

PROJECT OVERVIEW

Marion County Park and Lake is a 153 acre normally ponded reservoir that is owned by Marion County. This lake is comprised within the larger 300 acre Marion County Park. There is a 4,000 acre watershed that feeds this reservoir, which is primarily comprised of pasture and crop production. This watershed is in a very rural setting, but there are approximately 200 houses surrounding the reservoir that will contribute urban runoff. The dam was completed in 1937, so the reservoir is 81 years old now. This long reservoir life is cause for concern for sedimentation and water quality issues.

OBJECTIVE

- This teams objective was to gather data on sediment and water quality, offering insight into how they interact with the lake and watershed function.

RESEARCH

- Research was conducted on how sediment is transported to a lake and how it impacts the lake's function. Also researched was the relationship between sediment and water quality, as well as best management practices for proper watershed management.
- Case studies from other Kansas reservoirs and lakes were analyzed to ensure a broader context when looking at sedimentation issues.
- By combining research from conversations with stakeholders, the team ensured proper tests were conducted. Keeping stakeholders and limitations in mind, the team was able to offer recommendations based on several lake components.

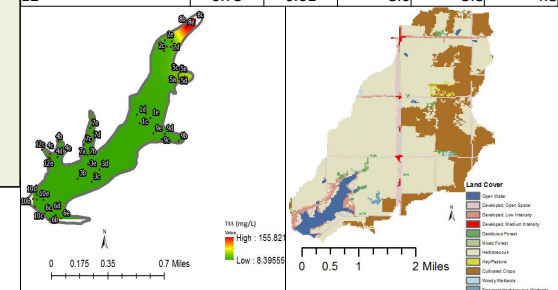
TESTING

- The team travelled to Marion County Park and Lake on 4/10/2018 and collected 12 composite soil and water samples. These samples were analyzed in the KSU Soils testing and Civil Engineering Laboratories for
 - Nitrogen and Phosphorus
 - Total, Volatile, and Fixed Suspended Solids
 - Fluorescence
 - Particle Size
 - Organic Matter
- Students also collected numerous data points on the day of sampling, such as:
 - Water Temperature
 - pH
 - Conductivity
 - TDS
 - Depth of Sediment Core
 - Water Depth

RESULTS

- Through data collection, it has been determined that the majority of nutrients and sediment enters the lake near Site #8 (Northernmost cove of the lake).
- Sample #8 had the highest concentrations/levels for all parameters tested.
- Sample #5 was determined to have resulted in a faulty lab result
- Samples #6 & 11 were obtained from the same site for quality assurance
- The trapping efficiency of the lake was 100% during the time of sampling, meaning 100% of the inflow's sediment is trapped within the lake.

Water Quality Sample Site	Total N ppm	Total P ppm	TSS (mg/l)	VSS (mg/L)	FSS (mg/L)
1	0.69	0.03	10.8	4.2	6.6
2	0.73	0.02	18	4.8	13.2
3	0.69	0.01	9.4	4.2	5.2
4	0.67	0.02	8.8	3.8	5
5	0.81	0.02	13.4	-7.4	20.8
6	0.73	0.01	8.8	3.6	5.2
7	1.03	0.02	8.8	3.6	5.2
8	1.54	0.17	155	14	141
9	0.81	0.03	10.6	3.4	7.2
10	0.76	0.01	8.4	3.2	5.2
11	0.98	0.01	8.8	3.6	5.2
12	0.73	0.01	8.6	3.8	4.8



RECOMMENDATIONS

- It is recommended to take 10 additional samples, focusing near Site #8, throughout different times of the year to gain a broader understanding of lake function.
- Recommendations also include that tests be conducted every year to continue monitoring pollution patterns.
- Soil results must be interpreted after results are obtained from the lab. Results will provide a better perspective on where to conduct further testing.
- Repeat testing should be conducted at multiple sample sites to ensure accuracy of previous results

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Sediment Core (Site 9)



YSI Sampling (Site 8)