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33
34 UNITED STATES DISTRICT COURT
35 DISTRICT OF OREGON

36
37 NATIONAL WILDLIFE FED'N, et al.,)
38)
39 Plaintiffs,)
40 v.)
41)
42 NATIONAL MARINE FISHERIES SERVICE))
43)
44 and UNITED STATES ARMY CORPS OF)
45 ENGINEERS, and U.S. BUREAU OF)
46 RECLAMATION,)

Civ No. 01-0640-RE (lead Case)
CV 05-0023-RE
(Consolidated Cases)

Declaration of
Gregory S. Graham

1 Defendants,

2
3 and

4
5 NORTHWEST IRRIGATION UTILITIES, PUBLIC
6 POWER COUNCIL, WASHINGTON STATE FARM
7 BUREAU FEDERATION, FRANKLIN COUNTY
8 FARM BUREAU FEDERATION, GRANT COUNTY
9 FARM BUREAU FEDERATION, AND STATE OF
10 IDAHO,

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12 Intervenor-Defendants.
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18 I, Gregory S. Graham, hereby state and declare as follows:

19 1. I have been employed with the U.S. Army Corps of Engineers since 1978. I hold a Bachelor's
20 degree in Civil Engineering from Washington State University, granted in 1980. At the present
21 time I serve as the Chief, Planning Branch, Walla Walla District. Planning Branch is responsible
22 for the preparation of all district planning documents, decision documents, environmental
23 compliance (NEPA, ESA, CWA, etc.), biological analyses, economic analyses, and cultural
24 resource analyses and clearances.

25 2. During my 26 years with the Corps, I have worked extensively on anadromous fish recovery
26 projects. For example, I was the Project Manager on the: 1992 Options Analysis / Environmental
27 Impact Statement, which included among other things the 1992 Drawdown Test of Lower
28 Granite and Little Goose reservoirs; the 1994 System Configuration Study (which evaluated
29 numerous options to improve juvenile and adult migration condition, including numerous lower
30 Snake River reservoir drawdown options); and the 2002 Lower Snake River Juvenile Salmon
31 Migration Feasibility Report and Environmental Impact Statement, which investigated dam

1 breach alternatives and other fish passage improvements. As a project manager, I provided
2 oversight and directed interdisciplinary teams to define problems, formulate and evaluate
3 alternatives, and develop recommendations to improve juvenile and adult migration conditions
4 and survival. In these capacities, I acquired a broad understanding of the effects of reservoir
5 drawdowns on the lower Snake River and impacts of alternative operations of Dworshak dam
6 and reservoir.

7 3. The following discussion is intended to address the physical and economic impacts
8 associated with the plaintiff's suggested injunctive relief concerning decreasing water particle
9 travel time (WPTT) to improve juvenile fish migration. In particular, I will discuss: 1) the
10 operation of the four lower Snake River projects at minimum operating pool (MOP), 2) a 10-foot
11 drawdown below MOP at Lower Granite Reservoir, and 3) operation of Dworshak below
12 elevation 1520 feet.

13 **BACKGROUND**

14 4. There are four dams on the lower Snake River, Ice Harbor, Lower Monumental, Little Goose
15 and Lower Granite, which are part of the Federal Columbia River Power System (FCRPS). They
16 are authorized for multiple uses, including navigation, hydropower generation, irrigation,
17 recreation, and fish and wildlife. The lower Snake River projects are operated as run-of-river
18 projects, meaning the river flow into the reservoir is equal to the flows released through the dam.
19 While the design of the lower Snake River projects includes some small allowance for pool
20 fluctuations (3 to 5 feet depending upon the project), these run-of-the-river projects provide
21 minimal storage capacity. During the juvenile fish migration season, generally April through
22 August, and based upon Endangered Species Act (ESA) consultations, the recommended
23 operation of these projects is a MOP operation during the migration season. MOP is the lowest

1 reservoir elevation in which the project navigation locks, fish facilities, powerhouse, and other
2 reservoir facilities were designed to operate. The intent of this operation is to increase water
3 velocity for the benefit of ESA listed migrating juvenile salmon and steelhead by reducing the
4 cross-sectional area of the reservoir.

5 5. The Corps and the other Action Agencies completed the Options Analysis/Environmental
6 Impact Analysis (OA/EIS) (A.R. 230), which looked at a variety of reservoir drawdown and flow
7 augmentation alternatives. This included the 1992 Drawdown Test, which provided information
8 on the physical impacts associated with drawdown of Lower Granite Dam and Little Goose
9 reservoirs.

10 **OPERATION AT MOP**

11 6. A suggested component to decreasing WPTT suggested by plaintiffs' is to operate the four
12 lower Snake River projects at MOP. As mentioned above, for ESA purposes, MOP is the
13 recommended operation for the lower Snake River projects. However, the last few years, Lower
14 Granite has been operated 1 foot above MOP (MOP+1) to allow commercial navigation vessels
15 to navigate over high spots in the navigation channel, resulting from the sediment build-up
16 occurring since the last maintenance dredging.

17 7. Although the Corps has operated at MOP+1 in the Lower Granite reservoir, commercial
18 navigation is being adversely affected (A.R. 32, pp 4-53-56). Under current conditions, without
19 maintenance dredging on the lower Snake River, operation of all projects at MOP would impact
20 the authorized navigation purpose by affecting commercial shipping and tour boat operations up
21 to the Lewiston and Clarkston area. If the lower Snake River projects were operated at MOP,
22 additional light loading of commercial barges would be required and the costs to shippers of light

1 loading could be significant. As an example, a 2-foot light load is estimated to cost shippers
2 approximately \$10 million over a 6 month period. (A.R. 32).

3 8. Operation at MOP will likely adversely affect safe operation of commercial and recreational
4 vessels. With current operation at MOP + 1, groundings have occurred, barges and tugs have
5 scraped bottom, and cruise ships have reported damage to equipment. The port of Clarkston
6 reports they have to move barges multiple times during loading because of the shallow berthing
7 area. Each time a partially loaded barge is moved, there is increased danger to barge personnel.
8 In addition, as the channel silts in, it narrows and increases the likelihood for collision between
9 passing vessels. This is especially critical when upstream and downstream barge tows are
10 passing. Towboats have to account for currents, and other hydraulic effects that alter their path.
11 With the average tow of 46 feet wide by 600 feet long, any amount of steerage needed to account
12 for currents, bank suction, or a bend in the river results in very little room for error for safe
13 passage.

14 9. MOP operation would also have adverse effects on the \$5 million/year tour boat industry.
15 The current MOP +1 operations have limited the use of larger cruise ships and even with smaller
16 cruise ships beings used, groundings have occurred.

17 10. The plaintiffs' suggested MOP operation of the lower Snake River projects, given the current
18 sediment build-up of the navigation channel, would be detrimental for the navigation industry.

19 **10-FOOT DRAWDOWN AT LOWER GRANITE RESERVOIR**

20 11. More significantly, the plaintiffs suggest a drawdown of up to 10-feet below MOP in Lower
21 Granite reservoir, for the period of June 20th to August 31st. There are numerous physical and
22 economic impacts related to a drawdown below MOP, which are addressed in the paragraphs
23 below. Most of this information was developed during the test drawdown of Lower Granite Dam

1 in 1992. The focus of the test was to gather information on the physical effects of reservoir
2 drawdowns. The four-week test occurred in March prior to the juvenile fish migration season to
3 minimize the potential negative impact on fish. In addition, this coincided with the annual lock
4 outage for maintenance. Lower Granite and Little Goose reservoirs were drawdown 36-feet and
5 12.5-feet below MOP, respectively. During low flow conditions, as are expected in the summer
6 of 2005, a 10-foot drawdown at the dam would result in an approximate 10-foot drawdown in the
7 area of the confluence of the Snake and Clearwater rivers (approximately 33 miles upstream
8 from the dam). This is the location of the cities of Lewiston and Clarkston, 3 public ports, and
9 several recreational boat ramps and facilities.

10 12. EFFECTS ON LOWER GRANITE FISH PASSAGE FACILITIES.

- 11 • The juvenile bypass system would be inoperable and eliminate the juvenile fish
12 transportation program at Lower Granite Dam.
- 13 • Operating Lower Granite at elevation 723 feet would take the Removable Spillway Weir
14 (RSW), used for juvenile fish passage, out of service.
- 15 • The Behavioral Guidance Structure in the forebay of the Lower Granite Dam would need
16 relocation to deeper water somewhere in the reservoir. This would take approximately
17 one-month to move this structure (requiring hiring of a contractor).
- 18 • Lower Granite has a false weir that allows the adult fish ladder to operate when the
19 reservoir is drawdown below MOP (up to 18-feet below). The exit pipe for this weir has
20 been disconnected and would have to be reinstalled to allow this facility to operate under
21 the drawdown below MOP. As designed and constructed, the alternate fish ladder was
22 meant for an emergency operation only and provides only a marginal adult fish passage

1 conditions. The estimated cost for this is \$20,000 and would take approximately 3-weeks
2 to complete.

3 13. COMMERCIAL NAVIGATION. Drawdown of Lower Granite reservoir below MOP would
4 shut down the lock operation to commercial vessels because there is insufficient draft over the
5 upstream sill of the lock and in the channel above the lock. This eliminates commercial traffic
6 above Lower Granite Dam, which includes the ports of Lewiston, Clarkston and Wilma. The
7 extensive, coordinated, and reviewed economic analysis done for the Lower Snake River
8 Juvenile Salmon Migration Feasibility Report/EIS, February, 2002 (A.R. 214), demonstrated that
9 the long term loss of the Snake River navigation system would result in annual economic losses
10 of \$37.8 million (A.R. 214, Summary, p.41). This analysis includes impacts from breaching all
11 four lower Snake River dams. Based on 1992-2001 shipping tonnage, shipments through Lower
12 Granite Dam account for 26% of cargo shipped on the Snake River. Applying this percentage to
13 the total economic losses over a 2-1/2 month drawdown period yields an average loss of \$2.5
14 million. This assumes there is capacity to handle changes in transportation modes, which in the
15 short-term may not be adequate unless much higher costs are paid.

16 14. LEWISTON LEVEE SYSTEM. The 41,000 feet of Lewiston levees are protected with riprap
17 from the crest elevation to elevation 730 feet. Below this elevation the levee is protected with
18 rock fill. Since the proposed reduction in reservoir level is 10 feet, some portions of the levee
19 would be exposed below the level of riprap protection and be subject to wave-action erosion.
20 Any significant erosion of the rock fill portion of the levee may result in a levee breach, which
21 could result in significant flooding and damages to downtown Lewiston. Sustained winds of 40
22 to 70 mph winds would be required to create waves of sufficient size and magnitude to cause
23 significant erosion (A.R. 227, Appendix B, Section 2c, Lewiston Levees, page 2). The

1 probability of 40-70 mph winds occurring during the drawdown period is small, but would need
2 to be closely monitored for public safety should a drawdown occur.

3 15. NATURAL SHORELINE SLOUGHING. Reservoir drawdown could result in natural slope
4 sloughing (sliding). Soils saturated by the reservoir are heavier than if dry. Supported by the
5 reservoir water pressure, saturated soils are stable. Lowering the reservoir levels removes the
6 water pressure and its stabilizing effect. Sloughing can expose cultural artifacts (such as native
7 American burial sites), significantly increase turbidity, expose utilities, cause navigation
8 problems, create safety issues, and destabilize engineered embankments (if they occur below or
9 adjacent to the embankment). (A.R. 227, page 79). Reducing the rate of drawdown could
10 minimize this effect.

11 16. ENCAPSULATED FILL. During the construction of the Lewiston Levee system, a
12 significant amount of potentially toxic waste material was placed in an encapsulated landfill on
13 the north bank of the Snake River. Reservoir drawdown can affect groundwater flow and
14 potentially the transport of contaminant waste from the encapsulated fill. Monitoring wells used
15 prior to and during the 1992 drawdown test identified no detectable leakage of contaminant
16 movement. However, the potential for this to occur exists, particularly if the condition of the
17 encapsulated landfill has deteriorated over the past 13-years. Monitoring during drawdown
18 would be required. If toxic material were detected as a result of drawdown, refilling the reservoir
19 would reduce further risk of contaminant leakage.

20 17. CULTURAL RESOURCE EFFECTS. There are in excess of 150 known archeological sites
21 (burials, fire pits, etc.), within the Lower Granite reservoir area. It is anticipated that a 10-foot
22 drawdown of Lower Granite reservoir would result in similar impacts to cultural resources as
23 occurred during the 1992 drawdown test. Fifteen identified archaeological sites were monitored

1 by Washington State University during the 1992 drawdown test and various types and categories
2 of impacts documented. The following observations and findings were reported (A.R. 227, page
3 130):

- 4 • Artifact collection and vandalism occurred during drawdown exposure at a much greater
5 scale than was originally anticipated.
- 6 • Two Native American burials were exposed.

7 18. OTHER EFFECTS AT LOWER GRANITE DAM.

- 8 • The navigation lock guidewall, used to guide commercial vessels into the lock, can
9 operate down to elevation 724 feet. However, a dive inspection is required on the lower
10 end of the monolith/slot to assure that it is free of debris. Lowering the reservoir to
11 elevation 723 feet would require removing the guidewall with an estimated cost of
12 \$50,000 and would require up to one-month to complete. If not removed, the resulting
13 damage to the guidewall/dam connection would be significantly more costly to repair.
- 14 • The trash shear boom, used to keep debris out of the turbine intakes, can also operate
15 down to elevation 724 feet. Lowering the reservoir to elevation 723 feet would require an
16 alternative powerhouse connection for the shear boom. This is estimated to cost \$25,000
17 and requires up to several weeks to complete.

18 19. EFFECTS TO THE LOCAL ECONOMY. This section highlights the impacts of a 10-foot
19 drawdown on local facilities and the local economy.

- 20 • There are over 40 miles of engineered embankment bordering the Lower Granite
21 reservoir (i.e. roads and railroads) that would be subject to possible wave-action erosion.
22 Due to the lowering of the reservoir level, bordering embankments would experience
23 settlement (consolidation of soils), which has the potential to adversely effect roads and

1 railroads located along an embankment, as well as the embankment itself. For example,
2 settlement may cause severe cracks to occur in the embankment, which could ultimately
3 cause a complete failure due to sliding. During the 1992 drawdown, the Camas Prairie
4 Railroad (CPRR) track misaligned due to settlement, resulting in speed reductions. Also,
5 cracks in railroad embankments and roads into and out of Lewiston and Clarkston area
6 occurred. (A.R. 227, page 79). These roads and railroads are vitally important
7 transportation alternatives, even more so given the 10-foot drawdown below MOP
8 operation, which would result in the loss of commercial navigation. A major failure to
9 these embankments could have impacts to the transport of goods into and out of the
10 Lewiston and surrounding area, significantly impacting the local economy.

- 11 • Damage to docks and boat landings would likely occur with a 10-foot drawdown. For
12 example, during the 1992 drawdown test, several of the docks at Port of Wilma and
13 Lewiston were damaged due to soil settlement at or near the dock. In addition, boat
14 landings at two commercial businesses in Clarkston were also damaged (A.R. 227, page
15 81).
- 16 • Potlatch Corporation has a pulp and paper mill plant with an effluent discharge diffuser
17 downstream from their plant at approximately Snake River Mile 140, just upstream from
18 the Washington/Idaho border. According to information stated on the permit (NPDES
19 Permit Number: ID0001163), the effluent discharge requires that the mixing zone be
20 limited to a percentage of the width and volume of stream (receiving waters) to allow a
21 zone of passage for aquatic life and that effluent concentrations be within defined limits
22 at various mixing points. Lowering of the reservoir by 10-feet may reduce the mixing

1 volume required, which may require a permit variance. If not granted, it could affect a
2 portion of Potlatch's operation.

- 3 • Based on studies conducted for potential breaching of the Lower Snake River dams,
4 modification of the Potlatch Corporation water intake would be required for a 10-foot
5 drawdown. If improvements were not made to the intake, Potlatch would be unable to
6 supply the entire 27,000-gallon per minute average requirement necessary for operation
7 of their pulp and paper mill plant. The required improvements are large and it would be
8 impractical to assume that they could occur in the time frame suggested by the plaintiffs.
9 As a result, this could also impact a portion of their operation.

- 10 • Shallow water supply wells in proximity to the river are often dependent on and draw
11 from levels commensurate with the reservoir level. Lowering of the reservoir level by 10
12 feet may drop ground water levels in nearby wells by a similar amount and may result in
13 lack of pumping ability for some wells. A cursory survey of well logs in proximity
14 (within 1/2 mile) to the river in the vicinity of the City of Clarkston revealed that at least
15 12 wells would be adversely affected.

16 **OPERATION OF DWORSHAK BELOW ELEVATION 1520**

17 19. The following discussion addresses the physical impacts associated with the plaintiff's
18 suggestion for decreasing water particle travel time (WPTT) by providing additional flow
19 augmentation water – in particular drafting Dworshak Reservoir below the current summer draft
20 limit of 1520 feet.

21 20. EFFECT OF HATCHERY OPERATIONS. The water temperature in Dworshak reservoir
22 varies with depth. Dworshak dam is equipped with a system (selector gate) that allows the
23 withdrawal of water from any depth between elevations 1600 (full) to 1500 feet, to meet the

1 desired water temperature requirements. If the reservoir were drafted to 1500 feet or below, this
2 selector gate is unusable. As a result, the warmer water normally supplied to Dworshak National
3 Fish Hatchery, would not be available. The colder water would reduce the fish growth rates at
4 the hatchery, which could impact the hatcheries ability to meet mitigation requirements.

5 21. EFFECT ON REFILL. It is estimated that to attain the suggested 10% decrease in WPTT
6 from additional flows from Dworshak Dam it would require drafting the project from elevation
7 1520 feet to elevation 1470 feet. The release of additional water below elevation 1520 feet to
8 elevation 1470 feet will seriously impact the ability of the reservoir to refill for the following
9 migration season. It is estimated that under average water conditions, the reservoir would only
10 refill to approximately elevation 1560 feet by July of next year, impacting the availability of
11 water for flow augmentation.

12 22. EFFECTS ON RECREATION. More than three quarters of all recreation use at Dworshak
13 Reservoir occurs from June 1st through September. Typically the reservoir is full (or near full) at
14 or near July 4th, the peak of the recreation season. Most recreation facilities become unusable as
15 the water level recedes. As public access is reduced public use also is reduced. Drafting
16 Dworshak from elevation 1520 feet to 1470 feet would further impact recreational areas during
17 the summer recreation season. For example: Granddad boat ramp is unusable at elevation 1530
18 feet, Dworshak State Park ramp at elevation 1510 feet, Bruce's Eddy ramp at 1490 feet, and
19 Dent Acres Campground ramp at 1485 feet. This leaves only the Big Eddy boat ramp usable to
20 elevation 1445 feet.

21 23. EFFECT ON CULTURAL RESOURCES. Lowering the reservoir level will expose more
22 area to wind and wave erosion. This may result in exposing cultural artifacts and increase
23 vandalism. In some areas, exposed shorelines are illegally used by off-road-vehicles, potentially

1 | disturbing cultural sites.
2 | 24. Pursuant to 28 U.S.C. § 1746, I declare under the penalty of perjury that the foregoing is true
3 | and correct to the best of my knowledge, based on my education, experience and professional
4 | judgment. Executed April 21, 2005, at Walla Walla, Washington.

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Gregory S. Graham
Civil Engineer, U.S. Army Corps of Engineers

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