

Central Lake - Stormwater Action Plan

Runoff Basics

One of the major pathways by which many types of pollutants get to lakes and streams is through stormwater runoff. Stormwater runoff results when drops of rain fall to the ground, or snow melts, and the resulting water that does not infiltrate into the ground flows over the surface of the land. This runoff often dislodges and carries soil or sediment particles (causing streambank erosion in some places) to which many pollutants are attached. The runoff may also directly move the pollutant itself (i.e., garbage, oils, grease, gas, pesticides, etc.). The amount of stormwater runoff that occurs is dependent upon a variety of conditions including storm intensity and duration, topography, time of year, soil moisture levels, soil permeability, vegetative cover types, the extent of vegetated cover, and the amount of impervious surfaces.

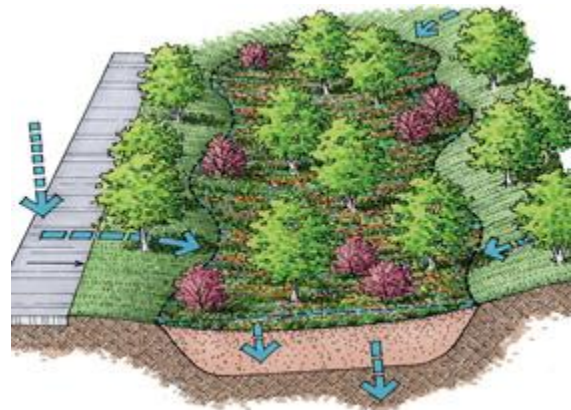


Road and roof runoff are two sources of stormwater.

Urban locations, like Traverse City, Elk Rapids, and Suttons Bay often produce greater amounts of runoff due to the increased amount of impervious surfaces in these urban areas relative to more rural settings within the watershed. Impervious surfaces are those areas on land that cannot effectively absorb or infiltrate rainfall. Areas such as these may include: roads, streets, sidewalks, parking lots, and rooftops. Runoff entering the Bay and its tributaries from storm drain outlets contributes a significant amount of pollution (there are almost 20 storm drain outlets to Grand Traverse Bay in Traverse City alone). However runoff may also enter waterways through ditches and other overland sources, as well as at road stream crossings. When added up, inputs from all these small instances of runoff can result in a massive amount of pollution entering Grand Traverse Bay. Most often the pollution is at its worst during heavy rain and snowmelt events.

Dealing With Runoff

Low Impact Development is a set of small-scale runoff management practices implemented on a site that mimic and work with nature to reduce water runoff and pollutants. LID methods manage water and pollutants at the source, minimizing the impact to ground water, streams, rivers, lakes and coastal waters. The U.S. EPA has found that implementing LID practices saves substantial money for developers, property owners and entire communities, all while improving water quality.



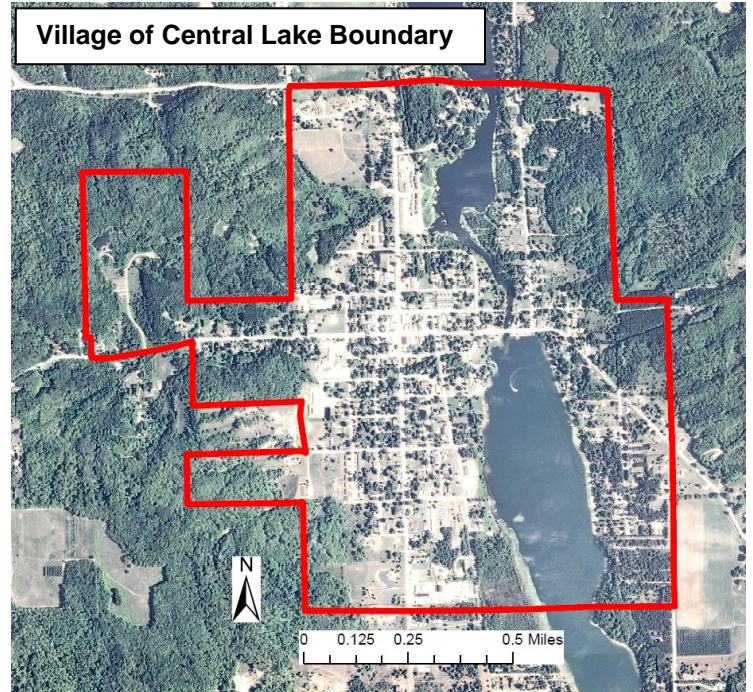
Addressing pollutants with LID runoff practices is of utmost importance in the Grand Traverse region because nutrients and sediments in runoff are the biggest threats to water quality in Grand Traverse Bay and its watershed.

Project Summary

In 2013 and 2014 staff from The Watershed Center Grand Traverse Bay and the Antrim Conservation District conducted initial stormwater runoff assessments for six communities in Antrim County - Alden, Bellaire, Central Lake, Elk Rapids, Ellsworth, and Shanty Creek Resort. The purpose was to help local governments in Antrim County begin to address pollution stemming from stormwater runoff in their communities to protect water quality and our Up North quality of life.

The following 'Action Plan' and accompanying pictures identify major points of runoff generated in the Village of Central Lake that enters Hanley and Intermediate Lakes as well as Knowles Creek (see aerial photo at right). The Plan also includes recommendations for ways to reduce stormwater runoff into these surface waters. In this way we can best utilize limited funds to make improvements where they would have the most effect.

A simple impervious assessment using aerial imagery shows that approximately 20% of the area within the Village of Central Lake limits is impervious and may generate stormwater runoff (Appendix A). This includes buildings, sidewalks, parking lots, and roads.



Findings/Recommendations

- General management -
 - Use Phosphorus-free fertilizers on public property (on areas currently fertilized)
 - Install porous pavement where possible: paver stones, porous concrete
 - Consider, for large parking areas (i.e. church and government office lots), installing infiltration islands to direct runoff into
 - Routinely remove sediment from catch basins
- Reduce Runoff to Drain System via Catch Basin Conversion/Diversion to Rain Gardens -
 - Utilize the following techniques to infiltrate runoff into rain gardens to capture 'first flush' of stormwater runoff, which is usually the dirtiest water.

- Catch Basin Conversion: Where no curbs and gutters exist and stormdrain inlets are grates flush with the ground, convert the surrounding area to a rain garden by excavating around the inlet and planting the basin; runoff will sheet flow into rain garden and overflow to existing storm system once garden fills up (see example from Suttons Bay at right)



Example placement for Catch Basin Conversion - southeast corner of Grove St. and M-88, near the Department of Public Works building (see photo at left). An area around the storm inlet grate could be converted into a rain garden to receive and infiltrate runoff before it enters the system. A riser could be placed on the inlet grate if necessary to improve water retention in the rain garden.

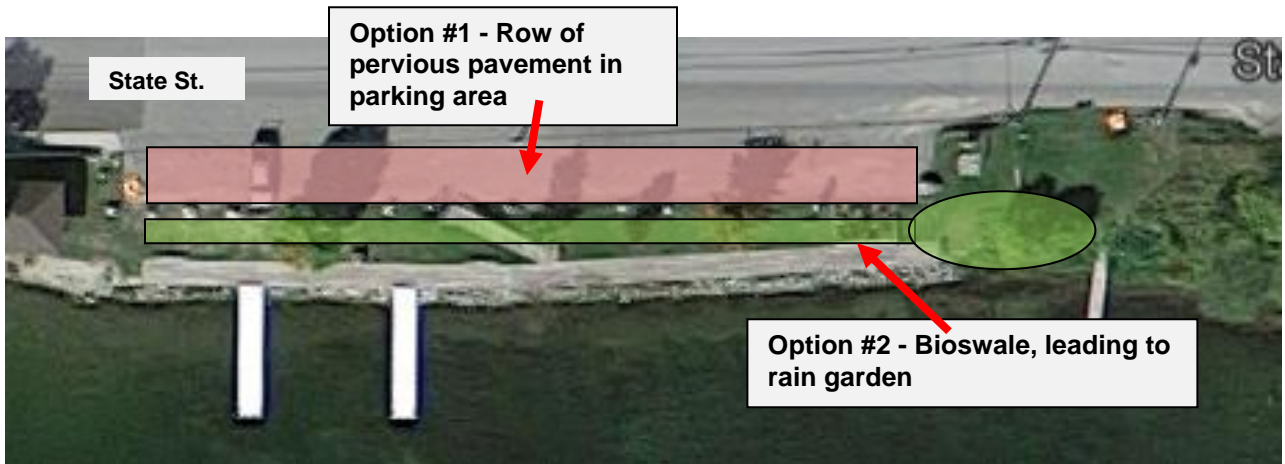
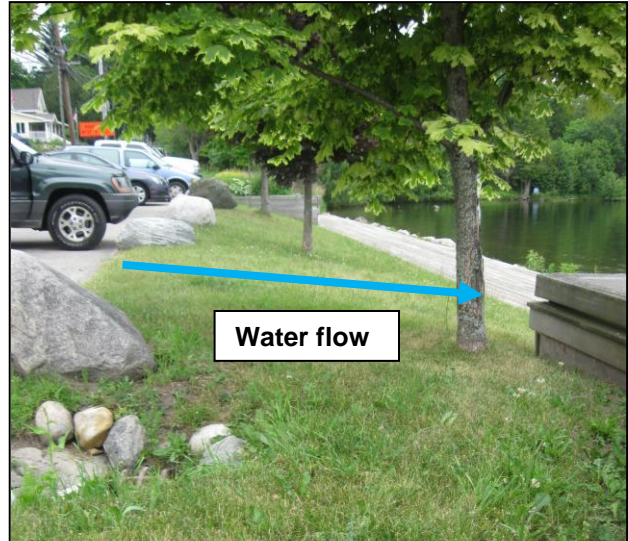
- Catch Basin Diversion: Where a curb and gutter system is in place with curb cutouts to storm drain catch basins, a rain garden could be installed upstream of the runoff into the storm system (see example from Suttons Bay below).



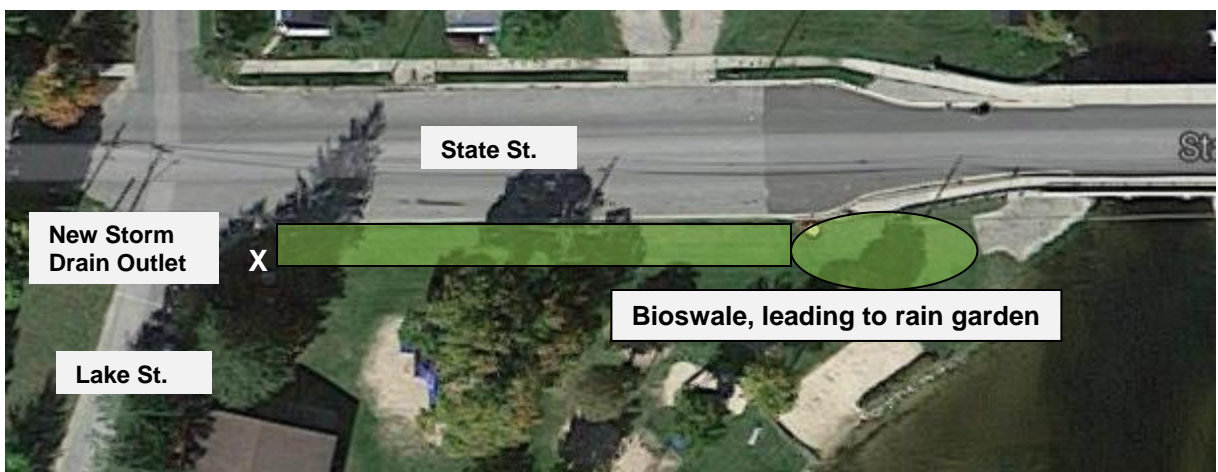
Examples of rain gardens installed in Suttons Bay where water is collected via curb and gutters into rain gardens. As rain gardens fill up, water will start bypassing the rain garden and go to existing catch basins.



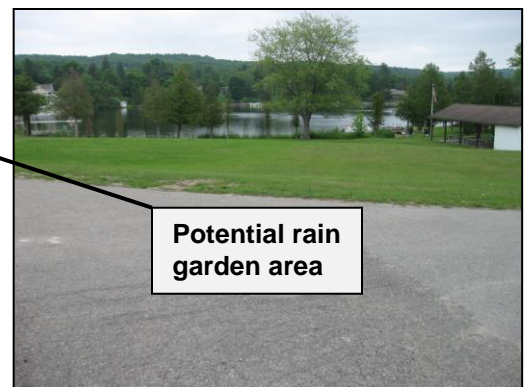
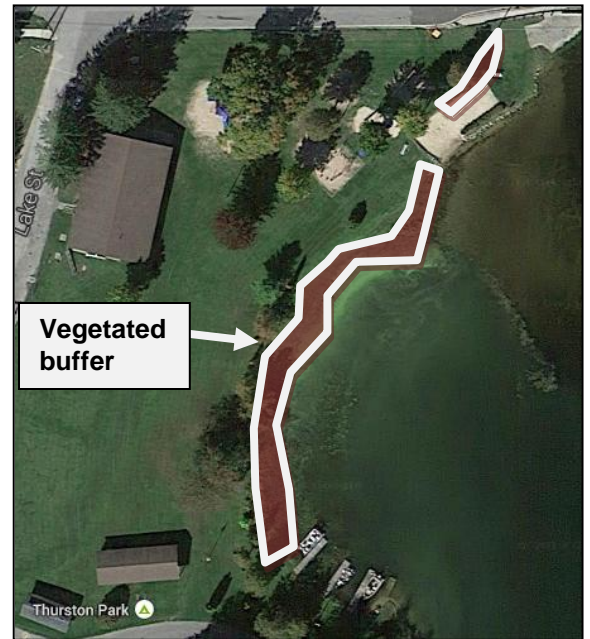
- State Street Parking for Fishing Area -
 - *Findings:* Stormwater from parking area and State Street flows over grass, directly into Intermediate lake
 - *Recommendations:*
 - Option #1 - Convert parking area to pervious pavement.
 - Option #2 - Create a swale on south edge of parking area, upslope of the trees, to capture and infiltrate water. Slope swale so it outlets at east edge of parking area, and if possible create rain garden to infiltrate additional runoff.



- State Street Drain Outlet into Intermediate Lake -
 - *Findings:* Storm drain outlet from State Street empties onto lawn and into Intermediate Lake adjacent to beach area at Thurston Park (public health hazard).
 - *Recommendations:* If possible, cut off pipe and have outlet further west on southeast side of Lake St. and State St. intersection (see aerial photo at bottom). Create a bioswale to a rain garden to infiltrate runoff. Overflow from rain garden could then be directed to the lake. Other areas of Thurston Park could also be utilized for infiltration of stormwater instead by redirecting stormwater to the south end of park along Lake St.

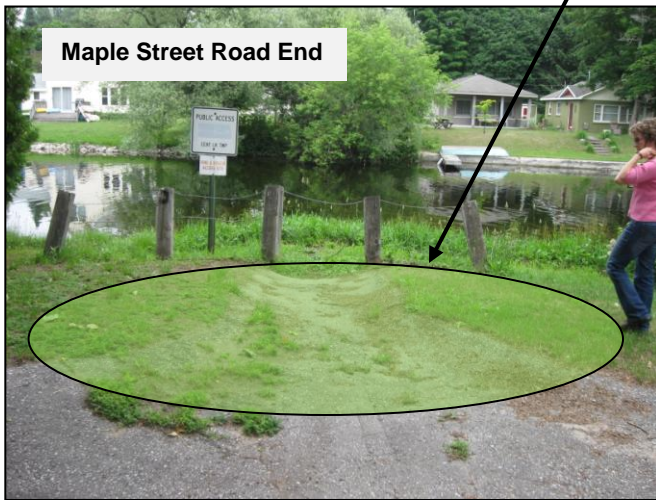


- Thurston Park and Campground -
 - *Findings:* The majority of the shoreline of Thurston Park lacks a greenbelt buffer and is mainly grass that is mowed to the water's edge. The lack of vegetation along the lakeshore allows more nutrients and runoff to enter the lake and pollute. Additionally, in some areas, a lack of shoreline vegetation encourages waterfowl to congregate.
 - *Recommendations:* Establish a buffer of vegetation along the shoreline of the park outside of the swim boundaries. If wanted, piers for fishing access may be added. The vegetated area can be established simply by creating a 'no mow' zone along the shore and allowing natural vegetation to grow; or the area can be enhanced by planting desired species of native grasses, flowers, and shrubs.
- Lake and Brooks Streets Runoff -
 - *Findings:* Runoff from Lake and Brooks Streets runs down the campground road and into Knowles Creek
 - *Recommendations:* Install rain garden(s) where possible to direct runoff into before it reaches the creek.



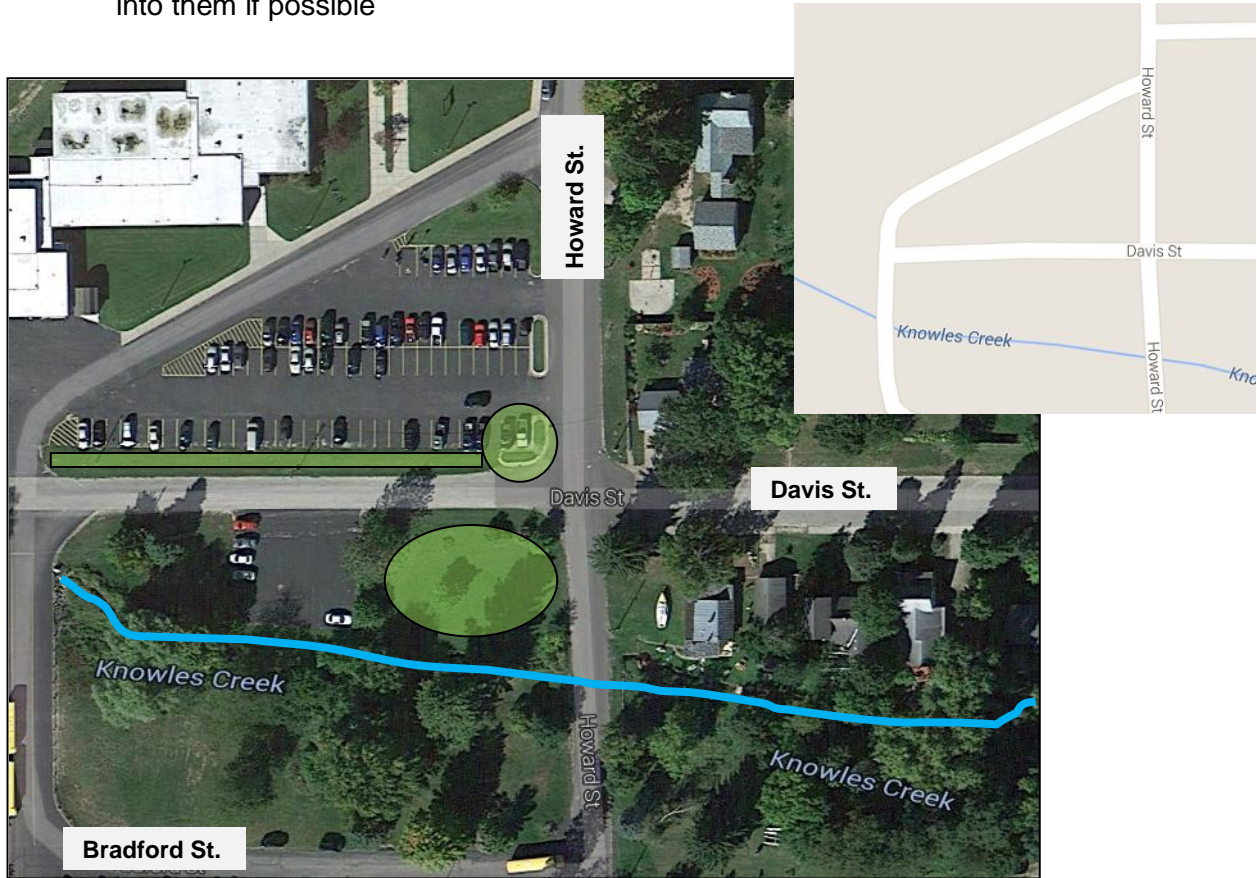
- Maple and Thomas Street Road Ends -

- *Findings:* Stormwater from Maple and Thomas Streets flows directly into the channel that connects Hanley and Intermediate Lakes
- *Recommendations:* Remove existing cement funnels directing stormwater to channel and install rain gardens



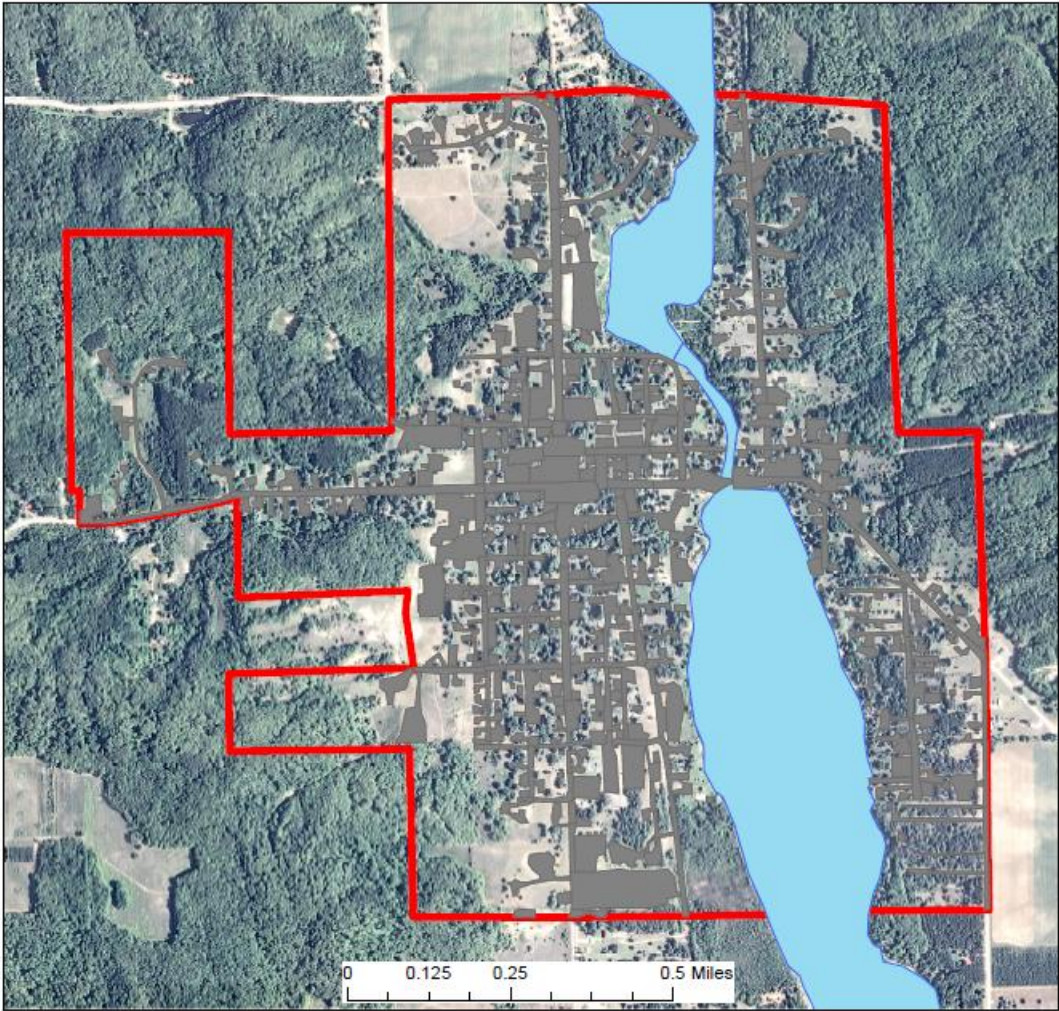
- School Parking lot -

- *Findings:* Runoff from school parking lot on corner of Howard St. and Davis St. drains into the street's catch basins which outlet into the nearby creek. Runoff is collected at two locations in the parking lot.
- *Recommendations:* Convert open/green spaces to rain gardens and direct stormwater into them if possible



Appendix A

Central Lake Impervious Surfaces



Central Lake Impervious
Central Lake

Central Lake Total Area: 805 Acres
Total Impervious Surfaces: 162 Acres

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Data Sources:
Michigan Geographic Data Library