Libby Dam/Hungry Horse White Paper

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Introduction

Wildlife habitat losses associated with construction of and subsequent inundation from Libby[1] and Hungry Horse[2] Dams were not mitigated/compensated based on a Habitat Evaluation Procedures (HEP) analysis as was done throughout most of the Columbia Basin Region. Instead, mitigation/compensation was based on a settlement agreement between Bonneville Power Administration (BPA) and affected State/Federal Agencies and Tribal Governments.

A "mechanism" for estimating the potential number of habitat units (HUs) that may have resulted from conducting a HEP analysis to address habitat losses associated with Libby and Hungry Horse Dams is presented in this paper. Libby Dam is used as the example project described below. The same concepts apply to Hungry Horse Dam.

Methods

Approximately 28,850 acres were directly impacted by construction of and subsequent inundation from Libby Dam (Yde and Olson 1984) within the United States while an additional 17,650 acres were flooded in Canada[3]. Moreover, 4,100 acres were impacted due to relocation of railroad lines and US Forest Service roads (Yde and Olsen 1984).

At least 16 cover types were identified in the Libby Dam Loss Assessment (Yde and Olson 1984) clearly indicating that the impacted area was considerably complex and diverse (Table 1). The challenge presented in drafting this white paper was to develop a "reasonable" estimate of the number of habitat units that may have resulted from conducting a HEP analysis at Libby Dam.

Table 1 Libby Dam Loss Assessment cover types

Libby Dam Loss Assessment Cover Types	
River	Warm, Dry Conifer
Standing Water	Cool, Dry Douglas Fir
Gravel Bar	Cool, Moist Douglas Fir
Grass	Warm, Moist Conifer
Sub-irrigated Grassland	Cold, Dry Sub-alpine Conifer
Riparian Shrub	Upland Shrub
Cottonwood Riparian	Talus
Mixed Riparian	Development

[1] Libby Dam is located on the Kootenai River in northwest Montana.
[2] Hungry Horse Dam is located on the South Fork Flathead River.
[3] Only losses occurring within the United States are included in HU calculations.

I believe a conservative, sound approach to estimating "ball park" HU losses for Libby Dam is to estimate HU losses on an "HU to Acre loss ratio" basis based on HU to Acre loss ratios at Grand Coulee Dam (Howerton et al. 1986), Chief Joseph Dam (Berger and Kuehn 1992) and Albeni Falls (Hansen et al. 1987)[4]. As illustrated in Table 2, I divided the combined HU losses at Grand Coulee, Chief Joseph, and Albeni Falls Dams by the total acres impacted resulting in a HU to Acre ratio of 1.7 to 1.0. This ratio approximates that found at Grand Coulee Dam (1.6:1.0), but is considerably less than at Albeni Falls (4.3:1.0).

Table 2 HU to acre ratios for Grand Coulee, Chief Joseph, and Albeni Falls Dams

Hydro Facility	Acres Impacted	HU Loss	HU to Acre Ratio
Grand Coulee	70,000	111,711	1.6
Chief Joseph	8,822	8,833	1.0
Albeni Falls	6,617	28,587	4.3
Total	**85,439**	**149,131**	**1.7**

Based on the modified loss assessment matrix shown in Table 3, which was developed using Libby Dam Loss Assessment (Yde and Olsen 1984) cover types and a potential number of HEP species[5], the 1.7:1.0 HU to acre loss ratio appears to be consistent with HU losses elsewhere. Even so, recognize that the 1.7:1.0 ratio is only a "coarse" estimate.

Table 3 Libby Dam cover types and potential number (range) of HEP models likely to be used to evaluate each cover type

Libby Dam Loss Assessment Cover Types	HEP Cover Type Analog	Number of Potential HEP Evaluation Species[1] per Cover Type
River	Riverine	2 - 3
Standing Water	Open water	2 - 3
Gravel Bar	Sand, Gravel, Cobble, Mud	1 - 2
Grass	Grassland	3 - 4
Sub-irrigated Grassland	Wet Meadow	2 - 3
Riparian Shrub	Riparian Shrub	3 - 4
Cottonwood Riparian	Riparian Deciduous Forest	3 - 4
Mixed Riparian	Mixed Riparian Forest	3 - 4
Upland Shrub	Upland Shrub	2 - 3
Warm Dry Conifer	Conifer Forest	2 -3
Cool Dry Douglas Fir		
Cool Moist Douglas Fir		
Warm Moist Conifer		
Cold Dry Sub-alpine Conifer	Sub-alpine Conifer Forest	2 - 3
Talus	Talus	1 - 2
Development	Development	N/A

[1] This is the likely "range" for the number of HEP species that would be used to evaluate each cover type and define "HU stacking" if a HEP analysis was initiated today.

[4] These dams were selected because they are located in the Upper Columbia Region and are the major BPA hydro facilities closest to Libby and Hungry Horse Dams.

[5] Potential HEP model numbers are consistent with other loss assessments.

Results

Applying the 1.7 HUs per acre ratio concept to the 28,850 acres impacted at Libby Dam yields 49,045 habitat units; suggesting that had a standard HEP analysis been completed at Libby Dam, the HU losses would have been at least 49,045 HUs for construction and inundation impacts alone. As illustrated in Table 4, railroad and road relocation impacts add another 6,970 habitat units for a total potential loss of 56,015 HUs[6]

Table 4 Estimated HU losses at Libby Dam based on a 1.7 HU per acre loss ratio

Hydro Facility	Construction - Inundation Acres Impacted (USA)[1]	Estimated HU Loss at 1.7 HU:1.0 Acre Ratio[2]	Railroad - Road Relocation Impacts (Acres)	Estimated HU Loss at 1.7 HU:1.0 Acre Ratio[3]	Potential Total HUs
Libby Dam	28,850	49,045	4,100	6,970	56,015
[1] An additional 17,650 acres were inundated in Canada.					
[2] The 1.7 HUs per acre ratio is a conservative estimate for construction and inundation losses.					
[3] The 6,970 HUs are for railroad/road relocation impacts.					

Discussion

To gain perspective relative to the rest of the Columbia Basin Region, a 49,045 HU loss is second only to Grand Coulee Dam (-111,785 HUs). Even at a 1.0 HU per acre loss ratio (-28,850 HUs), Libby Dam would still have the third highest losses. Only Grand Coulee Dam and Palisades Dam (-37,070 HUs) (BPA 2008) would have more.

Similarly, the 23,750 acres impacted at Hungry Horse Dam (Casey et al. 1984) would generate approximately 40,375 habitat units based on the 1.7 HUs per acre ratio. This suggests that Libby Dam and Hungry Horse would have likely yielded the second and third highest number of habitat unit losses within the Region (only less than Grand Coulee Dam) had a traditional HEP analysis been completed.

Conclusion

The potential for large numbers of habitat unit losses exist at Libby and Hungry Horse Dams. This coupled with the need to be consistent on how crediting is applied across the Region suggests that, perhaps, loss assessments for Libby and Hungry Horse Dams should be revisited.

[6] Other loss assessments, with exception of those in the Willamette Valley, did not include road relocations etc. as primary impacts.

References

Berger, Mathew., and D. Kuehn. 1992. Wildlife impact assessment Chief Joseph Dam project, Washington. WDFW. Olympia, WA. CCT. Nespelem, WA.

BPA. 2008. Wildlife crediting for BPA's fish and wildlife program. Dam crediting Summary Report – 2.5.607.0. www.efw.bpa.gov/IntegratedFWP/Wildlife.aspx. Bonneville Power Administration. Portland, OR.

Casey, D., C. A. Yde. and A. Olsen. 1984. Wildlife Impact Assessment and Mitigation Summary: Montana Hydroelectric Projects: Volume 3 - Hungry Horse Dam. MDFWP.Completion Report BPA Project No. 83-464.

Hansen, Jerome., R. C. Martin, and G. A. Meuleman. 1987. Albeni Falls wildlife protection, mitigation, and enhancement plan. IDFG. Boise, ID.

Howerton, J., J. Creveling, and B. Renfrow. 1986. Wildlife protection, mitigation, and enhancement planning for Grand Coulee Dam. Olympia, WA: Washington Department of Fish and Wildlife.

Yde, C. A. and A. Olsen. 1984. Wildlife Impact Assessment and Mitigation Summary: Montana Hydroelectric Projects: Volume 1 - Libby Dam. USDE. BPA. Project No. 83-464 Final Report.