

Report on Water & Soil Quality

Sites:

The water testing sites included the Iris pond and the Waterfall pond. The soil testing sites included the Iris Collection, Annual Garden, Wildflower Garden, Wilson Rose Garden, Perennial Garden, and the Turfgrass.

Results:

Water:

Chemical Characteristic	Garden	2008	2011	2012
Nitrates (mg/L)	Iris Pond	0.021	0.0258	0.0204
>10 mg/L = very high	Waterfall Pond	n/a	0.128	0.0205
Phosphorus (Water) ppm	Iris Pond	0.286	0.85	0.17
> 0.060 mg/L = very high	Waterfall Pond	n/a	0.27	0.24

Soil:

Chemical Characteristic	Garden	2008	2009	2012	
pH	Iris Collection	7.3	7.6	7.6	
	Annual Garden	7.7	8	8	
	Wildflower Garden	7.6	7.7	7.8	
	Wilson Rose Garden	7	6.8	6.7	
	Turfgrass	8.1		7.8	
	Perennial Garden	7.5	7.7	7.9	
Phosphorus Soil (Bray ppm)	Iris Collection	249	205	217	
	>20 = very high	Annual Garden	6.5	4.5	36
	Wildflower Garden	32	35	47	
	Wilson Rose Garden	233	232	298	
	Turfgrass	24		24	
	Perennial Garden	158	112	20	
Potassium [K] (ppm)	Iris Collection	828	615	536	
	>160 = very high	Annual Garden	87	78	297
	Wildflower Garden	166	156	177	
	Wilson Rose Garden	596	480	281	
	Turfgrass	96		138	
	Perennial Garden	318	236	85	
Organic Matter (%)	Iris Collection	7.6	9.3	8	
	>6.0 = very high	Annual Garden	8.5	7.7	9.8

	Wildflower Garden	5.8	6.3	7.1
	Wilson Rose Garden	12.3	12.3	13.3
	Turfgrass	3.8		5.5
	Perennial Garden	7	8	3.8
E.C. (mmhos/cm)	Iris Collection	0.2		0.3
>2.0 = very high	Annual Garden	0.3	0.49	0.4
	Wildflower Garden	0.2		0.3
	Wilson Rose Garden	0.7	1.96	1.8
	Turfgrass	0.2		0.4
	Perennial Garden	0.2		0.3

Conclusions:

The water test reveals that the levels of nitrates in both the Iris and Waterfall ponds are low. This is good because nitrates are a factor in increasing eutrophication. On the other hand, the phosphorus levels in both ponds were extremely high. In 2012, the level of phosphorus in both ponds did decrease from the previous year, and this may be due to decrease in horse manure input from old farm fields or shoreline buffers installed in 2009. In any case, the amount of phosphorus in both ponds needs to decrease. This can be accomplished by using less fertilizer in the gardens, which run down into the ponds.

The soil tests revealed that the gardens have a relatively high pH level. For flower gardens, it is preferable to have a lower pH. To lower the pH, gardeners should utilize ammonium sulfate. In most gardens, the phosphorus and potassium levels are too high. The Wilson Rose garden and the Iris Collection in particular, are extremely high. This may be remediated by limiting the amount of fertilizer containing phosphorus or potassium such as milloranite, fish emulsion, and miracle grow. The amount of organic matter in the gardens is at a good, high level. The gardeners should continue to use wood chips and mulch on their gardens to keep these high levels. The electric current for each of the gardens is also at a good level, indicating fertilizers are not used to an extreme.

This report gives a snapshot into the quality of water and soil for the gardens and ponds in the Arboretum, but does not give a great indication of the trends over the years. I would suggest continue testing the water and soil each year to get a better understanding of what factors are changing the quality of the water and soil. Also, due to the high levels of phosphorus, potassium, and pH in the soils, I would suggest limiting the fertilizer used in each garden to mainly ammonium sulfate and compost. These two fertilizers will drop the pH while adding nitrogen, and also add organic matter to the soils.