Huron River Watershed Council

Protecting the river since 1965

Boyden Creekshed Report

www.hrwc.org/boyden

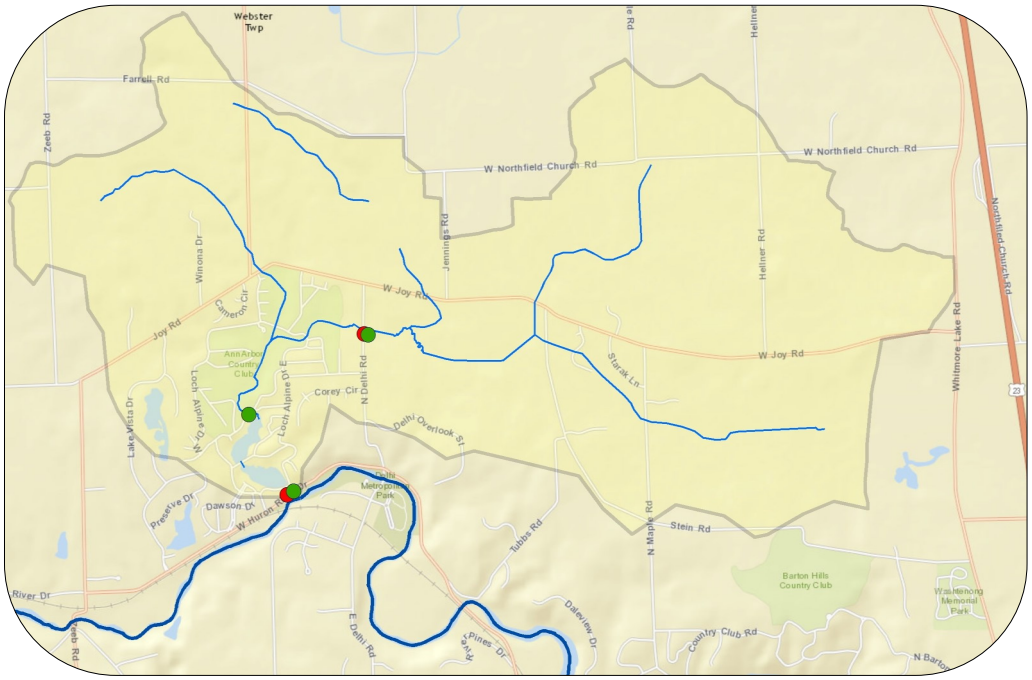
Creekshed Profile

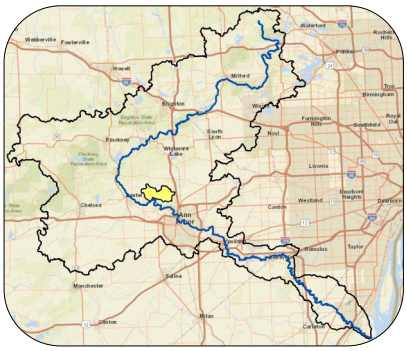
Boyden Creek was named after Luther Boyden who came to Michigan from Massachusetts in 1826. He and Thomas Alexander drew straws to determine the location of their property in what is now Webster Township, just north of Joy Road. Boyden won, and he chose a level area full of oak and hickory forests. Over time, most of the creekshed was converted to fields and became known as Boyden's Plains.

Today, while the majority of the creekshed is still agriculture, the most visible feature in the Boyden creekshed is the suburban neighborhood of Loch Alpine. This neighborhood had a start and stop development history starting in the 1920's and 1930's when the original developer built roads, bridges, and a golf course, but died before houses were put in. After this, sewer and water problems delayed construction and land ownership changed hands several times. The first residents did not move in until 1956, when the present sewage treatment plant was brought online.

The developers also put two dams into Boyden Creek to create Bridgeway and Greenook lakes. In 1968, severe flooding washed out the dams and caused extensive flooding damage and fine silt covered the creek and the Huron River downstream, damaging habitat and the aquatic community. In 2003, the dams breached happened again. After this, the golf course and the 450 families in Loch Alpine paid a $895,000 special assessment tax to dredge both lakes to deepen them and slow plant growth. They also made substantial improvements to the dams, hopefully preventing further washouts.

Boyden Creek has a small watershed, draining 7.4 square miles via 7.5 miles of creeks and streams The creek's slope (averaging 18.6 feet per mile) makes Boyden Creek one of the steeper creeks in the Huron watershed. There are 2 lakes (open water > 5 acres) and 8 ponds (open water < 5 acres) in the Boyden creekshed. The townships of Scio, Webster, Northfield, and Ann Arbor, and Washtenaw County Water Resources Commissioners all make decisions that affect the creek.





- Monitoring sites for Aquatic Insects, Stream Habitat, and Stream Temperature
- Monitoring site for Stream Flow, Phosphorus, Total Suspended Solids, and *E. coli*

For more details on these parameters, please see inside.

Huron River Watershed Council, 1100 North Main Street, Ann Arbor, MI 48104, (734) 769-5123, **Updated 2016**

Creekshed Status and Trends

HRWC Interns take measurements in a headwater stretch of Boyden Creek
Credit: HRWC

Creekshed Land Use

Little impervious surface; channelization

Total creekshed Size: 7 square miles
Land use based on the year 2000:
Agriculture: 59%, *4 square miles*
Residential & urban: 19.5%, *1.5 square miles*
Forest: 7%, *.5 square mile*
Open: 5%, .4 *square mile*
Wetland: 9%, 0.7 *square mile*

Total impervious surface: 4%, .3 *square mile*

While the low impervious surface in the creekshed allows runoff water to soak into the soil and groundwater, which is protective of water quality; drainage from agricultural fields and suburban lawns, as well as channelization of many stretches has resulted n water quality and aquatic habitat measures below those expected for this level of impervious surface.

Creekshed Natural Areas

Many natural lands yet unprotected

The creekshed's forests, wetlands, and grasslands soak up rainwater and runoff, filter pollutants from runoff, and provide wildlife habitat and beautiful places for us all to enjoy. Only about 15% of the creekshed remains as intact natural areas; only a small fraction of these areas are protected from development (about 3% of the creekshed), thanks to Ann Arbor's Greenbelt Program. Without intact natural areas, the creekshed face an uncertain future. It will be important to keep these lands natural, so they can keep the creek as healthy as possible.

Stream Habitat

Most of the creek is slightly degraded; healthy areas can be found.

While many sections of Boyden Creek have been straightened, lack woody debris and flow diversity, and have narrow riparian corridors, there are also natural areas with meanders, riffles, and pools, plentiful woody debris, and wide riparian zones. At all monitored locations, the stream bed is made of an even mix of sand, gravel, cobble, and muck.

Dams and Impoundments

Negatively affect the mouth of the creek

While dams provide recreational benefits, they greatly alter a stream's hydrology, and degrade fish and insect habitat. The water levels in the two lakes in Boyden Creekshed, Bridgeway Lake and Greenook Lake, are deepened and stabilized through dams. The creek below the dams is the most degraded location on Boyden Creek.

Fish Community

Small bodied cool-water fish community

Boyden Creek is home to smallmouth and largemouth bass and northern pike, but the stream is not known for great sport fishing. Smaller species and suckers compose most of the fish community, including blacknose dace, creek chub, mottled sculpin, rainbow darters, and hognose suckers.

Aquatic Insect Community

Diverse in the headwaters; otherwise fair throughout

In the headwater region, the aquatic insect population is very healthy, and the creek contains several sensitive insect species. Caddisflies in particular are very diverse in the Boyden Creek headwaters. In the other 2 sampling points in the creekshed, the insect community is a reflection of the disturbed habitat and is below average for streams of this size.

Stream Water Temperature

Cool to hot depending on location

Boyden Creek receives a mix of cold groundwater and warmer surface runoff. Much of the upper section of the streams is shaded by natural riparian areas. Temperature measurements show that the water temperature of upper Boyden Creek rarely gets above 70°F during July and August. This is a normal water temperature for a creek with these properties and in this area of Michigan. Downstream of Greenoak Lake where the creek joins the Huron River, Boyden Creek regularly gets above 85° F during July and August, which is considered hot and creates low dissolved oxygen situations.

E. coli

High above impoundments

E. coli bacteria is a useful water quality indicator for the presence of fecal contamination. In the Boyden creekshed, E. coli is normally present in low concentrations below the dams, but several times higher above, such that partial body contact (no drinking or recreational activities) is not recommended. After heavy rain events, E. coli can reach levels that are above State standards in both areas. It can take 48 hours for the E. coli to return to safe levels.

Phosphorus

Elevated

Phosphorus is the limiting nutrient in most freshwater systems, and too much phosphorus can cause algal blooms and water quality problems. The target for area streams is < 50 µg/l. Boyden Creek's mean total phosphorus (TP) near it's outlet is 50 µg/l, which is elevated. Upstream averages 80 µg/l. Agriculture in the headwaters likely contributes to elevated phosphorus, and the impoundment serves as a phosphorus sink, reducing concentration at outlet.

Color Coded Ranking

Excellent | Fair | Poor

Total Suspended Solids

Low

Total suspended solids (TSS) is a measurement of the amount of sediment and organic material held by the stream. A high TSS indicates high turbidity and erosion problems. Good TSS values during rain storms are below 80 mg/l; Boyden Creek's is 5 mg/l.

Conductivity

Normal

Conductivity is a measurement of the amount of ions (also known as salts) dissolved in water. Conductivity is a quick and easy measurement to make, and is useful as an indicator of potential problems, since conductivity is highly correlated with total dissolved solids (TDS). Conductivity levels in Boyden Creek are normal and have been normal since monitoring began in 1993.

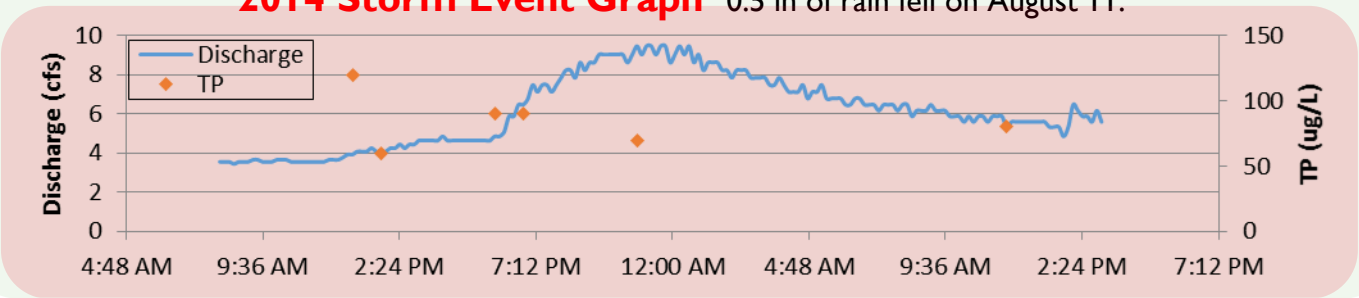
Stream Flow

Flashy

Stream flow is an important underlying factor for determining likely erosion rates, stream habitat quality, and aquatic community diversity. An important measure is "flashiness" or the rate a stream rises and falls through a storm event (see below). At the monitoring station, Boyden Creek has a flashiness rating that is high or less natural than comparable Michigan and Midwestern streams. This is likely due to the outlet structure of the dam, and is not necessarily representative of the entire creek.

2014 Storm Event Graph

0.5 in of rain fell on August 11.



Successes & Challenges

Successes

- The Ann Arbor Greenbelt and Webster Township Land Preservation programs are working to permanently preserve natural areas and working lands. These protected lands reduce additional impervious surfaces and allow for rainwater infiltration.

- Webster, Ann Arbor, and Scio townships require building setbacks and natural vegetation buffers from waterways and wetlands.

- Sections of Boyden Creek are high priority for The Legacy Land Conservancy farmland protection efforts.

- Boyden creek is in the Middle Huron section of the river, designated as impaired for excessive phosphorus. Efforts over the last 20 years to reduce phosphorus inputs to the river have been successful, with an overall 39% reduction in phosphorus load.

Challenges

- Several reaches (segments) of Boyden Creek were straightened and deepened for agricultural drainage in the past. Some of these reaches would benefit from restoration to natural shape and floodplain connection. That could improve oxygenation and reduce erosion.

- The dammed lakes release hot water with low dissolved oxygen to the Huron River. Removing these dams would improve habitat, fish, and insect communities in Boyden Creek and in the Huron River.

- The Ann Arbor Country Club is no longer in business, and the property owner has proposed developing a housing project on the land. However, because of a restriction agreement with Loch Alpine Improvement Association, the developer is prohibited from building without the Association's approval. Therefore, it is not clear what will happen on the old golf course. This could be an opportunity to create a large riparian buffer along Boyden Creek. Doing so would create new habitat for wildlife, improve habitat in the creek, improve water quality, and lower water temperatures.

A section of Boyden Creek flows through a former golf course with no vegetated riparian zone and offers little shading. Credit: Jana Smith

What you can do!

At home

• Minimize your turf lawn; instead put in deep rooted native plants that do not need to be fertilized or watered.

• If you own property with a natural area, work with a land conservancy to establish an easement to protect it from future development.

• Have your septic system checked regularly. Leaking septic systems can be a large source of phosphorus and *E. coli*.

In your community

• Learn to identify environmental impairments like algal growth in waterways and erosion on land—and follow up with HRWC when you see something wrong.

• If you are a resident of Loch Alpine encourage the Loch Alpine Improvement Association to work toward establishing a large riparian buffer along Boyden Creek.