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MEMORANDUM

TO: FPAC

FROM: Margaret Filardo

DATE: June 4, 2015

SUBJECT: Comparison of 1977 and 2015 Operations and Flow in the Snake River

After Tuesday's FPAC conference call I was curious as to how 2015 compared to 1977. The 1977 runoff was the lowest recorded runoff that has occurred in the Columbia Basin since 1929. There have been several comparisons of the runoff this year to 1977. While flows are significantly below Biological Opinion flow objectives this year, in my mind it did not seem as "dire" as I had always been told 1977 conditions were. Consequently, I explored and compared some of the operations that occurred. I am sharing this memo with you for your information.

At the FPAC meeting Paul Wagner commented that the Dworshak runoff volume was now even lower than observed in 1977. This is a true statement, but only for a part of the year. Paul is correct if we consider just the April–July or April–August runoff. Less runoff is coming off during this spring/summer period than was observed in 1977. But that represents only a part of the overall picture. The January–July runoff for DWR this year is considerably higher than occurred in 1977 (Table 1). The higher runoff observed in 2015 when the winter months are added to the volume, together with significantly different reservoir operations designed to produce flow objectives, results in a much different flow outcome than occurred in 1977.

Table 1. Runoff Volume (MAF) at Dworshak, Brownlee and Lower Granite Dams for 1977 and 2015 (6/3/2015, 10 Day QPF forecast).

DWR	2015	1977
Jan–July	2.607	1.509
Apr–Aug	1.237	1.3
BRL		
Jan–July	5.023	4.530
Apr–Aug	2.851	2.306
LGR		
Jan–July	19.05	12.46
Apr–Aug	11.61	?

In 1976–1977 Dworshak started out with a full pool (1600 feet) on September 1st. DWR then drafted through mid-March, in spite of the poor runoff volume forecasts. The reservoir did not refill, even after outflow was reduced to minimum in March. Some water was released from DWR during July and August, but judging from how low the flows were at Lower Granite, it would seem this might have been necessary to keep one turbine unit operational at the Snake River projects. The January–July runoff and the April–August runoff in 1977 are very similar, suggesting a very dry winter with very little runoff input to the reservoir.

In 2014–2015, Dworshak continued drafting in September to 1520 feet for fishery needs, but then was operated at minimum outflow all winter long. Water was not released until an increased inflow/flood control event in February, and then again for spring flow augmentation. DWR is now refilled, in part due to catching the winter inflow reflected in the January–July runoff volume.

As a result of these different winter operations and higher inflow, thus far in 2015 spring flows have been higher than observed in 1977 during the fish migration season. Based on the STP, flows are expected to be around 30 Kcfs for July and August this year. The higher flows in 2015 are a result of both (1) how we now operate reservoirs, focusing on staying on the upper rule curve and preventing excessive winter drafts; and, (2) the fact that more water was available to Dworshak this year compared to 1977.

In summary, while migration conditions are far below the Biological Opinion objectives for flow, flows are better this year than occurred in 1977. In addition, Court Ordered spill is occurring, while no spill occurred in 1977 and transportation was maximized. It was estimated that the 1977 in-river transport control group (from which no adults returned) suffered 100% mortality by the time they got to John Day Dam.

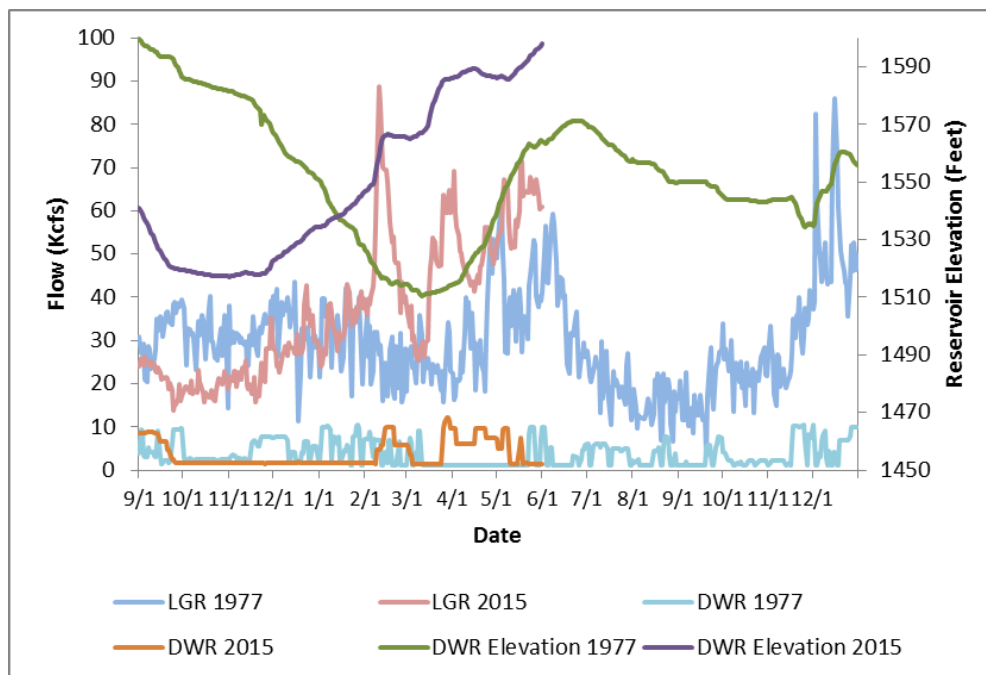


Figure 1. Comparison of Dworshak elevation and outflow, and Lower Granite flows for 1977 and 2015.

There are a few additional pieces of information that might be of some interest to you. The estimated adult return of the transported fish was near 0.1%. Again, no adult fish returned from the in-river control group. The graph above is based on daily average flows, but daily load factoring was a significant issue in 1977. The powerhouse flows at the Snake projects were often reduced to 1 Kcfs for several hours during a 24-hour period to follow load. In my reading I found that there was considerable concern expressed at the time that in-river fish were stranded due to these fluctuating conditions. In 2015 significant load following cannot occur due to limits on reservoir operating ranges, operation of one unit at the Snake River projects, and the requirements for spill.