

## Turbine Bypass Flow

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The hydroelectric turbines at the hydroelectric facilities have a bypass flow capability, meaning water from the lake can flow into the tailrace without going through the turbines.

The hydroelectric operator for the Deep Creek Hydroelectric Project is required, as per permit, to keep a minimum flow rate on the Youghiogheny River immediately downstream of the tailrace at 40 cfs.

Brookfield monitors the USGS flow gage at Oakland and according to a specified protocol operates a bypass flow to accomplish the 40 cfs minimum flow rate.

When the flow at the Oakland USGS gage is less than 26 cfs, Brookfield uses a bypass valve setting to provide the required bypass.

The annual reports list the valve setting and the resulting flow. This data was extracted from these reports and used in a linear regression model.

The characteristics of the bypass flow are modeled by the following equation, which was arrived at during a period of flow measurements.

$$Q = -13.816 + 0.722 \times V$$

Q = bypass flow, cfs

V = valve setting, %

The results are shown in Figure 1.

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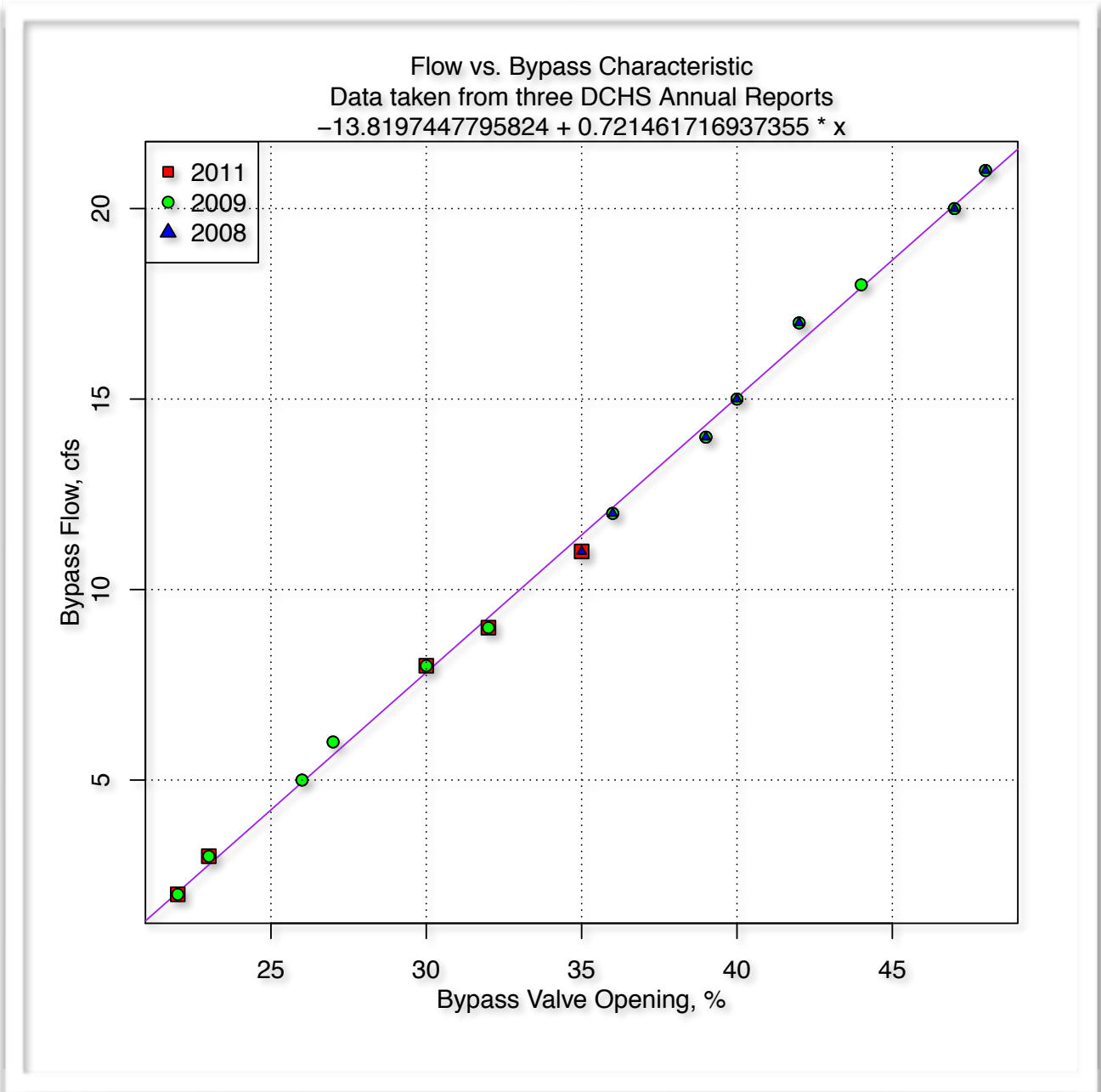


Figure 1 - Bypass Flow vs. Valve Opening