

Lake Helen Grand Opening Ceremony

Date/Time: May 20,
2016, 11:00am

Speakers:

- Joyce Hudson
Mayor
- Carla McCullough
Nebraska Department of Environment
Quality 319 Nonpoint Source
Coordinator
- Brad Newcomb
Nebraska Game and Parks, Southwest
District Manager
- Mark Brohman or Marilyn Tabor
Nebraska Environment Trust
Executive Director or Grant
Administrator
- Lyndon Vogt or Representative
Central Platte Natural Resources
District Manager

Lake Helen Gets New Life

Community...

Lake Helen was a 30 surface acre man-made impoundment located in Gothenburg, NE. The lake was constructed more than 100 years ago as part of an irrigation/power system but under the cities ownership and management, become a highly used recreation area and focal point for the community. Use of the lake declined as water quality began to degrade until the point was reached where the lake was closed due to health concerns.

Challenges...

Water quality conditions at Lake Helen had been degraded for several years. Dense blooms of cyanobacteria (blue-green algae) resulted from extremely high nutrient concentrations, shallow depths, poor water circulation, and high water temperatures. The shallow lake received water from the Gothenburg Irrigation Canal, a well in the park, overland runoff, and direct precipitation. While the maximum depth did exceed 8 feet, the average was only 4 feet. Lake Helen was a popular spot for resident and migratory waterfowl which contributed a majority of the nutrients to the lake. Due to poor conditions Lake Helen was not able to support a fishery.

Solutions...

In 2012, Gothenburg city officials assembled a project team to address water quality concerns. This team included representatives from the Gothenburg City Council, Nebraska Department of Environmental Quality (NDEQ), Nebraska Game and Parks Commission (NGPC), Miller & Associates, JEO Consulting, and LakeTech Consulting. Project planning funds in the amount of \$134,500 were provided by the NGPC, NDEQ, and the city. Planning efforts included identifying pollutant sources, loads, and loading targets, developing alternatives, engineering & design, and the preparation of a Water Quality Management Plan.

In 2013 the lake was drained to accommodate the following improvements:

- Excavation of 171,773 cubic yards of sediment,
- stabilization of 3,391 linear feet of shoreline,
- development of underwater shoals,
- installation of a circulation system,
- dam repair,
- installation of a pier,
- installation of a boat ramp, and

Efforts to address sediment and nutrient loading from outside the lake boundary consisted of:

- Eliminating the canal as a lake water source,
- construction of a bio-swale to filter runoff,
- development of tall grass buffers,
- rock placement to deter waterfowl, and
- other waterfowl control tactics.

Following the completion of the construction work; 1) the lake was treated with aluminum sulfate to precipitate phosphorus, 2) a deeper well was installed to access lower phosphorus water, and 3) recreational fish were stocked.

Project Funding...

The total cost of the water quality and habitat project was \$1,777,699. Additional City funds were used for other park improvements including access and parking. The project was made possible through funding assistance from the following sources:



- ❖ Nebraska Game and Parks Commission
- ❖ Nebraska Department of Environmental Quality
- ❖ Nebraska Environmental Trust
- ❖ Central Platte Natural Resources District
- ❖ City of Gothenburg

Results...

To reduce costs, excavated sediment was spoiled within the body of the lake reducing lake size to 19 acres. Even with the decrease in surface acres lake volume was increased from 128 acre feet to 195 acre feet. This resulted in average lake depths increasing from four feet to over ten feet. Significant water quality improvements resulted from this project including an increase in water

clarity from a few inches to over 15 feet, lower nutrient concentrations, and reduced algae densities. In 2015 recreational fish were stocked in the lake.



Mayor Joyce Hudson

City Council:

Jeff Kennedy, Council President

Randy Waskowiack

Verlin Janssen

Jay Richeson

City Administrator: Bruce Clymer

City Clerk: Connie Dalrymple

City Services Director: Shane Gruber

Electrical Foreman: Nate Baker

Former Council:

Tim Strauser

Jeff Whiting

Duane Oliver

Water Quality Improvements - Lake Helen

Parameter	Water Quality Standard	Pre-project (2011)	Post Project (2015)
Water Clarity	NA	3 inches	15 feet
Total Phosphorus ($\mu\text{g}/\text{l}$)	40	490	24

For More Information...

Overall Project: Bruce Clymer, City of Gothenburg (308) 537-3677

Water Quality: Mike Archer, Nebraska Department of Environmental Quality, (402)471-4224

Fisheries: Brad Newcomb, Nebraska Game & Parks Commission, (402) 865-3510

Consultant: Paul Brakhage, Lake-Tech Consulting, (402) 730-3658

Engineer: Travis Mason, Miller and Associates (308) 234-6456