

5.0 RESPONSIBILITY OF HYDROPOWER FOR SALMON AND STEELHEAD LOSSES INCURRED ABOVE GRAND COULEE DAM.

In view of the information presented in Section 4 of this report it is clear that the only factors that contributed significantly to the decline in the runs of Upper Columbia salmon and steelhead were: (1) The early hydroelectric dams on the Spokane River; (2) the blockage of the run by Grand Coulee, Rock Island, and Bonneville Dams; and (3) the commercial harvest in the lower river. The decline caused by the commercial harvest was temporary and could have been reversed by restricting the commercial fishery since the potential of the habitat for producing salmon in the Upper Columbia Basin (mainstem and tributaries) at the time Grand Coulee Dam permanently blocked the fish runs was essentially the same as it was during the period between 1807 and 1880 (see section 4.3 for details). In contrast, Little Falls Dam permanently blocked salmon from the upper portions of the Spokane River in 1911 and Grand Coulee blocked all salmon from the Upper Basin in 1939. These losses were permanent. Thus, it appears likely that hydropower was responsible for 100% of the loss. However, taking the conservative approach of assuming that some minimal (unmeasured) habitat degradation occurred, hydropower facilities are estimated at causing 90% of the loss.

5.1 THE PROBLEM OF ASSIGNING THE RELATIVE CONTRIBUTION OF HYDROPOWER IN MULTIPURPOSE PROJECTS.

For the Spokane River dams the sole purpose was hydroelectric power generation so hydropower related losses can be calculated at 90% of the total estimated losses. However, in projects that serve multiple functions (e.g., hydroelectric generation, irrigation, flood control, navigation, etc.) like Grand Coulee Dam, the problem of assigning the relative contribution of hydropower has arisen. This is further complicated by the fact that the relative use has changed over time as exemplified by the following statement (U.S. Army Corps of Engineers 1948):

"Grand Coulee Reservoir is operated currently [1948] almost entirely in the interests of power. Irrigation ultimately will become a major interest in serving the Columbia Basin Project, but will have little influence on reservoir operation plans, as the supply of water is always adequate for this purpose and the pumps can operate with a wide range of reservoir levels. Under present conditions the outlet capacity is such that only very limited flood control effect is practiced. Planned storage operations for power purposes involve drawdown to elevation 1208 by April runoff in drought years, the total active storage used for power purpose at such times being 5,120,000 acre feet. The use of this storage is valuable in firming up power operations not only at Grand Coulee Dam but also at Bonneville and McNary Dams."

One way to allocate the percentage of hydropower responsibility in multipurpose projects would be to examine the enabling legislation authorizing the construction the dam. However, the authorization documents generally provide only vague descriptions regarding the extent to which the project was envisioned to provide for various purposes. Presumably Congress

recognized this when it enacted the Northwest Power Planning and Conservation Act in 1980, and, therefore, intended that hydropower would pay for all damages to fish and wildlife caused by multiple use projects. This intent would be consistent with Congress's past actions in dealing with the Reclamation Act multiple-use projects, in which they recognized that hydropower revenues would pay for shortfalls in repaying costs associated with other aspects of the project. The Power Act states that "hydroelectric facilities" or "hydropower projects" are to be held accountable for the loss.

Another way to allocate the percentage of hydropower responsibility would be to examine documents that were used to justify the authorization. These documents were prepared by the U.S. Army Corps of Engineers (1948) and U.S. Bureau of Reclamation (1947). A similar series of reports were issued in the 1920's and 1930's. These documents contain cost-vs-benefit analysis of various aspects of the projects and are the justification upon which the project authorization was based. These documents make it plain that power revenues would be used to subsidize other uses of the project such as irrigation and flood control, i.e., without the expected hydropower revenues it would have been unfeasible to build the dams. For example, the U.S. Army Corps of Engineers (1948) reported:

"The Reclamation Project Act of 1939 limits the cost allocable to irrigation to amounts which, in the opinion of the Secretary of the Interior, the water users can reasonably be expected to repay. The amount usually would be much less than the construction cost . . . The practice, which has been sanctioned in numerous cases by Congress, of authorizing irrigation features of multipurpose projects to be paid for by power revenues from those projects cannot be extended very far in this basin . . ."

In the same report in their summary of "main control plan system economics" the Corps (1948) estimates that the total annual charges would amount to \$89,522,000, and the total annual benefits would be \$127,483,900 or a benefit to cost ratio of 1.42 to 1.00. The benefits could be broken down as follows:

Function	Average Annual Benefits (\$)	Percent of Total Benefits (%)
Flood Control	16,191,800	12.7
Navigation	3,442,600	2.7
Irrigation	137,500	0.1
Power	107,338,000	84.2
Recreation	374,000	0.3
<u>Total</u>	<u>127,483,900</u>	<u>100.0</u>

Of these, the only real revenue generated to repay construction costs would come from hydropower revenues and irrigation water user revenues. The flood control benefits would accrue to the region via reduced flood damage. This information suggests that it would be reasonable to hold hydropower accountable for the majority (i.e., at least 85%) of the losses in a multipurpose project, since it was envisioned that the bulk of the cost would be repaid by hydropower revenues.

The Congressional Act (Public Law 87-728) authorizing the Columbia Basin project (including Grand Coulee Dam) make it clear that this practice was actually followed. Public Law 87-728 paragraph 835K (Oct. 1, 1962, 76 Stat. 678) in a section entitled "Return of construction costs from marketing revenues in event of inability of irrigation water users to repay within repayment period and lack of other sources of revenue" states:

"Subject to the provisions of section 8351 of this title, that portion of the construction costs of any project hereafter authorized to be constructed, operated, and maintained by the Secretary of the Interior under the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388 and Acts amendatory thereof or supplementary thereto) within the Pacific Northwest which, though allocated to irrigation, is beyond the ability of irrigation water users to repay within the repayment period prescribed by law for that project and cannot be returned within the same period from other project sources of revenue shall be charged to and returned within that period from net revenues derived from the marketing of commercial power and energy through the federal Columbia Power System."

Another suggestion for separating out the percent contribution of hydropower to salmon and steelhead losses from multipurpose project has been to use the statement of project construction cost and repayment to determine the costs incurred by different aspects of the project. The 1984 statement for the Columbia Basin project is included in Fig. 5.1. Summarizing the total cost it can be seen that 75% of the cost of the project was related to irrigation and only 23% to hydropower.

<u>Category</u>	<u>Cost Allocation</u> <u>(\$)</u>	<u>Percent of</u> <u>Total Cost</u>
Irrigation	3,166,805,044	74
Power	982,310,000	23
Other	79,819,956	3
<hr/> Total	<hr/> 4,228,935,000	<hr/> 100

However, when the repayment schedule is examined, it can be seen that hydropower is repaying the bulk of the irrigation costs, i.e., \$3,006,981,087 of \$3,166,805,044 or 94%. Power revenues total \$3,989,291,087 of the total repayment of \$4,228,935,000 or 94%. Since electric rate payers are paying for 94% of the project it seems reasonable that hydropower should be held responsible for 94% of the fish losses caused by the project.

5.2 THE HYDROPOWER DEBT IN THE UPPER COLUMBIA BASIN.

Based on the information presented in this report the total number of fish lost annually in the Upper Columbia Basin and the loss of the annual





Figure 5.1. Columbia Basin project allocation and repayment
schedule: 1984 payment

SAMPLING SCHEDULE	PROJECT TOTAL	IRRIGATION	POWER		NAVIGATION AND FLOOD CONTROL	SETTLEMENT LAND PROGRAM	SPILLWAY FLOOD LIGHTING	INDIAN RESERVATION	FISH AND WILDLIFE	GENERAL
			COLUMBIA BASIN	THIRD PLANT						
COST										
PROPERTY & EQUIPMENT										
1	711,678,000	113,176,005	122,215,145		46,110,093		176,757			
1	414,847,934	442,747,934			2,100,000					
1	651,109,827	4,327,403	97,406,114	549,376,310						
1	296,579								250,579	
1	154,465									154,465
2	132,123,607	47,350,085	14,375,673	17,410,153	570,033				7,997,463	154,116
1	9,437,465	1,135								
3	6,792,129	7,071,748	1,127,453	2,419,170	754,758		9,071,130			
SUBTOTAL	1,415,440,005	611,070,510	235,138,385	619,611,633	19,534,894	9,071,130	176,757	0	3,294,242	314,116
PROPERTY CONSTRUCTION COSTS										
4	5,855,138							5,855,138		
5	2,534,921	2,198,197				315,724				
5	720,461									
SUBTOTAL	9,110,520	2,198,197	0	0	0	315,724	0	5,855,138	0	0
TOTAL CONSTRUCTION COST TO DATE										
	1,525,550,526	611,070,707	235,138,385	619,611,633	49,534,894	9,386,854	176,757	5,855,138	3,294,242	314,116
ESTIMATED COST TO COMPLETE CONSTRUCTION SERVICE FACILITIES										
6	2,597,776,891	2,554,317,835		33,735,613		2,065,146			4,197,758	3,210,199
	795,246	22,502		772,744						
SUBTOTAL	2,598,572,137	2,554,340,337	0	34,508,357	0	2,065,146	0	0	4,197,758	3,210,199
ESTIMATED TOTAL CONSTRUCTION COSTS										
	4,134,122,663	3,165,946,044	235,138,385	654,143,990	49,534,894	11,500,000	176,757	5,855,138	7,492,000	154,465
OTHER CHARGES										
7	99,007,543		1,963,967	87,043,576						
8	3,136,577	859,422	1,351,865			925,290				
8	2,668,217			2,668,217						
SUBTOTAL	94,812,337	859,422	3,315,832	89,711,793	925,290	0	0	0	0	0
TOTAL COSTS										
	4,229,935,000	3,166,805,466	238,454,217	743,855,783	50,460,174	11,500,000	176,757	5,855,138	7,492,000	154,465
REPAYMENT										
REPAYMENT REALIZED										
PF-51	14,490,902	14,490,902								
9	9,309,628					9,309,628				
10	15,000,000	15,000,000								
	476,584	222,379	150,705	350	103,150					
11	109,649,786		130,564,150	-20,921,364						
11	207,584		44,038	163,546						
11	2,568,184		2,568,184							
12	36,360,690		23,867,775	12,492,915						
SUBTOTAL	198,056,258	29,713,281	157,114,252	-4,254,553	103,150	9,309,628	0	0	0	0
UNREALIZED FUTURE REPAYMENT										
PF-51	121,056,942	121,056,942								
13	9,154,156	9,254,156								
14	2,130,372					2,130,372				
	3,036,159,000	3,036,981,087	77,028,377	752,120,306						
SUBTOTAL	3,048,451,270	3,137,092,185	77,028,377	752,120,306	0	2,130,372	0	0	0	0
TOTAL REPAYMENT										
	4,116,517,628	3,166,805,466	238,454,217	743,855,783	103,150	11,500,000	0	0	0	0
OTHER CREDITS										
1	4,200,998		4,200,998							
2	62,361,246				50,357,024		176,757		7,492,000	154,465
4	5,855,138							5,855,138		
SUBTOTAL	72,417,372	0	4,200,998	0	50,357,024	0	176,757	5,855,138	7,492,000	154,465
TOTAL REPAYMENT & OTHER CREDITS										
	4,229,935,000	3,166,805,466	238,454,217	743,855,783	50,460,174	11,500,000	176,757	5,855,138	7,492,000	154,465

THE ABOVE RESULTS FROM THE OPERATION OF VISITORS FACILITIES AND SERVICES OF MARCH 10, 1960
 P.L. 86-421, 8/2/57; 5176,757; P.L. 85-624, 8/12/58 57,402,000; P.L. 89-72, 7/9/65 5154,465;
 P.L. 85-491, 5/24/74 54,191,000
 PUBLIC ACT 71/32 CH. 369, 37 STAT. 564

APPROVED BY: *[Signature]* DATE: 12-10-54
 APPROVED BY: *[Signature]* DATE: 3-10-54

catch suffered by the Upper Columbia Indians are presented in Table 5.1. The total hydropower compensation and mitigation required from hydropower interests for the Upper Columbia Basin is a run size of 930,600 and catch of 545,000 salmon and steelhead.

It should be remembered that these numbers represent minimum numbers because of the conservative approach used for making estimations. It should also be recalled that well over 300 million dollars has been spent to mitigate for lost salmon fisheries. The majority of this was spent below the terminal dams. These monies have benefitted downstream fishermen for 50 years while the Upper Columbia Tribes received no (zero) compensation during this period. In this sense what is owed as replacement to the Upper Columbia Tribes is an ongoing, sustainable fishery of 545,200 salmon and steelhead, plus 50 years of revenue that they could have gained from their fishery had it been mitigated at the time the loss occurred, plus the accumulated interest on this revenue. The combined Indian catch was minimally 545,200 salmon and steelhead. Since this represents the minimum catch in the upriver areas, it defines the minimal level of mitigation and compensation that should occur in upriver areas.

Table 5.1. Hydropower responsibility for lost runs and catches of salmonid and steelhead in the Upper Columbia Basin.

total run size into Upper Columbia Basin	1.1 million	Indian catch (Historical)	644,500
- current run size	0	- current catch	0
= total loss	<u>1.1 million</u>	= lost Indian catch	<u>644,500</u>
X % responsibility of multipurpose hydroelectric projects (90%)	0.90	X % responsibility of multipurpose hydroelectric projects	0.90
= loss due to multipurpose and other hydroprojects	<u>990,000</u>	= loss due to multipurpose and other hydroprojects	<u>580,050</u>
X % responsibility of hydropower in multipurpose projects (94%)	0.94	X % responsibility of hydropower in multipurpose projects (94%)	0.94
= hydropower debt in Upper Columbia year (no. of salmon and steelhead)	<u>930,600</u>	= hydropower debt to Indian year (no. of salmon and steelhead)	<u>545,200</u>
- amount of fish produced by mitigation measures in the Upper Columbia Basin above Grand Coulee	0	- amount of fish produced by mitigation measures for Indian Tribes	0
= hydropower compensation still required in Upper Columbia Basin (No. fish)	<u>930,600</u>	= hydropower compensation still required for Indian Tribes (No. fish)	<u>545,200</u>

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