What is a Watershed?  John Wesley Powell, who discovered and explored the Grand Canyon, said that a watershed is: “that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water source and where, as humans settled, simple logic demanded that they become part of a community.”

More scientifically, a watershed is defined by natural geographic and geologic created boundaries both on and below the surface that convey the ground and surface water within that area to drain completely to a single source.

Watersheds can be quite large like the Flint, or smaller like the Kearsley Creek Sub-watershed, a partial drainage area of the larger whole it is contained in. Likewise, the Flint and Kearsley and others, are part of the larger regional makeup of the Great Lakes Watershed. Expanding beyond our state boundaries is the largest drainage in this country known as the Continental Divide, along which either side drains entirely to the Atlantic or the Pacific Oceans.

Jurisdictional boundaries of School Districts like Davison Community don’t abide by these divisions and frequently exist in multiple watersheds. And watersheds contain various types and sizes of jurisdictional entities.

Multiple jurisdictional entities working together as neighbors on a watershed plan and permit is a dynamic unique to Michigan. In other states the program is limited to the standard MS4 General Stormwater Permit; there may be watershed plans, but the actual permitting as a watershed is specific to the mitten. In fact, the watershed permit originated with the Alliance of Rouge Communities. Heavy and rapid industrial urbanization throughout the watershed led to the designation as an “Area Of Concern (AOC).” In 1987 Wayne County implemented an illicit discharge elimination plan (ZDEP) and in 1989 a Remedial action plan (RAP) was implemented for the Rouge, along with the first Voluntary Watershed based General Storm Water Permit that included 50 communities.

This was eventually adapted for use as a statewide permit.

The Kearsley Creek Sub watershed of the Middle Flint River Watershed is not as heavily urbanized as the Rouge. But as urbanization continues to expand, the stresses on our watershed will increase. To make sure it never degrades to the point of the Rouge, plans like the Kearsley Creek are designed to;

- Minimize property damage related to storm water, while trying to maintain or enhance water quality and resources of Kearsley Creek and its watershed.
- To identify and address existing and anticipated water quality and quantity problems, the GCDC initiated the creation of a watershed management plan.
- This watershed Management Plan was created as a result of a collaborative effort between the GCDC, local units of Government, Business owners, and concerned citizens. The plan uses results of hydrologic, physical and biological assessments, along with professional recommendations to achieve the goals of maintaining and improving the function and quality of Kearsley creek. This plan is intended to provide a comprehensive framework to be used in directing future developments to have as little impact as possible on the water quality of Kearsley Creek (Kearsley Creek Watershed Management Plan).

Davison community Schools own and operate 9 schools plus administrative and transportation facilities located within the jurisdictional boundary of the Genesee County Drain Commission. School Districts with discreet conveyances to collect and discharge stormwater runoff, meet the definition of a point source. The success of this program improved many water quality issues, but was not inclusive of the main source of watershed degradation, non-point source pollution. Whereas limiting contaminants from a discrete source is rather straightforward to manage, the same cannot be said of non-point source impacts. The nature of these types of contaminants is revealed in their name, non-point source; meaning originating from a variety of sources, which may not all be traced or well-defined. These contaminants are a result of all of us and our activities, our public policies, our individual and community practices. This is why watershed outreach and education is so very important in the ultimate success of the stormwater program.

Out of this came the National Pollution Discharge Elimination System (NPDES). This program under the CWA made it unlawful to discharge pollutants from a discrete conveyance into navigable waters known as a point source, without obtaining a permit. The success of this program improved many water quality issues, but was not inclusive of the main source of watershed degradation, non-point source pollution. Whereas limiting contaminants from a discrete source is rather straightforward to manage, the same cannot be said of non-point source impacts. The nature of these types of contaminants is revealed in their name, non-point source; meaning originating from a variety of sources, which may not all be traced or well-defined. These contaminants are a result of all of us and our daily activities, our public policies, our individual and community practices. This is why watershed outreach and education is so very important in the ultimate success of the stormwater program.

Getting it right has been a challenge. We’ve implemented some good ideas, like creating watershed alliances. The entire Stormwater Permitting process nationwide arose from the polluted state of the Rouge River Watershed. But challenges have remained and the approach continues to go through modifications as our understanding of the issues expands.

Proper pollution and watershed management is expensive. It’s a common argument that attempts to enact legislation that limits impact are power grabs by extremists. But the truth of the matter is prevention is significantly less expensive than the cost of cleaning up, no matter the pollutant, no matter the specifics. Proper pollution control also puts the responsibility of associated costs on the source of the pollution. When this is not the case, tax payers ultimately foot the bill.

The bottom line is it’s better for everyone’s health, (including the watersheds), and better for everyone’s wallet when we recognize the source of impact and take steps to reduce or eliminate it, at the source. By becoming familiar with and supporting pending legislation, everybody wins.

The Flint River Watershed is composed of 18 sub-watersheds and flows for 1639 miles through 7 counties, 20 villages and cities, 43 school districts and 58 townships. It drains nearly 1400 mi² and is home to 600,000, half of which rely on it as their primary drinking water source.

The smaller 329 acre Middle Flint watershed is composed of 4 sub-watersheds, one of which is Kearsley Creek. It also contains 743 lakes and 406 miles of rivers.

The Flint River watershed supports a healthy wildlife habitat, and several fisheries of significance. Ranging from cold water fisheries to spawning habitat for walleye, Northern Pike and small mouth Bass, higher quality waters are more vulnerable and require extra measures for adequate protection.

There’s nothing better than a cold glass of water on a hot summer day, or how about going for a swim, going boating or fishing? We’re very lucky that we live in an area where there is such a vast resource of water that adds to our enjoyment and quality of life.

But what would it be like if we were to lose that resource or if it was no longer safe for us to play in or drink it?

Each and every one of us has a responsibility to help keep our water clean. But we need to understand what it is we do that makes a difference, for better or worse.

Davison Community School District is dedicated to teaching the community what choices can make a difference.
When studying stream hydrology, certain parameters are examined to determine “base level” or the basic hydrologic flow conditions for the stream when in steady state. Parameters included in this definition are pH, Conductivity and temperature, and are directly related to each other, as well as turbidity and flow or the amount of water in the stream bed in base conditions. As one shifts, they all shift. They are inextricably linked and this cannot be altered. It is simply a fact of water chemistry.

Heavily urbanized streams rarely exhibit steady state or conditions of base flow. Aquatic populations will stabilize to the conditions at hand and a certain level of balance will resume that may or may not resemble pre-development. In S.E. Michigan, true conditions of base level are rare due to its heavy urbanization. Records were not historically maintained regarding water chemistry, but those that do exist shows the number one impact to watershed health nationwide. Temperature and stream flow are the number one impact to watershed health nationwide.

In addition, due to the extensive aspect of Michigan’s surface water features, chemical monitoring becomes prohibitive. Instead, water quality determinations rely on benthic investigations which provide an approximation of watershed health based on species proliferation.

Because headwaters of the Kearsley have, up until more recently, escaped heavy urbanization, the high quality designation as a cold water fishery was maintained. Conditions in the upper portions have historically supported stocking with brown trout to supplement angler activity.

The fishing industry, both on the Great Lakes and in the interior of the state, provides an extremely important contribution to economic stability statewide. According to the report “Climate Change and the Economy of Michigan, (http://www.cier.umd.edu/climateadaptation/Climate%20change---MICH.pdf),” “In 2006 around $544 million was spent by 1.4 million anglers, 13 percent of whom were primarily interested in trout. This species is sensitive to water temperature and stream flow. If trout fishing no longer is viable due to climate change, Michigan could lose more than $75 million in trip-related tourism.”

Urbanization directly impacts water temperature and stream flow of the watershed within which it is contained. This effect is not limited to climatic shift, but is the number one impact to watershed health nationwide.

Typically, base flow is fed through infiltration of rainwater that percolates through the subsurfaces following precipitation events. This process not only drops out contaminants and delivers water to the streambed in gradual amounts, helping to support base flow conditions, it also allows for cooling as it travels through interflow till gradual discharge into the surface water expression.

Urbanization changes this up. The aforementioned gradual infiltration provides a mechanism that helps to prevent sudden changes in stream conditions that stress aquatic species like temperature sensitive trout. Instead, urbanization means an increase in “impervious cover”; roofs, roads and other hard surfaces that impede natural processes. Precipitation runs off the hard surfaces collecting any and all pollution that has collected there since the last precipitation event. This now contaminated water is warmed from interacting with the surface and sustained contact with the atmosphere, enters the watershed in concentrated slugs. In channel water levels surge and can be noted in hydographs as a dramatic spike upwards (see IC website). This subjects the temperature and base flow sensitive brown trout to increasing levels of stress.

According to the Michigan DEQ website, (http://www.michigan.gov/deq/0,1607,7-153313_3628_11581-169375--00.html) the 115 mile Kearsley Creek Watershed is contained within the Saginaw River and Bay Remedial Action Plan. As is typical, intense development is the source of stress threatening the health of Kearsley Creeks status as a cold water fishery. Upper portions have historically supported stocking brown trout for anglers to enjoy. The increased intensity of urbanization is threatening the health of these populations.

The impacts to Kearsley Creek are complex and the solutions are as well. Effective management requires the participation of a team. The Genesee County Drain Commission along with the Michigan State DEQ and 23 shareholders that include local governments, watershed councils and other conservation and science/research groups, have committed to maintaining and improving the long term health of Kearsley Creek. To learn the details and how you might be able to get involved, go to: (http://www.michigan.gov/documents/deq/kearsley/kcwp_3591687_7.pdf)

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Kearsley Creek is part of the Saginaw River and Bay Area of Concern. ADC’s are required by the EPA to develop an RAP or Remedial Action Plan. That begins with identifying what the Beneficial Use Impairments are. Once these are identified, plans are drafted to address the impairments and milestones are tracked. To learn more visit http://epa.gov/glnpo/arc/sagivr.html

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Genesee County has opted for the watershed permit, which is designed to have all the different permittees in their jurisdiction work together on a coordinated plan. School districts are fortunate when they have the opportunity to be included participate in such SWPP (Storm Water Pollution Prevention Initiative) because the program was not designed with them in mind, and the requirements can be akin to fitting a round peg in a square hole. Because participation in a SWPP is about sharing responsibility, Schools can carry more of the educational components to fulfill that requirement, with out it being too much of a burden. The Flint River watershed council is active in this process too and helps implement the “Genesee Green” program that is focused on school kids collecting water data that helps decision makers with understanding impacts to the water shed (http://www.geneseegreen.org/)

The FRWC also conducts “Benthic” monitoring, which is a predictor of the rivers health. They are always looking for volunteers, so why not get involved? Go to: www.flintriver.org to learn more and get involved!

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Kearsley in the News: From Sherman Publications, April 27, 2011 - Michigan Department of Natural Resources fish biologist Joe Leondard reported that about 6,000 Brown Trout were planted in the Kearsley Creek last week in sections of Atlas Township. The 6-inch fry were released at Kettle, Goodwin, and Kipp road bridges. The fish should reach the 8-inch legal size by August; he said. The releases are prior to the April 30 statewide trout and salmon season opener. However, Leondard said the Kearsley Creek offers a few challenges for anglers Keeping out this Saturday. The main issue for those fishing the Kearsley Creek is that too often they roam onto private property without landowner permission; he said. “The Kearsley Creek is the only designated trout waterway in the Flint River Watershed – thus we continue to stock the stream.”

A study of Kearsley Creek in 2010 using electric shock was conducted in July by DNR biologists. According to the study, a total of 70 brown trout were counted in 2,200 feet of the river. The fish ranged in size from about eight inches to 15 inches, said Leonard. “The fish looked good health wise – I would have liked to have the number of (fish) higher, but there has been sufficient numbers to continue the stocking. The water quality was good, but the water system is marginal,” he said. “The concern with the Kearsley Creek is shallow water, too warm of water temperature and a serious lack of good habitat.”

Local environmentalist David Green, who teaches integrated science at Brandon Middle School and has studied area waterways, is concerned about the DNR report on the Kearsley Creek. “The excessive sedimentation is caused by runoff from erosion of the land along the local streams,” he said. “The salt or sand from nearby roads is entering the water. My guess is the phosphates from fertilizers and faulty septic tanks from Lake Louise upstream is also playing a role in the deterioration of Kearsley Creek.”

Green said that other factors including the loss of ash trees, which provide shade, and the recent clearing of land in front of Brandon High School could have also prompted a loss of necessary environmental conditions.

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Saginaw River and Bay Beneficial Use Impairments

Of the 14 beneficial uses these are impaired for Saginaw River and Bay:

- Restrictions on fish and wildlife consumption
- Eutrophication or "undesirable algae"
- Tainting of fish and wildlife flavor
- Restrictions on drinking water consumption, or "taste and odor"
- Degradation of fish and wildlife populations
- Beach closings
-Degradation of plant species
- Bird or animal deformities or "reproductive problems"
- Degradation of benthos
- Degradation of phytoplankton and zooplankton populations
- Restrictions on dredging activities
- Loss of fish and wildlife "habitat"

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Sedimentation is one of the biggest and most difficult issues for watershed managers to get a handle on. Sources of origin range from agriculture to construction sites, and cost tax payers millions, possibly billions of dollars a year in remediation. Actual effect is difficult to articulate because the diversity of water features diminishes our ability to recognize the impacts. To complicate further, each source requires dramatically different management parameters. There is one universal necessity however; there must be an effective communication component between the managing agencies and the public that have potential to impact. Sans this integral cog in the wheel, forward progress resulting in improved outcomes is nearly impossible. Plumes like this one fill shipping channels, impeding commerce. With cuts to federal funding that provide support to dredging programs, port managers are facing closures that will have far reaching economic effects. Simultaneously, cuts to state and federal programs that provide oversight to regulatory programs monitoring potential sources creates latent causes. So as a society we are faced with making difficult choices. Some politicians will try and convince us to believe that forcing regulation on industry impedes economic growth that hurts all of us. Yet lack or the same allows activities to happen unchecked, exacerbating the situation. So what do you think needs to be done???
The Headwaters of the Clinton River rise in Springfield and Independence Townships and flow through 4 counties and 60 urban and rural communities, eventually discharging into Lake St Clair. The watershed drains approximately 760 square miles and supports several high quality trout streams including a rainbow trout fishery. Especially in the less developed headwaters regions, there is a rich eco system of open marshes and wetlands, a wealth of owl and waterfowl populations, and a stunning array of wildflowers. Serving a population of 1.4 million, the watershed has improved dramatically over the past 30 years since the environmental controls regulated under the Clean Water Act.

Engaging volunteers to help with stream bank stabilization fulfills the public outreach and education as well as the public participation portion of watershed permit requirements. Activities such as this help to develop stewardship, but so does creating recreational opportunities on the river, like paddelpalooza. Find out more or sign up at http://www.facebook.com/event.php?eid=120111231399259 or go to http://www.crw.org/ for all the different upcoming activities.

There are seven sub-watersheds included in the Clinton River Watershed with varying degrees of issues depending on the level of urbanization within each. Each Sub-watershed has its own management plan that examines the population per area, and considers the land use practices and percentages of each. The analysis of each sub-watershed includes an examination of existing practices and policies within the individual communities. These are referred to as “non-structural BMPs or best management practices, because they can have a profound influence on the number one negative impact on watershed health, our development patterns.

These plans also declare a set of goals and objectives. This is an important aspect because by agreeing to some endpoint, a sense of ownership is established that creates accountability and responsibility. There is a perceived benefit to be associated with “green” practices, but there are also sacrifice of expenses. City and DPW managers have a variety of responsibilities and various backgrounds that influence their perception of the importance and benefits of proper expenditures. Plans can identify or infer practices that are counter to the desired outcome so can help support the outcome by shining a light on harmful or less beneficial practices.

For detail and specifics on each of the sub-watershed plans, please visit: http://crwc.org/watershed/subwatersheds/index.html

Sedimentation is one of the most preventable types of contamination, contributing to loss of stream bank integrity and habitat. Heavy metals and PCBs also attach onto particles. Under conditions of low flow, these particles settle out and stay “insitu”. However, when it rains, the runoff from impervious surfaces will deliver a slug into the river, causing a spike in the flow. Faster water will do more “work” such as transporting sediment downstream and increasing the erosive capacity of the river. This emphasizes the understanding that conditions downstream are impacted by what happens upstream. Water Quality issues are greater at the discharge point in Lake St Clair, punctuated by beach closures caused by high e-coli. And streambank erosion is a growing issue in increasingly urbanized rivers like the Clinton, where efforts of restoration are ongoing. (see: http://crwc.org/search.html?cx=006380466330798627141.3An0i6d65dzfa&cof =FORID%3A10&ie=UTF-8&q=Search+this+site...streambank+erosion&sa=A)

Additional problems of concern are the oil and grease found in Bear Creek and Red Run Drain, along with pesticides. Excessive nutrients contribute to aquatic habitat degradation by creating an environment favorable to algae growth, leading to low dissolved oxygen. Decreases in available oxygen affect biota (found to be low in CR) and fish populations, that although thriving now, need to have protections in place. Additional issues are high levels of bacteria, originating from a variety of sources, like leaking septic systems, combined sewer overflows, cross connections, and other illicit discharges. In fact, the newest TMOL (total maximum daily load restriction) for the Clinton established in 2010 is for ecoli, the bacteria associated with human waste. Eliminating sources of this harmful disease causing bacteria is challenging due to the variety of sources it can originate from. To complicate matters, there is controversy over the expense associated with the illicit discharge screening process intended to identify sources that may be contributing to the problem. So far, results have not proven to be revealing, providing a low return on investment. How communities approach resolution to these issues, reducing impact, is open for discussion. This is why creating watershed partners is such a vital component towards successful management, where impacts are reduced and improvement in habitat increases. By sharing failures as well as successes, we can build on our collective knowledge as we move forward.
Water Resource management is about water quality and water quantity. These are complicated issues that reach into the depths of our infrastructure and the base of our society. Legislative responsibility exists in the domain of not just Federal and State government, but of Local government as well.

Local government is an especially important player in this equation, as it is their decisions about land use and willingness to support proactive measures that can have far reaching effects on long term watershed health, not to mention local budget health.

The role of local managers directly affects water resources and citizen participation that is crucial for improving decision making processes. Future issues and management are defined by current capital improvements, zoning ordinances, and proper planning. Federal, State, and County laws, Township ordinances and Village by laws, control the political and legal jurisdictions for our rivers, tributaries, wetlands and riparian zones. So having well informed individuals in pivotal positions is key.

Unfortunately, historically, this has not been the case…

This is why watershed councils are such an essential resource.

Working as the voice of our watersheds, watershed councils are purveyors of indispensable information. They collect data and prepare reports, offer guidance and resources for citizens and government alike. They help to build relationships and alliances that lead to greater appreciation for the value of our resources.

To get involved go to: www.hrwc.org or http://www.therouge.org/

Our rivers are more than just a source of drinking water or commerce; our rivers are a great source of recreation. Communities with recreational value draw the best and brightest for their workforce, and can be a source of economic growth.

Data collected by the MiSeagrant reports the following: Michigan has over 1500 miles of kayaking and canoeing rivers, and 4.6 million folks participate in the great lakes region. The kayak industry brings in $396 million of taxable income, and creates 35,000 jobs.

Michigan's great lakes also provide inexpensive means for transportation of import commodities with an efficiency rating 3x greater than transport by trains and 10x greater than by trucking.

We are 5th in the nation for resident and non-resident anglers, 3rd for registered boats. Jobs arising from our water resources are estimated at 804,381, a 25% decrease from a decade ago. Still Lakes related income is in excess of $2 billion annually.


When you protect your watershed, you’re protecting jobs and our economy!

Want to learn more about watersheds?

Here are some useful links that will take you on a learning adventure

EPA Watershed Surf: http://cfpub.epa.gov/surf/state.cfm?statepostal=ME


USGS Water Science for Schools: http://mi.water.usgs.gov/

Michigan Hydrologic Summary: http://mi.water.usgs.gov/hydrosum.php

DEQ approved watershed plans: http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3714,4012-95995--,00.html

MSU Michigan watershed links page: https://www.msu.edu/~habrong/niwtrshd.htm

Center for watershed protection: http://www.cwp.org/

Watersheds and climate are very closely related. Practices that protect our watershed also help to reduce the heat signature of a place and help to reduce carbon emissions. This is because more than 13% of our energy goes to heat, treat, and pump our water supplies. On top of this, our nation’s electrical supplies represent whopping 49% of withdrawals from our rivers, lakes and wetlands. It takes vast amounts of water to cool the power plants that generate electricity. And for every incandescent bulb that burns for 10 hours a day, we use 3000–6000 gallons of water. Count up how many bulbs you have in your house, your neighborhood, your school, or the local mall and add it all together; you start to understand how we emit 290 million metric tons of carbon annually. 5% of our total carbon use, related to water usage. This is the same amount of annual greenhouse gas emitted by 53 million vehicles or 40 million homes!

To help us out, the EPA has certified water sense fixtures: toilets and faucets that reduce our water usage. For the price of a Water Sense Aerotor faucet, you could save enough electricity to dry your hair with a hair dryer every day for a year. And if only one percent of all households in America replaced their old faucet replaced theirs with a new Water Sense toilet, the U.S would save enough money to power the electricity needs for 40,000 homes for a full year.

To learn more about products that meet this labeling, or to learn more about the Water Sense program, visit http://www.epa.gov/watersense/