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HellerEhrman LLP

Memorandum

To: Watershed Advisory Group

From: Lincoln C. Loehr

Date: December 13, 2007

Re: Temperature TMDL

16663.0005

The comments submitted by the Corps of Engineers on November 9th included a figure showing a statistical summary of daily average volume weighted temperatures in the Pend Oreille River, Idaho for existing and natural conditions, for 5 segments of the river in Idaho. The last segment was by Albeni Falls dam. The figure is attached to this memo. Though not stated on the figure, the statistical summary covered the period June 21 through September 21, 2004.

The presentation used box and whisker plots which identified the 10th, 25th, 50th, 75th and 90th percentile values from the daily average volume weighted modeled temperatures for the quarter. It also presented the data points for the values that were less than the 10th percentile and greater than the 90th percentile values.

I used the data from the figure to create data tables for each of the segments, which are also attached to this memo. I used the extreme values as if they were the lower 1st and the upper 99th percentiles. I then created frequency distribution graphs of temperature using those values. The following figures show the frequency distribution as a line graph, and as a bar graph for the station at Albeni Falls dam. The figures are just several different ways of presenting the same information that is in the figure from the Corps of Engineers comments. The figures demonstrate that the water is cooler during this time period under the existing conditions than under the natural conditions. The final figure shows the temperature difference between the existing and the natural modeled conditions for these different percentile values. Note that the temperature difference for the 10th percentile through the 99th percentile is consistently cooler under the existing temperatures compared to the natural temperatures.

The figures demonstrate that the effect of the Albeni Falls dam is to cool the river. The river is warm in the summer, but because the human causes result in a decrease in the temperature, it meets the temperature standards. Human causes do not result in a temperature increase of greater than 0.3 degrees C. The decrease is actually beneficial, and the benefit carries forward to the downstream facilities. Idaho does not need to 303(d) list the Pend Oreille River for temperature, nor does it need to develop and implement a temperature TMDL. Washington should acknowledge that the Pend Oreille River, at the Idaho border, meets Washington's temperature standards.

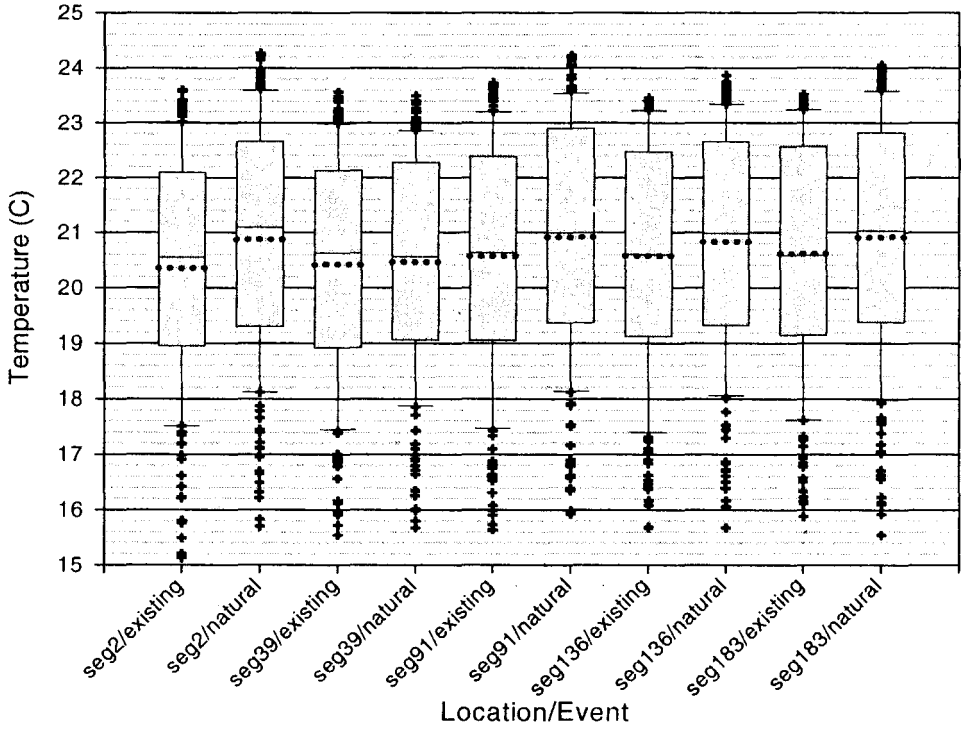


Figure 1 Statistical Summary of Daily Average Volume Weighted Temperatures in the Pend Oreille River, Idaho for Existing and Natural Conditions (note seg2 upstream boundary, seg 39 – 10K, Seg 136 – 30 K, Seg 183 – Albeni Falls Dam)

	Seg2-Existing	Seg2-Natural
1%	15.2	15.7
10%	17.5	18.13
25%	18.95	19.3
50%	20.58	21.1
75%	22.1	22.68
90%	23	23.6
99%	23.6	24.25

	Seg136-Existing	Seg136-Natural
1%	15.7	15.7
10%	17.4	18.06
25%	19.1	19.33
50%	20.6	20.99
75%	22.46	22.67
90%	23.21	23.37
99%	23.41	23.86

	Seg39-Existing	Seg39-Natural
1%	15.5	15.62
10%	17.42	17.86
25%	18.9	19.05
50%	20.62	20.58
75%	22.15	22.3
90%	23	22.82
99%	23.58	23.5

	Albeni Falls Dam - Existing	Albeni Falls Dam - Natural
1%	15.85	15.52
10%	17.61	17.99
25%	19.15	19.38
50%	20.58	21.03
75%	22.59	22.82
90%	23.22	23.59
99%	23.5	24.07

	Seg91-Existing	Seg91-Natural
1%	15.6	15.93
10%	17.46	18.15
25%	19.04	19.38
50%	20.62	21
75%	22.39	22.9
90%	23.2	23.57
99%	23.7	24.2

	Seg2-Existing	Seg39-Existing	Seg91-Existing	Seg136-Existing	Albeni Falls Dam - Existing
1%	15.2	15.5	15.6	15.7	15.85
10%	17.5	17.42	17.46	17.4	17.61
25%	18.95	18.9	19.04	19.1	19.15
50%	20.58	20.62	20.62	20.6	20.58
75%	22.1	22.15	22.39	22.46	22.59
90%	23	23	23.2	23.21	23.22
99%	23.6	23.58	23.7	23.41	23.5

	Seg2-Natural	Seg39-Natural	Seg91-Natural	Seg136-Natural	Albeni Falls Dam - Natural
1%	15.7	15.62	15.93	15.7	15.52
10%	18.13	17.86	18.15	18.06	17.99
25%	19.3	19.05	19.38	19.33	19.38
50%	21.1	20.58	21	20.99	21.03
75%	22.68	22.3	22.9	22.67	22.82
90%	23.6	22.82	23.57	23.37	23.59
99%	24.25	23.5	24.2	23.86	24.07

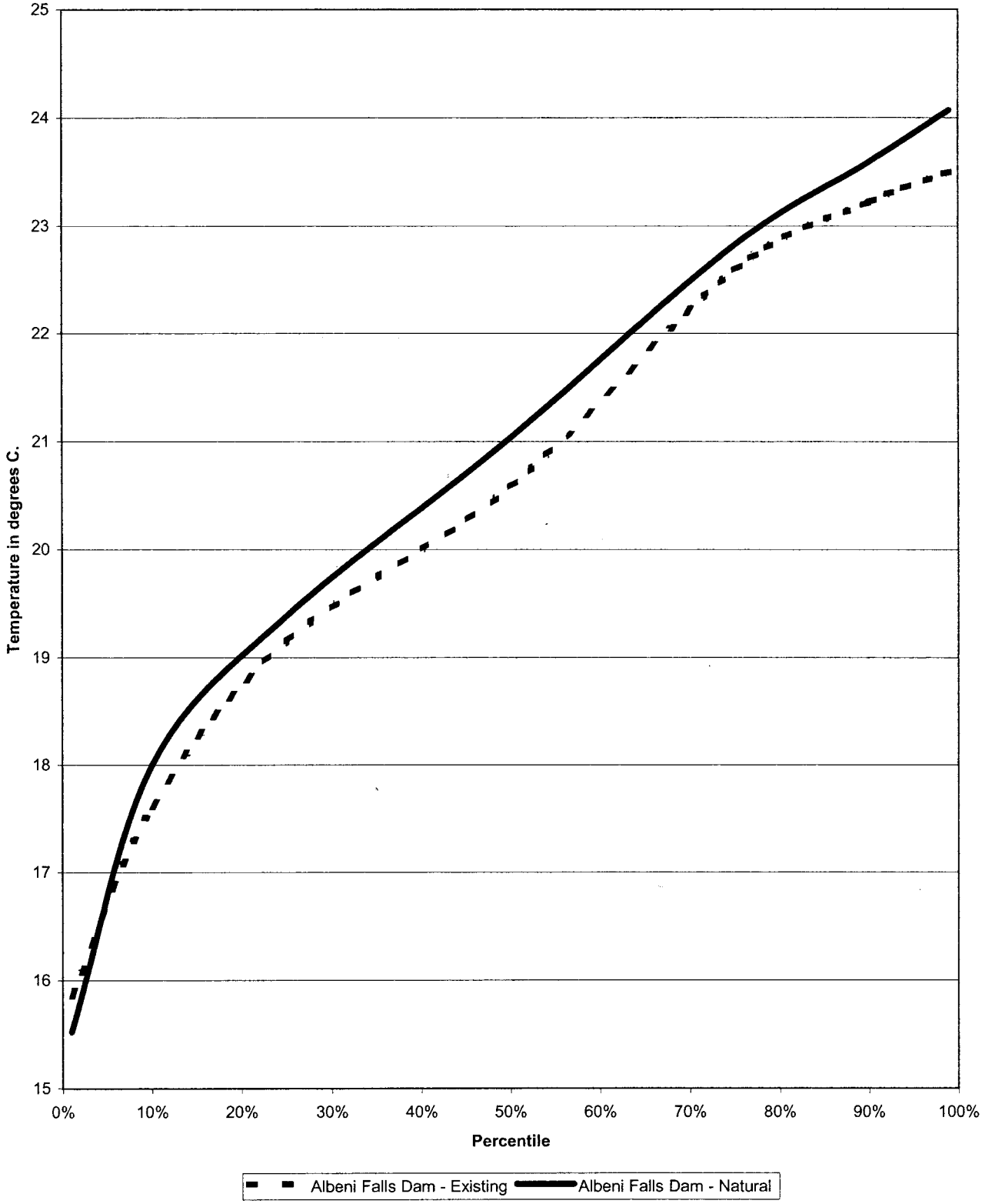
temperature difference comparing existing to natural temperatures.

	Seg2-(exist-natural)	Seg39-(exist-natural)	Seg91-(exist-natural)	Seg136-(exist-natural)	Albeni Falls Dam-(exist-natural)
1%	-0.50	-0.12	-0.33	0.00	0.33
10%	-0.63	-0.44	-0.69	-0.66	-0.38
25%	-0.35	-0.15	-0.34	-0.23	-0.23
50%	-0.52	0.04	-0.38	-0.39	-0.45
75%	-0.58	-0.15	-0.51	-0.21	-0.23
90%	-0.60	0.18	-0.37	-0.16	-0.37
99%	-0.65	0.08	-0.50	-0.45	-0.57

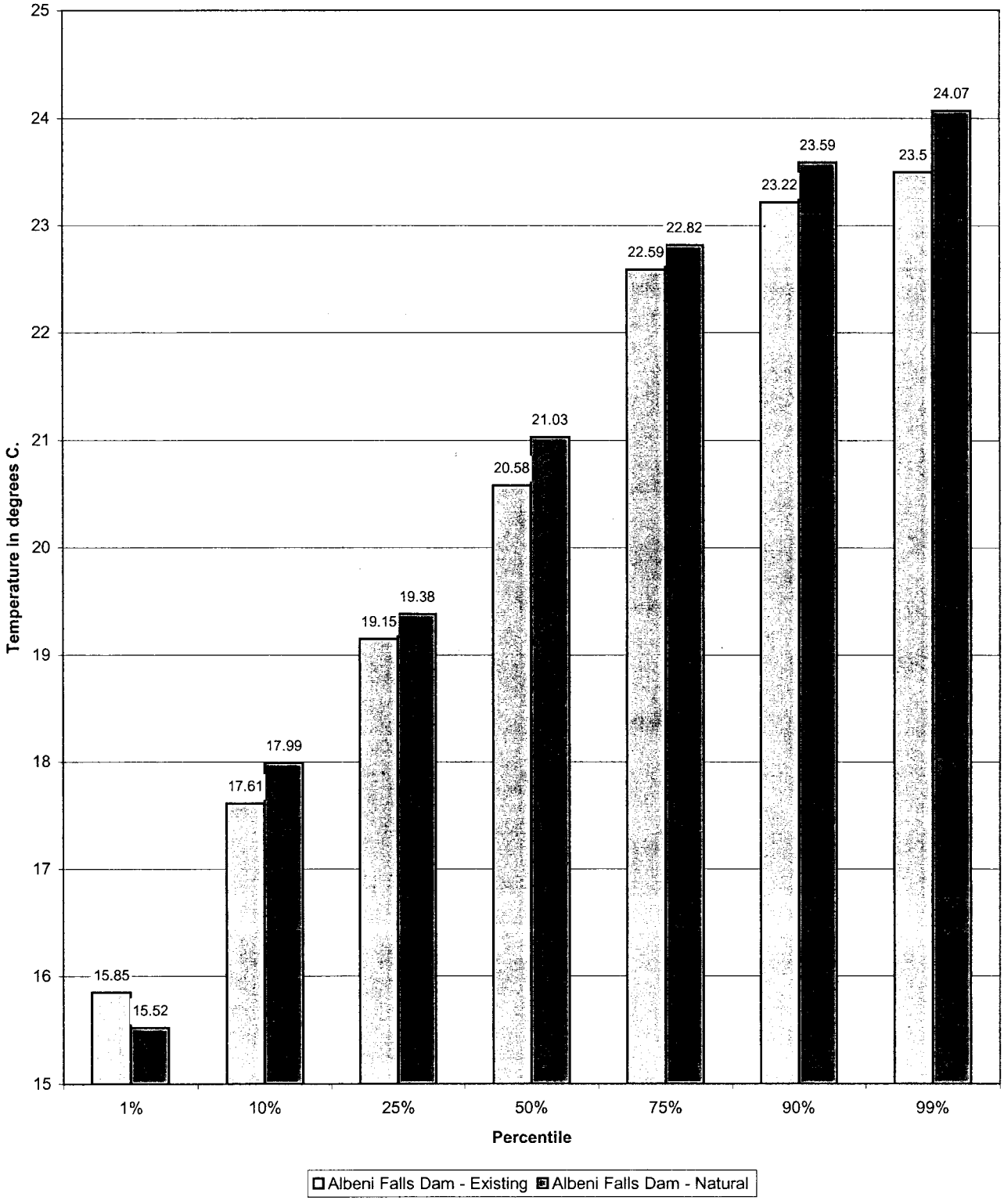
temperature difference at Albeni Falls Dam comparing existing to natural

	Albeni Falls Dam-(exist-natural)
1%	0.33
10%	-0.38
25%	-0.23
50%	-0.45
75%	-0.23
90%	-0.37
99%	-0.57

Temperature frequency distribution at Albeni Falls Dam, June 21 to September 21, 2004



Frequency percentile temperatures for Albeni Falls Dam
June 21 through September 21, 2004



Temperature Differences at Albeni Falls Dam
June 21 through September 21, 2004
(modeled existing minus modeled natural from frequency distribution)