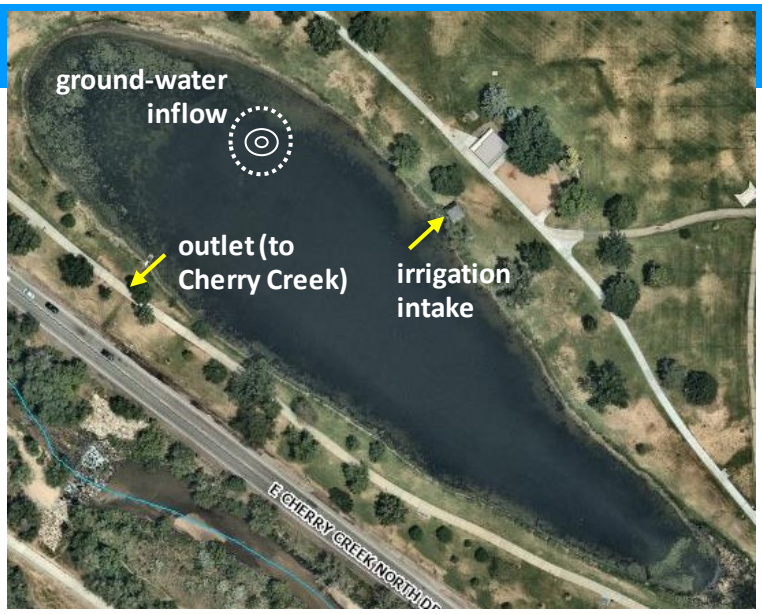
Lollipop Lake



Background, Long Term Issues & Trends

- Lollipop Lake within Garland Park was likely an intermittently flooded streamside wetland along Cherry Creek prior to road and residential development.
- Garland Park and the lake were more formally established in the early 1960's.
- The primary water subsidy is pumped groundwater from a well developed on the north side of the park.
- Other than what flows off the surface of the perimeter, the lake currently receives little urban runoff.
- To preserve water loss through percolation, the lake bottom was lined with bentonite in 1996.

Developing Issues

- The lake vegetative production has been dominated by phytoplankton (floating cellular algae) for many years, with little rooted vegetation or filamentous algae growth.
- Lollipop is one of a few Denver lakes which have unfortunately experienced avian botulism deaths impacting ducks. Noted first in 2010, the extent of the problem varies from year to year driven most likely by climatic factors.
- While Lollipop is only superficially impacted by storm runoff, there are plans to develop a new storm line from northeast of the lake (near Oneida and Tennessee). This will add a significant amount of acreage to the watershed and will result in considerable contribution of water during storm events. See "Upcoming Actions" on page 2 for more detail.

Location: Garland Park @ 6301 E Cherry Creek North Dr
Surface Area: 4.1 acres
Max Depth: ~ 8 ft
Primary Source Water: Actively pumped groundwater

Intended Lake Uses:
Irrigation, wildlife habitat, aesthetics, fishing

Current Regulatory Issues[1/]:
dissolved oxygen

1/ Conditions exceeding state water quality standards.

*Updated **Jan 2020** questions to:*
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Habitat, Water Quality, Fish & Wildlife

Habitat: Lollipop Lake currently offers little diversity in aquatic habitat. With the vegetative community dominated by phytoplankton, there is little to no structure in the lake to provide cover or surface area for insects and fish. The wetland on the east end is the only habitat offering beyond the turf grass monoculture around the perimeter (Fig 1). A positive attribute of the lake is the shallow mudflats along much of the north and west perimeter. This supports benthic burrowing macroinvertebrates (insects and worms) and other aquatic life (crayfish, minnows) which attracts small to medium sized wading birds (avocets, egrets, black crowned night herons) that forage for food. (Fig 2).

Fish & Wildlife: As mentioned above, the gradual slope along the northwest portion of the lake provides good feeding habitat for wading birds. Snowy egrets are often noted feeding in this area. Gadwall have also been regularly noted often in groups of up to a dozen birds (Fig 2).

Crayfish and frogs are also commonly noted at the lake. Based on observation only, the zooplankton (single-celled floating non-plant organisms) community has been light during mid-summer monitoring visits.

Fig 1. Lollipop looking west; note lack of perimeter vegetation beyond turf.

Fig 2. Snowy egret at Lollipop Lake (left; *photo A Polonsky*) and gadwall (right; *photo-Minnesota Breeding Bird Atlas*)

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Fish stocked in 2018 included channel catfish, large mouth bass, and bluegill.

Water Quality: The water temperature and dissolved oxygen levels in the lake have generally been supportive of aquatic life, including warmwater fish and even occasionally trout over the past several years (Fig 3). The favorable and relatively cool water temperatures are a result of the water contributed by the well from the north side of the lake.

Issues Summary & Upcoming Actions

Habitat: Lollipop is a typical urban plains pond with little in-lake or perimeter habitat provisions for aquatic and other wildlife. While portions of the perimeter are shallow and do provide benefits afforded by that (some aquatic life and subsequent predators), most of it is turf grass. Drawbacks of turf grass are that it requires high maintenance (fertilizers and herbicides) and is very attractive to Canada geese when there is a lake next to it. The turf maintenance and goose waste contributes nutrients to the lake which will drive algae growth.

Wildlife: Avian botulism will continue to be a concern at the lake. This and all lakes that have been impacted by this problem must be surveilled regularly for outbreaks. Dead waterfowl and other animals must be collected to minimize likelihood of significant waterfowl die-offs.

Water Quality: There is currently low water turnover due to limited inputs to the lake (via the pumped groundwater). Incorporating more storm runoff via the 2020 Oneida-Tennessee infrastructure plans will increase turnover. There is also the possibility that these increased storm flows could drive temperatures higher than they currently are. While this would not be preferred, it is a tradeoff for an urban pond that provides water quality improvements in the larger scheme (regional watershed view).

Recommendations

- *Be vigilant in surveillance for impacts of avian botulism;*
- *Use the Oneida stormwater project as impetus to establish diverse riparian and upland habitat around the lake. This can provide positive impacts for both wildlife and water quality;*
- *If water quality continue to support it after the Oneida stormwater is incorporated into the Lollipop watershed, manage this as one of Denver's trout fisheries;*
- *Work with Colorado Parks and Wildlife to assure there are adequate number of large mouth bass to control planktivorous fish so as to increase zooplankton abundance. This can help control phytoplankton levels and improve water clarity and drive some pant growth;*
- *Add in-lake habitat structure for fish; and*
- *Continue working with DPHE to assess pre– and post-Oneida storm water project so as to help understand its impact, and potential impacts in other Denver-lake watersheds.*

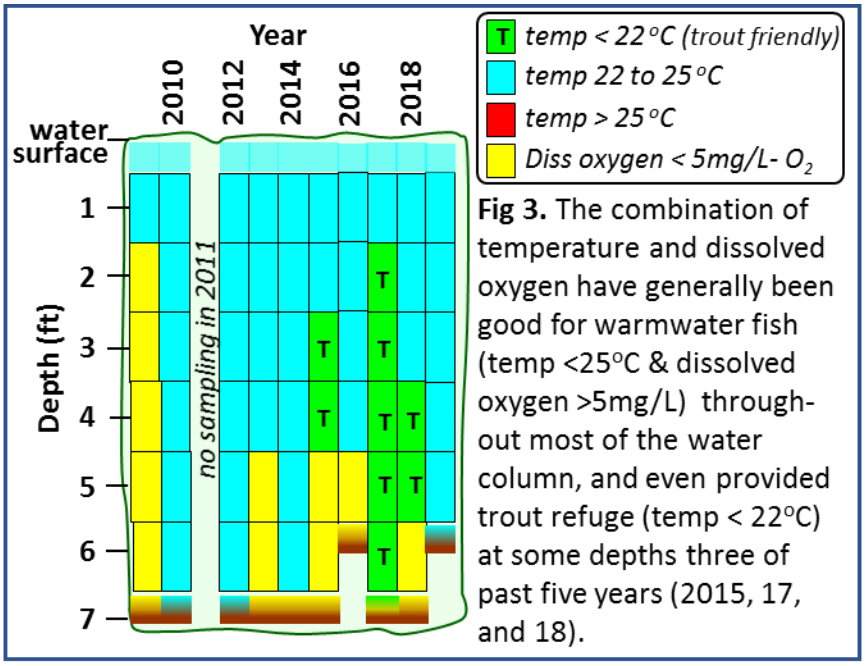

Fig 3. The combination of temperature and dissolved oxygen have generally been good for warmwater fish (temp <25°C & dissolved oxygen >5mg/L) throughout most of the water column, and even provided trout refuge (temp < 22°C) at some depths three of past five years (2015, 17, and 18).

Upcoming Actions: As mentioned above, there are plans to capture runoff from a stormwater basin northeast of the park (vicinity of Oneida St and Tennessee Ave) and divert it to Lollipop. The Department of Public Works (DPW) plan includes new storm drainage infrastructure, a settling basin in the park prior to the lake, and an open channel as it approaches the lake from the northeast (within the park). Work should commence by February 2021. This could provide opportunities to diversify the perimeter landscape. Pursuing more of a natural approach could decrease the need for fertilizers and pesticides and make the lake less hospitable to Canada geese, which prefer low growing vegetation. The DPW is working with the Department of Public Health and Environment to assess lake water quality and biota 'before' and 'after' this project. This will allow the City to better understand impacts of storm drainage on lake water quality.