Garfield Lake

Background, Long Term Issues & Trends

- Garfield Lake was initially established by the Department of Parks and Recreation (DPR) In the mid 1950's.
- Renovation in 1997/1998 included sediment removal, addition of meanders along the perimeter, creation of a two-island complex, emergent wetland establishment, shoreline boulder sections, and a bottom release outlet structure.
- The primary water source for Garfield is the Agricultural Ditch via the Salisbury Lateral. Outflow from Garfield returns to the Lateral and ultimately supplies Huston Lake.

Location: 3600 W Mississippi Ave
Surface Area: 7.0 acres
Max Depth: ~14ft
Primary Source Water: Clear Creek via Agricultural Ditch on Salisbury Lateral
Intended Lake Uses: Aesthetics, wildlife habitat, fishing, irrigation (2019?)

Current Regulatory Issues[1/]: Dissolved oxygen

1/ Conditions exceeding state water quality standards.

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Developing Issues

Low dissolved oxygen levels continue to be the primary water quality concern in Garfield Lake (Fig 1). Loading of organic matter, primarily algae, and its subsequent decomposition is the primary driver for this. Another contributing factor is the low water exchange (due to limited inflow/outflow). This can extend stagnant areas in the lake which creates good habitat for algae growth.

Wildlife habitat was greatly enhanced when the islands were established over twenty years ago. However, short-legged wading birds have been seemingly absent or rare at the lake over the past several years. This is likely attributable to erosion along the island perimeter and a lack of shallow mudflats that create good feeding habitat for the birds.

A newly created bike and pedestrian amenity along the west shoreline includes a bridge across a portion of the lake. This has created a stagnant area that is partially cutoff from the rest of the lake. These conditions are conducive to algae and floating plant productivity, which can seed problems for the rest of the lake.

Habitat, Fish, and Wildlife

Habitat: The in-lake habitat includes (a potential for) mudflat-transition from the island perimeter to the deeper water. The perimeter provides some healthy emergent vegetation stands dominated by bulrush but also including cattails and sweetflag. There are also a handful of large boulder armored sections which diversify the shoreline depths, provide shading and offer slightly cooler habitat. Garfield has a relatively well established perimeter plant

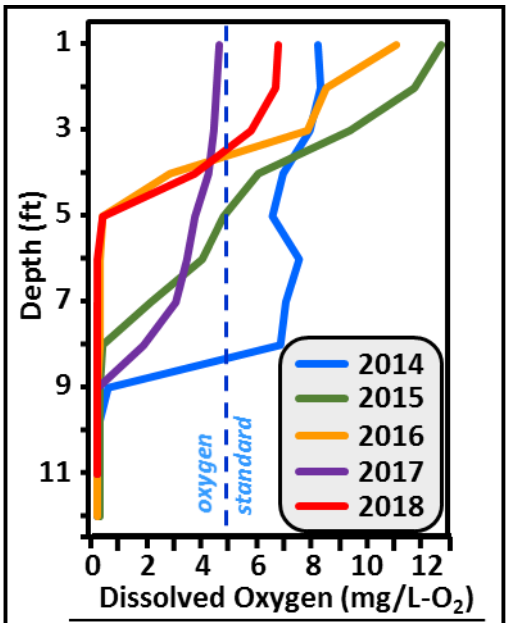

Fig 1. Dissolved oxygen profiles from mid-lake, south of island (in July). Note that oxygen levels supportive of healthy fish communities has diminished the past 5 years.

Recommendations

- *The downward trending dissolved oxygen status of the lake can be at least partially remedied with an aeration system. Installation of a system with enough power to mix the middle to east end of the lake would also help decrease the likelihood of bluegreen algae blooms;*
- *Consider chemical treatment of algae and pervasive floating vegetation (i.e., duckweed) west of the bike/pedestrian bridge as needed; and*
- *Stabilization of the island perimeter with emergent vegetation (or other means) and renovation of the mudflats could increase the wildlife habitat value of the lake.*

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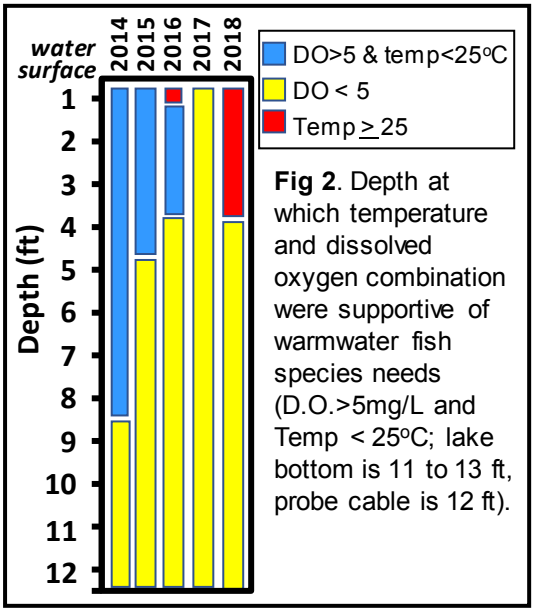

Fig 2. Depth at which temperature and dissolved oxygen combination were supportive of warmwater fish species needs (D.O.>5mg/L and Temp < 25°C; lake bottom is 11 to 13 ft, probe cable is 12 ft).

community (amongst Denver urban lakes). The mix of aforementioned emergent vegetation, sedge, and willows are good for aquatic fowl, passerines, and other wildlife. Other than the perimeter vegetation and boulder sections, there is little in-lake structure for fish needs. Over-hanging vegetation, primarily from the islands, does provide some shading and opportunities for fish-food (insects) to fall into the lake.

Fish: Trout, black crappie, and channel catfish were stocked in 2018 by Colorado Parks and Wildlife. As mentioned above, the primary issue over the past several years has been a general degradation of water quality, which has a direct impact on fish. Dissolved oxygen and temperature are critical factors in supporting healthy fish communities. The combination of these two parameters were supportive of healthy warmwater fish populations (temperature < 25°C and dissolved oxygen > 5mg/L-O_2) in 2014, from the water surface to a depth of eight feet (Fig 2). However, this has degraded steadily with depths of four and three feet in 2015 and 2016, respectively. This degraded further in 2017 and 2018 to the point where there was no preferable fish refuge within the water column on these mid-summer monitoring visits.

Water clarity over the past decade has been marginal in Garfield (Fig 3). This is usually attributable to prolific phytoplankton growth, but can also be a result of suspended sediment. The latter can be more of an issue when there is a healthy carp population (or other bottom dwelling fish), following high local winds , and/or following episodes of significant storm runoff, all of which can re-suspend sediment off the lake bottom.

Wildlife: While it has weathered over the past 20 years, the Garfield island is still a great amenity for wildlife. Erosion around the perimeter has diminished shallow mudflats critical to feeding by short-legged wading birds. Upon establishing the islands in 1997/98, sandpipers and killdeer were common residents and/or visitors in the lake. There were even nesting sandpipers noted in the late 1990's. These birds have not been observed on DPHE monitoring visits for at least the past five years.

While not seemingly directly related to the lake, large resident hawks (possibly northern harrier or Swainsons) have inhabited the park over the past few years. A healthy lake and surrounding landscape can help increase wildlife opportunities through provision of critical habitat needs to a variety of species. Certainly the large trees in the park provide resting and possibly nesting sites for the hawks.

Large numbers of geese feeding and loafing at the park add to the organic load in the lake. While there is some healthy riparian and shoreline vegetation, enhancing taller, more diverse perimeter plant communities could discourage some use of the lake by Canada geese.

Fig 3. Secchi disc from mid-lake (7/12/18) at six inch depth.

Issues Summary & Upcoming Actions

Water Quality: Low dissolved oxygen has been the most pressing problem for Garfield water quality over the past four to five years. Suspended materials in the water column (phytoplankton and/or sedimentary particles) have limited water clarity over the past ten years.

Habitat: Erosion of the island perimeter is impacting wildlife habitat and may be contributing to sustained marginal water clarity. Diversifying the perimeter plant community could help decrease the number of Canada geese at the park, and bring in more bird and other wildlife species.

Upcoming Actions: There are no significant management plans for Garfield Lake known of by DPHE at this time.