500        | 60           | 42                        | 15,970                        |
| SULLIVAN LAKE                       | P             | 2588.7                       | 2564.0                       | 31.0         | 1.29   | 0                    |               |              | 548                       |                               |
| BOUNDARY                            | P             | 1990.0                       | 1950.0                       | 27.1         | 1.65   | 4                    | 33,000        | 633.7        | 275                       | 26,720                        |
| SEVEN MILE                          | P             | 1715.0                       | 1690.0                       | 21.2         | 0.48   | 3                    | 36,000        | 605          | 197                       | 26,800                        |
| WANETA                              | PI            | 1517.8                       | 1502.0                       | 4.2          | 0.36   | 4                    | 25,000        | 283.0        | 205                       | 27,820                        |
| TWIN LAKES                          | I             |                              |                              | 15.1         | 1.89   |                      |               |              |                           |                               |
| POST FALLS                          | P             | 2128.0                       | 2120.8                       | 225.0        | 42.45  | 6                    | 5,410         | 15.0         | 61                        | 6,300                         |
| HAYDEN LAKE                         | ORC           |                              |                              | 73.0         |        |                      |               |              |                           | 72                            |
| UPPER FALLS                         | P             | 1870.5                       | 1864.5                       | 0.8          | 0.14   | 1                    | 2,500         | 10.2         | 64                        | 6,675                         |
| MONROE STREET                       | P             | 1806.0                       | 1806.0                       |              |        | 1                    | 1,800         | 14.8         | 72                        | 6,864                         |
| NINE MILE                           | P             | 1606.6                       | 1590.0                       | 4.6          | 0.42   | 4                    | 5,000         | 26.0         | 70                        | 7,220                         |
| LONG LAKE                           | P             | 1536.0                       | 1512.0                       | 104.2        | 5.00   | 4                    | 6,300         | 70.0         | 174                       | 7,793                         |
| LITTLE FALLS                        | P             | 1362.0                       | 1351.0                       | 2.2          | 0.26   | 4                    | 7,200         | 32           | 84                        | 7,793                         |
| GRAND COULEE *                      | FPIRC         | 1290.0 @                     | 1208.0                       | 5185.5       | 80.53  | 24                   | 280,000       | 6,180.0      | 343                       | 107,700                       |

**PERTINENT DATA FOR SELECTED DAMS AND RESERVOIRS**

|                                       |                      |       | YEAR   | L O C A T I O N     |        | OWNER OR   | REMARKS                             |
|---------------------------------------|----------------------|-------|--------|---------------------|--------|------------|-------------------------------------|
|                                       | DAM                  | CBTT  | COMP-  |                     |        | OPERATOR   |                                     |
|                                       |                      | IDENT | LETION | RIVER               | MILE   |            |                                     |
| M I D D L E C O L U M B I A R I V E R |                      |       |        |                     |        |            |                                     |
| 1                                     | NORTH DAM(DRY FALLS) | BNK   | 1951   | OFF COLUMBIA R      | --     | USBR       | (PUMP-TURBINE GENERATORS) BANKS LK  |
| 2                                     | NILE VALLEY          |       | 1918   | WILSON CR           |        | NVR        |                                     |
| 3                                     | PINTO                | PIN   | 1948   | OFF STREAM BANKS L  | --     | USBR       | BILLY CLAPP LAKE FORMERLY (LONG LK) |
| 4                                     | SODA LAKE            |       | 1952   | OFF STREAM          | --     | USBR       |                                     |
| 5                                     | O'SULLIVAN           | POT   | 1949   | CRAB CR             | 45.8   | USBR/GRANT | S COLUMBIA BSN I D POWERHOUSE 1990  |
| 6                                     | OWHI                 |       |        | LITTLE NESPELEM     |        |            |                                     |
| 7                                     | CHIEF JOSEPH         | CHJ   | 1961   | COLUMBIA            | 545.1  | COE        | RUFUS WOODS LAKE                    |
| 8                                     | ZOSEL                |       | 1927   | OKANOGAN            | 77.4   | WHITE      |                                     |
| 9                                     | SPECTACLE LAKE       |       | 1969   | OFF TOATS COULLE CR | --     |            | WHITE NEAR TONASKET, WA             |
| 10                                    | SALMON LAKE          | SAL   | 1921   | OFF SALMON CR       | --     | OKANOGAN   | CONCONALLY LK (NORTH)               |
| 11                                    | CONCONULLY           | CCL   | 1910   | SALMON CR           | 15.5   |            | OKANOGAN CONCONALLY RESERVOIR       |
| 12                                    | LEADER LAKE          |       | 1910   | LOUP LOUP CR        |        | PVP        |                                     |
| 13                                    | WELLS *              | WEL   | 1967   | COLUMBIA            | 515.1  | DOUGLAS    | LAKE PATEROS                        |
| 14                                    | CHELAN               | CHL   | 1927   | CHELAN              | 4.8    | CHELAN     |                                     |
| 15                                    | ROCKY REACH *        | RRH   | 1961   | COLUMBIA            | 473.7  | CHELAN     | LAKE ENTIAT                         |
| 16                                    | SNOW LAKES           |       |        | SNOW CR             |        | CI         |                                     |
| 17                                    | ROCK ISLAND          | RIS   | 1933   | COLUMBIA            | 453.4  | CHELAN     | 2ND POWERHOUSE ADDED 1981           |
| 18                                    | WANAPUM *            | WAN   | 1964   | COLUMBIA            | 415.8  | GRANT      |                                     |
| 19                                    | PRIEST RAPIDS *      | PRD   | 1961   | COLUMBIA            | 397.1  | GRANT      |                                     |
| 20                                    | KEECHELUS            | KEE   | 1917   | YAKIMA              | 214.5  | USBR       |                                     |
| 21                                    | LAKE KACHESS         | KAC   | 1912   | KACHESS             | 0.9    | USBR       |                                     |
| 22                                    | CLE ELUM             | CLE   | 1933   | CLE ELUM            | 8.2    | USBR       |                                     |
| 23                                    | BUMPING LAKE         | BUM   | 1910   | BUMPING             | 17.0   | USBR       |                                     |
| 24                                    | CLEAR LAKE           | CLR   | 1914   | N F TIETON          | 40.2   | USBR       | RAISED 18 FT IN 1918, REHAB 1964    |
| 25                                    | TIETON               | RIM   | 1925   | TIETON              | 21.3   | USBR       | RIMROCK LAKE                        |
| 26                                    | NACHES               |       | 1906   | NACHES              | 9.7    | PP&L       |                                     |
| 27                                    | ROZA                 | RZA   | 1939   | YAKIMA              | 127.9  | USBR       |                                     |
| 28                                    | CHANDLER             | CDR   | 1956   | YAKIMA              | 47.1   | USBR       |                                     |
| U P P E R S N A K E R I V E R         |                      |       |        |                     |        |            |                                     |
| 1                                     | JACKSON LAKE         | JCK   | 1911   | SNAKE               | 1000.2 | USBR       |                                     |
| 2                                     | PALISADES *          | PAL   | 1957   | SNAKE               | 901.6  | USBR       | REBUILT 1995                        |
| 3                                     | HENRYS LAKE          | HEN   | 1923   | HENRYS FORK         | 117.4  | N FORK     |                                     |
| 4                                     | ISLAND PARK          | ISL   | 1938   | HENRYS FORK         | 1.7    | USBR       |                                     |
| 5                                     | ASHTON               |       | 1917   | HENRYS FORK         | 45.0   | UP&L       |                                     |
| 6                                     | FALLS RIVER          |       | 1993   | FALLS               |        | MHP        |                                     |
| 7                                     | GRASSY LAKE          | GRS   | 1939   | GRASSY CR           | 48.0   | USBR       | INTER-BASIN TRANSFER TO BLACKFOOT   |
| 8                                     | GEM STATE            |       | 1993   | SNAKE               |        | MHP        |                                     |
| 9                                     | GRAYS LAKE           |       | 1924   | WILLOW CR           |        | BIA        |                                     |
| 10                                    | BLACKFOOT            | BLK   | 1910   | BLACKFOOT           | 69.0   | BIA        | ENLARGED IN 1924, REHAB 1986        |
| 11                                    | RIRIE *              | RIR   | 1977   | WILLOW CR           | 17.0   | USBR       |                                     |
| 12                                    | PORTNEUF             |       | 1951   | PORTNEUF            | 82.7   | PM         |                                     |
| 13                                    | AMERICAN FALLS *     | AMF   | 1927   | SNAKE               | 714.0  | USBR       |                                     |
| 14                                    | MINIDOKA             | MIN   | 1911   | SNAKE               | 675.0  | USBR       | LAKE WALCOTT                        |
| 15                                    | OAKLEY               | OKL   | 1913   | GOOSE CR            | 29.9   | OAKLEY     |                                     |
| 16                                    | TWIN FALLS CREEK     |       | 1935   | SNAKE               | 617.4  | IDAHO      | REBUILT 1995                        |
| 17                                    | WILSON LAKE          |       | 1909   | OFF STREAM          | 7.4    | N SIDE     |                                     |
| 18                                    | MILNER               | MIL   | 1905   | SNAKE               | 640.0  | TF/IDAHO   | REBUILT 1932, POWERHOUSE 1992       |
| 19                                    | MURTAUGH             |       | 1905   | OFF STREAM          |        | TF         |                                     |
| 20                                    | SHOSHONE FALLS       |       | 1904   | SNAKE               | 614.7  | IDAHO      |                                     |
| 21                                    | SALMON FALLS CREEK   | SAM   | 1911   | SALMON FALLS CR     | 46.0   | SALMON     |                                     |
| 22                                    | CEDAR CREEK          |       | 1920   | CEDAR CR            |        | CEDAR      |                                     |
| 23                                    | 1000 SPRINGS         |       | 1912   | SNAKE (SPRINGS)     | 584.7  | IDAHO      |                                     |
| 24                                    | MUD LAKE             | MUDI  | 1921   | CAMAS CR            |        | OWSLEY     | TERMINAL LAKE WITH DIKES            |
| 25                                    | MACKAY               | MAC   | 1918   | BIG LOST            |        | B LOST R   |                                     |
| 26                                    | UPPER SALMON B       |       | 1947   | SNAKE               | 580.8  | IDAHO      |                                     |
| 27                                    | UPPER SALMON A       |       | 1937   | SNAKE               | 579.6  | IDAHO      |                                     |
| 28                                    | LOWER SALMON FALLS   |       | 1949   | SNAKE               | 572.9  | IDAHO      |                                     |
| 29                                    | LITTLE WOOD *        | WOD   | 1936   | LITTLE WOOD         | 78.8   | USBR       | PROJECT ENLARGED 1960               |
| 30                                    | FISH CREEK           |       |        | FISH CR (WOOD)      |        | CAREY V    |                                     |

**P E R T I N E N T   D A T A   F O R   S E L E C T E D   D A M S   A N D   R E S E R V O I R S**

| DAM                                   | FUNKTION | NORMAL<br>MAXIMUM<br>FOREBAY | NORMAL<br>MINIMUM<br>FOREBAY | STORAGE      |        | INSTALLED GENERATION |               |              | NORMAL<br>MAXIMUM<br>HEAD | AVE ANN<br>DISCHARGE<br>(CFS) |
|---------------------------------------|----------|------------------------------|------------------------------|--------------|--------|----------------------|---------------|--------------|---------------------------|-------------------------------|
|                                       |          |                              |                              | (1000 AC FT) |        | NO OF<br>UNITS       | CAP IN<br>CFS | CAP IN<br>MW |                           |                               |
|                                       |          |                              |                              | ACTIVE       | TOP FT |                      |               |              |                           |                               |
| M I D D L E C O L U M B I A R I V E R |          |                              |                              |              |        |                      |               |              |                           |                               |
| NORTH DAM(DRY FALLS)                  | IP       | 1570.0                       | 1539.5                       | 715.0        | 27.00  | 6                    | 19,200        | 314.0        | 280                       |                               |
| NILE VALLEY                           | I        |                              |                              | 6.7          |        |                      |               |              |                           |                               |
| PINTO                                 | I        | 1335.0                       | 1312.8                       | 21.2         |        | 0                    |               |              |                           |                               |
| SODA LAKE                             | I        | 1008.2                       | 1008.2                       |              |        |                      |               |              |                           |                               |
| O'SULLIVAN                            | IFP      | 1046.5                       | 1022.5                       | 332.2        | 29.00  | 1                    |               | 6.7          |                           |                               |
| OWHI                                  | I        |                              |                              | 5.3          | 0.54   |                      |               |              |                           |                               |
| CHIEF JOSEPH                          | Pirg     | 956.0                        | 930.0                        | 116.0        | 7.80   | 27                   | 219,000       | 2,075.0      | 177                       | 108,000                       |
| ZOSEL                                 | M        | 911.5                        | 909.0                        | 17.0         |        | 0                    |               |              |                           |                               |
| SPECTACLE LAKE                        | I        | 1371.0                       | 1352.0                       | 6.2          |        | 0                    |               |              |                           |                               |
| SALMON LAKE                           | I        | 2324.3                       | 2282.1                       | 10.5         | 0.31   | 0                    |               |              |                           | 3                             |
| CONCONULLY                            | I        | 2287.0                       | 2232.4                       | 13.0         | 0.45   |                      |               |              |                           | 29                            |
| LEADER LAKE                           | IP       |                              |                              | 5.3          |        |                      |               |              |                           |                               |
| WELLS *                               | PFR      | 781.0                        | 771.0                        | 74.0         | 10.70  | 10                   | 220,000       | 774.3        | 72                        | 112,500                       |
| CHELAN                                | PR       | 1100.0                       | 1079.0                       | 677.4        | 32.90  | 2                    | 2,016         | 48.0         | 393                       | 2,024                         |
| ROCKY REACH *                         | PFR      | 707.0                        | 703.0                        | 36.0         | 9.20   | 11                   | 220,000       | 1,273.2      | 93                        | 121,320                       |
| SNOW LAKES                            |          |                              |                              | 12.5         | 0.18   |                      |               |              |                           |                               |
| ROCK ISLAND                           | P        | 613.0                        | 609.0                        | 9.5          | 2.50   | 18                   | 220,000       | 788.0        | 54                        | 118,200                       |
| WANAPUM *                             | PFR      | 571.0                        | 560.0                        | 161.0        | 13.80  | 10                   | 178,000       | 831.3        | 83.5                      | 118,300                       |
| PRIEST RAPIDS *                       | PFR      | 488.0                        | 481.5                        | 44.0         | 7.00   | 10                   | 187,000       | 288.5        | 82.5                      | 118,400                       |
| KEECHELUS                             | I        | 2517.0                       | 2425.0                       | 158.0        | 2.56   |                      |               |              |                           | 330                           |
| LAKE KACHESS                          | I        | 2262.0                       | 2192.8                       | 239.0        | 4.54   |                      |               |              |                           | 285                           |
| CLE ELUM                              | I        | 2240.0                       | 2110.0                       | 436.9        | 4.80   |                      |               |              |                           | 909                           |
| BUMPING LAKE                          | I        | 3426.0                       | 3389.6                       | 33.7         | 1.30   |                      |               |              |                           | 291                           |
| CLEAR LAKE                            | I        | 3018.0                       | 2960.0                       | 5.3          | 0.27   |                      |               |              |                           |                               |
| TIETON                                | I        | 2926.0                       | 2766.0                       | 198.0        | 2.53   | 0                    |               |              |                           | 489                           |
| NACHES                                | P        | 1496.4                       |                              |              |        | 2                    | 495           | 4.5          | 151                       |                               |
| ROZA                                  | PIC      |                              | 1220.5                       |              |        | 1                    | 1,080         | 11.3         | 160                       |                               |
| CHANDLER                              | PI       | 618.5                        |                              |              |        | 2                    | 1,500         | 12.0         | 122                       |                               |
| U P P E R S N A K E R I V E R         |          |                              |                              |              |        |                      |               |              |                           |                               |
| JACKSON LAKE                          | IFrc     | 6760.0                       | 6730.0                       | 847.0        | 25.20  | 0                    |               |              |                           | 1,410                         |
| PALISADES *                           | IFPrC    | 5620.0                       | 5497.9                       | 1200.0       | 16.24  | 4                    | 14,500        | 118.8        | 245                       | 6,220                         |
| HENRYS LAKE                           | IPF      | 6473.9                       | 6457.2                       | 90.4         |        |                      |               |              |                           | 53                            |
| ISLAND PARK                           | I        | 6302.0                       | 6239.0                       | 127.3        | 7.80   |                      |               |              |                           | 585                           |
| ASHTON                                | P        | 5157.4                       |                              |              |        | 3                    | 1,930         | 5.8          | 48                        | 1,450                         |
| FALLS RIVER                           | P        |                              |                              |              |        | 2                    | 750           | 9.1          | 252                       |                               |
| GRASSY LAKE                           | I        | 7210.0                       | 7135.0                       | 15.2         | 0.31   |                      |               |              |                           | 40                            |
| GEM STATE                             | P        |                              |                              |              |        |                      |               | 22.4         |                           |                               |
| GRAYS LAKE                            | I        | 6388.0                       |                              | 40.0         | 22.00  |                      |               |              |                           |                               |
| BLACKFOOT                             | I        | 6120.5                       | 6086.0                       | 350.0        | 17.30  |                      |               |              |                           |                               |
| RIRIE *                               | FRC      | 5112.8                       | 5023.0                       | 80.5         | 1.56   |                      |               |              |                           | 180                           |
| PORTNEUF                              | I        | 5681.0                       |                              | 23.7         |        |                      |               |              |                           | 142                           |
| AMERICAN FALLS *                      | IFPmrc   | 4354.5                       | 4295.8                       | 1672.6       | 56.10  | 3                    | 12,188        | 92.3         | 88                        | 6,910                         |
| MINIDOKA                              | IPF      | 4245.0                       | 4236.0                       | 95.2         | 11.70  | 7                    | 5,000         | 15.6         |                           | 6,040                         |
| OAKLEY                                | I        | 4756.0                       | 4619.0                       | 74.4         | 1.25   |                      |               |              |                           | 62                            |
| TWIN FALLS CREEK                      | P        | 3519.4                       | 3507.0                       | 0.9          | 0.10   | 1                    | 935           | 43.7         | 147                       | 2,850                         |
| WILSON LAKE                           | I        | 4012.0                       |                              | 18.5         | 1.43   |                      |               |              |                           |                               |
| MILNER                                | IPr      | 4133.8                       | 4122.8                       |              |        | 2                    |               | 58.3         |                           | 2,550                         |
| MURTAUGH                              | I        |                              |                              | 5.2          |        |                      |               |              |                           |                               |
| SHOSHONE FALLS                        | IP       | 3362.0                       | 3357.0                       | 0.6          | 0.12   | 3                    | 860           | 12.5         | 212                       |                               |
| SALMON FALLS CREEK                    | I        | 5025.8                       | 4445.8                       | 182.7        | 3.40   | 0                    |               |              |                           |                               |
| CEDAR CREEK                           | I        |                              |                              | 23.7         |        |                      |               |              |                           | 27                            |
| 1000 SPRINGS                          | P        | 3061.9                       | 3061.9                       | 0            |        | 3                    | 560           | 8.0          | 182                       |                               |
| MUD LAKE                              | I        |                              |                              | 44.0         |        |                      |               |              |                           |                               |
| MACKAY                                | I        | 6066.5                       | 6007.0                       | 44.4         | 1.36   |                      |               |              |                           | 306                           |
| UPPER SALMON B                        | P        | 2878.2                       | 2876.2                       | 1.2          | 0.60   | 2                    | 6,500         | 19.5         | 37                        |                               |
| UPPER SALMON A                        | P        | 2841.3                       | 2841.1                       |              |        | 2                    | 6,000         | 17.6         | 43                        |                               |
| LOWER SALMON FALLS                    | IP       | 2798.6                       | 2792.6                       | 4.6          | 0.83   | 4                    | 16,000        | 70.0         | 60                        | 8,410                         |
| LITTLE WOOD *                         | IC       | 5237.3                       | 5127.4                       | 30.0         | 0.57   |                      |               |              |                           | 135                           |
| FISH CREEK                            | I        |                              |                              | 12.7         | 0.56   |                      |               |              |                           |                               |

**PERTINENT DATA FOR SELECTED DAMS AND RESERVOIRS**

|   |                  |       | YEAR   | L O C A T I O N    |       | OWNER OR  | REMARKS                            |
|---|------------------|-------|--------|--------------------|-------|-----------|------------------------------------|
|   | DAM              | CBTT  | COMP-  |                    |       | OPERATOR  |                                    |
|   |                  | IDENT | LETION | RIVER              | MILE  |           |                                    |
| U P P E R   S N A K E   R I V E R           |                  |       |        |                    |       |           |                                    |
| 31  | TWIN LAKES       |       | 1908   | McKINNEY CR (WOOD) |       | TL        | MORMAN RESERVOIR                   |
| 32  | MAGIC            | MAG   | 1917   | BIG WOOD           | 67.5  | BIG WOOD  |                                    |
| 33  | UPPER MALAD      |       | 1949   | MALAD              | 1.0   | IDAHO     |                                    |
| 34  | LOWER MALAD      |       | 1911   | MALAD              | 0.2   | IDAHO     | REBUILT 1948                       |
| 35  | BLISS            | BLS   | 1949   | SNAKE              | 560.3 | IDAHO     |                                    |
| 36  | MOUNTAIN HOME    |       | 1906   | RATTLESNAKE CR     |       | MT HOME   |                                    |
| 37  | C J STRIKE       | CJS   | 1952   | SNAKE              | 492.0 | IDAHO     |                                    |
| 38  | SWAN FALLS       | SWA   | 1900   | SNAKE              | 457.7 | IDAHO     | REBUILT 1918, 1994                 |
| 39  | MOUNTAIN VIEW    |       | 1969   | BOYLE CR           |       | DVR       | BLUE LAKE                          |
| 40  | WILD HORSE       | WLD   |        | OWYHEE             | 286.0 | BIA       | NEAR ELKO, NV                      |
| 41  | WILSON RIVER     |       |        | S F OWYHEE         |       |           |                                    |
| 42  | CHIMNEY CREEK    |       |        | S F OWYHEE         |       |           |                                    |
| 43  | ANTELOPE         |       |        | JACK CR            |       | JORDAN    |                                    |
| 44  | OWYHEE           | OWY   | 1938   | OWYHEE             | 28.5  | USBR/OID  | POWERHOUSE ADDED 1991              |
| 45  | LITTLE CAMAS     |       | 1912   | LITTLE CAMAS CR    | 22.0  | MT HOME   | INTER-BASIN DIVISION               |
| 46  | ANDERSON RANCH * | AND   | 1950   | S F BOISE          | 43.5  | USBR      |                                    |
| 47  | ARROWROCK *      | ARK   | 1915   | BOISE              | 75.4  | USBR      | DAM CREST RAISE 5' IN 1935         |
| 48  | LUCKY PEAK       | LUC   | 1961   | BOISE              | 63.8  | COE       | POWERHOUSE CONSTRUCTED BY SCL 1994 |
| 49  | HUBBARD          |       | 1902   | OFF STREAM         | --    | BOISE     | NEAR BOISE, ID                     |
| 50  | PLEASANT VALLEY  |       | 1925   | BLACKS CR          |       | PV        |                                    |
| 51  | DEER FLAT        | LOW   | 1908   | OFF STREAM         | --    | BOISE     | LAKE LOWELL; DIV FROM BOISE R      |
| 52  | SILVER CREEK     |       | 1969   | SILVER CR          |       |           | MOON RESERVOIR                     |
| 53  | WARM SPRINGS *   | WAR   | 1919   | M F MALHEUR        | 108.0 | USBR      |                                    |
| 54  | AGENCY VALLEY *  | BEU   | 1935   | N F MALHEUR        | 15.0  | USBR/VALE | BEULAH RESERVOIR                   |
| 55  | BULLY CREEK *    | BUL   | 1963   | BULLY CR           | 12.5  | USBR/VALE |                                    |
| 56  | WILLOW CREEK #3  |       | 1911   | MALHEUR            |       | ORCHARDS  |                                    |
| 57  | PAYETTE LAKE     | PAY   | 1944   | N F PAYETTE        | 75.4  | LAKE      |                                    |
| 58  | LAKE FORK        |       | 1926   | L F PAYETTE        | 18.0  | LAKE      |                                    |
| 59  | CASCADE          | CSC   | 1948   | N F PAYETTE        | 40.2  | USBR      |                                    |
| 60  | DEADWOOD         | DED   | 1931   | DEADWOOD           | 24.4  | USBR      |                                    |
| 61  | HORSESHOE BEND   |       | 1993   | PAYETTE            |       | HBH       |                                    |
| 62  | SAGE HEN         |       | 1938   | SAGE HEN CR        |       | SQUAW     |                                    |
| 63  | BLACK CANYON     | EMM   | 1924   | PAYETTE            | 38.7  | USBR      |                                    |
| 64  | PADDOCK VALLEY   |       | 1950   | LITTLE WILLOW CR   |       | L WILLOW  |                                    |
| 65  | LOST VALLEY      |       | 1929   | LOST CR            |       | L VALLEY  |                                    |
| 66  | C BEN ROSS       |       | 1936   | OFF STREAM         |       | L WEISER  |                                    |
| 67  | CRANE CREEK      |       | 1920   | CRANE CR           | 12.5  | CRANE     |                                    |
| 68  | MANN CREEK       | MAN   | 1967   | MANN CR            | 13.0  | USBR      |                                    |
| 69  |                  |       |        |                    |       |           |                                    |
| L O W E R   A N D   M I D D L E   S N A K E |                  |       |        |                    |       |           |                                    |
| 1   | UNITY            | UNY   | 1938   | BURNT              | 63.6  | USBR      |                                    |
| 2   | MASON *          | PHL   | 1968   | POWDER             | 133.7 | USBR      | PHILLIPS LAKE                      |
| 3   | THIEF VALLEY     | THF   | 1932   | POWDER             | 70.0  | USBR      |                                    |
| 4   | BROWNLEE *       | BRN   | 1959   | SNAKE              | 285.0 | IDAHO     |                                    |
| 5   | OXBOW *          | OXB   | 1961   | SNAKE              | 273.0 | IDAHO     |                                    |
| 6   | HELLS CANYON *   | HCD   | 1967   | SNAKE              | 247.0 | IDAHO     |                                    |
| 7   | GOOSE LAKE       |       | 1919   | GOOSE CR           |       | GOOSE     |                                    |
| 8   | BRUNDAGE         |       | 1935   | BRUNDAGE CR        |       | BRUNDAGE  | ENLARGED IN 1987                   |
| 9   | WALLOWA LAKE     | WAL   | 1929   | WALLOWA LAKE       |       | ADC       | WALLOWA LAKE                       |
| 10  | DWORSHAK         | DWR   | 1973   | N F CLEARWATER     | 1.9   | COE       |                                    |
| 11  | LOWER GRANITE    | LWG   | 1975   | SNAKE              | 107.5 | COE       |                                    |
| 12  | LITTLE GOOSE     | LGS   | 1970   | SNAKE              | 70.3  | COE       | LAKE BRYAN                         |
| 13  | LOWER MONUMENTAL | LMN   | 1970   | SNAKE              | 41.6  | COE       | LAKE HERBERT G WEST                |
| 14  | ICE HARBOR       | IHR   | 1961   | SNAKE              | 9.7   | COE       | LAKE SACAJAWEA                     |

**P E R T I N E N T   D A T A   F O R   S E L E C T E D   D A M S   A N D   R E S E R V O I R S**

| DAM                                     | FUNC-<br>TION | NORMAL<br>MAXIMUM<br>FOREBAY | NORMAL<br>MINIMUM<br>FOREBAY | STORAGE      |        | INSTALLED GENERATION |               |              | NORMAL<br>MAXIMUM<br>HEAD | AVE ANN<br>DISCHARGE<br>(CFS) |
|---|---------------|------------------------------|------------------------------|--------------|--------|----------------------|---------------|--------------|---------------------------|-------------------------------|
|   |               |                              |                              | (1000 AC FT) |        | NO OF<br>UNITS       | CAP IN<br>CFS | CAP IN<br>MW |                           |                               |
|   |               |                              |                              | ACTIVE       | TOP FT |                      |               |              |                           |                               |
| U P P E R   S N A K E   R I V E R       |               |                              |                              |              |        |                      |               |              |                           |                               |
| TWIN LAKES                              | I             |                              |                              | 31.2         | 4.04   |                      |               |              |                           | 460                           |
| MAGIC                                   | I             | 4935.0                       | 4821.4                       | 191.5        | 3.90   |                      |               |              |                           |                               |
| UPPER MALAD                             | P             | 3001.3                       | 3007.0                       |              |        | 1                    | 800           | 9.0          | 124                       |                               |
| LOWER MALAD                             | P             | 2876.6                       | 2876.6                       | 0            |        | 1                    | 1,200         | 15.0         | 153                       |                               |
| BLISS                                   | P             | 2654.0                       | 2644.0                       | 2.3          | 0.25   | 3                    | 15,000        | 75           | 70                        | 10,060                        |
| MOUNTAIN HOME                           | I             |                              |                              | 4.2          |        |                      |               |              |                           |                               |
| C J STRIKE                              | P             | 2455.0                       | 2450.0                       | 36.8         | 7.40   | 3                    | 13,800        | 89.1         | 88                        | 9,970                         |
| SWAN FALLS                              | P             | 2314.2                       | 2306.0                       | 6.8          | 0.89   | 2                    | 8,000         | 25           | 24                        | 10,220                        |
| MOUNTAIN VIEW                           | MR            |                              |                              | 8.3          |        |                      |               |              |                           |                               |
| WILD HORSE                              | I             |                              |                              | 71.7         | 2.93   |                      |               |              |                           |                               |
| WILSON RIVER                            | I             |                              |                              | 9.0          | .83    |                      |               |              |                           |                               |
| CHIMNEY CREEK                           | I             |                              |                              | 9.0          | 0.54   |                      |               |              |                           |                               |
| ANTELOPE                                | I             |                              |                              | 55.0         |        |                      |               |              |                           |                               |
| OWYHEE                                  | IP            | 2670.0                       | 2590.2                       | 715.0        | 13.90  | 1                    |               | 8            |                           | 1,604                         |
| LITTLE CAMAS                            | I             | 4924.0                       | 4904.0                       | 18.4         | 1.40   |                      |               |              |                           |                               |
| ANDERSON RANCH *                        | IFP           | 4196.0                       | 4044.0                       | 418.0        | 4.74   | 2                    | 1,800         | 27.0         | 330                       | 963                           |
| ARROWROCK *                             | IF            | 3216.0                       | 2974.0                       | 285.5        | 3.12   |                      |               |              |                           | 2,411                         |
| LUCKY PEAK                              | FIqcrp        | 3055.0                       | 2905.0                       | 264.4        | 2.85   | 4                    | 5,500         | 87.5         |                           | 2,733                         |
| HUBBARD                                 | I             | 2776.0                       | 2757.3                       | 4.1          |        |                      |               |              |                           |                               |
| PLEASANT VALLEY                         | I             |                              |                              | 3.6          |        |                      |               |              |                           |                               |
| DEER FLAT                               | I             | 2530.5                       | 2503.5                       | 169.0        | 9.84   |                      |               |              |                           |                               |
| SILVER CREEK                            | I             |                              |                              | 5.7          |        |                      |               |              |                           |                               |
| WARM SPRINGS *                          | IF            | 3406.0                       | 3327.0                       | 191.0        | 4.60   | 0                    |               |              |                           | 200                           |
| AGENCY VALLEY *                         | IF            | 3340.0                       | 3263.2                       | 59.9         | 1.90   |                      |               |              |                           | 141                           |
| BULLY CREEK *                           | IF            | 2516.0                       | 2456.6                       | 30.0         | 0.95   |                      |               |              |                           | 34                            |
| WILLOW CREEK #3                         | I             |                              |                              | 20.4         |        |                      |               |              |                           |                               |
| PAYETTE LAKE                            | IR            | 4990.0                       | 4984.0                       | 27.7         | 5.00   |                      |               |              |                           | 369                           |
| LAKE FORK                               | I             | 5119.0                       | 5101.0                       | 20.4         | 1.50   |                      |               |              |                           | 147                           |
| CASCADE                                 | IP            | 4828.0                       | 4787.5                       | 653.0        | 28.30  |                      |               |              |                           | 983                           |
| DEADWOOD                                | IR            | 5334.0                       | 5202.8                       | 162.0        | 3.00   |                      |               |              |                           | 235                           |
| HORSESHOE BEND                          | P             |                              |                              |              |        | 2                    | 3,500         |              | 9.5                       |                               |
| SAGE HEN                                | I             |                              |                              | 5.2          |        |                      |               |              |                           |                               |
| BLACK CANYON                            | IP            | 2497.5                       | 2409.3                       | 44.7         | 1.09   | 2                    | 1,540         | 18.0         | 94                        | 2,830                         |
| PADDOCK VALLEY                          | I             |                              |                              | 36.4         | 1.50   |                      |               |              |                           |                               |
| LOST VALLEY                             | I             | 4774.7                       | 4751.6                       | 7.1          |        |                      |               |              |                           | 41                            |
| C. BEN ROSS                             | I             |                              |                              | 7.8          | 0.35   |                      |               |              |                           |                               |
| CRANE CREEK                             | I             | 3245.0                       | 3197.0                       | 57.7         | 2.90   |                      |               |              |                           | 74                            |
| MANN CREEK                              | IR            | 2889.0                       | 2825.0                       | 11.7         | 0.28   |                      |               |              |                           |                               |
| L O W E R   &   M I D D L E   S N A K E |               |                              |                              |              |        |                      |               |              |                           |                               |
| UNITY                                   | I             | 3820.0                       | 3776.5                       | 25.2         | 0.93   | 0                    |               |              |                           |                               |
| MASON *                                 | CIFP          | 4062.4                       | 3985.5                       | 52.5         | 2.45   |                      |               |              |                           | 100                           |
| THIEF VALLEY                            | I             | 3133.0                       | 3084.0                       | 17.4         | 0.74   |                      |               |              |                           | 117                           |
| BROWNLEE *                              | FPRN          | 2077.0                       | 1976.0                       | 975.3        | 14.50  | 5                    | 34,500        | 675          | 272                       | 17,650                        |
| OXBOW *                                 | P             | 1805.0                       | 1800.0                       | 5.4          | 0.99   | 4                    | 25,000        | 220.0        | 120                       | 17,800                        |
| HELLS CANYON *                          | PN            | 1688.0                       | 1635.0                       | 98.8         | 2.38   | 3                    | 30,000        | 450.0        | 210                       | 18,760                        |
| GOOSE LAKE                              | I             |                              |                              | 6.6          |        |                      |               |              |                           |                               |
| BRUNDAGE                                | I             | 6238.5                       |                              | 7.33         | 0.33   |                      |               |              |                           |                               |
| WALLOWA LAKE                            | IR            |                              |                              | 37.5         | 1.29   |                      |               |              |                           |                               |
| DWORSHAK                                | FPNcr         | 1600.0                       | 1445.0                       | 2015.8       | 17.85  | 3                    | 10,500        | 400.0        | 627                       | 5,820                         |
| LOWER GRANITE                           | PNcriq        | 738.0                        | 733.0                        | 53.0         | 10.70  | 6                    | 130,000       | 810.0        | 100                       | 49,680                        |
| LITTLE GOOSE                            | PNcriq        | 638.0                        | 633.0                        | 49.6         | 9.92   | 6                    | 130,000       | 810.0        | 98                        | 47,230                        |
| LOWER MONUMENTAL                        | PNcriq        | 540.0                        | 537.0                        | 20.0         | 6.74   | 6                    | 130,000       | 810.0        | 100                       |                               |
| ICE HARBOR                              | PNcriq        | 440.0                        | 437.0                        | 25.0         | 8.33   | 6                    | 196,000       | 603.0        | 100                       |                               |

**PERTINENT DATA FOR SELECTED DAMS AND RESERVOIRS**

|                                     |                     |      | YEAR            | L O C A T I O N |       | OWNER OR  | REMARKS  |
|-------------------------------------|---------------------|------|-----------------|-----------------|-------|-----------|--|
|                                     | DAM                 | CBTT | COMP-<br>LETION | RIVER           | MILE  | OPERATOR  |  |
| L O W E R C O L U M B I A R I V E R |                     |      |                 |                 |       |           |  |
| 1                                   | MILL CREEK          | MLL  | 1942            | OFF STREAM      | --    | COE       | VIRGIL B. BENNINGTON LAKE<br>LAKE WALLULA        |
| 2                                   | MCNARY              | MCN  | 1957            | COLUMBIA        | 292.0 | COE       |  |
| 3                                   | McKAY               | MCK  | 1927            | McKAY CR        | 4.9   | USBR      | FED FROM UMATILLA RIVER<br>HEPPNER, OREGON       |
| 4                                   | COLD SPRINGS        | CLS  | 1908            | OFF STREAM      |       | USBR/HERM |  |
| 5                                   | WILLOW CREEK        | WIL  | 1984            | WILLOW CR       | 52.4  | COE       |  |
| 6                                   | JOHN DAY            | JDA  | 1968            | COLUMBIA        | 215.6 | COE       | LAKE UMATILLA                                    |
| 7                                   | CRANE PRAIRIE       | CRA  | 1940            | DESCHUTES       | 238.3 | USBR/COID |  |
| 8                                   | WICKIUP             | WIC  | 1940            | DESCHUTES       | 226.8 | USBR      |  |
| 9                                   | CRESCENT LAKE       | CRE  | 1922            | CRESENT CREEK   | 29.9  | USBR/TID  | NEAR MADRAS, OR                                  |
| 10                                  | HAYSTACK            | HAY  | 1957            | OFF HAYSTACK CR |       | USBR/NUID |  |
| 11                                  | WASCO               | WAS  | 1959            | CLEAR CR        | 12.1  | USBR      | PRINEVILLE RES<br>REHAB 1950                     |
| 12                                  | ARTHUR B BOWMAN *   | PRV  | 1962            | CROOKED         | 72.5  | USBR/OCH  |  |
| 13                                  | OCHOCO *            | OCH  | 1920            | OCHOCO          | 10.0  | USBR/OCH  | LAKE BILLY CHINOOK                               |
| 14                                  | ROUND BUTTE         | ROU  | 1964            | DESCHUTES       | 110.6 | PGE       | LAKE SIMTUSTUS                                   |
| 15                                  | PELTON              | PEL  | 1958            | DESCHUTES       | 102.8 | PGE       |  |
| 16                                  | THE DALLES          | TDA  | 1957            | COLUMBIA        | 191.5 | COE       | LAKE CELILO, NWCPUD POWERHOUSE 1990              |
| 17                                  | POWERDALE           |      | 1923            | HOOD            | 3.5   | PP&L      | UNITS 11-17 IN 1974; 2ND PH 1982                 |
| 18                                  | CONDIT              | UND  | 1913            | WHITE SALMON    | 3.3   | PP&L      |  |
| 19                                  | BONNEVILLE          | BON  | 1937            | COLUMBIA        | 146.1 | COE       | PORTLAND   |
| 20                                  | BULL RUN #1         | BUN  | 1928            | BULL RUN        | 11.5  | PORTLAND  |  |
| 21                                  | BULL RUN #2         | RUN  | 1961            | BULL RUN        | 6.5   | PORTLAND  | LAKE BEN MORROW                                  |
| 22                                  | BULL RUN            |      | 1912            | SANDY           | 6.5   | PGE       | LAKE ROSLYN                                      |
| 23                                  | SWIFT #1            | SWF  | 1958            | LEWIS           | 47.9  | PP&L      | OPERATED BY PP&L                                 |
| 24                                  | SWIFT #2            |      | 1958            | LEWIS           | 44.2  | COWLITZ   |  |
| 25                                  | YALE                | YAL  | 1953            | LEWIS           | 34.2  | PP&L      |  |
| 26                                  | MERWIN              | MER  | 1931            | LEWIS           | 19.6  | PP&L      | LAKE MERWIN (FORMERLY ARIEL DAM)                 |
| 27                                  | PACKWOOD            | PWD  | 1964            | LAKE CR         | 5.3   | WPP       | PACKWOOD LAKE                                    |
| 28                                  | COWLITZ FALLS *     |      | 1994            | COWLITZ         | 88.6  | LEWIS     | RIFFE LAKE (FORMERLY DAVISSON LAKE)              |
| 29                                  | MOSSYROCK *         | MOS  | 1968            | COWLITZ         | 65.5  | TACOMA    |  |
| 30                                  | MAYFIELD *          | MAY  | 1963            | COWLITZ         | 52.0  | TACOMA    |  |
| W I L L A M E T T E R I V E R       |                     |      |                 |                 |       |           |  |
| 1                                   | HILLS CREEK         | HCR  | 1962            | M F WILLAMETTE  | 47.8  | COE       |  |
| 2                                   | LOOKOUT POINT       | LOP  | 1955            | M F WILLAMETTE  | 21.3  | COE       |  |
| 3                                   | DEXTER              | DEX  | 1955            | M F WILLAMETTE  | 18.0  | COE       | POWER PLANT<br>STORAGE FOR CARMEN POWER PLANT    |
| 4                                   | FALL CREEK          | FAL  | 1965            | FALL CR         | 7.2   | COE       |  |
| 5                                   | COTTAGE GROVE       | COT  | 1942            | C F WILLAMETTE  | 29.7  | COE       |  |
| 6                                   | DORENA              | DOR  | 1949            | ROW             | 7.5   | COE       |  |
| 7                                   | CARMEN              | CRM  | 1962            | McKENZIE        | 87.6  | EUGENE    |  |
| 8                                   | SMITH               | SMH  | 1963            | SMITH           | 2.1   | EUGENE    | HENRY HAGG LAKE<br>WILLAMETTE FALLS, OREGON CITY |
| 9                                   | TRAIL BRIDGE        | TRB  | 1963            | McKENZIE        | 81.0  | EUGENE    |  |
| 10                                  | COUGAR              | CGR  | 1963            | S F McKENZIE    | 4.5   | COE       |  |
| 11                                  | BLUE RIVER          | BLU  | 1968            | BLUE            | 1.8   | COE       |  |
| 12                                  | LEABURG             | LEA  | 1930            | McKENZIE        | 33.3  | EUGENE    |  |
| 13                                  | WALTERVILLE         |      | 1911            | McKENZIE        | 20.8  | EUGENE    |  |
| 14                                  | FERN RIDGE          | FRN  | 1941            | LONG TOM        | 25.6  | COE       |  |
| 15                                  | GREEN PETER         | GPR  | 1967            | MIDDLE SANTIAM  | 5.5   | COE       |  |
| 16                                  | FOSTER              | FOS  | 1967            | SOUTH SANTIAM   | 37.7  | COE       |  |
| 17                                  | DETROIT             | DET  | 1953            | NORTH SANTIAM   | 60.9  | COE       |  |
| 18                                  | BIG CLIFF           | BCL  | 1953            | NORTH SANTIAM   | 58.1  | COE       | HENRY HAGG LAKE<br>WILLAMETTE FALLS, OREGON CITY |
| 19                                  | SCOGGINS *          | SCO  | 1975            | SCOGGINS CR     | 4.8   | USBR      |  |
| 20                                  | T W SULLIVAN        | ORC  | 1889            | WILLAMETTE      | 26.6  | PGE       |  |
| 21                                  | TIMOTHY LAKE        | TMY  | 1956            | CLACKAMAS       | 15.8  | PGE       | STORAGE FOR POWER D/S                            |
| 22                                  | STONE CREEK         |      | 1994            | CLACKAMAS       |       | EWEB      | SUPPLIED BY HARRIET & TIMOTHY LKS                |
| 23                                  | OAKGROVE POWERHOUSE | OKG  | 1924            | CLACKAMAS       | 5.1   | PGE       |  |
| 24                                  | NORTH FORK          | NFK  | 1924            | CLACKAMAS       | 31.1  | PGE       |  |
| 25                                  | FARADAY             | FAD  | 1907            | CLACKAMAS       | 26.2  | PGE       |  |
| 26                                  | RIVER MILL          | EST  | 1911            | CLACKAMAS       | 23.3  | PGE       |  |



**P E R T I N E N T   D A T A   F O R   S E L E C T E D   D A M S   A N D   R E S E R V O I R S**

| DAM                                 | FUNC-<br>TION | NORMAL<br>MAXIMUM<br>FOREBAY | NORMAL<br>MINIMUM<br>FOREBAY | STORAGE<br>(1000 AC FT) |        | INSTALLED GENERATION |               |              | NORMAL<br>MAXIMUM<br>HEAD | AVE ANN<br>DISCHARGE<br>(CFS) |
|-------------------------------------|---------------|------------------------------|------------------------------|-------------------------|--------|----------------------|---------------|--------------|---------------------------|-------------------------------|
|                                     |               |                              |                              | ACTIVE                  | TOP FT | NO OF<br>UNITS       | CAP IN<br>CFS | CAP IN<br>MW |                           |                               |
| L O W E R C O L U M B I A R I V E R |               |                              |                              |                         |        |                      |               |              |                           |                               |
| MILL CREEK                          | FR            | 1235.0                       | 1212.0                       | 3.3                     | 0.23   | 0                    |               |              |                           |                               |
| McNARY                              | PNfria        | 340.0                        | 335.0                        | 185.0                   | 38.10  | 14                   | 232,000       | 986.0        | 75                        | 169,800                       |
| McKAY                               | IFRC          | 1322.0                       | 1182.0                       | 73.8                    | 1.55   |                      |               |              |                           |                               |
| COLD SPRINGS                        | I             |                              | 560.0                        | 44.6                    | 3.93   |                      |               |              |                           |                               |
| WILLOW CREEK                        | Fcri          | 2063.0                       | 2047.0                       | 9.8                     | .16    | 0                    |               |              |                           | 19                            |
| JOHN DAY                            | FPNcria       | 268.0                        | 257.0                        | 534.0                   | 54.10  | 16                   | 322,000       | 2160.0       | 105                       | 172,400                       |
| CRANE PRAIRIE                       | I             | 4445.0                       | 4424.0                       | 55.3                    | 4.94   |                      |               |              |                           | 36                            |
| WICKIUP                             | I             | 4337.7                       | 4250.8                       |                         | 10.60  | 0                    |               |              |                           | 710                           |
| CRESCENT LAKE                       | I             | 4847.0                       | 4823.4                       | 117.2                   | 3.93   |                      |               |              |                           | 49                            |
| HAYSTACK                            | IF            | 2842.0                       | 2780.0                       | 5.6                     | 0.26   |                      |               |              |                           |                               |
| WASCO                               | I             | 3514.4                       | 3488.0                       | 11.9                    | 0.56   | 0                    |               |              |                           | 15                            |
| ARTHUR B BOWMAN *                   | IFC           | 3234.8                       | 3114.0                       | 152.8                   | 1.00   |                      |               |              |                           | 365                           |
| OCHOCO *                            | IF            |                              | 3047.0                       | 47.5                    | 1.00   | 0                    |               |              |                           | 47                            |
| ROUND BUTTE                         | PR            | 1945.0                       | 1860.0                       | 274.3                   | 3.99   | 3                    | 11,200        | 244.1        | 368                       | 4,115                         |
| PELTON                              | PR            | 1580.0                       | 1573.0                       | 3.8                     | 0.56   | 3                    | 11,200        | 97.2         | 151                       | 4,315                         |
| THE DALLES                          | PNcria        | 160.0                        | 155.0                        | 53.0                    | 10.50  | 24                   | 375,000       | 1814.0       | 85                        | 177,900                       |
| POWERDALE                           | P             | 292.0                        | 291.0                        |                         |        | 1                    | 500           | 6.0          | 210                       |                               |
| CONDIT                              | P             | 301.0                        | 296.0                        | 1.1                     | 0.01   | 2                    | 1,400         | 9.6          | 179                       | 1,128                         |
| BONNEVILLE                          | PNcrq         | 77.0                         | 70.0                         | 138.0                   | 24.40  | 18                   | 288,000       | 1080.2       |                           | 183,300                       |
| BULL RUN #1                         | M             | 1044.0                       |                              | 30.7                    |        |                      |               |              |                           | 603                           |
| BULL RUN #2                         | M             | 860.0                        |                              | 21.0                    |        |                      |               |              |                           |                               |
| BULL RUN                            | PM            | 655.0                        | 648.0                        | 0.9                     | 0.16   | 3                    | 1,120         | 21.0         | 326                       | 659                           |
| SWIFT #1                            | P             | 1007.0                       | 900.0                        | 447.0                   | 4.62   | 3                    | 9,350         | 204.0        | 396                       | 2,919                         |
| SWIFT #2                            | P             | 604.0                        | 603.3                        | 0.3                     | 0.10   | 2                    | 8,600         | 67.5         | 136                       | 2,919                         |
| YALE                                | P             | 490.0                        | 430.0                        | 189.6                   | 3.77   | 2                    | 8,000         | 108.0        | 250                       | 3,940                         |
|                                     |               |                              |                              |                         |        |                      |               |              | 70                        |                               |
| MERWIN                              | P             | 239.6                        | 225.0                        | 244.0                   | 3.92   | 3                    | 11,400        | 135          | 187                       | 4,825                         |
| PACKWOOD                            | P             | 2855.5                       | 2850.5                       | 3.6                     | 0.46   | 1                    | 300           | 31.5         | 1,812                     | 100                           |
| COWLITZ FALLS *                     | PRF           | 866.0                        |                              | 10.2                    |        | 2                    | 10,000        | 70           | 98                        |                               |
| MOSSYROCK *                         | PF            | 778.5                        | 621.5                        | 1397.0                  | 11.63  | 2                    | 14,500        | 300          | 347                       | 5,108                         |
| MAYFIELD *                          | PR            | 425.0                        | 415.0                        | 21.4                    | 2.20   | 4                    | 10,150        | 162.0        | 182                       | 6,148                         |
| W I L L A M E T T E R I V E R       |               |                              |                              |                         |        |                      |               |              |                           |                               |
| HILLS CREEK                         | FPNlcrq       | 1543.0                       | 1414.0                       | 234.3                   | 2.68   | 2                    | 1,800         | 30.0         | 320                       | 1,087                         |
| LOOKOUT POINT                       | FPNlcrq       | 929.0                        | 819.0                        | 336.4                   | 4.24   | 3                    | 9,300         | 120.0        | 231                       | 2,900                         |
| DEXTER                              | PFnir         | 695.0                        | 690.0                        | 4.8                     | 0.99   | 1                    | 4,200         | 15           | 59                        | 2,900                         |
| FALL CREEK                          | FNlcrq        | 834.0                        | 673.0                        | 125.0                   | 1.85   | 0                    |               |              |                           |                               |
| COTTAGE GROVE                       | Fcr           | 791.0                        | 719.0                        | 31.8                    | 1.14   | 0                    |               |              |                           | 264                           |
| DORENA                              | FINcqr        | 835.0                        | 770.5                        | 72.1                    | 1.87   | 0                    |               |              |                           | 708                           |
| CARMEN                              | P             | 2605.0                       |                              |                         |        | 2                    |               |              |                           |                               |
| SMITH                               | P             | 2605.0                       | 2525.0                       | 9.9                     | 0.17   |                      | 3,400         | 80.0         | 513                       | 96                            |
| TRAIL BRIDGE                        | P             | 2092.0                       | 2045.0                       | 2.2                     | 0.07   | 1                    | 1,900         | 10.0         | 82                        | 1,009                         |
| COUGAR                              | FPINcqr       | 1699.0                       | 1516.0                       | 153.5                   | 1.23   | 2                    | 1,050         | 25.0         | 437                       | 78                            |
| BLUE RIVER                          | FNlwrq        | 1357.0                       | 1132.0                       | 82.8                    | 0.97   | 0                    |               |              |                           | 426                           |
| LEABURG                             | P             | 742.0                        | 740.0                        | 0.1                     | 0.07   | 2                    | 2,900         | 15.3         | 89                        | 4,323                         |
| WALTERVILLE                         | P             | 598.0                        | 601.0                        | 0.3                     |        | 1                    | 2,575         | 8.0          | 54                        | 4,461                         |
| FERN RIDGE                          | FINwqr        | 375.1                        | 340.0                        | 101.0                   | 9.04   | 0                    |               |              |                           | 512                           |
| GREEN PETER                         | FPINwqr       | 1015.0                       | 922.0                        | 312.5                   | 3.59   | 2                    | 4,600         | 80.0         | 310                       | 2,141                         |
| FOSTER                              | FPINwqr       | 641.0                        | 609.0                        | 28.3                    | 1.19   | 2                    | 3,200         | 20.0         | 110                       | 2,141                         |
| DETROIT                             | FPINwqr       | 1569.0                       | 1425.0                       | 321.0                   | 3.45   | 2                    | 5,340         | 100.0        | 360                       | 1,567                         |
| BIG CLIFF                           | Pr            | 1206.0                       | 1182.0                       | 3.0                     | 0.14   | 1                    | 3,100         | 18.0         | 96                        | 2,524                         |
| SCOGGINS *                          | FIRMC         | 303.5                        | 252.3                        | 23.6                    | 0.11   | 0                    |               |              |                           | 140                           |
| T W SULLIVAN                        | P             | 52.0                         |                              | 0                       |        | 13                   | 5,000         | 15.4         | 40                        | 30,640                        |
| TIMOTHY LAKE                        | P             | 3190.0                       | 3125.0                       | 61.7                    | 1.43   | 0                    |               |              |                           | 132                           |
| STONE CREEK                         | P             | 3048.0                       |                              |                         |        | 1                    |               | 12           | 680                       |                               |
| OAKGROVE POWERHOUSE                 | P             | 1988.0                       | 1958.0                       | 0.4                     | 0.03   | 2                    | 820           | 51.0         | 880                       | 477                           |
| NORTH FORK                          | P             | 665.0                        | 664.0                        | 6.0                     | 0.35   | 2                    | 5,455         | 38.4         | 135                       | 2,691                         |
| FARADAY                             | P             | 520.0                        | 515.0                        | 0.6                     | 0.10   | 6                    | 4,835         | 34.5         | 133                       | 2,691                         |
| RIVER MILL                          | PM            | 388.8                        | 381.6                        | 0.5                     | 0.11   | 5                    | 4,510         | 19.1         | 81                        | 2,691                         |

**PERTINENT DATA FOR SELECTED DAMS AND RESERVOIRS**

|   |      | YEAR            | L O C A T I O N     |       | OWNER OR   | REMARKS                            |
|---|------|-----------------|---------------------|-------|------------|------------------------------------|
| DAM                                       | CBTT | COMP-<br>LETION | RIVER               | MILE  | OPERATOR   |                                    |
| P U G E T   S O U N D   &   C O A S T A L |      |                 |                     |       |            |                                    |
| KOMA KULSHAN                              |      | 1990            | ROCKY-SULPHUR-SANDY |       | KOMA       |                                    |
| LAKE WHATCOM                              |      | 1937            | WHATCOM CR          |       | BELLINGHAM |                                    |
| ROSS *                                    | ROS  | 1956            | SKAGIT              | 105.2 | SEATTLE    |                                    |
| DIABLO                                    | DIA  | 1929            | SKAGIT              | 101.0 | SEATTLE    |                                    |
| GORGE                                     | GOR  | 1960            | SKAGIT              | 96.6  | SEATTLE    |                                    |
| UPPER BAKER *                             | UBK  | 1959            | BAKER               | 9.1   | PUGET      | BAKER LAKE (NATURAL)               |
| LOWER BAKER                               | SHA  | 1926            | BAKER               | 1.1   | PUGET      | LAKE SHANNON                       |
| HENRY M JACKSON                           |      | 1965            | SULTON              | 16.5  | PUD #1 SNO | SPADA LAKE, FRMLY GEO CALMBACK DAM |
| LAKE CHAPLAIN                             |      |                 | CHAPLAIN CR         | 0.5   |            |                                    |
| TWIN FALLS                                |      | 1989            | SF SNOQUALMIE       |       | TFH        |                                    |
| SNOQUALMIE #1                             |      | 1898            | SNOQUALMIE          | 40.5  | PUGET      |                                    |
| SNOQUALMIE #2                             |      | 1910            | SNOQUALMIE          | 40.0  | PUGET      |                                    |
| TOLT                                      |      | 1963            | S F TOLT            |       | SEATTLE    |                                    |
| CEDAR FALLS                               |      | 1914            | CEDAR               | 37.2  | SEATTLE    |                                    |
| HOWARD A HANSON                           | HAH  | 1962            | GREEN               | 64.5  | COE        |                                    |
| MUD MOUNTAIN                              | MMD  | 1949            | WHITE               | 29.6  | COE        |                                    |
| WHITE RIVER                               | TAP  | 1911            | OFF WHITE R         | 24.3  | PUGET      | LAKE TAPPS                         |
| ELECTRON                                  |      | 1904            | PUYALLUP            | 41.7  | PUGET      |                                    |
| ALDER                                     | ALD  | 1945            | NISQUALLY           | 44.2  | TACOMA     | LAKE ALDER                         |
| LA GRANDE                                 | LGR  | 1912            | NISQUALLY           | 42.5  | TACOMA     |                                    |
| YELM                                      |      | 1930            | NISQUALLY           | 26.2  | CENTRALIA  |                                    |
| CUSHMAN #1                                | CSH  | 1926            | N F SKOKOMISH       | 19.6  | TACOMA     | LAKE CUSHMAN                       |
| CUSHMAN #2                                |      | 1930            | N F SKOKOMISH       | 17.3  | TACOMA     |                                    |
| GLINES CANYON                             |      | 1927            | ELWHA               | 10.0  | JAMES      | LAKE MILLS                         |
| WYNOOCHEE                                 | WYN  | 1972            | WYNOOCHEE           | 51.8  | TACOMA     | POWERHOUSE BUILT 1994              |
| LEMOLO #1                                 | LEM  | 1954            | NORTH UMPQUA        | 88.6  | PP&L       |                                    |
| CLEARWATER #1                             |      | 1953            | CLEARWATER R        | 9.0   | PP&L       |                                    |
| CLEARWATER #2                             |      | 1953            | CLEARWATER R        | 5.7   | PP&L       |                                    |
| LEMOLO #2                                 |      | 1956            | NORTH UMPQUA        | 77.3  | PP&L       |                                    |
| TOKETEE                                   |      | 1950            | NORTH UMPQUA        | 75.4  | PP&L       |                                    |
| FISH CREEK                                |      | 1952            | FISH CR             | 6.6   | PP&L       |                                    |
| SLIDE CREEK                               |      | 1951            | NORTH UMPQUA        | 73.2  | PP&L       |                                    |
| SODA SPRINGS                              |      | 1952            | NORTH UMPQUA        | 69.8  | PP&L       |                                    |
| GALESVILLE *                              | GSV  | 1985            | COW CREEK           | 60.0  | DOUG CO    |                                    |
| PROSPECT #1                               |      | 1912            | N F ROGUE           | 169.4 | PP&L       |                                    |
| PROSPECT #2                               |      | 1928            | N F ROGUE           | 122.0 | PP&L       |                                    |
| PROSPECT #3                               |      | 1932            | S F ROGUE           | 10.5  | PP&L       |                                    |
| LOST CREEK                                | LOS  | 1976            | ROGUE               | 158.4 | COE        |                                    |
| ELK CREEK                                 | ELK  | --              | ELK CR              | 1.7   | COE        | CONSTRUCTION SUSPENDED             |
| FISH LAKE                                 |      | 1908            | N F LTL BUTTE CR    | 15.7  | MID        | REHAB 1923                         |
| FOURMILE LAKE \$                          |      | 1908            | FOURMILE CR         |       | MID        | REBUILT 1922                       |
| AGATE                                     | AGA  | 1966            | DRY CR              | 3.0   | USBR/ROG   |                                    |
| HYATT \$                                  | HYA  | 1923            | KEENE CR            |       | USBR/ROG   |                                    |
| HOWARD PRAIRIE \$                         | HPD  | 1958            | BEAVER CR           |       | USBR/TAL   |                                    |
| KENNE CREEK \$                            |      | 1960            | EMIGRANT CR         | 8.0   | USBR/TAL   | GREEN SPRINGS POWER PLANT          |
| EMIGRANT LAKE *                           | EMI  | 1924            | EMIGRANT CR         | 29.3  | USBR/TAL   | REBUILT 1960                       |
| APPLEGATE                                 | APP  | 1980            | APPLEGATE           | 45.7  | COE        |                                    |

**P E R T I N E N T   D A T A   F O R   S E L E C T E D   D A M S   A N D   R E S E R V O I R S**

| DAM  | FUNC-<br>TION                 | NORMAL<br>MAXIMUM<br>FOREBAY                   | NORMAL<br>MINIMUM<br>FOREBAY                   | STORAGE<br>(1000 AC FT)               |                                      | INSTALLED GENERATION  |                                     |                                      | NORMAL<br>MAXIMUM<br>HEAD       | AVE ANN<br>DISCHARGE<br>(CFS)       |
|--|-------------------------------|--|--|---------------------------------------|--------------------------------------|-----------------------|-------------------------------------|--------------------------------------|---------------------------------|-------------------------------------|
|  |                               |  |  | ACTIVE                                | TOP FT                               | NO OF<br>UNITS        | CAP IN<br>CFS                       | CAP IN<br>MW                         |                                 |                                     |
| P U G E T   S O U N D   &   C O A S T A L                                    |                               |  |  |                                       |                                      |                       |                                     |                                      |                                 |                                     |
| KOMA KULSHAN<br>LAKE WHATCOM<br>ROSS *                                       | P<br>M<br>FPR                 |  |  | 26.4<br>1052.0                        | 5.00<br>11.85                        |                       |                                     | 12                                   | 1200                            |                                     |
| DIABLO<br>GORGE  | P<br>P                        | 1602.5<br>1206.0                               | 1475.0<br>1197.0                               | 27.2<br>964.0                         | 0.91<br>0.24                         | 4<br>4                | 15,600<br>6,500<br>7,400            | 451.0<br>159.0<br>183.0              | 397<br>330<br>380               | 3,377<br>4,093<br>4,458             |
| UPPER BAKER *  | FP                            | 724.0  | 674.0  | 184.8                                 | 4.89                                 | 2                     | 5,300                               | 94.4                                 | 285                             | 2,026                               |
| LOWER BAKER  | P                             | 438.6  | 363.6  | 142.4                                 | 2.22                                 | 1                     | 4,300                               | 64.0                                 | 263                             | 2,593                               |
| HENRY M JACKSON<br>LAKE CHAPLAIN<br>TWIN FALLS                               | M,P<br>M<br>P                 | 1450.0   | 1429.0   | 154.9<br>13.4                         | 0.44                                 | 4                     | 1,300                               | 111.2<br>20                          |                                 | 97                                  |
| SNOQUALMIE #1<br>SNOQUALMIE #2<br>TOLT                                       | P<br>P<br>M                   | 401.0<br>401.0                                 |  | 0.4<br>396.5<br>57.8                  | 0.11<br>0.11                         | 5<br>2                | 1,050<br>1,530                      | 11.6<br>31.0                         | 271<br>287                      | 2,623                               |
| CEDAR FALLS<br>HOWARD A HANSON   | PM<br>FA                      | 1550.0<br>1206.0                               | 1510.0<br>1040.0                               | 38.8<br>25.0                          | 1.82<br>1.73                         | 0<br>0                | 700                                 | 28.4                                 | 620                             | 200<br>311<br>1,074                 |
| MUD MOUNTAIN<br>WHITE RIVER<br>ELECTRON<br>ALDER<br>LA GRANDE                | F<br>P<br>P<br>P<br>P         | 1215.0<br>543.0<br>1538.0<br>1207.0<br>935.0   | 895.0<br>515.0<br>1484.0<br>1140.0<br>910.0    | 106.0<br>46.7<br>54.0<br>161.5<br>1.0 | 0.96<br>2.52<br>0.01<br>3.33<br>0.05 | 0<br>4<br>4<br>2<br>5 |                                     |                                      |                                 | 1,469                               |
| YELM<br>CUSHMAN #1<br>CUSHMAN #2<br>GLINES CANYON<br>WYNOOCHEE               | P<br>PR<br>P<br>PM<br>PFCAIRM | 318.0<br>738.0<br>480.0<br>588.3<br>800.0      |  | 615.0<br>460.0<br>559.3<br>700.0      |                                      | 1<br>2<br>3<br>1      |                                     | 9<br>43.2<br>81.0<br>17.4<br>12.8    | 208<br>257<br>480<br>192<br>165 | 1,816<br>746<br>753<br>1,510<br>556 |
| LEMOLO #1<br>CLEARWATER #1<br>CLEARWATER #2<br>LEMOLO #2<br>TOKETEE          | P<br>P<br>P<br>P<br>P         | 4148.0<br>3861.0<br>3101.3<br>3327.7<br>1635.0 | 4097.0<br>3875.0<br>3168.0<br>3325.5<br>2414.0 | 12.3<br>0.2                           | 0.44                                 | 1<br>1<br>1<br>1<br>3 | 565<br>350<br>460<br>620<br>1,425   | 29.0<br>15.0<br>26.0<br>33.0<br>42.5 | 752<br>651<br>760<br>729<br>448 | 424<br>168<br>215<br>583<br>987     |
| FISH CREEK<br>SLIDE CREEK<br>SODA SPRINGS<br>GALESVILLE *<br>PROSPECT #1     | P<br>P<br>P<br>WIFPR<br>P     | 3024.0<br>603.0<br>1805.5<br>1881.5<br>2477.2  | 3014.0<br>600.0<br>1779.0<br>1744.0<br>2477.0  |                                       | 0.03                                 | 1<br>1<br>1<br>2<br>1 | 150<br>1,430<br>1,600<br>1.8<br>145 | 11.0<br>18.0<br>11.0<br>1.8<br>3.8   | 1,034<br>169<br>114<br>135      | 191<br>1,092<br>1,237               |
| PROSPECT #2<br>PROSPECT #3<br>LOST CREEK<br>ELK CREEK<br>FISH LAKE           | P<br>P<br>FPRI<br>FICMRA<br>I | 2591.5<br>3375.7<br>1872.0<br>1726.0<br>4641.5 | 2594.5<br>1751.0<br>1581.0<br>4615.0           | 315.0<br>95.0<br>7.8                  | 3.40<br>1.29<br>0.42                 | 2<br>1<br>2<br>0<br>0 | 935<br>160<br>2,600                 | 32.0<br>7.2<br>49.0                  | 607<br>720<br>323<br>204        | 804<br>174<br>1,821<br>209<br>37    |
| FOURMILE LAKE \$<br>AGATE<br>HYATT \$<br>HOWARD PRAIRIE \$<br>KEENE CREEK \$ | I<br>I<br>IP<br>FI<br>P       | 5746.5<br>1510.0<br>5016.0<br>4526.6<br>4403.5 | 5724.0<br>1467.0<br>4981.7<br>4471.0<br>4378.0 | 15.6<br>4.7<br>16.2<br>60.6<br>0.3    | 0.90                                 | 0<br>0<br>0<br>0<br>1 |                                     | 16.0                                 | 1,984                           | 14<br>12<br>117                     |
| EMIGRANT *<br>APPLEGATE  | IF<br>FIR                     | 2241.0<br>1987.0                               | 2131.5<br>1854.0                               | 39.0<br>75.2                          | 0.81<br>0.99                         | 0<br>0                |                                     |                                      |                                 | 31<br>405                           |

Sheet 5b of 5

OWNER OR OPERATOR

ADC  
ASH  
BELLINGHAM

ASSOCIATED DITCH COMPANY  
ASHLEY IRRIGATION DISTRICT  
CITY OF BELLINGHAM

|                  |                                      |
|------------------|--------------------------------------|
| B FERRY          | CITY OF BONNERS FERRY                |
| BID              | BITTERROOT IRRIGATION DIST           |
| B LOST R         | BIG LOST RIVER CANAL COMPANY         |
| BC HYDRO         | B C HYDRO & POWER AUTHORITY          |
| BIA              | BUREAU OF INDIAN AFFAIRS             |
| BOISE            | BOISE PROJECT BOARD OF CONT          |
| BIG WOOD         | BIG WOOD CANAL COMPANY               |
| BRUNDAGE         | BRUNDAGE WATER USERS                 |
| CAREY V          | CAREY VALLEY RESERVOIR COMP          |
| CE               | CORPS OF ENGINEERS                   |
| CEDAR            | CEDAR MESA COMPANY                   |
| CENTRALIA        | CITY OF CENTRALIA                    |
| CHELAN           | CHELAN COUNTY PUD NO 1               |
| CI               | CHELAN IRRIGATION DISTRICT           |
| COID             | CENTRAL OREGON IRRIGATION DT         |
| COMINCO          | COMINCO, LIMITED                     |
| COWLITZ          | COWLITZ COUNTY PUD                   |
| CRANE            | CRANE CREEK RESERVOIR COMP           |
| DVR              | SHOI-PAI TRIBE OF DVR                |
| DOUG CO          | DOUGLAS COUNTY, OREGON               |
| DOUGLAS          | DOUGLAS COUNTY PUD NO 1, WA          |
| EUGENE           | CITY OF EUGENE                       |
| GOOSE            | GOOSE LAKE RESERVOIR COMP            |
| GRANT            | GRANT COUNTY PUD NO 2                |
| HAYDEN           | HAYDEN L WATERSHED IMPROVE           |
| HBH              | HORSESHOE BEND HYDRO                 |
| HERM             | HERMISTON IRRIGATION DIST            |
| IDAHO            | IDAHO POWER COMPANY                  |
| JAMES            | JAMES RIVER PAPER CO, INC            |
| JORDAN           | JORDAN VALLEY IRRIGATION CO          |
| KOMA             | KOMA KULSHAN                         |
| LAKE             | LAKE IRRIGATION DISTRICT             |
| LEWIS            | LEWIS COUNTY PUD                     |
| L VALLEY         | LOST VALLEY RESERVOIR COMP           |
| L WEISER         | LITTLE WEISER RIVER IRR DIST         |
| L WILLOW         | LITTLE WILLOW CREEK IRR COMP         |
| MHP              | MARYSVILLE HYDROPOWER PART           |
| MONTANA MONTANA  | POWER COMPANY                        |
| MT HOME MOUNTAIN | HOME IRRIGATION CO                   |
| N FORK           | NORTH FORK RESERVOIR COMPANY         |
| N SIDE           | NORTH SIDE CANAL COMPANY             |
| NUID             | NORTH UNIT IRRIGATION DIST           |
| OAKLEY           | OAKLEY CANAL COMPANY                 |
| OCH              | OCHOCO IRRIGATION DISTRICT           |
| OID              | OWYHEE IRRIGATION DISTRICT           |
| OKANOGAN         | OKANOGAN IRRIGATION DISTRICT         |
| ORCHARDS         | ORCHARDS WATER CO                    |
| OWSLEY           | OWSLEY CANAL COMPANY                 |
| PORTLAND         | CITY OF PORTLAND                     |
| PP&L             | PACIFIC POWER & LIGHT COMP           |
| PEND             | PEND OREILLE COUNTY PUD              |
| PEND MINES       | PEND OREILLE MINES                   |
| PV               | PLEASANT VALLEY IRRIGATION C         |
| PVP              | PLEASANT VALLEY IRRIGATION & POWER C |
| PGE              | PORTLAND GENERAL ELECTRIC            |
| PM               | PORTNEUF-MARSH VALLEY CO             |
| PUGET            | PUGET SOUND POWER & LIGHT CO         |
| PUD #1 SNO       | SNOHOMISH CO PUD & C OF EVER         |
| ROG              | ROGUE RIVER VALLEY IRR DIST          |
| SALMON           | SALMON RIVER CANAL                   |
| S COL ID         | SO COLUMBIA IRRIGATION DISTR         |
| SEATTLE          | CITY OF SEATTLE                      |
| SQUAW            | SQUAW CREEK IRRIGATION COMP          |
| SMITH            | SMITH CREEK HYDROPOWER               |
| S MONTANA        | STATE OF MONTANA                     |
| TACOMA           | CITY OF TACOMA                       |
| TAL              | TALENT IRRIGATION DISTRICT           |
| TID              | TUMALO IRRIGATION DISTRICT           |
| TFH              | TWIN FALLS HYDRO ASSOCIATES          |
| TW               | TWIN LAKE RESERVOIR & IRR CO         |
| TF               | TWIN FALLS CANAL COMPANY             |
| UP&L             | UTAH POWER & LIGHT COMPANY           |
| USBR             | U S BUREAU OF RECLAMATION            |
| VALE             | VALE IRRIGATION DISTRICT             |
| WPPSS            | WASHINGTON PUB POWER SUPPLY          |
| WWP              | WASHINGTON WATER POWER COMP          |
| W KOOTENAY       | WEST KOOTENAY POWER & LIGHT          |
| WHITE            | WHITESTONE COULEE IRR DISTR          |

AUTHORIZED PROJECT FUNCTIONC (CAPS)  
OTHER PROJECT FUNCTIONS (lower case)

P HYDROPOWER AT SITE AND/OR DOWNSTREAM  
I IRRIGATION  
F FLOOD CONTROL  
N NAVIGATION  
M MUNICIPAL AND INDUSTRIAL WATER SUPPLY  
C FISH AND WILDLIFE CONSERVATION  
A POLLUTION ABATEMENT OF LOW FLOW AUGMENTATION  
R RECREATION  
Q WATER QUALITY

- \* Section 7 Project.
- % Includes 1-foot flashboards annually installed during the summers.
- @ Includes 2-foot flashboards annually installed during the summers.
- + Storage is a function of flow and pool elevation.
- \$ Klamath River Basin; flows diverted to Rogue Basin.

## APPENDIX D

### LIST OF CHARTS

#### TEMPERATURE & PRECIPITATION INDICES

##### Number

- 1 Western Washington - Fall/Winter
- 2 Western Oregon - Fall/Winter
- 3 Columbia R ab The Dalles - Fall/Winter
- 4 Columbia R ab The Dalles - Spring/Summer

#### STORAGE & STREAMFLOW HYDROGRAPHS

July-August

- 5 Columbia R at Mica Dam, BC
- 6 Columbia R at Revelstoke, BC
- 7 Columbia R at Arrow Dam, BC
- 8 Kootenai R at Libby Dam, MT
- 9 Duncan R at Duncan, BC
- 10 Kootenay R at Kootenay Lake, BC
- 11 SF Flathead R at Hungry Horse Dam, MT
- 12 Flathead R at Flathead Lake, MT
- 13 Pend Oreille R at Pend Oreille Lake, ID
- 14 Columbia R at Grand Coulee Dam, WA
- 15 Snake R at Brownlee Dam, ID-OR
- 16 NF Clearwater R at Dworshak Dam, ID
- 17 Columbia R at John Day Dam, OR-WA
- 18 MF Willamette R at Hills Creek Dam, OR
- 19 MF Willamette R at Lookout Point Dam, OR
- 20 Fall Cr at Fall Creek Dam, OR
- 21 Row R at Dorena Dam, OR
- 22 CF Willamette R at Cottage Grove Dam, OR
- 23 SF McKenzie R at Cougar Dam, OR
- 24 Blue R at Blue River Dam, OR
- 25 Long Tom R at Fern Ridge, OR
- 26 Middle Santiam R at Green Peter Dam, OR
- 27 South Santiam R at Foster Dam, OR
- 28 North Santiam R at Detroit Dam, OR
- 29 Rogue R at Lost Creek Dam, OR
- 30 Applegate R at Applegate Dam, OR

#### STORAGE AND STREAMFLOW HYDROGRAPHS

Water Year

##### Number

- 31 Yakima R at Cle Elum, WA
- 32 Yakima R nr Parker, WA
- 33 Snake R at Jackson Lake, WY
- 34 Snake R nr Heise, ID
- 35 Willow Cr at Ririe Dam, ID
- 36 Snake R nr Shelley, ID
- 37 Snake R at American Falls Dam, ID
- 38 Snake R at Milner Dam, ID
- 39 Little Wood R at Little Wood, ID
- 40 Owyhee R at Owyhee, OR
- 41 Boise R at nr Boise, ID
- 42 Payette R nr Emmett, ID
- 43 NF Malheur R at Agency Valley Dam, OR
- 44 Bully Cr at Bully Creek Dam, OR
- 45 MF Malheur R at Warm Springs Dam, OR
- 46 Snake R at Weiser, ID
- 47 Mill Cr at Mill Creek Dam, WA
- 48 Willow Cr at Willow Creek Dam, OR
- 49 Crooked R at Prineville Dam, OR
- 50 Ochoco R at Ochoco, OR
- 51 Green R at Howard A. Hanson Dam, WA
- 52 White R at Mud Mountain Dam, WA
- 53 Wynoochee R at Wynoochee Dam, WA
- 54 Skagit R at Ross Dam, WA
- 55 Baker R at Upper Baker Dam, WA
- 56 Cowlitz R at Mayfield/Mossyrock Dams, WA

#### FLOOD REGULATION

April-July

- 57 Columbia R at Mica Dam, BC
- 58 Columbia R at Arrow Dam, BC
- 59 Kootenai R at Libby Dam, MT
- 60 Kootenai R at Bonners Ferry, ID



**FLOOD REGULATION (Cont'd)**  
April-July

**Number**

|    |   |
|----|---|
| 61 | Duncan R at Duncan Dam, BC              |
| 62 | Kootenay R at Kootenay Lake, BC         |
| 63 | Columbia R at Birchbank, BC             |
| 64 | SF Flathead R at Hungry Horse Dam, MT   |
| 65 | Flathead R at Columbia Falls, MT        |
| 66 | Flathead R at Flathead Lake, MT         |
| 67 | Pend Oreille R at Pend Oreille Lake, ID |
| 68 | Columbia R at Grand Coulee Dam, WA      |
| 69 | Snake R at Jackson Lake Dam, WY         |
| 70 | Snake R nr Heise, ID                    |
| 71 | Snake R nr Shelley, ID                  |
| 72 | Boise R at Boise, ID                    |
| 73 | Payette R nr Emmett, ID                 |
| 74 | Snake R at Weiser, ID                   |
| 75 | Snake R at Brownlee Dam, ID-OR          |
| 76 | NF Clearwater R at Dworshak Dam, ID     |
| 77 | Clearwater R at Spalding, ID            |
| 78 | Snake R bl Lower Granite Dam, WA        |
| 79 | Columbia R at Vancouver, WA             |
| 80 | Columbia R at The Dalles Dam, OR        |

**FLOOD REGULATION**  
November-February

**Number**

|    |                            |
|----|----------------------------|
| 81 | Willamette R at Eugene, OR |
| 82 | Willamette R at Albany, OR |
| 83 | Santiam R at Jefferson, OR |
| 84 | Willamette R at Salem, OR  |

**SECTION 7 PROJECTS**  
Winter and Spring

|    |                         |
|----|-------------------------|
| 85 | Scoggins Dam and Lake   |
| 86 | Galesville Dam and Lake |
| 87 | Emigrant Dam and Lake   |
| 88 | Mason Dam and Lake      |

**SUMMARY & ANNUAL HYDROGRAPHS**  
Water Year

|    |                                     |
|----|-------------------------------------|
| 89 | Columbia R at Priest Rapids Dam, WA |
| 90 | Snake R nr Clarkston, WA            |
| 91 | Columbia R at The Dalles Dam, OR    |
| 92 | Willamette R at Salem, OR           |