DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NORTHWESTERN DIVISION
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July 26, 2012

Planning, Environmental Resources,
Fish Policy and Support Division

Mr. Barry Thom
NOAA Fisheries Service
1201 NE Lloyd Blvd., Suite 100
Portland, OR 97232

Dear Mr. Thom:

This is in regard to the John Day Adaptive Management Implementation Plan. As you know, the Adaptive Management Implementation Plan calls for the development of a Plan of Study (Plan) for operating the John Day Reservoir at Minimum Operating Pool as a Long-term Contingency Action. I am pleased to inform you that this Plan is now complete. The Plan was developed by the Corps in coordination with the other Action Agencies and was provided in draft for review and comment to our partners in the Regional Implementation Oversight Group (RIOG). The Plan and our responses to comments received from the RIOG are enclosed.

I am forwarding a copy of this letter to Ms. Kathryn Puckett, Columbia Snake Salmon Recovery Office, Bureau of Reclamation, PN Region, 1150 N. Curtis Road, Suite 100, Boise, ID 83706; Mr. Duane Mecham, Office of the Regional Solicitor, 805 SW Broadway, Suite 600, Portland, OR 97205; Ms. Sarah McNary and Mr. Paul Majkut, Bonneville Power Administration, PO Box 3621, Portland, OR 97208; and Mr. Bruce Suzumoto, NOAA Fisheries Service, 1201 NE Lloyd Blvd., Suite 100, Portland, OR 97232.

Sincerely,

David L. Combs
Chief, Planning, Environmental Resources,
Fish Policy and Support Division

Enclosures

John Day Minimum Operating Pool
Feasibility Plan of Study
July 2012

1. INTRODUCTION AND PURPOSE

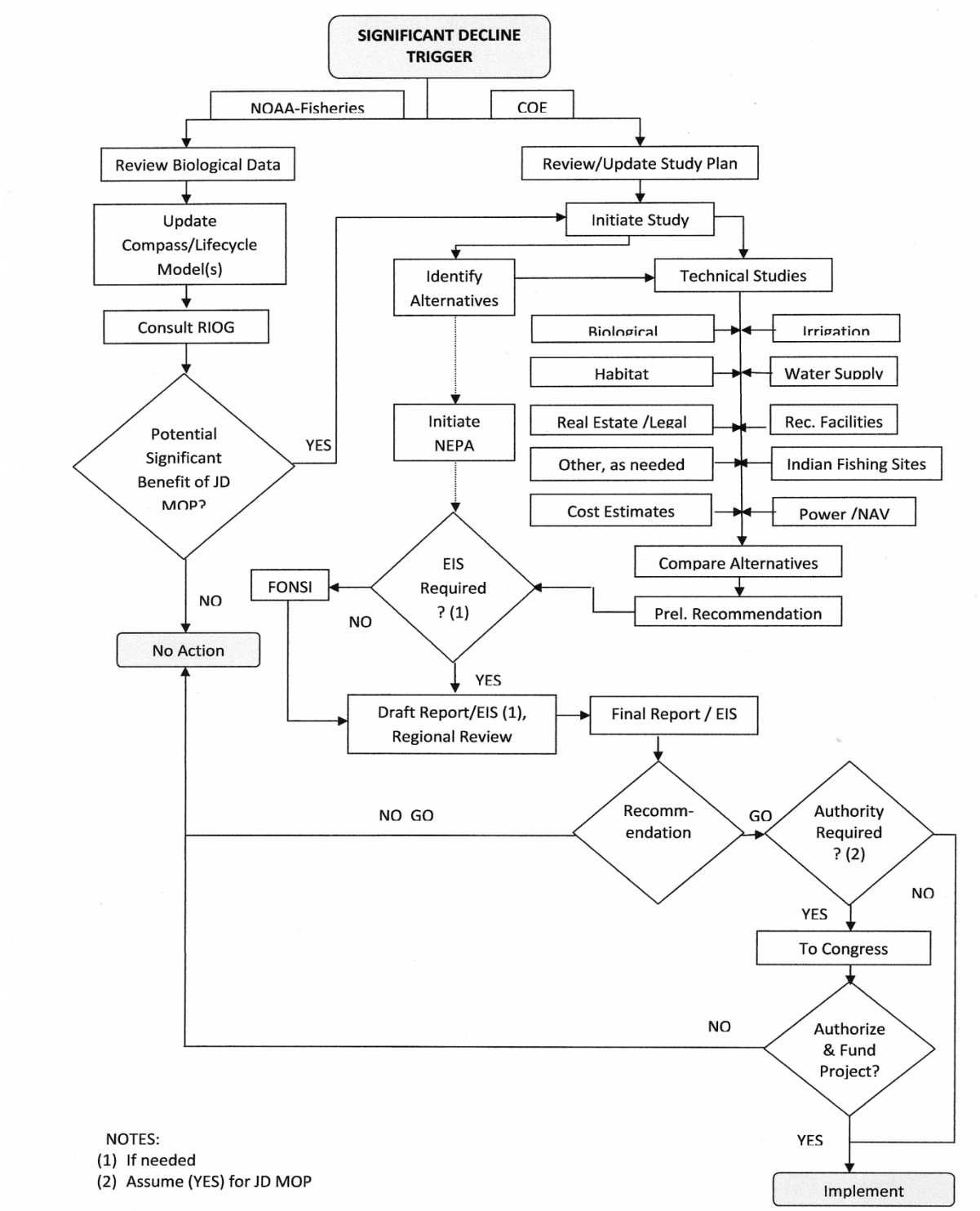
The National Oceanic and Atmospheric Administration (NOAA) Fisheries' 2010 Supplemental Biological Opinion (BiOp) on the operation of the Federal Columbia River Power System (FCRPS) identified "triggers" that if tripped, would result in the implementation of immediate and potential long-term contingency actions to address an Endangered Species Act (ESA) listed salmonid species' decline. The BiOp states: "*In the selection of Long-term Contingency Actions for a particular species, emphasis will be on actions that would significantly improve the survival of the fish experiencing the significant decline*." The overall adaptive management and contingency process is depicted at page 42 of the FCRPS Adaptive Management Implementation Plan (AMIP) (http://www.salmonrecovery.gov/Files/BiologicalOpinions/AMIP_09%2010%2009.pdf) Operation of John Day Dam at its minimum operating pool (MOP) elevation is identified as one of the potential long-term contingency actions. Specifically, regarding this potential action, the BiOp provides as follows:

> ***John Day Reservoir Operations at Minimum Operating Pool (MOP) from April through June****: By December 2011, the Corps, in coordination with the other federal agencies, will complete study plans to include milestones, scope and schedule as well as a decision making process [as] appropriate. Implementation of this operation will require the Corps to conduct an evaluation and prepare National Environmental Policy Act (NEPA) documentation which are necessary to seek authority from Congress to mitigate for related impacts. Currently the Corps does not have authority to mitigate for related impacts, such as those identified in previous studies affecting irrigation, municipal water supplies, hatchery water supplies, anadromous and resident fish habitat, wildlife habitat, recreation sites, cultural resource sites, and adult passage facilities.*

Following the occurrence of a decline trigger, NOAA Fisheries and the AAs, in consultation with the Regional Implementation Oversight Group (RIOG), would conduct an initial evaluation of the potential need for both long term contingency actions and the benefits of the MOP operation for the species of concern using then existing data and modeling resources. If it is determined that there is a potential for a significant benefit of the operation the feasibility study would be initiated by the Corps as outlined in this plan of study. Additional decision points would occur over the course of the study, as shown in Figure 1.

To fulfill the requirements of the BiOp, the US Army Corps of Engineers (Corps), in collaboration the Bureau of Reclamation (Reclamation) and Bonneville Power Administration (BPA)(together the Action Agencies (AAs)), other Federal agencies and Regional Sovereigns, has developed this Plan of Study (POS) that outlines a comprehensive feasibility-level study that will inform a decision process as to whether a recommendation to implement the action or alternatives and seek Congressional authority to mitigate impacts, as necessary, is warranted. This study plan documents assumptions and defines the scope, work tasks, schedule and cost estimating necessary to conduct the study. The intent, once thoroughly reviewed and completed, is for this POS to be available to the Corps and the Region, should a "Significant Decline Trigger" occur over the course of the period covered by the 2010 Supplemental BiOp.

Figure 1. John Day MOP Decision Process



2. FEASIBILITY STUDY PURPOSE AND SCOPE

The purpose of the John Day MOP Feasibility Study (JDMOP Study) is to support the Corps' efforts pursuant to the 2010 FCRPS BiOp. It will be conducted in conformance with all current Corps policies and procedures including periodic internal and external reviews as the study progresses. The JDMOP Study is to provide the basis for a sound, scientifically based decision regarding the risks and benefits of operating John Day dam at MOP to support salmon recovery. The study will evaluate the potential benefits and detriments of the operation and implemented measures, impacts to the environment, public and private facilities and uses affected as a result of an annual April through June operation of the John Day pool at the MOP level. The study process will include all pertinent requirements of the National Environmental Policy Act (NEPA). A range of alternative measures will be identified, evaluated and compared with the proposed operation. Recommendations will be the result of a thorough analysis of the benefits of the operation and alternatives for the species experiencing the significant decline, tradeoffs, impacts, and mitigation costs. Assuming a decision to recommend implementation of John Day to MOP is made, the Corps would ask Congress for authorization to mitigate impacts to facilities (public and private) resulting from the operation.

3. PROJECT AUTHORITES

The John Day Lock and Dam Project was originally authorized in the May 17, 1950, Flood Control Act, Public Law 81-516 for navigation, hydropower, flood control, water quality and fish and wildlife. The general plan, presented in House Document No. 531, 81st Congress, 2nd Session, provided for a dam, power plant, navigation lock, and reservoir extending to McNary Lock and Dam. Flood control storage of 2 million acre-feet was provided between elevations 255 and 292 feet at the dam. Due to adverse effects of the fluctuating water levels on waterside properties and installations, the Committee on Public Works of the U.S. Senate requested a review of authorized flood control features of the project on April 22, 1953. In response, a review report was submitted to the Congress on August 9, 1956, (Senate Document No. 10, 8th Congress, 1st Session) which recommended revision of flood storage capacity to about 500,000 acre-feet. This revision would be achieved by reduced surcharge and drawdown from normal lake level at an approximate elevation of 262 feet. The Public Works Committees of the Senate and House adopted this recommendation as a change from the original 1950 authorization in review reports dated April 22, 1956, and December 12, 1956, respectively. The Corps General Design Memorandum (GDM) of June 1958 reported that the most beneficial plan would be to fluctuate the reservoir elevation between elevations 265 and 262 feet for power generation, and provide the 500,000 acre-feet of flood control storage between elevations 257 and 268 feet. The John Day project authorization was later modified by Public Law 89-298 to

provide additional authority for the acquisition of land to be used for waterfowl habitat management. This authorization was substantially in accordance with the recommendations of the Chief of Engineers contained in Senate Document No. 28, 89th Congress, 1st Session. The Chief's recommendations cited both mitigation for the construction of the project and resource enhancement as justification for acquiring additional lands and developing a national wildlife refuge within the project area. Additional authority associated with this project is found in PL78-534 (Flood Control Act of 1944) for public parks and recreational facilities.

4. EXISTING PROJECT

John Day Lock and Dam is one unit in the comprehensive development for multiple-purpose uses of the water resources of the Columbia River and its tributaries. The general layout of the project is shown in Figure 2. Table 1 provides pertinent project data. The dam provides approximately 76 miles of navigation from the head of The Dalles reservoir to McNary Dam, completing navigation improvements from the Pacific Ocean to the Pasco-Kennewick area of Washington and to Lewiston, Idaho on the lower Snake River. The project provides approximately 2,160,000 kilowatts (kw) of nameplate rating generating capacity. Lake Umatilla is the farthest downstream reservoir on the Columbia River with authorized flood control storage. The 500,000 acre-feet of flood control storage is used to reduce downstream flood damages, compensating for unavoidable irregularities in operation of upstream reservoirs and regulating flows from uncontrolled tributaries above the site.

The John Day project is one of eight projects on the lower Columbia and Snake Rivers authorized for multiple purposes with design features that provide passage for adult and juvenile anadromous fish. While normally operated as a run-of-river project (a dam project without significant storage capacity where, generally, inflow equals outflow) the pool contains useable storage capacity which can be made available for flood control, the only one of the eight projects that can be operated for this purpose.

Table 1: John Day project data

Description	Elevation (msl)
Maximum pool	276.5 feet
Full pool	268 feet
Normal pool	265 feet
Minimum Irrigation pool (MIP)	262.5 feet (adjusted with flows)
Minimum Operating pool (MOP)	257 feet

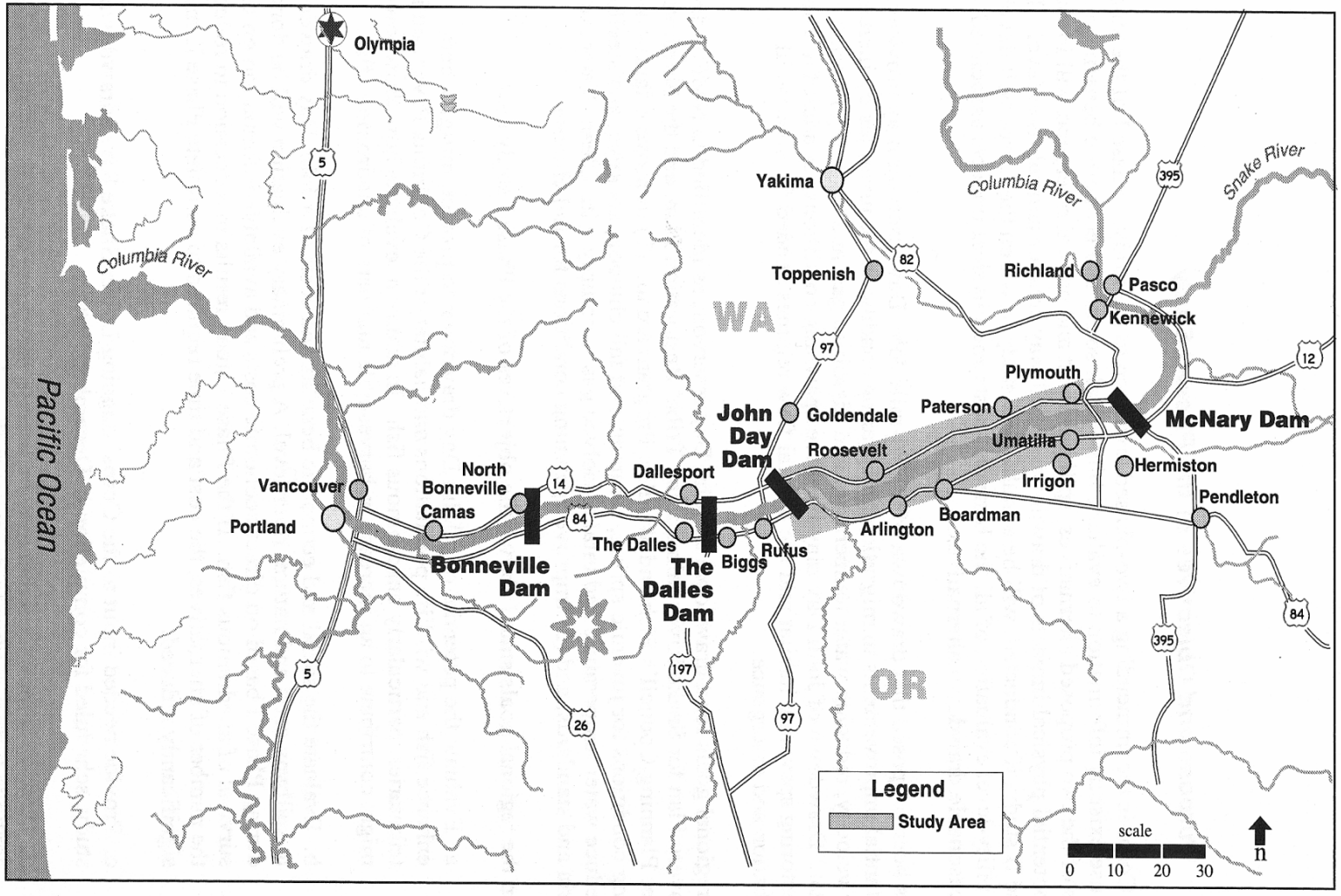


Figure 2. John Day MOP Feasibility Study Area

5. BACKGROUND INFORMATION

To provide flood control storage space, the overall operating range of the project is 11 feet, greater than the other dams on the lower Snake and Columbia Rivers. Normal project operations have not involved frequent nor sustained operation at the MOP level. For this reason, a sustained operation at MOP at this project has more significant impacts than at the other run-of-river projects. Operation at MOP will have adverse effects on public and private facilities, including water supplies, irrigation and recreation sites, as well as habitat values which have developed on and adjacent to the reservoir over its 40+ years of operation.

Prior to 1992, average pool levels normally fluctuated around elevation 263.5 feet in the winter/spring period and elevation 266.5 feet in the summer/ fall period. Operational ranges were generally 3-5 feet to provide pondage to support variations in power production requirements.

A number of studies, Congressional directives and related actions have been taken since the early 1990's regarding drawdown scenarios for John Day pool. Following recommendations in the Options Analysis/ EIS in 1992, the normal operations were modified during the May through August juvenile salmonid passage season to a floor of 262.5 feet (MIP) with a range of 1.5 feet to 264 feet, which continues annually to the present time. A reconnaissance level study was completed in 1994, evaluating MOP operation in response to the Northwest Power Planning Council's 1988 Fish and Wildlife Program Amendments. A detailed summary of that study and a compilation of the prior activities associated with drawdowns of John Day reservoir is provided in three attachments to this document:

Attachment I. Prior studies and activities regarding John Day drawdowns.

Attachment II. Congressional actions with regard to John Day drawdowns.

Attachment III. Summary of the 1994 John Day MOP report.

6. STUDY ELEMENTS

Assumptions

It is assumed that NOAA Fisheries will have primary responsibility to provide the initial biological analysis on the potential benefit of the proposed operation on the species in decline to make a determination, with the AA's and in collaboration with RIOG, as to whether this study should be initiated. Because the then current models or other existing information will not address all potential effects, as well as effects on other species and habitat values, additional biological data will be required to determine the relative merits of the operation and alternatives through this study to make a final assessment and recommendation.

The proposed operation is a 3-month drawdown to MOP April thru June. It is assumed that for the balance of the juvenile migration season thru August that the pool would be returned to the current MIP operation and returned to normal pool levels beginning in September. With reference to the 1994 study (see Attachment III), this earlier (spring) and shorter duration MOP operation may present a somewhat different picture relative to the impacts of the operation. This could, for instance, be relevant regarding habitat and recreation site effects and potentially other factors.

In addition, a range of alternatives to the John Day MOP operation will be identified, screened and evaluated.

Another factor that could influence the impacts of operating at MOP is the potential changes to the Columbia River Treaty between Canada and the United States which could impact how the Columbia River is operated. No decisions have been made at this point but by the time this effort is initiated more definition of how the operation of the Columbia River could be impacted should be available and incorporated into the analysis.

The following describes the elements of the study necessary to complete the JDMOP Study and NEPA compliance processes. While all of the elements identified for evaluation relate specifically to the proposed MOP operation, some alternatives may have effects on these elements as well, requiring similar evaluations:

Biological Studies

The central hypothesis of the JD MOP operation is that fish survival would increase due to decreased travel time for juvenile spring migrants through the John Day Reservoir and earlier ocean entry time. The effect of decreased travel time and earlier ocean entry on salmon and steelhead survival will first be explored using the updated COMPASS and other existing information from years of field studies and monitoring. No additional field studies are anticipated. Existing data that would be analyzed to assess effects of the MOP operation on survival and travel time include:

1. Data from PIT-tagged fish detected at McNary and John Day Dams
2. Lower Columbia River acoustic telemetry study data

To initiate the study a workshop would be conducted for detailed planning for the biological and habitat studies that would need to be accomplished in order to assess the overall benefits and detriments to the targeted stock, as well as other anadromous and resident fish, aquatic organisms, habitat and wildlife. The workshop would also be the vehicle to work with the Region to initially identify a range of potential alternative measures that would subsequently be screened and ranked for their potential to provide benefits to compare with the proposed MOP operation. A complete literature search would be conducted and reported at the workshop to assist in determining what is known regarding these issues and what data gaps would be

necessary to fill in order to make a final decision on the merits of the proposed operation. Resulting studies would involve the collection of data, conduct of physical and/or numerical model studies and tests to establish baseline project conditions and to assess and predict the effects that operation at MOP and the other alternatives would have on anadromous fish and other organisms as described herein and in the next section below.

a. Juvenile dam passage. The 2010 Biological Opinion juvenile dam passage survival performance standards for Spring/Summer Chinook and Steelhead have been established at 96%. The subyearling Chinook passage survival standard is 93%. Assuming these passage standards are attained with the current John Day operation, it will be necessary to assess whether operation of the pool at MOP, five- feet lower than current MIP operation, changes overall dam passage survival. Potential effects to evaluate include changes in juvenile fish passage distribution, forebay behavior, dam and route-specific survival, and adult passage into and through ladders.

1. Effects on fish guidance efficiency (FGE). Operating at MOP may have an impact on FGE, existing prototype and model data (physical and numerical) will be investigated to see if there is any documented impacts. One source of potential impacts to screen efficiency will be evaluated by looking at the previously collected data on STS and ESBS at JDA. The current Bonneville 2nd PH FGE CFD model will be probed and changes to the elevation of the gate well orifice will be evaluated. The actual impacts, if any, cannot be quantified without field test which will require MOP operations to be implemented.

2. Effects on spill conditions- JDA. Numerical modeling of the top spill weir will be conducted to evaluate the necessary changes in the height of the facility under MOP operations. Total Dissolved Gas (TDG) and spillway survival is not anticipated to be negatively impacted by operating at MOP.

3. Effects on spill conditions – McNary. Model studies from the original design of the McNary flow deflectors will be evaluated to determine potential impacts due to revised tailwater. TDG experts will be consulted to provide technical expertise on TDG impacts. Actual impacts cannot be evaluated until MOP operations are implemented.

4. Effects on passage systems. Baseline data on operational conditions would be reviewed and/or collected as required to be used in modeling efforts to assess potential effects on fish passage and survival for the following.

- John Day juvenile bypass system, orifice passage efficiencies , turbine entrainment and conditions, and spillway weirs
- McNary outfall plunge

b. Adult dam passage. The 1994 report indicated that operation of John Day pool at MOP would affect flow conditions in the McNary and John Day fish ladders. Since that study, measures to improve performance of both the John Day north and south ladders have been completed or are underway (as of 2011).

1. Determine whether the new improvements are sufficient to meet adult passage criteria at the John Day ladders. If so, no other effort would be required. If not, determine what additional measures would be required.

2. Conduct an assessment of the entrance conditions at McNary ladders to determine the need for modifications.

c. Effects of the operations on lamprey passage. While little is known about juvenile lamprey passage at John Day, adult passage has been studied and recent improvements made to John Day and McNary Dam ladders. Investigation would include an assessment of adult lamprey passage at the dams, monitoring at the juvenile sampling facilities, as well as habitat issues (discussed in next section).

d. Develop feasibility–level designs and cost estimates for any potential modifications to passage facilities if determined necessary to maintain or improve passage performance at the dams.

Habitat, Resident Fish and Wildlife

The 1994 reconnaissance level study identified 8,400 acres of existing shallow water habitat including 2,100 acres of marsh-riparian zones that would be impacted by the MOP operation. This resource is primarily located in the upper one-third of the reservoir and the UNWR. The following would be evaluated for the potential MOP operation and, as appropriate, for alternative actions:

a. Effects on shallow water fish habitat. Collect baseline data on benthic organisms (including macro-benthic invertebrates), vegetation, water quality, plankton composition and abundance. Two years of data collection would be required to assess the potential fate of these organisms under the MOP operation scenario.

b. The effects on fall Chinook and sturgeon spawning below McNary and John Day Dams will be evaluated through spawning surveys.

c. Change in nesting habitat for terns, gulls, and other piscivorous birds and potential for this to change juvenile fish survival will be assessed (scope of this effort is under internal review).

d. The effect of MOP operation on resident piscivorous fish species will be assessed. In particular the effect of fluctuating reservoir elevations on smallmouth bass, walleye, and northern pikeminnow spawning habitat will be evaluated.

e. Water quality modeling and monitoring will be conducted to determine the effects of the MOP operation on total dissolved gas generation and temperature at and below John Day and downstream projects.

f. The following study efforts would be required to establish without project conditions and assess impacts of and mitigation requirements for effects of MOP operation on habitat for subyearling fall Chinook, lamprey and resident fish and wildlife. The overall project shoreline and lands will be considered, but studies will focus on the Umatilla National Wildlife Refuge, operated by the U.S. Fish and Wildlife Service (USFWS) and two wildlife management areas operated by the State of Oregon on project lands. The work would be conducted in cooperation with the Fish and Wildlife Service and State agencies.

(1) Develop a detailed delineation of the shoreline and shallow water habitat and marsh –riparian zones under current operations and at MOP.

(2) Assess the occurrence of subyearling fall Chinook, juvenile (ammocoetes and macrothalmia) lamprey and assess impact of the operation on these organisms in conjunction with subparagraph a., above.

(3) HEP Analyses. Establish existing habitat values using the Habitat Evaluation Process methodology. Conduct similar analyses to assess the impacts of the drawdown and establish mitigation requirements for losses of shallow water, marsh and riparian habitat associated with John Day pool and potential off-site mitigation locations.

g. Wildlife field studies. Collect information on wildlife productivity in the emergent marsh and riparian habitat areas. Establish numbers of species present and importance of habitats to species reproduction and foraging western painted turtle, waterfowl, rails, herons and allies, passerines, furbearers and others.

h. Submergent plant communities. Establish the location, extent and species composition of submergent plant communities impacted by the drawdown.

i. Develop/evaluate mitigation alternatives. Based on requirements established by analysis of the existing without project condition, identify and evaluate potential on and off-site locations, development and management measures to mitigate for habitat losses. Analysis will entail HEP evaluations for potential mitigation locations, preliminary development requirements, comparative costs and output of alternative scenarios, incremental cost analysis and justification. Alternative plans will be identified

to include off-site land requirements and preliminary development schemes for comparison. Preliminary designs would be used to develop the baseline cost estimate which would accompany the decision document.

j. A Coordination Act report will be provided by the Fish and Wildlife Service and be included as part of the feasibility study.

Water Supplies

a. Umatilla and Irrigon Fish Hatcheries. Investigate and develop alternative methods for mitigating the additional increment of water supply shortfall which would be caused by the drawdown operation. Initial contacts with the hatchery managers' report that significant changes in hatchery operations have occurred that require additional water supply during portions of the year. The current available water supply, however, has stayed fairly constant throughout the year, unlike the information that was presented in the 1994 study. Both new groundwater sources and other methods to replace water supplies lost through drawdown will be investigated (i.e. recycling water, relocating hatcheries, etc).

1) Explorations will be conducted and test wells installed to determine the feasibility and capacity for locating and developing additional groundwater sources, if needed.

2) A program to test and demonstrate the feasibility of alternatives to provide treatment of river water or recycled hatchery water as alternatives to additional new groundwater supplies will be conducted.

3) Comparative designs and cost estimates will be presented in the decision document (feasibility report). An incremental analysis of alternative measures will be used to aid in developing recommendations. The preliminary designs for the recommended alternative will be used for preparation of the baseline cost estimate.

b. City of Boardman municipal water supply.

1) Negotiate agreement with owner to conduct studies.

2) Conduct studies to assess the impact, need and alternatives for additional water to supplement existing municipal capacity. Since the 1994 report, the city has added a 2nd Rainey well to their system to keep up with water supply needs and, as before, the MOP operation will likely impact that production.

c. Public and private groundwater supplies. As reported in the 1994 report, at least 2,000 groundwater wells were estimated to be operating in the vicinity of the reservoir.

Many of these were drilled into a shallow aquifer the level of which is anticipated to be closely tied to reservoir surface elevations.

1) Conduct studies to tabulate existing groundwater well locations, year of construction, depth, type, capacity, etc. Estimate potential physical and financial impacts which will result from the drawdown.

2) Develop instrumentation and monitoring criteria and preliminary plan and cost estimate for installation prior to drawdown. Develop instrumentation, monitoring and contingency plans to deal with short-term groundwater supply problems which could result from the operation.

Irrigation Pump Stations

Irrigation pumping facilities on the John Day pool will be directly impacted by MOP operation. Recent (2011) preliminary discussions indicate that one additional station has been constructed and that one existing has been modified to include being operational at MOP. Presently, operation at 262.5 feet (MIP) remains the floor for the vast majority of irrigators on the reservoir. The mitigation requirements will vary considerably from station to station, including the potential need to relocate or consolidate pumping facilities. The age, design and condition of the stations will also be highly variable. New requirements since the 1994 report, such as intake screening criteria, will likely present more significant modification issues leading to significantly higher costs than previously identified. It has been recently suggested that modifications required for irrigation intakes may interfere with navigation. This was not identified at the time of the 1994 report. The issue reportedly relates to requirements for screening and clearances off the bottom for the pump intakes which would need to be maintained under a lowered pool condition. This may require water depths at the intakes similar to those of the navigation channel. Conditions at each intake would need to be investigated to determine an appropriate location and/or design to meet depth requirements.

Study activities to include:

a. Negotiate a preliminary agreement with each owner to conduct the studies. This agreement would clarify the study level (appraisal?) and responsibilities of each party involved in the study.

b. Collect updated bathymetry information in the vicinity of each station and potential relocation sites for design of replacement facilities, intake extensions, screening, and/or pump modifications as necessary.

c. As determined necessary based on existing information, updated bathemetry and potential modification measures, conduct explorations to determine rock contour

locations at locations where potential for encountering rock is anticipated.

d. Establish existing as-built pump station installation design and operation through review of previous plans and specifications, if existing, and/or field investigations and testing. Determine the nature of impacts to intake, capacity and develop designs and cost estimates for mitigation of each of the impacted facility.

Recreation and Treaty Fishing Access Sites and Facilities

Recreational facilities are located at 16 sites on the John Day pool. Nine of the sites are owned and operated by the Corps. The other six are operated by various state, municipal, or port entities. At three of the six, commercially operated moorages and marina facilities are provided. Most of the sites would require some level of modification to operate at MOP. At the recreation sites potential modifications for operation at a pool elevation of 257 feet would consist of dredging for access to facilities (including potential rock removal), extension of boat ramps and swimming areas, modification of access ramps and docks.

Treaty fishing access facilities include boat ramps and associated docks at five locations, Le Page, Quesnel, Sundale, Roosevelt and Pine Creek. Based on preliminary information from the 1994 report, at least two of these sites (Quesnel and Sundale) would need to be modified for continued access with the pool at MOP. These and the other sites will need to be evaluated.

Study activities to include:

a. For the non-Corps owned facilities negotiate a preliminary agreement with each owner to conduct studies.

b. Coordinate and receive Tribal input regarding impacts and options for mitigation at the fishing access sites.

c. Conduct hydro-surveys to provide bathymetric information in the vicinity of boat ramps, beaches, access channels and moorages to determine requirements for dredging and other modifications to maintain the serviceability of these facilities under drawdown conditions.

d. As determined necessary based on existing information and potential modification measures, conduct explorations to determine rock contour locations at each site where potential for encountering rock in dredging or modifying facilities is anticipated.

e. Develop alternative solutions to modify or replace existing facilities and costs to mitigate impacts of the operation, as appropriate. Provide incremental analysis where various levels of serviceability may be restored or replaced with alternative measures.

f. The Economic Analysis study component will address impacts to recreation use and activity and the economic consequences of the three-month operation at MOP. Impact

and mitigation costs developed in the sites and facilities impact study will be utilized in the economic evaluation.

Hydropower

Hydropower production would be reduced due to the lower head differential and operating range. In collaboration with the Bonneville Power Administration, a reanalysis of the effects of the operation on hydropower generation, involuntary spill, wind integration and power system reliability under a John Day MOP operation.

Navigation

Reconnaissance studies indicated several physical modifications and areas of concern which need to be addressed prior to implementation of MOP operation. Recent information received from navigation interests suggest that, at MOP, there may be one or more locations where there could be issues of adequate channel clearance. These would need to be investigated if MOP operation is pursued. The requirements to address these potential impacts are as follows:

a. Navigation Impacts. Dredging in the authorized Federal channel, access channels, and commercial docks to accommodate MOP operation was performed under special Congressional authority in 1992. Several potential additional access channel problems were identified during the study. The following activities are required;

1) Obtain new condition hydrosurveys. Assess need and quantities for re-dredging areas dredged in 1992 and new areas. Provide recommendations in decision document with regard to need and recommendations for Congressional authority to dredge non-Federal areas.

b. Blockages at Mouth of John Day and Umatilla Rivers. Under a periodic drawdown there is a potential that sediment accumulated at the mouths of these rivers could create impassable conditions for adult migrant fish. It is anticipated that contracts would be prepared prior to the implementation of MOP operation as a contingency should problems develop. Periodic maintenance may also be required at intervals under the interim drawdown scenario.

A condition survey will be obtained to develop preliminary quantity and cost estimates for the contingency dredging work to be used in the decision document and baseline cost estimate.

Utilities

A sewer outfall belonging to the City of Umatilla and a natural gas pipeline will be exposed by

the MOP operation and corrective actions to extend and or bury the lines will be required. The following activities will be necessary;

a. Negotiate a preliminary agreement with each owner to conduct the studies.

b. Conduct hydrosurveys to provide bottom contour information in the vicinity of each for design of modifications.

c. Establish existing as-built conditions. Summarize design and cost information in the decision document and baseline cost estimate.

Slope Stability

During reconnaissance studies it was generally determined, with one possible exception, that operation of the pool at MOP would not be expected to cause any significant slope stability problems. No specific plans will be developed during AP&D to monitor general conditions. The one identified problem area is at the site of an existing slide near Alderdale.

Activation of this slide could impact operations of the Burlington Northern RR or Washington State Highway 14. The following activities will be performed;

a. Evaluate the need and justification for an instrumentation and monitoring program. Document requirements in a letter report for approval at NPD. The cost estimate for the letter report will be included in the decision document and baseline cost estimate.

b. Develop contingency plans to address actions required should movement impact the integrity of the transportation facilities. Contingency plans for other yet-unidentified localized problems develop.

Hazardous Toxic and Radioactive Waste (HTRW)

HTRW documentation for sites considered for relocation of facilities or offsite mitigation will be needed prior to the completion for each category in the feasibility document. Efforts include the provision of cost estimate support for all contracts within the scope of this effort as required. Participate in development of the feasibility report/EIS decision document. Coordinate schedule for completion of HTRW environmental site assessments.

Economic Studies

Economic studies will be conducted to fully evaluate the proposed operation and alternatives identified in the study process. In accordance with guidelines of the U.S. Water Resource Council, the evaluation will consider National Economic Development, Environmental Quality, Regional Economic Development, and Other Social effects. The following will be included:

a. Update evaluation of economic impacts to hydropower generation and transmission and navigation for operation at MOP, and other alternatives, as appropriate. Include evaluation of impacts of operation over a narrower range on hydropower and transmission system capacity.

b. Evaluate direct and indirect economic impacts and provide incremental analyses to support recommendations with regard to degree of restoration of serviceability of impacted facilities.

Environmental Compliance

The System Operation Review, completed in 1995 (ROD: 1997), provided NEPA coverage for the MOP operation. Work was suspended on advanced planning and design activities shortly thereafter (see Attachments I&II). A review and determination will be needed as to whether the NEPA coverage remains valid or if a supplement or new EA or EIS is necessary. For purposes of this study plan and cost estimate, it is assumed that a new EIS will be required to meet NEPA requirements, to include complete description of effects for the proposed operation and alternatives. In addition to the products discussed in various sections above, the following action, reports and documents will be prepared;

a. National Environmental Policy Act. In compliance with NEPA, the following steps would be required.

1. Notice of Intent
2. Scoping
3. Draft Environmental Impact Statement
4. Public review and comments
5. Final Environmental Impact Statement.

b. Clean Water Act. Evaluate impacts to water quality and the aquatic environment from placing any fill material.

c. Endangered Species Act. Identify and prepare biological assessments and initiate formal consultation for listed fish and wildlife species potentially impacted by the drawdown operation.

d. Cultural Resources. The 1994 study provided a preliminary assessment of the potential for occurrence and nature of cultural resources and historic properties potentially to be impacted by the MOP operation. In cooperation with Tribal and State Historic Preservation Offices, the following efforts would be performed, in accordance with Sections 101 and 106 of the National Historic Preservation Act, the Archeological Resources Protection Act, Native American Graves Protection and Repatriation Act, and the American Indian Religious Freedom Act

1. Expand on the previous reconnaissance level effort to assess the extent and nature of cultural properties potentially impacted by the periodic operation and refill of the pool.

2. Develop a monitoring program for implementation during the initial seasons of operation

3. Develop contingency plans for the disposition of various categories of properties based on their significance and risks for alternative preservation measures.

4. Preparation of documentation required for Section 106 consultation.

Feasibility Report

A draft and final Feasibility Report/ NEPA Document will be prepared including appendices to document the results of the various technical studies described above. The following activities are required:

a. Formulation of the details of the requirements for a decision document and the day-to-day management and coordination of the various components of the studies leading to final recommendations. Assure compliance with feasibility level study and NEPA process requirements.

b. Develop, monitor, modify as required overall schedule, costs, and tasking for input of the various biological and engineering components of the study to achieve milestones.

c. Conduct study team meetings, provide progress reports, determine budget requirements, and assure coordination with Regional entities as the study progresses.

d. Prepare for and conduct required internal and peer reviews

e. Provide information to and solicit input from the public on the scope, schedule, progress and/or recommendations for this study

Surveying and Mapping

In support of technical team efforts, provide data to evaluate shallow water habitat impacts and potential habitat mitigation opportunities; bathymetry data at specific sites to support design modifications to pump stations, recreation sites and other facilities; and to establish dredging requirements, an extensive series of hydro surveys will be performed at the outset.

a. Coordinate with drawdown teams to determine requirements for database

information. Gather data and input database. Initial availability will be data information sheets.

b. Incorporate database information into a GIS system which will allow mapping support and various access improvements for drawdown team information requirements. Provide maps as needed.

Real Estate/Legal

Government Liability to Impacted Parties. Although the Federal government owns all physical lands within the John Day Lock and Dam Project, over the last fifty years the Dept. of the Army has granted interests connected with these properties to private and public entities for various uses including those that have been described in other sections of this POS. Some may be adversely affected by the MOP operation. Determination of the government's liability, if any, to holders of outgrants at John Day Project impacted by MOP operation would require a case-by-case review of existing easements, leases, licenses, permits, deed reservations, and letters of consent.

In prior studies (see Attachment I, a preliminary analysis was made of all the then existing outgrants on the project. To the extent that there have been no changes to the then existing outgrants, that information remains valid. With regard to subparagraphs a. and b. below, a review of the information would be necessary and any modified or new outgrants would be evaluated similarly for this study.

a. Impacts to Various Other Users. The nature of the agreements and potential impacts for all of these outstanding uses will be reviewed.

b. Compensable Interests. Coordinate with technical managers in support of drawdown activities. Identify the potential for compensable interests of grantees, such as the irrigation pump station, recreation site and water well owners. Estimate cases individually or associate in groups (where appropriate) with a preliminary legal opinion for COE mitigation responsibility.

c. Rights of Entry. Coordinate for right of entry permits for all technical requirements. Requests for permits should be submitted not less than 60 days prior to need by respective category technical managers.

Discretionary Authority. The Chief of Engineers has limited discretionary authority to modify certain facilities impacted by the operation of a project. Under 33 USC 701q, the Corps has discretionary authority to repair, relocate, restore or protect highways, railways and utilities impacted by operation of a Corps project. Under 33 USC 633, the Corps authority is limited to the construction or reconstruction of a project owned by an agency of government and used in

the performance of a government function. The extent to which either of these authorities can be applied to mitigation of facilities impacted by John Day MOP operation will need to be further evaluated on a case by case basis.

7. Study Schedule

It is estimated that the feasibility study through to final report/EIS and recommendation will require 3 years to complete. This is based on assumptions that field studies, as discussed in the Biological and Habitat studies sections above and that a full NEPA process would be required. A bar graph displaying this schedule is attached (Figure 3).

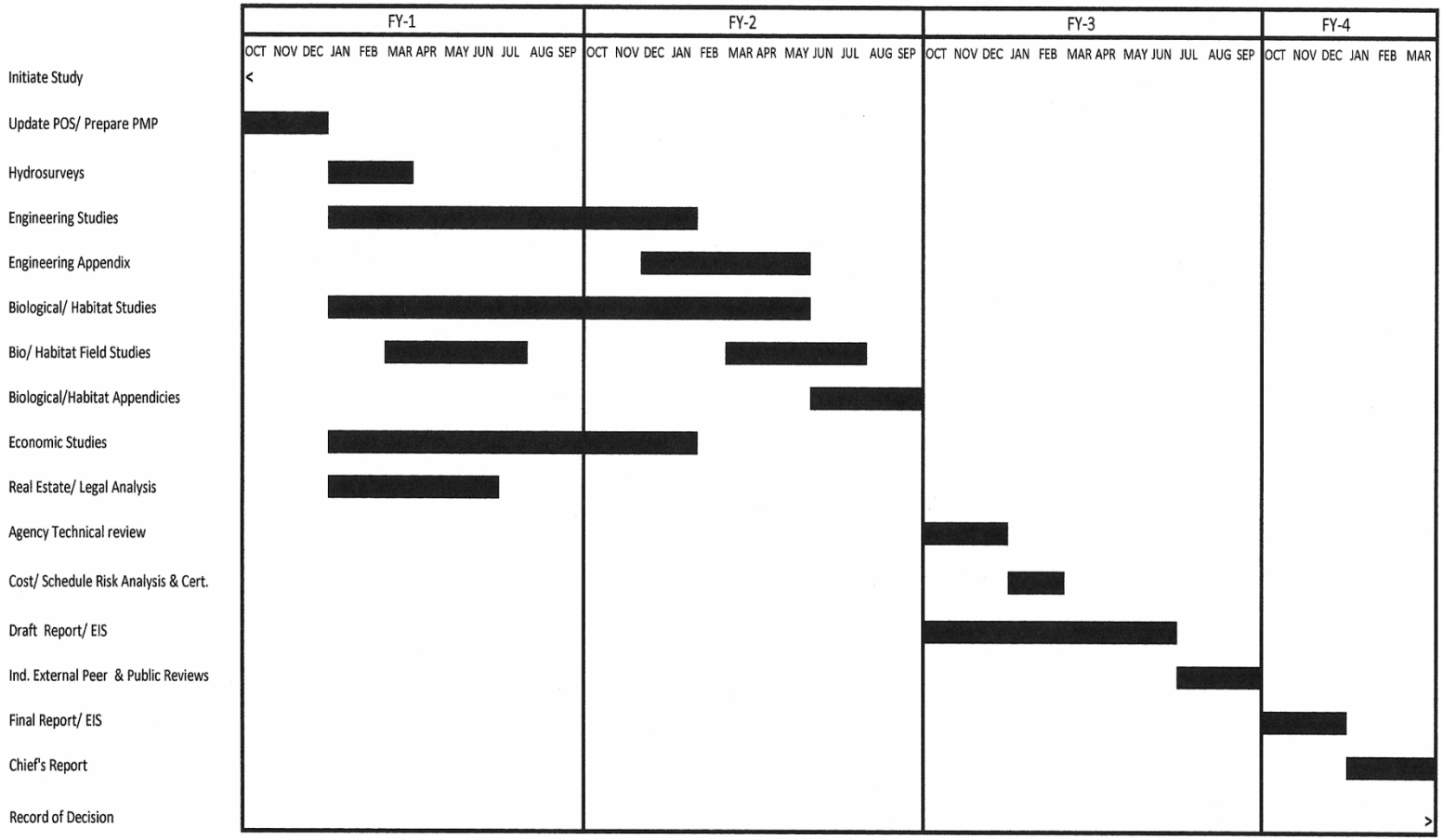
8. Study Cost Estimate

The estimated cost to complete the feasibility study is $8.4 million. The estimate is based on a detailed man-hour estimate prepared for the AP&D activity when that program was initiated updated to 2012 price levels. The detailed estimate is filed and available in the Portland District Project Management office. Labor and contract costs were updated to reflect current Federal salary levels. A contingency of 30% is added to reflect risk and uncertainties bringing the total estimate to $10.9 million. The cost estimate will necessarily need to be revised to reflect price levels at the time of study initiation, as well as changes in available information or requirements.

Figure 3

JOHN DAY MINIMUM OPERATING POOL

FEASIBILITY STUDY SCHEDULE



ATTACHMENT I

PRIOR STUDIES and ACTIVITIES

REGARDING JOHN DAY DRAWDOWNS

The following activities have either been pursued specifically to address drawdowns of John Day reservoir or included drawdown to MOP as a component of broader operational plans in consideration of measures to improve survival of listed anadromous fish passing through the hydrosystem. Copies of published materials resulting from these actions, where applicable, are available through Portland District's Technical Library. Some of these materials are also available electronically, as noted.

- **Columbia River Salmon Flow Measures, Options Analysis/EIS, 1992 (Record of Decision (ROD), April 1992).** This study was conducted to address potential immediate operational actions to improve passage conditions for recently ESA listed salmonid species in the basin. An outcome of this study was for the Corps to implement operation of John Day pool at "minimum irrigation pool" (MIP) during the May through August juvenile migration period. The intent was to operate at the lowest level possible without impacting operation of existing agricultural irrigation pump stations drawing water from the reservoir. The nominal floor level for MIP is El. 262.5 feet at the dam however the level could be raised if necessary to avoid issues with pumping facilities production. This operation continues annually with a targeted 1.5 foot operating range between elevations 262.5 and 264 feet.

- **System Configuration Study Phase I, Appendix B: John Day Reservoir Minimum Operating Pool Technical Report, April 1994.** See detailed summary of this study in Attachment 3**.**

- **Reinitiation of Consultation on 1994-1998 Operation of the Federal Columbia River Power System and Juvenile Transportation Program in 1995 and Future Years 1995 FCRPS Biological Opinion (ROD: March 1995)**. Called for implementation of a year-round MOP operation by 1996, but only after appropriate mitigation measures have been assured. The NMFS also called for the study of a deeper drawdown to spillway crest. In the 1994 report, the Corps estimated that it would require 5 years for detailed studies and an EIS, off-site land-acquisition, design and construction. In its Record of Decision of 19 March 1995, the Corps expressed concern with implementing mitigation measures associated with MOP operations while simultaneously evaluating the feasibility of further drawdown to spillway crest. The

Corps also reported that, without additional authority, the Corps cannot completely mitigate for impacts that may be caused by operation at MOP. Until all mitigation measures have been identified, and the appropriate authority enacted, the Corps cannot assure mitigation.

- **John Day MOP Advanced Planning and Design (AP&D).** In FY1993**,** as directed by Congress (see below), and while the System Configuration Study and the System Operation Review were underway, the Corps initiated advanced planning and design. This was to be a feasibility level study with parallel design and implementation document development for mitigation of impacts to public and private facilities. The purpose of this was to expedite implementation of MOP operation should that be the decision.

  These efforts were suspended in FY 1996, as Congress (see below) suspended further funding for drawdown activities pending scientific justification for continued pursuit of this and other drawdown measures. In 1997 NMFS provided their justification, which was delivered to Congress by the Corps. The AP&D activity did not resume, however, as the focus became the evaluation of the deeper drawdown measures called for in the 1995 BIOP.

- **Columbia River System Operation Review, Final Environmental Impact Statement, Nov. 1995 (ROD: February 1997).** This basin-wide study addressed a number of alternatives for configuration and operation of the Columbia River basin hydrosystem incorporating direction emanating from the 1995 Biological Opinion. Included in the preferred alternative was operation of the John Day pool at its MOP elevation on a year around basis, however, the Corps further noted that, per instructions from Congress regarding scientific justification for drawdowns, action on AP&D was suspended.

- **John Day Drawdown Phase I Study, January 2000.** With Congressional approval (see below) a Phase 1 study of deeper drawdowns was initiated in 1997. This was to be a reconnaissance level study, the scope of which required and received Congressional approval. Congress had directed that efforts be limited to this Phase 1 study, with subsequent activity subject to further Congressional direction following its review of the Phase 1 report. The study addressed deeper drawdowns to spillway crest and natural river levels. In the 2000 report, the Corps concluded, based on estimated biological benefits and the costs to implement, that further action on these alternatives was not justified. Following public review, the report and recommendation was submitted to Congress as required. No additional Congressional direction has been received to date.

ATTACHMENT II

CONGRESSIONAL ACTIONS REGARDING JOHN DAY DRAWDOWNS

The following is a summary of actions taken by the Congress, either in Act language or through Appropriations or Conference Committees' reports related to drawdowns of the John Day reservoir.

- **Energy and Water Development Appropriations Act of FY 1993.** Congress authorized what was to be termed "Advanced Planning and Design" (AP&D) for mitigation of impacts to allow for the MOP operation and appropriated up to $2M funding to initiate the effort. This language authorized the design of mitigation measures for both public and private facilities, but did not authorize Federal construction of private facilities. It is noted that the FY 1993 Act language authorizing AP&D has not been rescinded.

- **FY 1994 and 1995 Appropriations.** The Congressional committees continued to support AP&D. However, in the Conference Committee Report for FY 1996 appropriations, the committees cited conflicting information and concerns over the effectiveness of drawdowns as a salmon recovery method. This prompted the Congress to direct the Administration to provide scientific justification along with any further requests for funding. Justification for continuing to look at drawdowns as a potential measure was ultimately provided by the NMFS in 1997.

- **Conference Committee Report for FY1996**. Funding for continued activity for AP&D was suspended by Conference Committee language for FY 1996 and no budgets have been requested nor funding or direction provided by Congress for continuation of AP&D or any other activities related to John Day MOP.
-
- **FY1998 Senate Appropriations Committee Report**. Required the Corps to provide a scoping document for the deeper drawdown study discussed in Attachment 1. With approval of the scoping document the Corps would be allowed to proceed with the study. In this same report language the committee further indicated that no funds were available to drawdown John Day or to make any physical modifications related to such an activity.
-
- **FY 1999 Conference report.** Following submittal of the Phase 1 plan of study to Congress, funds were provided to conduct a Phase I study of deeper drawdown, which was also to be submitted to Congress upon completion. The study included

evaluation of spillway crest drawdown and natural river level operation (dam removal).

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- **Energy and Water Development Appropriations Act of FY 2000.** The Phase I report was completed in September of 2000, and submitted to Congress. It recommended that further study was not warranted. The Act stated in part, "Provided, that no part of any appropriation contained in this Act shall be expended or obligated to begin Phase II on the John Day Drawdown study or to initiate a study of the McNary Dam unless authorized by law."

ATTACHMENT III

SUMMARY OF THE JOHN DAY MOP 1994 REPORT

In 1991, in response to the Northwest Power Planning Council's 1988 Fish and Wildlife Amendments, a reconnaissance-level study was initiated to evaluate operating John Day pool at or near its minimum operating pool (MOP) level. The purpose would be to reduce the reservoir's cross-sectional area to increase flow velocities during the juvenile fish migration season. The results of the study were documented in a report entitled, John Day Minimum Operating Pool Technical Report, dated April, 1994.

The following discussion summarizes the most significant issues and findings of the reconnaissance study, as reported in 1994. The technical report is available for a complete review of the study findings, if desired. This study evaluated a 1 May through 31 August MOP operation and investigated the benefits and impacts to migrating fish, project operations, the environment and other uses of the reservoir. As will be discussed below, during the course of the study, an alternative to operate at MOP permanently for the purpose of providing at least partial mitigation for habitat impacts associated with the 4-month drawdown was also investigated. This alternative was adopted by NMFS in its 1995 Biological Opinion which is also discussed below.

Reservoir Flow Velocities

The report identified a MIP to MOP range of water particle travel time (WPTT) reduction through John Day pool of 0.4 to 1.25 days for flows ranging between 300 and 100 kcfs, respectively. This represents an approximate 10-12% reduction in WPTT in John Day pool and an approximate 2-3% reduction in overall WPTT between Lower Granite pool and Bonneville tailrace.

Biological Effects

In addition to the modeled potential for reduced juvenile travel time discussed previously, that results in less opportunity for predation in the pool, there was also a potential loss of predator spawning habitat identified as another possible factor for reduced predation. However, increased predator/prey concentration and possible temperature increases with drawdown were identified as factors which could tend to increase predation. In the reservoir, other factors such as loss of juvenile salmonid rearing habitat (shallow water habitat), effects on predation levels, and potential loss of benthic production in the shallow water areas were identified. The other potential effects identified in the report included factors at the dams, such as changes in overall non-turbine passage efficiency, turbine mortality due to reduced efficiency of the turbines with lowered head differential, changes in fish guidance efficiency

(FGE) of bypass system screens, changes in orifice passage efficiency between the gatewells and the bypass channel.

Overall, with regard to the benefit of MOP operation for migrating juveniles, the study was inconclusive and recommended more detailed investigation of the above issues.

To meet current passage criteria with MOP operation, the report noted that the fish ladders at John Day and ladder entrances at McNary Dam would require modification in order to meet current adult passage criteria. McNary Dam ladder entrance sills would need to be lowered to meet criteria.

Notwithstanding the passage effectiveness and survival issues identified above, generally project facilities at the dam (powerhouse, navigation locks, spillway, and fish passage facilities) are operational at MOP.

Habitat Values

Annual operation at MOP will impact an estimated 8,400 acres of shallow water habitat including 2,100 acres of marsh-riparian zones throughout the reservoir. The Umatilla National Wildlife Refuge (UNWR) and two state-managed wildlife areas represent a significant portion of the habitat areas. Unlike winter drawdown of storage reservoirs, the MOP operation would occur during the warmest and driest season, when impacts to vegetation would be most severe and result in permanent loss of emergent marsh and riparian habitat. These losses will significantly impact resident and migratory fish and wildlife. Refuge personnel have documented losses from the current MIP operation, but indicate that MOP operation would be much more significant, particularly for waterfowl and resident fish and the associated hunting and fishing programs on the refuge. The existing shallow water habitat is also believed to be a benefit to rearing juvenile salmon.

Several alternatives to at least partially preserve the most significant of these habitat areas during the drawdown period were investigated under the study. These included drip irrigation, sprinkling, diking off the more important backwater areas and pumping water into them. All options were found to be either ineffective for the intended purposes or impractical for technical or cost reasons. The alternative to permanently operate at MOP was advanced because it would avoid the fluctuations of the seasonal operation and could be expected to provide replacement habitat area for about 25 percent of the losses after a period of recovery. No other opportunities to mitigate resident fish impacts have been identified. Off-site mitigation would be required to fully offset the wildlife impacts associated with drawdown operations. The March 2, 1995, NMFS Biological Opinion called for the permanent operation at or near MOP recognizing concerns raised regarding impacts to resident fish and wildlife of the seasonal operation (RPA, Section VIII.A.5,).

Hydropower

Hydropower production would be reduced due to the lower head differential under MOP. The John Day project is extensively for load factoring and the lower pool operation at MOP could reduce the projects capability to meet fluctuating instantaneous demand, which would need to be shifted to other storage or other non-hydro sources.

Navigation

The authorized navigation channel through John Day pool is designed to be operational at MOP. For the most part the channel is naturally deep and dredging has generally not been necessary. Within the last 20 years only once was it recalled that any dredging has been required. This was at the upper end of the reservoir below McNary Dam. In the1994 report it was noted that additional channel markers may be necessary near RM 290 due to a new shallow area that would be exposed north of the channel. Commercial navigation access to port facilities may be impeded. Some access channels and berths were dredged in the early 1990's in anticipation of a potential MOP operation at that time. The Corps normally does not have the authority to address the needs for dredging private access channels or port facilities.

Irrigation

Agricultural irrigation pumping stations on the reservoir will be impacted by MOP operation. At the time of the report over 142,000 acres of farmland was under irrigation from John Day reservoir, with a crop value of $246M per year. At that time it was found that modifications to ensure pumping capability would be required at 20 of 21 pump stations on the reservoir, including those providing water for the (UNWR) farming program and native plant nursery. These stations ranged in capacity from 300 gallons per minute to very large facilities capable of pumping over 250,000 gallons per minute. Most stations appear to require relatively straightforward measures to extend intakes, however, several including some of the larger stations, likely will require the addition of new low-head pumping facilities. All irrigators would experience higher pumping costs due to the higher lifts required with a lowered pool elevation. Given the time that has passed since the study, the status of all irrigation pumping facilities on the reservoir would need to be reviewed should the MOP operation be pursued. As indicated above, the Corps does not have the authority to address the needs at these privately owned facilities.

Hatchery Water Supplies

The Umatilla and Irrigon Hatcheries employ a well system in the reservoir and groundwater wells for production water supplies. Information acquired in 1994 suggested that the proposed May through August MOP operation would not impact production capacity at the hatcheries, as

less water is required in these months following spring juvenile releases. However, based on the information at the time of the report, the alternative to operate at MOP permanently would impact on operations at these hatcheries and require mitigation.

Municipal and Other Water Supplies

The City of Boardman, Oregon employs a well system similar to the hatcheries for its municipal water supply. Extrapolating data from prior pumping tests at various pool elevations above MOP, it was estimated that the facility will lose approximately 25% of its capacity at MOP. In addition, there are indications that hardness and alkalinity levels would exceed water quality advisory standards for drinking water, and treatment facilities may be required.

Over 2,000 groundwater wells have been identified in the area including those serving the Umatilla NWR. With very preliminary information it was estimated that at least a small number of these wells, possibly 3% could be impacted to the point of requiring modifications. If MOP were implemented, it is anticipated that a monitoring program for ground-water wells would be necessary to assess the extent of the impact to these facilities.

Recreation and Treaty Fishing Sites

In the 1994 report, the visitation to recreation sites and facilities on the reservoir was reported to be over 1.6 million in 1989. The majority of the 16 recreation sites on the pool would require modifications to extend boat ramps, swimming beaches and dock facilities in order to maintain their current level of service. Three of the sites (LePage, Sundale, and Quesnel parks) provide Indian treaty fishing access. Several marinas would require dredging to reestablish channel depths, including two which would entail rock excavation.

Cultural Resources

Significant cultural resources exist on the project. Over 200 sites have been recorded. Over 600 additional sites have been projected to exist within the fluctuation zone. No reliable estimate of mitigation costs can be projected at this time. A monitoring program would be implemented in conjunction with the drawdown operation.

Costs

Costs estimates to modify the facilities discussed above are provided from the report at the original April 1994 price levels and, for information only, at more recent price levels by applying a factor of 1.65, using the Corps' Construction Cost Composite Index for Civil Works Projects. The construction cost to mitigate impacts of the 4-month operation was estimated to be $65M in 1994, which calculates to an estimated $106M at 2010 price levels. For the year round operation the estimate in 1994 was about $100M, or $165M at 2010 price levels. Annual O&M

costs were $0.6 M ($1.0M at 2010 price levels). Economic impacts identified in the report were substantially the result of reduced hydropower generation, with some additional operational costs identified, including water supply pumping under a higher head differential. In the report, for 4-month drawdown this was estimated to be $3.8 million ($6.3M at 2010 price levels), annually.