

Pond Report 2025

2024 Pond Committee members

- Valerie Harper
- David Beard
- Jack McKelvy
- Becky Waugh
- Dan Shaw

Update of aeration system

- After the pond was drained it was observed that:
 - 1 aeration line was missing and 2 were not set up correctly based on Vertex's layout of the aeration lines.
 - 4 diffuser stations were damaged.
- To repair or replace the Aeration System issues, tubing and diffuser stations were ordered.
- Updating the aeration system began in the fall of 2024 and will be finished in the spring of 2025.

Silt and Sludge Accumulation in the Pond

- Prior to draining the main pond, we researched the cost of silt and sludge removal. Removal of silt and sludge in just the southern 1.13-acre portion of the pond would have been \$200,000, due to the need to barge dredge and the cost of equipment staging. The needed equipment would have to come from other states. The total pond size is 13.5 acres
- After the main pond was drained, it was discovered very little silt and sludge had accumulated.
- The silt and sludge retention pond has worked very well and been extremely crucial in keeping silt and sludge out of the marina and main pond. Both the State of Colorado and various Lake Management companies have emphasized the importance of maintaining the retention pond.

Amount of Silt and Sludge Removed from Retention Pond and Marina in 2024

- Silt and sludge in the retention pond, which was constructed in 2011, have been removed every year except for 2023.
- Depending on how wet the silt and sludge was, the material removed from the retention pond was between 10-15 dump-truck loads.
- 30+ dump-truck loads of relatively dry silt and sludge were removed from the marina in 2024. Had the silt and sludge been wet, probably 45+ truck loads would have been removed.
- Silt and sludge removal costs were \$3500 for the retention pond and \$8500 for the marina in 2024. Mechanical removal will not occur in 2025 for either area.

Benefit of the Retention Pond

- The retention pond decreases the amount of silt and sludge deposited in the Marina. The Marina serves as a secondary retention area preventing additional silt and sludge from entering the pond.
- Draining the retention pond and allowing it to dry before dredging allows for faster removal, less dump truck loads required, and lower costs.
- By maintaining the retention pond, the lifespan of the covert pipe will increase due to the reduction of abrasive particulates compromising the pipe structure.

Pond Management Company

- Our pond is basically a widened irrigation ditch that is used as a recreational pond.
- Since more residents are using the pond, we need to find out how safe the water is.
- In addition to water quality and E. coli measurements, EcoResource Solutions will:
 - Measure depth and composition of loose soil on the pond bottom
 - Add **nonpathogenic**, sludge removing bacteria, where needed, to reduce silt and sludge
 - Replace the compressors when needed
 - Replace the filters every visit
 - Treat algal blooms
 - Provide advice
 - Repair the aeration system and treatments for algal bloom at additional costs.
 - Rebuild compressors at cost of \$400 which includes labor and rebuild kit

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 algacides 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 ₃ ; 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 ₃ ; mg/L)	300	300	>300	300	220	20-300
Dissolved oxygen (mg/L)	3.5	5	6	7	7	>6
Chlorophyll a (mg/m ³)	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

Erosion of Retention Pond Bank

- Currently using a backhoe to remove silt and sludge from retention pond
- The weight of the backhoe is eroding the retention pond bank, whereby increasing the chance of the bank collapsing sometime in the future.
- Currently exploring the cost of reinforcing the top of the bank and fixing the retaining wall along the toe of the slope and/or alternative removal methods to prevent further erosion of the bank.
- If we need to shore up the bank, we will submit a proposal stating how much money must be added to the reserve account over time to pay for it.