

**From:** Fred Hays

**Subject:** Water Test Results

**Date:** December 2, 2024 at 11:18:01 AM MST

**To:** Valerie Harper

Hello Valerie,

Here are the water sample results for E. Coli, suspended soils, and turbidity. These samples were taken from the Marina, Retention, and the Middle.

Middle: E. Coli: 34mpn/100ml

Suspended Soils: 12mg/L

Turbidity: 14.7 NTU

Marina: E. Coli: 126mpn/100ml

Suspended Soils: 14mg/L

Turbidity: 16 NTU

Retention: E. Coli: 167mpn/100ml

Suspended Soils: 18mg/L

Turbidity: 17.2 NTU

These figures may seem difficult to read however a clear trend can be seen. The overall quality of the water increases the further samples are taken from the retention area. E. Coli disperses, suspended soils decrease, and turbidity decreases. These are all trends we expected to see and can be attributed to runoff entering the retention area. If there are nearby farms, particularly pig farms, this would explain the E. Coli. Though we feel at this time that even the levels seen in the retention pond are not requiring immediate intervention. If there is anything else I can do for you or answer any questions, please feel free to let me know.

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**Fred Hays**

*Biological Technician*



## Water Quality Results

1. Sources of ammonia and nitrite include animal waste, fertilizers, breakdown of organic matter, and natural processes. Ammonia nitrogen was high in July possibly due to fertilizer runoff.
2. Alkalinity indicates the ability of water to neutralize acids. The higher alkalinity seen in the marina and pond in October may be the result of limestone or concrete breakdown.
3. Chloride is an electrolyte needed by fish. Low levels are detrimental to fish whereas high levels are toxic. Higher levels in retention pond and marina may be due to fertilizer runoff upstream.
4. Carbon dioxide increases the acidity of water and needed by plants for photosynthesis
5. Hardness is a measure of mineral salts. Affects the ability of algae to work. Dissolved oxygen levels were low in July. Was unable to turn on aeration until dam was completed.
6. Chlorophyll a is used to measure algae content. Several factors contributed to higher levels of algae in the marina.

Water quality parameter	July		October			RLR
	South	North	Retention	Marina	Middle	
Temperature (F)	71	71	61	59	58	33-85
pH	7.5	7.5	7.5	7.5	7.1	6-9
Ammonia nitrogen (mg/L)	1	1	0.5	0.5	0.5	< 0.5
Nitrite nitrogen (mg/L)	< 0.05	0.05	0.05	0.05	0.05	<0.05
Alkalinity, total (as CaCO <sub>3</sub> ; mg/L)	150	143	190	300	310	20-400
Chloride (mg/L)	14	16	37	25	15	< 75
Carbon dioxide (mg/L)	8	7	7	7	8	< 10
Hardness, total (as CaCO <sub>3</sub> ; mg/L)	300	300	>300	300	220	20-300
Dissolved oxygen (mg/L)	3.5	5	6	7	7	>6
Chlorophyll a (mg/m <sup>3</sup> )	9.12	8.23	8.11	10.09	6.72	< 10

## Soil Composition, E. coli, and Turbidity

1. Would like to see a decrease in the amount of sludge in the retention pond and marina.
2. Adding a mix of sludge removing bacteria to the retention pond and marina will decrease the amount sludge present
3. Less sludge reduces the depth of the loose soil layer resulting in a decreased amount of material to remove from the retention pond and a decrease in frequency of dredging.
4. E. coli present is probably from runoff containing animal feces.
5. Turbidity levels in line with rivers containing sediment.

Soil Chemistry and Composition	Retention	Marina	Middle	RLR
Composition loose soil layer	9% silt, 68% sludge, 23% sandy gravel	11% silt, 71% sludge, 18 % sandy gravel	15% silt, 58% sludge, 27% sandy gravel	Want to aim for 58% sludge
Depth of loose soil layer (inches)	34 inches	29 inches	18 inches	
Nitrogen (ppm)	11 ppm	14 ppm	9.5 ppm	
Phosphorus (ppm)	41 ppm	61 ppm	61 ppm	
Potassium (ppm)	63 ppm	85 ppm	85 ppm	
E. coli (mpn/100ml)	167	126	34	< 235 for single sample Source EPA
Suspended solids (mg/L)	18	14	12	
Turbidity (NTU)	17.2	16	12	Turbidity levels in rivers with sediment 10-20 NTU