

MEMORANDUM

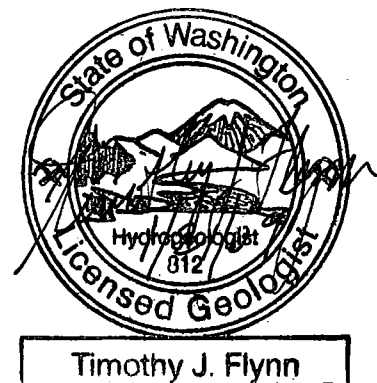
Project No.: 080040-002-01

January 22, 2009

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Lathrop, Winbauer, Harrel, Slothower & Denison, LLP

From: Joseph N. Morrice, LHG
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Re: Evaluation of Groundwater Pumping Lag Effects on the Yakima River,
Anderson Hay and Grain Facility

This memorandum presents an evaluation of potential benefits to instream flows and fish habitat in the Yakima River due to a proposed change in the source of an existing water right from a surface water diversion on the Yakima River to a groundwater source in hydraulic continuity with the river. Two previous memoranda evaluated hydraulic continuity between the river and the proposed groundwater source (Aspect, 2008a) and the potential for the proposed change to impair existing surface water and groundwater rights (Aspect, 2008b).

As discussed below, the proposed water right change would have a positive impact on in-stream flow and reduce releases from storage in the upper Yakima River, particularly during the late irrigation season (September and October) when low flows are desirable for salmon spawning. The lower flows during spawning would then allow for reduced flows and storage releases in the upper Yakima River to protect salmon redds (egg nests) during the incubation period (November through March).

Background

MTA Holdings, LLC has requested a change to Yakima River Basin Adjudication Court Claim No. 00636 (Court Claim No. 00636), which authorizes a surface water diversion from the Yakima River for the purpose of seasonal irrigation use from April 1 to October 15. Court Claim No. 00636 authorizes a total annual use of 127 acre-feet per year (afy) for irrigation of 12.5 acres, with a maximum diversion rate of 0.324 cubic feet per second (cfs).

A change application (KITT-07-09) filed with the Kittitas County Conservancy Board requests a change in the place of use for 0.104 cfs (47 gallons per minute [gpm]) and 40.64 afy associated with Court Claim No. 00636 to MTA Holdings' Anderson Hay and Grain facility, located approximately 1 mile southeast of the existing place of use. The remaining

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0.220 cfs and 86.36 afy associated with this claim would be transferred temporarily to Ecology's Trust Water Rights Program.

MTA Holdings subsequently amended the change application, requesting to change the surface water point of diversion to a groundwater point of withdrawal on the Anderson Hay and Grain facility. The proposed groundwater source is located approximately 4 miles downriver from the existing point of diversion.

Lag Effect

The proposed water right change was presented to the Yakima Water Transfer Working Group (WTWG) in November 2008. One issue raised at the WTWG meeting is the potential for the "lag effect" (i.e., the time between the start or end of pumping and when effects on flows in the Yakima River are realized) to impact surface water flows in the Yakima River beyond the period of use.

Under the current surface water diversion, reductions in flow in the Yakima River occur immediately and are equal to the instantaneous rate of diversion. By changing to a groundwater source the reductions in flow would be delayed and of lower magnitude during the irrigation season than under current conditions. Pumping of groundwater during the irrigation season would continue to affect flows in the Yakima River after the end of the irrigation season due to the lag effect. The duration of the lag and the magnitude of the effects during and after the irrigation season will vary depending on hydrogeologic conditions.

An analysis of streamflow depletion, based on the Well Pumping Depletion Model developed by Western Water Consulting, was provided by the Washington State Department of Ecology (Ecology). This analysis assumes a single well at the Anderson Hay and Grain facility is pumped at a continuous rate of 47 gpm over the 198-day irrigation season (April 1 through October 15). Results of this model indicated that flow reductions in the Yakima River would be at a minimum at the start of the irrigation season, gradually increasing and reaching a peak depletion about a month after the end of the irrigation season, then decreasing again until the start of the next irrigation season. The maximum predicted streamflow depletion rate was roughly half the seasonal groundwater pumping rate.

Although a useful tool for qualitatively evaluating potential effects of groundwater pumping on surface water flows, the analytical model applied by Ecology includes simplifying assumptions and limitations that do not account for hydrogeologic conditions at the site. The primary limitation is that the analytical model does not account for other surface water sources of recharge to groundwater, such as a large pond located about 2,000 feet south of the site. The effect of including recharge from the pond would be to reduce the magnitude and duration of the estimated streamflow depletion. Based on these limitations, the analysis provided by Ecology is conservative and over estimates of the magnitude of streamflow depletion and the duration of the lag after groundwater withdrawals end. Based on the proximity of the proposed well source to the Yakima River and other surrounding surface water bodies, and the transmissive nature of the alluvial aquifer, we would anticipate considerably less lag time of pumping effect. We also expect that the timing impacts

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associated with the proposed groundwater withdrawal would be positive relative to the management strategy of the Yakima River flow regime during the end of the irrigation season.

Benefit of Proposed Change

The primary environmental benefit of the proposed change from a surface water diversion to a groundwater source would be to spawning and incubation habitat for spring Chinook salmon in the upper Yakima River. Starting in September of each year, the United States Bureau of Reclamation (USBR) performs what is referred to as the flip-flop operation to encourage spring Chinook to spawn at lower river stage levels in the upper Yakima River above the Teanaway River. As described in the Interim Comprehensive Basin Operating Plan for the Yakima Project (USBR, 2002):

“The flip-flop term derives from the fact that the Yakima and Naches Rivers form a “Y.” In this operation, water from the three reservoirs in the upper Yakima River system (right side of the “Y”) is used to meet irrigation demands downstream of the confluence of the Naches and Yakima Rivers through the first week of September, and water is retained in reservoirs of the Naches River arm (left side of the “Y”) to the maximum extent possible. After the first week of September, reservoir operations are flip-flopped with demands downstream of the confluence of the Naches and Yakima Rivers being met from the Naches River system reservoirs and flows from the upper Yakima River system reservoirs are reduced. This operation reduces flows in the upper Yakima River at the time that fish spawn, forcing the fish to build redds at a lower elevation in the stream channel. As a result, less water is needed to be released during the winter to keep the redds under water and maintain the fish eggs.”

Flow reductions in the upper Yakima River for the flip-flop operation begin on September 1st and last through the end of the irrigation season. Following the irrigation season, sufficient flows are maintained in the upper Yakima River to protect salmon redds through the incubation period (November through March), with water released from storage as necessary.

The sources of flows in the Yakima River at the point of diversion currently authorized for use under Court Claim No. 00636 include unregulated (natural) flows, releases from the three reservoirs in the upper Yakima River system, and irrigation return flows. Releases from storage to meet irrigation demands have begun as early as May in dry years and as late as August in wet years, with an average start date of June 24.

As discussed previously, the proposed use of a groundwater source would result in less water removed from the Yakima River during the irrigation season than under the current surface water diversion. This would reduce flows and releases from storage in the upper Yakima River required to meet irrigation demand, including during the flip-flop operation. The reduced flows required during the flip-flop operation would in turn result in lower required flows during the salmon incubation period to protect salmon redds in the upper Yakima River.

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The proposed change to a groundwater source would result in some reduction in flows in the Yakima River relative to current conditions after the end of the irrigation season (i.e., after seasonal groundwater withdrawals cease). The proposed groundwater source is located well below the confluence of the Yakima River and the Teanaway River, whereas the flip-flop operations are intended to improve fish spawning and incubation habitat above the Teanaway River. Therefore, additional releases from storage would not be required to offset the effects of the proposed change in order to protect salmon redds during the November through March incubation period.

References

Aspect Consulting, LLC, 2008a, Memorandum - Hydraulic Continuity Assessment, Anderson Hay and Grain Facility. August 11, 2008.

Aspect Consulting, LLC, 2008b, Memorandum - Impairment Assessment, Anderson Hay and Grain Facility. August 11, 2008.

United States Bureau of Reclamation (USBR), 2002, Interim Comprehensive Basin Operating Plan for the Yakima Project, Washington. November 2002.

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