Power Planning and Fish and Wildlife Program Development

RELATIONSHIP OF THE POWER PLAN TO THE FISH AND WILDLIFE PROGRAM: SUFFICIENT RESOURCES TO MEET ELECTRICITY DEMANDS AND THE REQUIREMENTS FOR FISH AND WILDLIFE

The Power Act requires that the Council's power plan and Bonneville's resource acquisition program assure that the region has sufficient generating resources on hand to serve energy demand and to accommodate system operations to benefit fish and wildlife. The central purpose of this chapter of the power plan is to explain how the Fifth Power Plan satisfies this statutory responsibility. This chapter also includes recommendations for how to improve the way in which power issues are considered in fish and wildlife decisionmaking and vice versa.

The Act requires the Council to update its fish and wildlife program before revising the power plan, and the amended fish and wildlife program is to become part of the power plan. The plan is then to set forth "a general scheme for implementing conservation measures and developing resources" with "due consideration" for, among other things, "protection, mitigation, and enhancement of fish and wildlife and related spawning grounds and habitat, including sufficient quantities and qualities of flows for successful migration, survival and propagation of anadromous fish." Northwest Power Act, Secs. 4(e)(2), (3)(F), 4(h)(2).

Bonneville in turn is to acquire sufficient generating resources, consistent with the Council's power plan to (1) meet its contractual obligations for power supply and (2) "assist in meeting the requirements of section 4(h) of the program" – that is, the requirements of the fish and wildlife provisions and program. The ultimate goal, as expressed best in Section 4(h)(5) concerning the fish and wildlife program, is to assure the region an "adequate, efficient, economical and reliable" power supply while at the same time allowing for the operations and other program elements that will "protect, mitigate and enhance" fish and wildlife populations. (Northwest Power Act, Secs. 2(6), 4(h)(5), 6(a)(2))

Whether Bonneville had sufficient resources to meet these needs became a big issue when the drought year of 2001 coincided with the fact that Bonneville had contracted for firmer loads than it had resources to serve and the wholesale power market could not supply the difference at a reasonable price. Just at the time the Council initiated the process of amending the mainstem portion of its fish and wildlife program, it appeared that neither the region nor Bonneville had the resources to meet either need, let alone both. In other words, the region did not have the resources (under such a low water year) to both serve regional loads and provide adequate operations for fish. As a result, the Council received a number of recommendations during the mainstem amendment process regarding power supply, resource development, and power planning.

By the time the Council finished the mainstem amendments in 2003, things had changed, at least for the near term. The region had lost over 2000 average megawatts of demand and gained over 3,000 average megawatts of new resources. Because of this, the region went from about a 4,000 average megawatt deficit (using a critical water standard) in 2000 to over a 1,000 average megawatt surplus in 2004. Bonneville's particular situation changed accordingly. Thus the Council's official assessment, as part of its mainstem amendment findings about assuring the

region an "adequate, efficient, economical and reliable power supply" (known as the AEERPS finding), was that in the short term, the region and Bonneville had sufficient resources to meet, without undue threat, both the electricity loads that remained and fish and wildlife operations. But, the Council promised that it would take a long-term look at this situation as one of the key issues in the power plan.

The Fifth Power Plan addresses these issues in this way: analyses of future demand and existing resource availability, taking into consideration both physical and economic risk, indicate that the region and Bonneville presently have enough generating resources to meet power supply needs for some time to come. With recommended actions to pursue cost-effective conservation, the region should be able to stave off the cost of new resources or the risk to power supply for much longer. The Council also recommends that Bonneville not contract to deliver more power than the existing system is able to generate under critical water conditions, except in bilateral deals in which the customers bear the cost and risk of any new resources Bonneville has to acquire to serve that extra load. The Council concludes that resources should be ample to meet electricity demands and to stabilize the delivery of fish and wildlife operations.

IMPROVING THE INTEGRATION FISH AND WILDLIFE AND POWER CONSIDERATIONS

While the power plan analysis serves to address the central legal relationship between the power plan, power supply resources, and the fish and wildlife program, the Council has also been investigating particular issues that are relevant to the relationship between fish and wildlife and power system operations. These include:

- How can we better integrate power considerations into fish and wildlife decisionmaking, and vice versa?
- How can we improve our understanding of the cost impacts and cost effectiveness of specific fish and wildlife operations?
- How can we improve our standards and procedures for addressing inevitable power system emergencies in the future?

The rest of the chapter addresses these issues.

Background

The Columbia River Basin hydroelectric system is a limited resource that is unable to completely satisfy the demands of all users under all circumstances. Conflicts often arise that require policy makers to decide how to equitably allocate this resource. In particular, measures developed to aid fish and wildlife survival often diminish the generating capability of the hydroelectric system. Conversely, "optimizing"[1] the operation of the system to enhance power production can have detrimental effects on fish survival.

The Council has dual responsibilities to "protect, mitigate and enhance" fish and wildlife populations (affected by the hydroelectric system) while assuring the region "an adequate, efficient, economical and reliable" power supply. Although developed at different times and

[1] "Optimizing" here means that energy production is maximized, limited by other than fish and wildlife constraints, such as flood control, irrigation, navigation, etc.

under different processes, the Council has attempted to use an integrated approach in developing both its fish and wildlife program (program) and the power plan (plan).

Evaluating fish and wildlife measures for cost effectiveness is central to the mainstem portion of the Fish and Wildlife Program. During the development of the program, physical and economic impacts of each fish and wildlife measure affecting the operation of the hydroelectric system were assessed and considered before final adoption.

The analysis for this power plan assumes that all fish and wildlife operations pertaining to the hydroelectric system, as outlined in the NOAA Fisheries biological opinion and the Council's program, will be followed. However, the Council realizes that emergencies may occur in which fish and wildlife operations would be interrupted. Assuring the adequacy of resources for the power system minimizes not only the risk of electrical shortages and high prices but also minimizes the risk of emergency interruptions to fish operations.

The actions identified in this power plan are based on best available scientific data and are designed to assure an adequate, efficient, economical and reliable power supply. The Council also intends that its decisions about fish and wildlife program expenditures be made carefully and that the projects that implement that program are efficient and scientifically credible. For the region to achieve both objectives, it must coordinate planning and decision-making for both power production and fish and wildlife. Outside of the Council, however, no clear process exists for integrated long-term planning.

Recommendation -- Better Integration of Planning Efforts

The Council recommended in its 2000 program that both in-season and annual decision-making forums be improved.[2] The program states "at present, this decision structure is insufficient to integrate fish and power considerations in a timely, objective and effective way." It goes on to recommend that the forums should broaden their focus by including "expertise in both biological and power system issues" and by directly addressing longer-term planning concerns, not just weekly and in-season issues.

It is in such a forum where the long-term physical, economic and biological impacts of a fish and wildlife operation can be openly discussed and debated. Actions identified in the program to benefit fish and wildlife "should also consider and minimize impacts to the Columbia basin hydropower system if at all possible." The program further says that the goal should be "to try to optimize both values to the greatest degree possible."

To this end, the Council reiterates its recommendation in the 2003 program to improve and broaden the focus of the forums created to address issues surrounding fish and wildlife operations, especially those related to long-term planning.

Benefits of Integration

Power system planners can provide valuable information to fish and wildlife managers to aid their development of measures to improve survival. Similarly, fish and wildlife managers can

[2] "Fish and Wildlife Program," Northwest Power Planning Council, Council Document 2000-19, pp.28, and "Mainstem Amendments to the Columbia River Basin Fish and Wildlife Program," Northwest Power Planning Council, Council Document 2003-11, pp.28-29.

provide data to power planners so that they can plan for resource mixes that minimize impacts to fish and wildlife, whenever possible.

Biologists developing a fish and wildlife program must be able to assess relationships between various physical parameters and survival. For example, river flows, water temperature, passage routes (turbines, bypass or barges), predation, ocean conditions and a host of other factors all affect survival and long-term population forecasts for salmon. Based on these relationships, biologists can make recommendations regarding those elements that can be controlled, such as the operation of the hydroelectric system. Any changes to the operation of the hydroelectric system will result in differences in reservoir elevations, river flows, energy production and cost.

Using sophisticated computer models that simulate the operation of the Northwest power system, power planners can assess the impacts of any given set of fish and wildlife measures that change the operation of the hydroelectric system. For a fish and wildlife program and, in particular, for individual elements of that program, physical impacts (effects on reservoir elevations and on river flows) and economic impacts (changes in generation production and related cost) can be analyzed and provided to fish and wildlife managers.

Changes in reservoir elevations, river flows and spill are used, along with other data, by biologists to estimate fish passage survival through the system. Passage survival estimates are an important part of life-cycle models, which are used to forecast long-term fish populations. Long-term population estimates, along with their corresponding uncertainties, will determine whether certain species are well off, stable or declining. In this sense, physical analysis by power planners plays a very important role in the development of the fish and wildlife program.

Emergency Curtailment Strategy

As the years of 2000 and 2001 unfolded, analyses by the Council and others indicated that fully implementing the 2000 Biological Opinion (BiOp) mainstem hydroelectric operations in 2001 was likely to compromise power system reliability. This was due to very dry conditions in that year and the basic state of the power supply in the Northwest and in the rest of the Western interconnected system. Allowances in the BiOp, however, permit the curtailment of fish and wildlife operations during power emergencies. The Bonneville Power Administration (Bonneville) declared a power emergency in that year based on the water supply and the lack of available generation on the market. Decisions were made to severely reduce bypass spill during the spring and summer months in order to assure adequate supplies of power and to manage the economic impact of the high market prices. This action initiated a regional debate regarding the additional risk placed on endangered or threatened fish and what measures could be taken to avoid or reduce the likelihood of such events occurring in the future.[3] The situation in 2000-2001 was so severe that there was little choice but to curtail almost all operations for fish. However, had the situation been less severe the region would have been ill-prepared to determine which operations to curtail or modify and which to carry out. To avoid such a situation in the future, an emergency curtailment strategy should be established. Having cost and biological impacts for individual measures allows power planners and biologists to prepare such a strategy and have it in place prior to a power emergency.

Appendix O provides more background information regarding those elements of the fish and wildlife program that affect the operation of the hydroelectric system and their impacts to the power system.

[3] See Chapter 1.

Ultimately, an adequate power supply must also adequately provide for fish and wildlife operations. Determining that we have an adequate power supply means analyzing how often that supply is insufficient. This is tabulated in a metric commonly referred to as a loss of load probability (LOLP). Perhaps a similar type of metric can be developed to assess the likelihood of failure to provide fish and wildlife operations with measurable benefits to fish. The Council attempted to develop such a metric but found uncertainties surrounding biological benefits of fish and wildlife operations made it difficult to determine a clear and acceptable metric. Whether a metric is developed or not, the Council has the responsibility to assure the region that its power plan will provide both an adequate power supply and that it will adequately provide operations to protect fish and wildlife.