

### 3. DISCUSSION

Variations in the hydrologic regime of the White River appear to impact the hydraulic communication between the aquifer and river throughout the year, which in turn impacts aquifer behavior and the potential well-field yield. The relative magnitude of the various hydrologic factors controlling hydraulic communication, however, is still unclear. The yield of each well is also affected by the variability in the hydraulic characteristics of the aquifer, well design, and available drawdown to the pump intake. These factors can be controlled to a certain extent, but must be balanced to provide an optimum quantity of water for a given length of time subject to the physical constraints of the system.

The purpose of the following discussion is to describe the components of the system as we presently understand them based on the available information. There may be other viable explanations, but it may require the collection and analysis of additional geologic and hydrologic data combined with the development of a mathematical model, to fully understand and predict the dynamic interaction between the river and the aquifer. There are mathematical models that can simulate surface-water and groundwater interaction. However, the usefulness of such a model, and its ability to be used as a predictive tool in a system where the boundary conditions continually change would have to be weighed against continued analysis of well-field operational data and wetland impacts that could be obtained from year-to-year system monitoring.

#### 3.1 White River Hydrology

The hydrology of the upper White River system in the vicinity of the hatchery is described by Dunne<sup>1</sup>. The following discussion is based primarily on data and interpretations presented in that report.

##### River Flow

The river drains the northern flanks of Mount Rainier and surrounding areas. The typical yearly distribution of streamflow is presented on Figure 6. This figure shows occurrence levels for various flows in the river throughout the year. River flow is generally unregulated with the exception of high-runoff periods, when Mud Mountain Dam is used for temporary storage. The 50%, or median flow, represents a flow that is not exceeded 50 percent of the time during that period. Similarly, flows at the 80 percent level are not exceeded 80 percent of the time, and represent a typical maximum flow. It should be noted that flow in the White River varies daily and there may be a significant range in flow during the course of one day.

During winter, river flows are generally around 1,000 cfs, but may range from about 750 cfs to 2,500 cfs. River stage may fluctuate by one to two feet during this period. Occasional periods

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<sup>1</sup> Dunne, T., 1986. Sediment Transport and Sedimentation Between River Miles 5 and 30 along the White River, Washington. Prepared for Puget Sound Power and Light Company Bellevue, Washington, August, 1986.