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The Oregon Garden Wetlands
Water Quality Research

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Photo by Peter Marbach

The SPROut (Sustainable Plant Research and Outreach) program at The Oregon Garden started collecting wetlands water quality data in 2002, and since then has expanded to 14 designated sites. We check monthly for nutrients (nitrate and phosphorous), temperature, turbidity, conductivity, dissolved oxygen, and pH for each of the 14 sites, and conform to DEQ standards. We take all measurements on site except for the nutrient sampling which is sent to a Portland lab for analysis.

Rough analysis of the water quality data shows a reduction in nutrient load and temperature as the water filters through the ponds. Our flow system using aquatic plants restores water to acceptable standards for fish and watershed health before rejoining the local watershed at Brush Creek.

Figure 1 shows a summary for several months of nitrate data in 2005. It confirms a decrease in nitrate levels as the water passes through the cells. A rough comparison between the levels in the wastewater cells and those sites not influenced by wastewater (Brush-Up, Native Pond, and Oak Grotto) demonstrates that our wetlands return nitrate density to levels more characteristic of native waters.

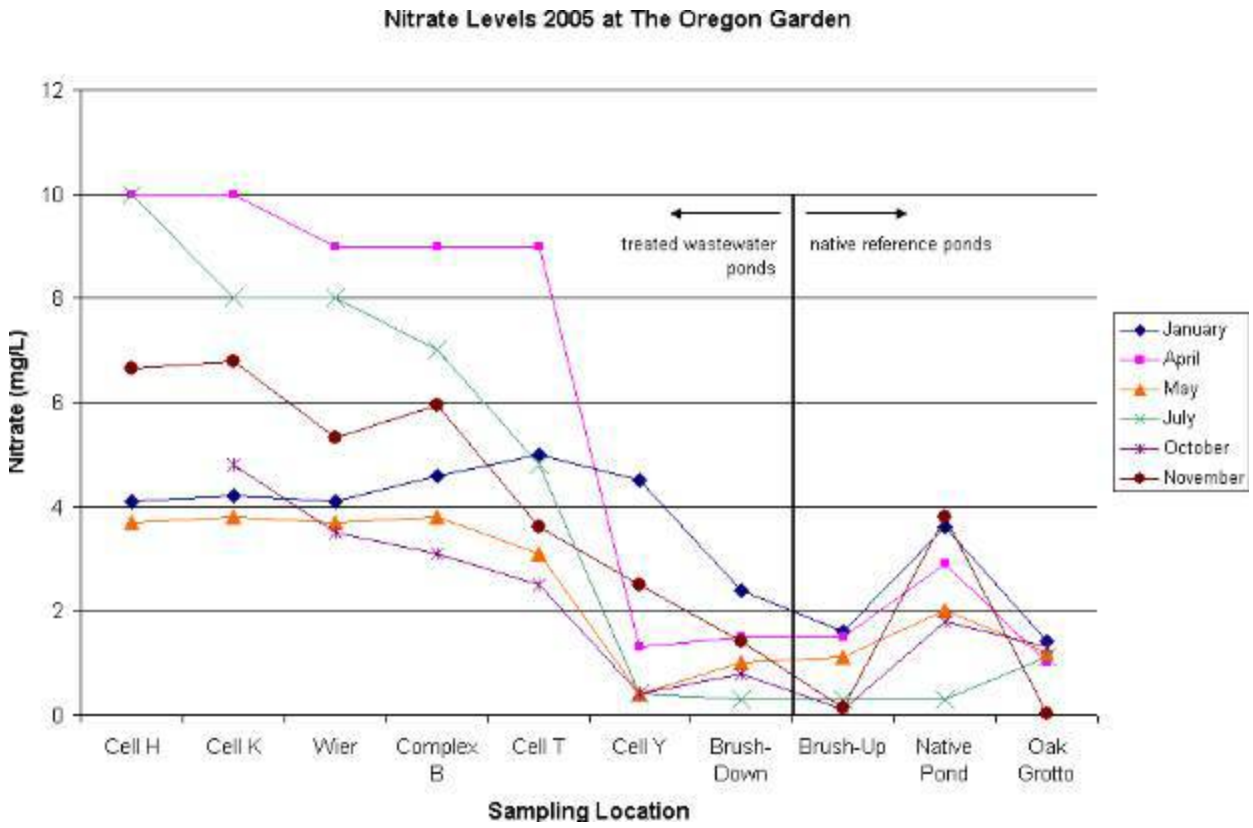

Figure 1: Nitrate Levels at The Oregon Garden through 2005. Treated wastewater flows down from cell A (not shown) through cell H to cell Y and then directly to Brush-Down, just downstream of where the water from The Garden enters Brush Creek. Wastewater does not affect sampling sites to the right of the vertical line. Brush-Up is upstream from where the water from The Garden enters Brush Creek. The Native Pond and Oak Grotto existed before the creation of The Garden.

Total phosphorous levels show a similar decline. **Figure 2** illustrates the decline in total phosphorous at The Garden for 2005.

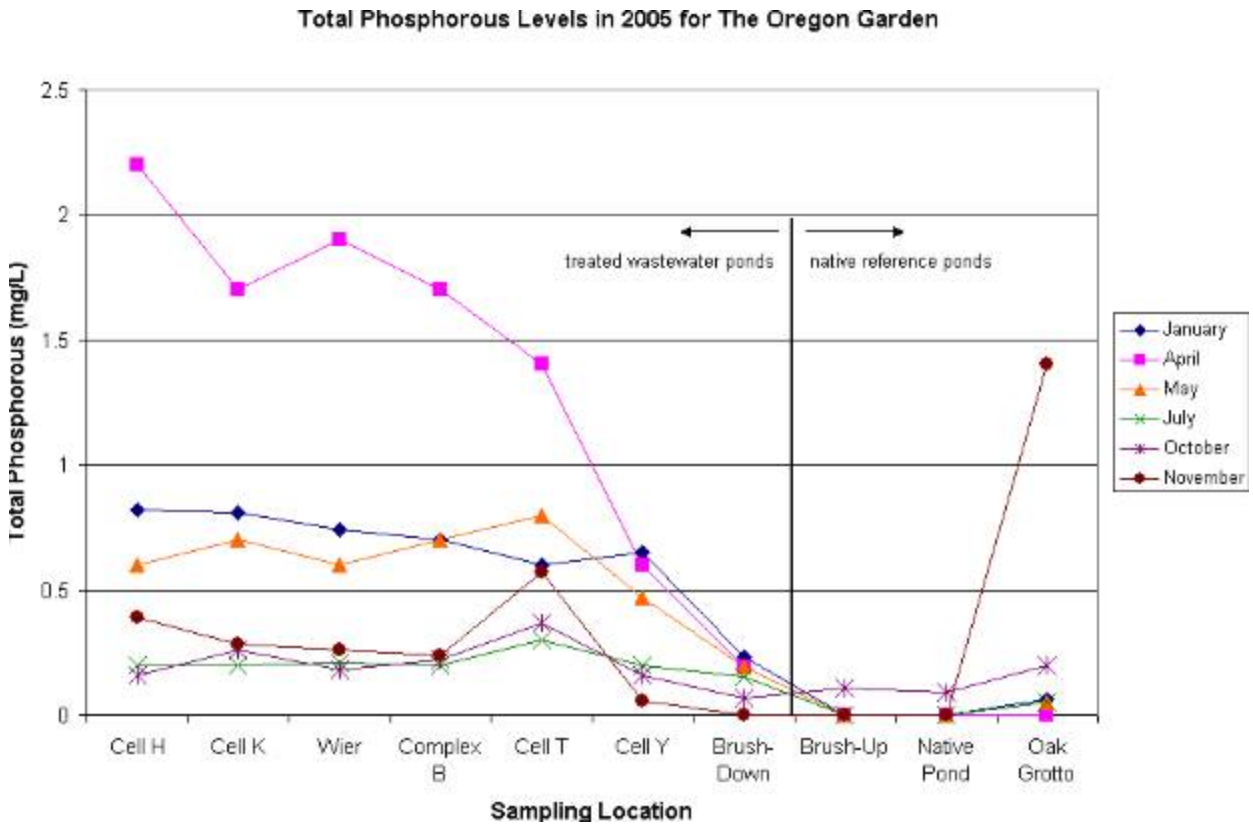

Figure 2: Total phosphorous levels at The Oregon Garden for 2005. Treated wastewater flows down from cell A (not shown) through cell H to cell Y and then directly to Brush-Down, just downstream of where the water from The Garden enters Brush Creek. Wastewater does not affect sampling sites right of the vertical line. Brush-Up is upstream from where water from The Garden enters Brush Creek. The Native Pond and Oak Grotto existed before the creation of The Garden.

Conventional methods for treating wastewater, including solids separation and disinfection, can substantially raise the water temperature. Ideally wastewater should return to “normal” or fish-safe temperatures before being released to natural waterways. As stated earlier, Silverton has a limit on how much wastewater they can release to Silver Creek, based on its effect on the overall stream temperature. **Figure 3** illustrates the average 2-3 degree Celsius water temperature drop from the top of the wetlands to where it enters Brush Creek.

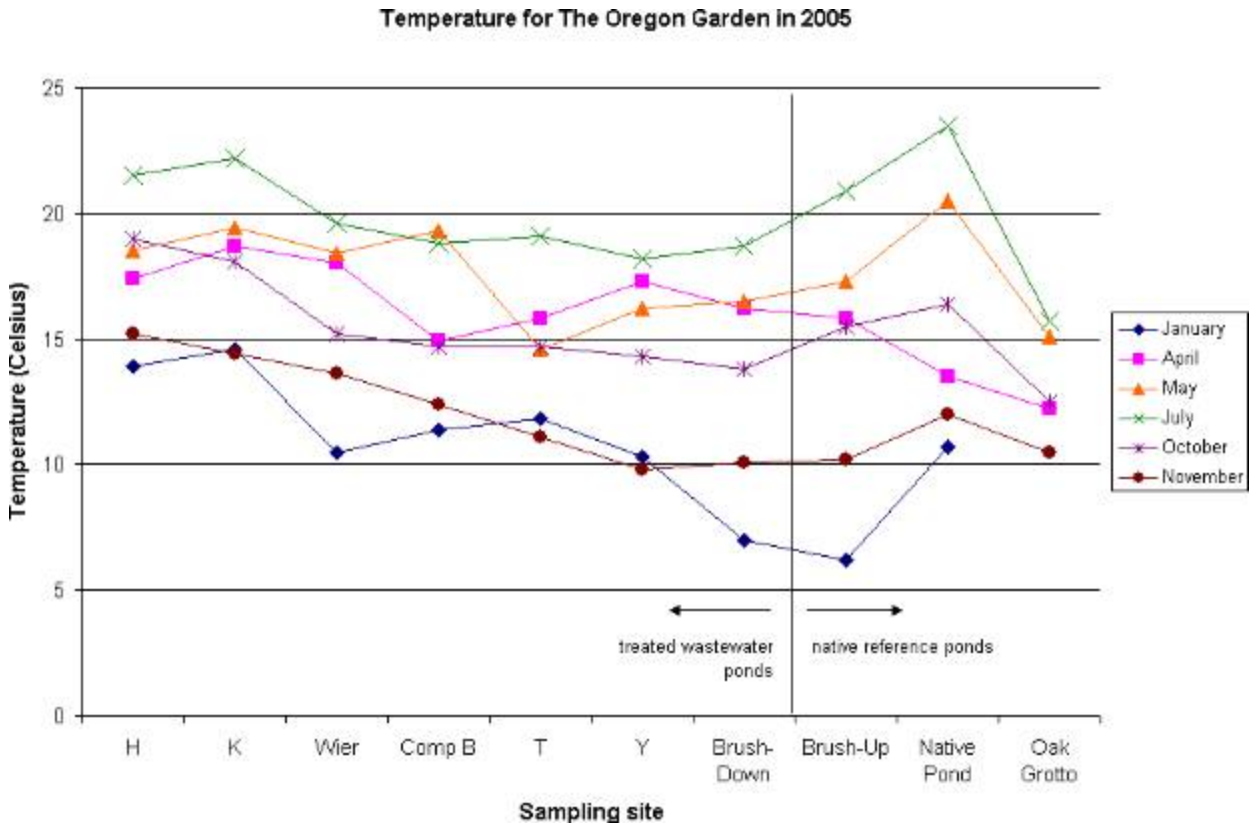

Figure 3: Temperature changes in The Oregon Garden wetlands for 2005. Treated wastewater flows down from cell A (not shown) through cell H to cell Y and then directly to Brush-Down, downstream of where the water from The Garden enters Brush Creek. Wastewater does not affect sampling sites to the right of the vertical line. Brush-Up is upstream from where the water from The Garden enters Brush Creek. The Native Pond and Oak Grotto existed before the creation of The Garden.

Next to The Oregon Garden is Petitt Reservoir Dam on Brush Creek (see figure 4), which investigators suspect has a warming effect on Brush Creek. Water discharges from the top of the reservoir, where solar radiation warms the water. This means that the water in Brush Creek directly downstream of Petitt Reservoir Dam is warmer than the water entering the reservoir. The temperature reduction from The Oregon Garden Wetlands can also help compensate for this other source of warming to Brush Creek.

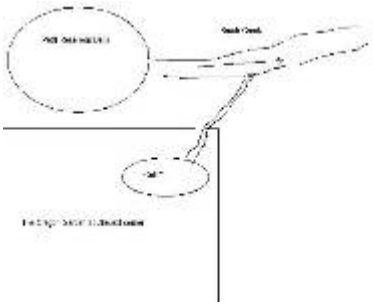

Figure 4: Diagram of Petitt Reservoir on Brush Creek next to The Oregon Garden.
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