

Project Description

Duck Creek does not support two of the intended uses of the stream: primary contact recreation and children's recreation. This impairment in Duck Creek is due to high levels of indicator bacteria called *Escherichia coli* (*E. coli*) measured in the stream. High *E. coli* levels in a waterbody can indicate the presence of potentially harmful bacteria and viruses (also called pathogens). Bacteria can enter Duck Creek from various point sources and nonpoint sources.

Ten years of water quality monitoring by Partners of Scott County Watersheds (PSCW) and Iowa Department of Natural Resources (IDNR) has indicated that *E. coli* is ubiquitous in all reaches of Duck Creek and its associated tributaries. The concentrations fluctuate significantly spatially and over time, but in most cases are well above the target Total Maximum Daily Load (TMDL) levels. No trends can be easily discerned from the water quality data, but it is apparent that a significant decrease is not occurring.

The Scott County Soil and Water Conservation District (SCSWCD) is endeavoring to further quantify the urban sources of *E. coli* with the Duck Creek Urban Investigation Plan. (UIP) In October, 2013, an Urban Investigation Committee was formed by PSCW, tasked to further examine *E. coli* sources in Duck Creek. The committee created the UIP to search for and quantify *E. coli* sources. The overall goal of the plan is to examine data collected to better plan for and implement practices to improve water quality in the watershed. The results of the plan will lead to improved water quality, benefitting the 80,050 residents that live within the watershed.

Activities, Methods, Objectives, and Outcomes

PSCW plans to continue existing sampling efforts, including IOWATER Snapshots on May 6 and October 8, 2014. As part of the Duck Creek Management Plan, Snapshots are held twice a year to collect water quality data, and investigations into illicit discharges, storm and sanitary sewer cross connections, leaking sanitary sewers and other obvious sources are conducted. City and county agencies have identified and rectified such sources to the extent possible, and while it is possible that a few such sources remain, further explanation of the ubiquitous nature of the *E. coli* bacteria is needed. The UIP will provide much needed, additional information focused on three potential urban sources— storm sewers, pet waste and re-suspension of bacteria within stream sediments.

SCSWCD will hire a consultant to collect samples for *E. coli* analysis and microbial source tracking. The City of Davenport has committed to certifying their waste water treatment lab to conduct *E. coli* analysis. This service will provide a cost savings for the UIP and a needed resource for future investigations. Microbial source tracking, conducted to identify particular sources of fecal contamination (e.g. human, dog, bird, etc.), will be contracted through Source Molecular Corporation.

Storm Sewers

Storm sewers may act as incubators for bacteria growth and as a source for wildlife fecal matter, and are ubiquitous throughout the urban part of the watershed. No investigations to date have

been taken on the potential contribution of storm sewers to the Duck Creek *E. coli* load. The UIP calls for sampling storm sewer inlets and outlets for *E. coli* during various times of the year, and during various precipitation events.

Method

Sample inflow and outflow at 8 sites in Davenport & Bettendorf

Spring - moderate precipitation event

Sample beginning, during and after

8 sites x 2 samples each location x 3 sample times

Summer - T storm precipitation event

Sample beginning, during and after

8 sites x 2 samples each location x 3 sample times

Fall – precipitation event during drought period, low flow

Sample beginning, during and after

8 sites x 2 samples each location x 3 sample times

Objective

Gain insight into *E. coli* loads coming into and out of storm sewers from residential, commercial and industrial land uses.

Outcome

Understand the *E. coli* load entering the storm sewer system, and determine the contribution to the *E. coli* load from bacteria growing inside the storm sewers. Develop and implement Best Management Practices (BMPs) based on results.

Pet Waste

The UIP calls for sampling a location in which pet waste is regularly deposited a residential lawn in which no pet waste occurs and a commercial landscaping lagoon in which waterfowl are routinely present.

Method

Sample 2 Parks, 2 residences

Spring - moderate precipitation event

Sample beginning and after

4 sites x 1 sample each location x 2 sample times

Summer - T storm precipitation event

Sample beginning and after

4 sites x 1 sample each location x 2 sample times

Fall - precipitation event during drought period, low flow

Sample beginning and after

4 sites x 1 sample each location x 2 sample times

Objective

Gain insight into the magnitude of *E. coli* contribution from pet/animal waste, and on the varying bacteria transport pathways present in the Duck Creek Watershed.

Outcome

Determine the role pet/animal waste plays in the overall *E. coli* watershed load, modify current BMP's if necessary, and develop and implement new BMP's.

Stream Sediments

The UIP calls for sampling stream sediments in Duck Creek select riffle areas, pools, and at the mouths of tributaries with their own high *E. coli* concentrations. Re-suspension of bacteria that has been deposited and/or grown in stream sediments is considered a source, but no investigations to date have been completed to quantify the potential *E. coli* load. It is suspected that a portion of the *E. coli* delivered to the streams settles into the streambed, survives, and grows. During periods of high flow the stream sediments are re-suspended, as would the *E. coli* bacteria, and high *E. coli* concentrations would be observed in the stream water.

Method

4 tributary mouths, 4 tributary locations, 4 Duck Creek locations

Spring - moderate precipitation event

Sample beginning and after

12 sites x 1 sample each location x 2 sample times

Summer - T storm precipitation event

Sample beginning and after

12 sites x 1 sample each location x 2 sample times

Fall - precipitation event during drought period, low flow

Sample beginning and after

12 sites x 1 sample each location x 2 sample times

Objective

Identify if stream sediments are a contributor to the Watershed's *E-coli* load, and if so, under what flow conditions is re-suspension of *E-coli* most prevalent.

Outcome

Identification of geomorphic stream structures that enhance the growth of bacteria in sediment. Develop and implement BMP's if needed.

Timetable

Task	Major Milestones
Spring IOWATER Snapshot	Sample 32 sites in Duck Creek Watershed
UIP Spring Sampling	Sample all locations
UIP Summer Sampling	Sample all locations
Fall IOWATER Snapshot	Sample 32 sites in Duck Creek Watershed
UIP Fall Sampling	Sample all locations monthly
2014 Report	Complete UIP report

Community Involvement

Urban Investigation Committee members include Dan McNeil, Watershed Coordinator, PSCW; Jane Webber, Commissioner, SCSWCD; Brian Steinman, Davenport Public Works; Patty Copeland, Bettendorf Public Works; Steve Gustafson, Bettendorf resident; Ed Kocal, Iowa Department of Natural Resource (IDNR) and Mary Skopec, IDNR.

Evaluation Measures

The results of the UIP will be used to determine areas and strategies to improve water quality in the Duck Creek Watershed. The number of infiltration practices, number of acres in practices, *E-coli* and gallons of runoff that are reduced will be reported annually to project partners and funders.

Sustainability

Identification of potential sources will lead to BMP's that will lead to effective reduction and meeting of TMDL. Infiltration practices will ensure a clean, ample, and sustainable supply of groundwater. The benefits of infiltrating more rain water into the ground will also be seen in the reduction of flash floods, which annually flood many homes and erode the banks of the creeks.

The infiltration practices that are installed through continued work on the Duck Creek Watershed Management Plan will continue to reduce stormwater runoff and provide water quality improvements for as long as they are maintained. Residents, recreationalists, children, pets, and wildlife will receive the long-term benefits from the cleaner water in Duck Creek and its tributaries.

Strategies for long-term funding and program viability

The Urban Investigation Committee will continue to meet, assess the plan and make any needed adjustments needed moving forward. SCSWD is planning to pursue funding from state agencies and private foundations to continue the investigation beyond 2014.

