



Park Charles - Lake Pershing

Fish Mortality

8/1/2021

Brandt Ehrhardt,

Please find enclosed data and information about your recent concern of fish mortality at Pershing Lake, Park Charles South Subdivision, O'Fallon, Mo.

Some background information and events have been documented for this report that may (or may not) have any relation to the event. Pershing Lake is a 7.7 acre man-made impoundment with an mean depth of 7.2 feet and maximum depth of 17.1 feet. (*Bathymetric Map 2005*). There is one large primary inlet at one end of the lake emptying a rather large watershed. There are several smaller inlets along the shoreline draining smaller portions of the watershed. A controlled outlet weir and large emergency overflow are located at one end of the lakes large dam structure. No aeration system is currently in use to aerate the lake, and to add one would be relatively expensive for this size waterbody. Large gaggles of geese periodically frequent the lake. The Lake was last stocked with fish in the spring of 2020. This lake does not have a history of fish kills. Monthly Water Quality Data was last collected on 7/14/2021 by Leisure Ponds. (*Data attached*).

On Sunday evening, 8/1/2021, Leisure Ponds received an E-Mail from Brandt Ehrhardt notifying that some fish mortality was observed at Pershing Lake between Saturday evening the day before, and that Sunday. Brandt observed about 60 dead fish, and an oily film extending about 6' out along the south end of the pond. It is not known at the time of writing this report if any parts of the upstream watershed may have had any chemical spills or releases, and no major rain event was reported to have occurred just prior to the event.

On 8/3/2021 Leisure Ponds conducted a Lake Assessment including Water Quality Testing of the lake and confirmed dead fish to be floating along the shoreline including at least fifty 6-10" Bluegill and a very few Largemouth Bass. While there, Leisure Ponds contacted Jerry Arrendale to assist with some additional questions. (No additional sick or struggling fish were observed at that time.)



Using as a guide the U.S Fish and Wildlife Service's Field Manual for the Investigation of Fish Kills; Water Quality data and observations (although not conclusive) indicate a Natural Cause - Low Dissolved Oxygen, to be the likely cause of the fish mortality. There may be other factors that contributed to the low dissolved oxygen levels.

Natural Causes that may cause fish kills include lake turnovers and oxygen depletion, toxic algal blooms, hydrogen sulfide poisoning, toxic natural substances, and gas super saturation. In addition to Natural Causes leading to fish mortality other causes may include a Toxic Substance Release within the lake or watershed, and Infectious Agents like fish diseases.

Key indicators from field observations and WQ Data that Oxygen depletion was the probable cause:

- Relatively short duration of fish mortality and relatively few fish affected.
- Very few dead minnows observed. (*Minnows typically die first from a toxic substance release.*)
- Black water color. Unusual black looking water color can be a visual indicator of low dissolved oxygen levels.

Other Possibilities from observations and WQ Data.

- Although water quality parameters as measured were typical for the Lake on 8/3, water quality data collected 7/14 (18 days before the event) indicated unusually high ammonia nitrogen levels for this lake. On 8/1, Brandt Ehrhardt indicated a oily film, and on 8/3 Leisure Ponds observed some (possibly remaining) planktonic blue-green algae along the windblown shore of one end of the lake. This, combined with the very black looking water may indicate an algal bloom (caused by the previous high nitrogen levels) and crash had occurred. The dying algal decomposition could potentially deplete dissolved oxygen levels in the pond and lead to a partial fish kill.

Key Concepts:

- a) All lakes have a natural Carrying Capacity of aquatic life they can support. This carrying capacity can be exceeded during extreme seasonal conditions like hot summers when warmer water allows for less dissolved oxygen to be held in the water, and in the winter when ice cover may reduce oxygen development.
- b) Although more common in late summer or fall, stratified lakes can be rapidly de-stratified after a heavy rain event thus mixing the anoxic lower layer with the oxygen containing upper layer resulting in overall dissolved oxygen levels to be below the carrying capacity of the lake or pond.

A data summary and observations are attached. (2 pages)



On 8/3/2021, there was very little fish odor and likely not enough dead fish to require clean up and disposal, although signs of scavengers eating and helping to remove the dead fish were not observed.

Please call if you have any questions or need further assistance.

Jim Darlington