

GRATIOT COUNTY

Students estimate cost to dredge Pine River

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The cost to fully dredge the Pine River of sediment could cost no less than \$5.5 million, students at Alma College have determined.

Students in Alma College professor Murray Borrello's Watershed Hydrology course estimated costs of dredging the river to remove heavy sedimentation from algal blooms - up to 420,000 cubic yards - from Honeyoey Creek to the Alma Dam that is settling at the river bottom and sediment deposition behind the dam.

Dredging is being considered to alleviate the problem of high nitrogen and phosphorus levels found in the river - although the high levels were not found within Alma's city limits, but further north on the river. The high levels are causing algae growth and dissolved oxygen depletion, creating the need to dredge the river.

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Costs

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According to an analysis by Matt Motz, a student in Borrello's course, the most conservative cost estimate to do the least amount of dredging was \$5.5 million.

If all but three feet of sediment were removed, the estimated cost would be \$11 million; or \$20 million to remove all but two feet or \$30 million to remove all but one foot of it.

If all the sediment were dredged, the estimated cost would be \$45 million, according to Motz.

Alma city manager Philip Moore, who attended a presentation on the subject by the students last week, said the city commission has not addressed the dredging issue and that it is not part of any long-term plans.

"Cost is a big factor. I'm not sure the city has the bonding capacity to do that," Moore said. "The city is limited to how much it can sell in bonds, based on the tax base. There may be another funding mechanism I'm not aware of."

Jurisdiction of where the sediment lies and who would dispose of it and how is another issue.

"The city is the major recipient of the sediment but a good portion of that lies in Arcada Township as well," he said.

There is also the question of how the city's drinking water - more than 15 percent of which comes from the Pine River - would be impacted.

"How would that impact our water intake? I don't know the answer to that yet," Moore said.

The students also compared upstream and downstream of the Alma Dam - the source of the algal blooms causing the higher levels - with the city's wastewater treatment plant.

They compared nitrogen, phosphorus and dissolved oxygen levels upstream of the dam over a three-year period to three weeks of measurements at the wastewater treatment plant.

Student Logan St. John, in Borrello's course and part of the student group,



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The Honeyoey Creek just upstream from the Pine River outside of Alma.

said this was done to see if the wastewater treatment plant was having a direct, impairing impact on the river.

"The nitrogen levels downstream of the wastewater treatment plant, on average, were lower than upstream," St. John said. "It was not having any measurable effect on putting nutrients into the river. The higher levels are upstream."

He said if the wastewater treatment plant is discharging more than allowed, they can receive massive fines from the Environmental Protection Agency.

As the higher levels are upstream and not coming from the wastewater treatment plant, the group worked to ascertain where the high nitrogen, phos-

phorus and dissolved oxygen levels were coming from and the cause of the algae growth in the Pine River.

They found that Honeyoey Creek is the main source of nitrogen and phosphorus in the Pine River upstream of the Alma Dam.

"We looked at the Honeyoey Creek because it goes through a lot of agricultural land," said McKenzie Fox, a student in the group and in Borrello's class. "That can have a lot of impact on agricultural land because of manure (application and possible) dumping."

Borrello said dissolved oxygen levels should be at about 5 parts per million but it was found to be around 4 parts per million, on average in the Pine

River upstream of Alma Dam for the bulk of the summer months.

"It starts off really high because of the algae producing oxygen but, when the algae dies, it settles to the bottom and decomposition takes oxygen out of the water," he said.

According to their research, the values for nitrogen, phosphorus and dissolved oxygen violated surface water quality standards for the creek and the Pine River for 2014, 2015 and 2016 set under the federal Clean Water Act.

The students believe the concern should lay with Honeyoey Creek and not the wastewater treatment plant.

Their work will continue next summer with more research on both the Pine River and Honeyoey Creek.