

— APPENDIX D—

**Effects of Wasco Dam Storage
on White River Flows**

EFFECTS OF WASCO DAM STORAGE ON WHITE RIVER FLOWS

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The White River is a tributary to the Deschutes River and enters downstream from Pelton Dam at river mile (RM) 46.4. The White River drainage is approximately 417 square miles and has its headwaters near Mt. Hood. White River Falls is a natural barrier in the basin and is 2.1 miles upstream from the confluence with the Deschutes River.

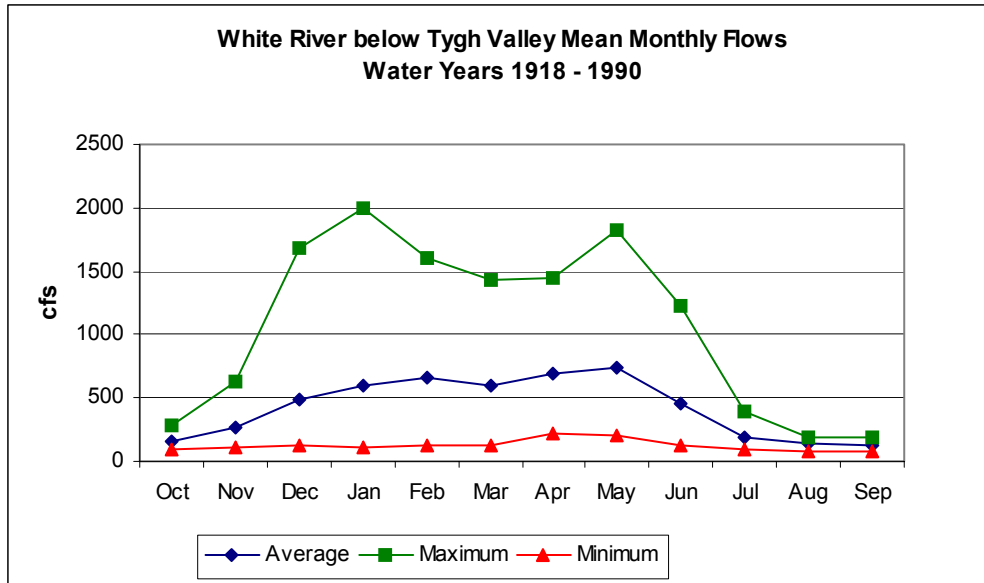
The Wapinitia Project consists of approximately 2,100 acres in the White River basin. Wasco Dam storage is used to supplement the irrigation flows on the project when the natural flows begin to decrease in July during wet years and as early as April in dry years. The total amount of water diverted from natural streamflow and storage for the Wapinitia Project is 5,000 acre-feet (AF) annually.

There are three private irrigation districts in the White River basin that also affect the flow in the White River. These private diversions divert more water than the Wapinitia Project, diverting flow to approximately 7,160 acres for a total amount of 21,490 AF annually¹. The diversions occur primarily during the summer months. The effect of Wasco Dam storage on White River flows is small when compared to the other irrigation projects in the White River basin.

Wasco Dam storage effects on White River flows was analyzed by using daily flow data from the U.S. Geological Survey (USGS) gage below Tygh Valley and calculating how dam operations affected those flows. The Tygh Valley gage was located near the mouth of the White River downstream from White River Falls and approximately 2 miles upstream from the confluence with the Deschutes River. Data were available for water years 1918 through 1990. Mean monthly flows were computed and the average, maximum, and minimum flows were plotted in Figure 1. The monthly flows ranged from 2,000 cubic feet per second (cfs) maximum during a January winter rain event to a minimum of 80 cfs during a base flow period in August. The average monthly flows ranged from roughly 130 cfs in August and September to 730 cfs in May.

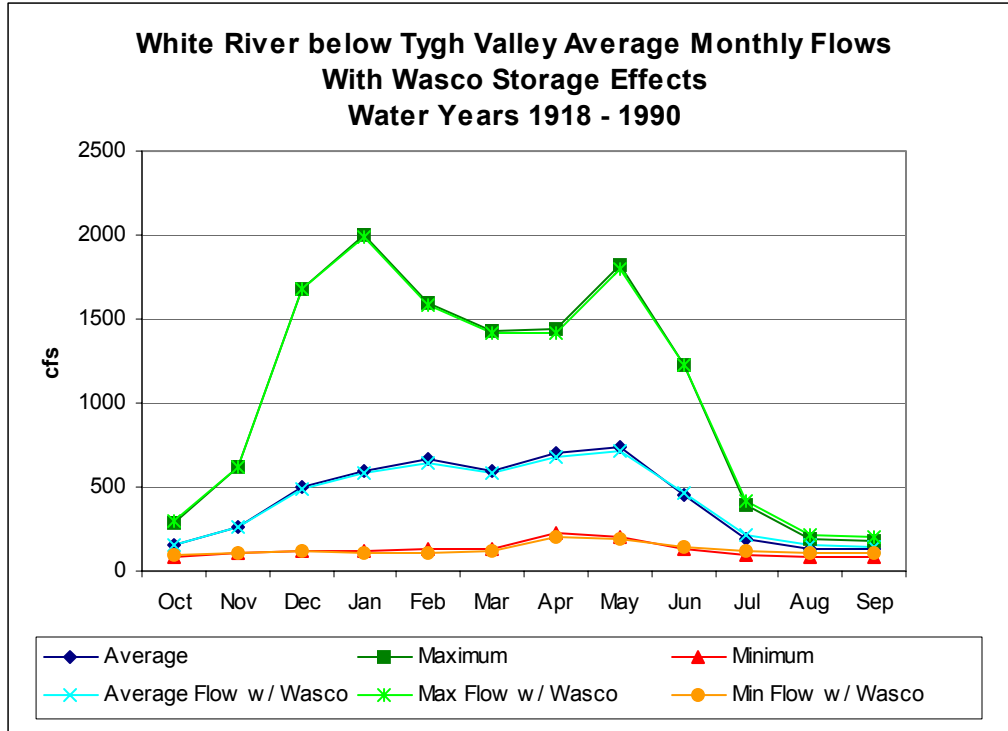
¹ Toll, Larry. 2002. Personal Communication. Watermaster, Oregon Department of Water Resources.

**Figure 1. White River below Tygh Valley
Mean Monthly Flows for Period 1918 – 1990**



Effects from Wasco Dam operations on White River flow were analyzed using reservoir storage data. Daily storage data for the period 1984 through 2000 were available from the Bureau of Reclamation’s historic data set. During this period there were two years when data was not available and some months were missing within a few other years. End-of-month storage was tabulated for each year and the change in storage for each month was calculated. The change in monthly storage was averaged and converted to change in flow. The maximum, minimum, and average change in monthly flow is shown in Figure 2.

Figure 2. Flow Change per Month due to Wasco Dam Operations



The change in monthly flow ranged from an increase of 46 cfs to a decrease of 102 cfs. The average change was +6 cfs during the irrigation season. The monthly flow change is positive when the water is released from storage into the river; when the flow change is negative the water is going into storage and not flowing down the river. Negative flow changes occur in the winter months during storage and in the spring months during periods of high runoff from rain and snowmelt events. Positive flow changes occur during the June through September period when natural runoff is low and irrigation demands are high, because storage is released to supply irrigation water. These flow trends are applicable to the White River and the Deschutes River below its confluence with the White River.

The Wasco Dam storage changes and the total White River flow were compared in Figure 3. This figure illustrates the magnitude of impacts of the average monthly amount of water stored and released from Wasco Dam on the White River. For all three categories, minimum, average and maximum flows, the effect of the change in flow from Wasco Dam are very small when compared to the total White River flow.