



Low Dissolved Oxygen Levels In the Pond

In the days around June 7-10, 2023, several residents observed dead catfish in Glenshire Pond, after a few days of heavy rain and runoff. On June 8, GDRA staff contacted David Shaw, a Glenshire resident and president of Balance Hydrologics, a local hydrology consulting firm to assist in evaluating what might be causing the fish die-off. That evening, David conducted an initial site visit to measure basic water quality indicators around the pond and at the inflow and outflow streams, and found extreme low Dissolved Oxygen (DO) levels in some areas, but no other strange odors, colors, or indications of contamination.

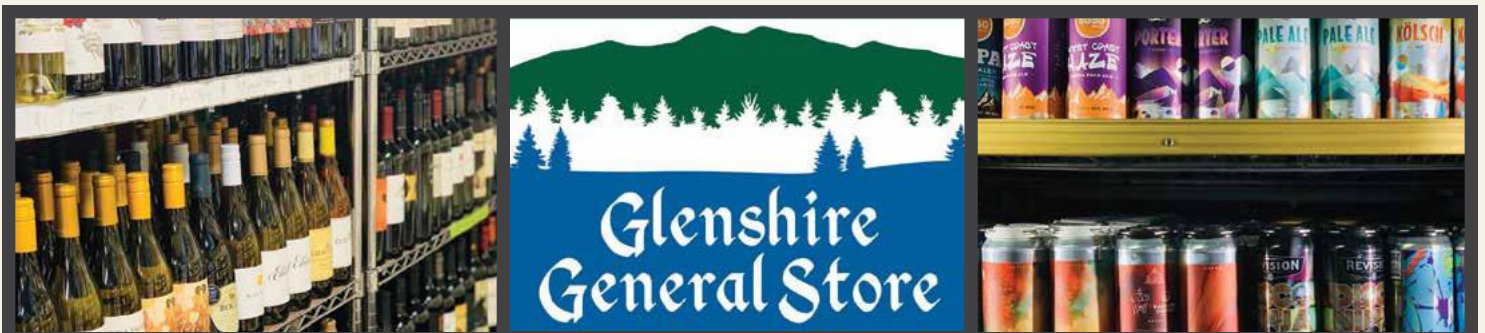
Given the proximity of the low-DO water in the pond to a main Truckee Sanitation District (TSD) sewer line, David contacted TSD and let them know of the observations that evening. At 7:35am the next morning, TSD staff was on site to evaluate the integrity of the sewer line with their Closed Circuit Television (CCTV) inspection system, and found no

indication of exfiltration from the system, and consistent with David’s observations, they found no smells or signs of sewage. As a precautionary measure, GDRA staff requested TSD to come out a second time. On June 20, TSD staff performed another thorough assessment and they assured us that the Glenshire Pond issues were unrelated to the TSD sewer system.

David returned to the site on June 9 with GDRA Board member and ecologist Adrian Juncosa to collect water quality samples for more detailed analysis and screening for other constituents that might be causing harm to the fish. David and Adrian again recorded water quality conditions using a field meter and collected samples from within the pond and at multiple points along the two main inflow streams, both upstream and downstream of residential areas. Analytical results provided by a state-certified analytical lab suggest that water quality in Glenshire area streams and in the pond were generally consistent with background levels, and near mean monthly objectives established for the Truckee River by the Regional Water Quality Control Board.

The question therefore remains - why were DO levels so low, and why did so many catfish suddenly die? Several hypotheses can be put forth as to whether this was a natural event, or caused by human disturbance, but further investigations would be required to test these ideas.

Per local and state experts, a leading hypothesis is based on the fact that ice on a pond or lake surface inhibits oxygenation of the water and prevents wind from mixing the pond waters as they normally do continually in a shallow water body such as our pond. If the pond remained iced over for a longer period of time than normal, DO levels, especially near the bottom where catfish tend to spend most of their time, could drop to a lethally low level. Lake Davis (Plumas



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County), which is at almost exactly the same elevation as Glenshire Pond, had a longer than normal period of ice cover and also experienced modest fish kills in June.

It is also possible that the extreme snowpack, rapid melting, and infiltration of snowmelt into the ground in the areas surrounding the pond caused groundwater to be 'pushed' out into the pond. Since groundwater typically has extremely low DO levels, and would have been discharging into the bottom of the pond, where catfish dwell, this may have deprived the catfish of oxygen and caused them to die. This is also untested and would require additional hydrogeologic studies and evaluations.

It is also possible that the cause was not primarily related to low DO but to a toxin. Afternoon thunderstorms could have washed road or garden contaminants from the neighborhood into the pond, which made it toxic to fish. However, this is unlikely, since nearly all the dead fish were bottom-dwelling catfish and thunderstorms occur in June in many years when no fish mortality has been observed. Water quality testing for target contaminants would need to be conducted during runoff events to evaluate this hypothesis further.

Regardless of the cause of the fish die-off, the quick communication and response by residents and the

Association highlights the value of our little pond as not just a neighborhood amenity, but also as a critical ecological resource that we must protect and steward. As was previously discussed in the March 2022 issue of the Shire, though the catfish in question are not native species, they do provide a food resource to important special-status native birds such as ospreys and pelicans, which in turn provide a free ecological service of removing nutrients from the aquatic ecosystem.

Processing and analysis of the water samples and meter readings were received by GDR on July 5, 2023, and are available to residents at www.glenshiredevonshire.com. Balance Hydrologics' preliminary conclusion is that the fish die-off could be a natural event, but a more comprehensive investigation and monitoring program would need to be established to better evaluate this, and/or to rule out the presence of certain toxins during runoff events.

Samples and readings were collected not only to evaluate the current situation, but as part of our ongoing effort to regularly monitor and establish data points around the ecology and health of the pond. The last sampling was processed in spring 2021.

— *By David Shaw, Brian Hastings, Adrian Juncosa and Lori Kelley*

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