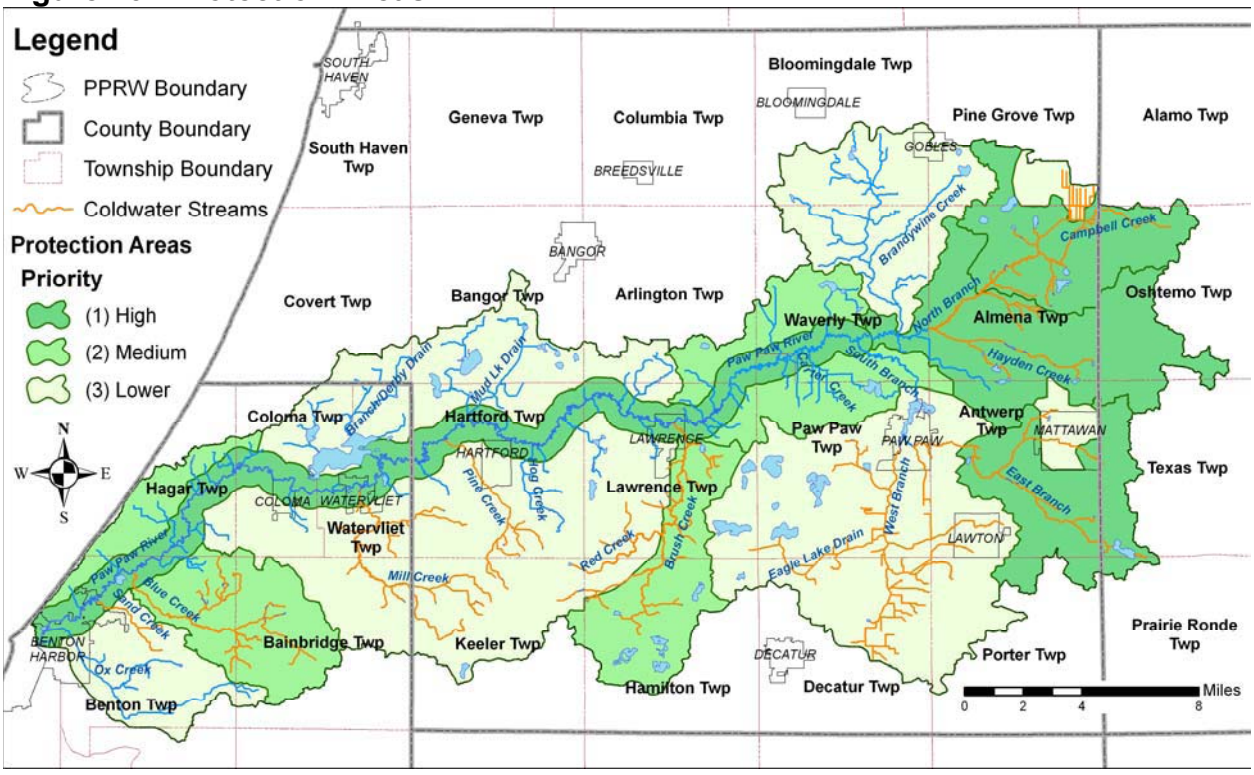
8 Prioritization - Areas, Pollutants, Sources

Priority areas were identified in the watershed based on lands that are contributing, or have the potential to contribute, a majority of the pollutants impacting water quality. By identifying priority areas, implementation can be targeted to the places where the most benefit can be achieved. Three different types of areas were prioritized in the PPRW – protection, agricultural management and urban management. Pollutants and sources of pollutants were also prioritized for each of the three areas.

8.1 Protection Areas

The prioritization of protection areas is based on the amount of natural land cover (habitat), groundwater recharge potential, intact wetland functions, the presence of high quality water bodies and development pressure. The PPRW is prioritized into three categories for protection as shown in Figure 23. High priority protection areas are generally the Paw Paw River mainstem and the PPRW headwaters (North Branch and East Branch subwatersheds). Medium priority protection areas include the Blue Creek and Brush Creek subwatersheds, the southwestern half of Waverly Township and the area near Lake Michigan. The high and medium priority areas, if not preserved or at least managed properly, have the potential to contribute large amounts of pollution, as well as disrupt hydrologic patterns in the watershed. The remainder of the watershed is lower in priority for protection efforts, but since this analysis is at a landscape level, specific sites in the lower priority area may need just as much attention as the high and medium priority areas for maintaining long-term water quality in the watershed.

Figure 23. Protection Areas



Protection Area Pollutants and Sources

In the protection areas the prioritization of pollutants and sources is based on their potential to threaten or impair water quality as development increases in these areas.

In the protection areas, the pollutants are prioritized as follows:

1. **Sediment** is a known pollutant causing impairments throughout the watershed. Construction sites in developing areas often contribute sediment to water bodies. Additional impervious surfaces alter hydrology leading to increased erosion and sedimentation.
2. **Nutrients** are currently a problem pollutant around lakes and urban areas. Nutrients are often attached to sediment. Stormwater runoff containing nutrients from lawns and golf courses is expected to increase with new development. Nutrients from additional septic systems could also be an issue with increased development in rural or suburban areas not served by municipal sewer.
3. **Temperature** is a concern because most coldwater streams are located in protection areas. With additional impervious surfaces and the removal of riparian buffers, the temperature of these streams could increase. Increased temperature could limit their ability to support coldwater fish.
4. **Bacteria and pathogens** are currently a suspected problem around lakes not served by municipal sewer systems. With increased development and additional septic systems in protection areas (especially in areas with soils not suitable for septic systems), bacteria and pathogens might become a more widespread problem.
5. **Pesticides** are suspected to become a problem with increased urbanization and the use of pesticides on lawns and golf courses.
6. **Oil, grease and metals** are not currently suspected to be a major problem in protection areas. The amount of oil, grease and metals is expected to increase with new development in these areas.

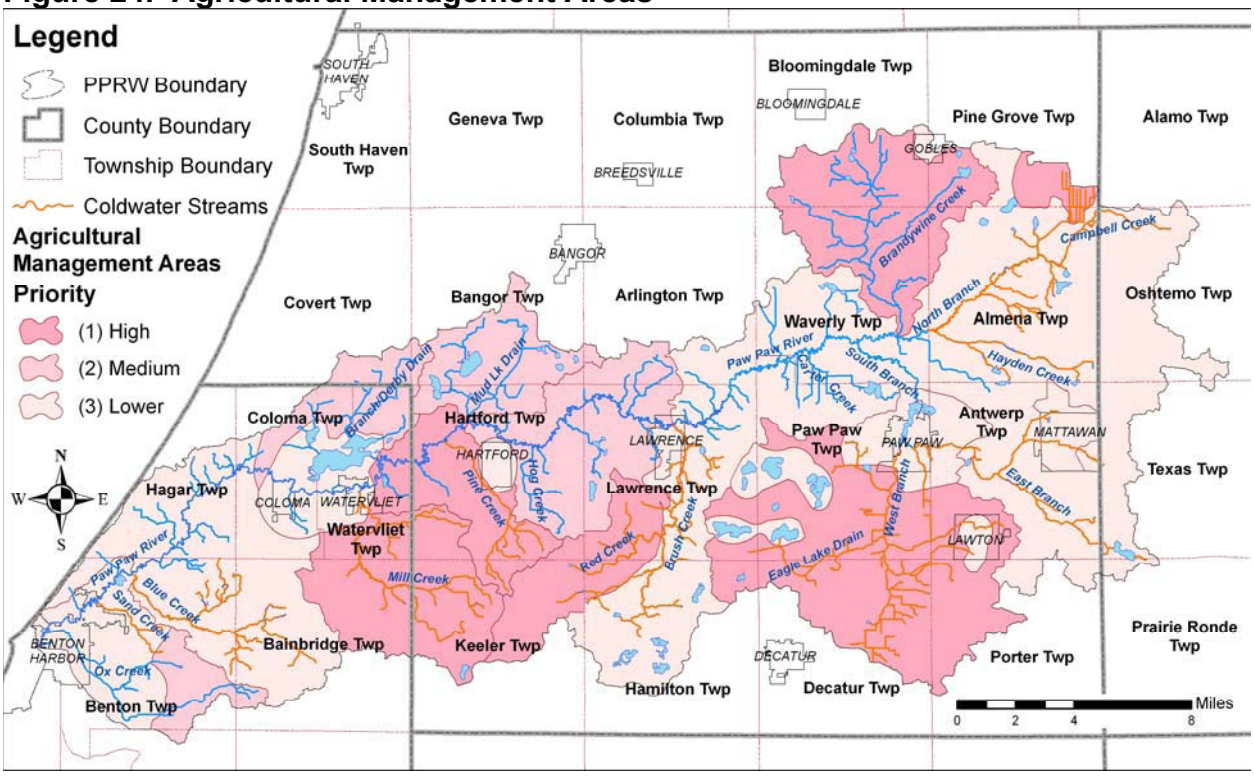
In the protection areas, the pollutant sources are prioritized as follows:

1. **Streambanks –** Increasing impervious surface in protection areas could alter hydrology and cause streambank erosion if runoff is not managed properly. Removal of the riparian corridor for waterfront development in protection areas could cause additional streambank erosion.
2. **Stormwater runoff –** Several priority pollutants could be delivered to protection area water bodies by stormwater runoff. With new development, stormwater runoff from construction sites and impervious surfaces is expected to increase in protection areas.
3. **Septage waste –** Failing septic systems are expected to become a problem with additional waterfront and suburban type development occurring in protection areas.
4. **Livestock –** There are several unrestricted livestock access sites within the protection areas; however, with increased residential development occurring in these areas, it is expected that livestock problems will become less of a concern.

8.2 Agricultural Management Areas

The prioritization of agricultural management areas is based on significant water body impairments, estimated pollutant loadings (SWAT model), amount of agriculture land cover and problems identified by MDEQ staff, MDNR Fisheries staff, Van Buren County Drain Commissioner or through the volunteer inventory process. The PPRW is prioritized into three categories for agricultural management as shown in Figure 24. The high priority agricultural management areas are the Mill Creek, Pine Creek, Red Creek, Brandywine Creek and West Branch subwatersheds and the Mentha Flats area in the southeast corner of Pine Grove Township. The medium priority agricultural management areas generally cover the Branch & Derby Drain, Mud Lake Drain and Hog Creek subwatersheds as well as the upstream portions of Ox and Sand Creek. The high and medium priority areas are suspected to contain a majority of the agricultural related pollutant sources impairing or threatening water quality in the PPRW. The remainder of the watershed is in a lower priority level for agricultural management efforts. However, since this analysis is at a landscape scale, there may be agricultural sites in the lower priority area that need attention to improve water quality in the watershed.

Figure 24. Agricultural Management Areas



Agricultural Management Area Pollutants and Sources

In the agricultural management areas the prioritization of pollutants and sources is based on their suspected significance to impaired water quality in these areas.

In the agricultural management areas, the pollutants are prioritized as follows:

1. **Sediment** is a known pollutant throughout the watershed, especially in the agricultural areas. Sediment from agricultural runoff also carries nutrients like phosphorus and nitrogen. Biosurveys found sediment impairment occurring in all of the impaired streams in agricultural management areas.
2. **Bacteria and pathogens** are a known pollutant in two of the highest priority agricultural management area waterbodies, Mill and Pine Creeks. TMDLs are scheduled for development in these watersheds due to extremely high Escherichia coli (E. coli) levels. Unrestricted livestock access sites have also been found in agricultural management areas.
3. **Nutrients** are a suspected pollutant in all of the agricultural management areas. In the West Branch, one of the highest priority agricultural management areas, a TMDL is scheduled for development due to low dissolved oxygen levels. Nutrients from agricultural runoff are suspected to be causing the impairment.
4. **Pesticides** are suspected to be a problem in agricultural areas; however, no data was found to document their significance in the PPRW.
5. **Temperature** is a concern in agricultural management areas because the removal of tree cover along coldwater streams and drains can lead to increased water temperature. Temperature is also impacted by altered hydrology from increased drainage efficiency and soil compaction, because groundwater recharge is reduced.
6. **Oil, grease and metals** are a concern in agricultural areas because of the use and maintenance of farm equipment (tractors, irrigation pumps, etc.).

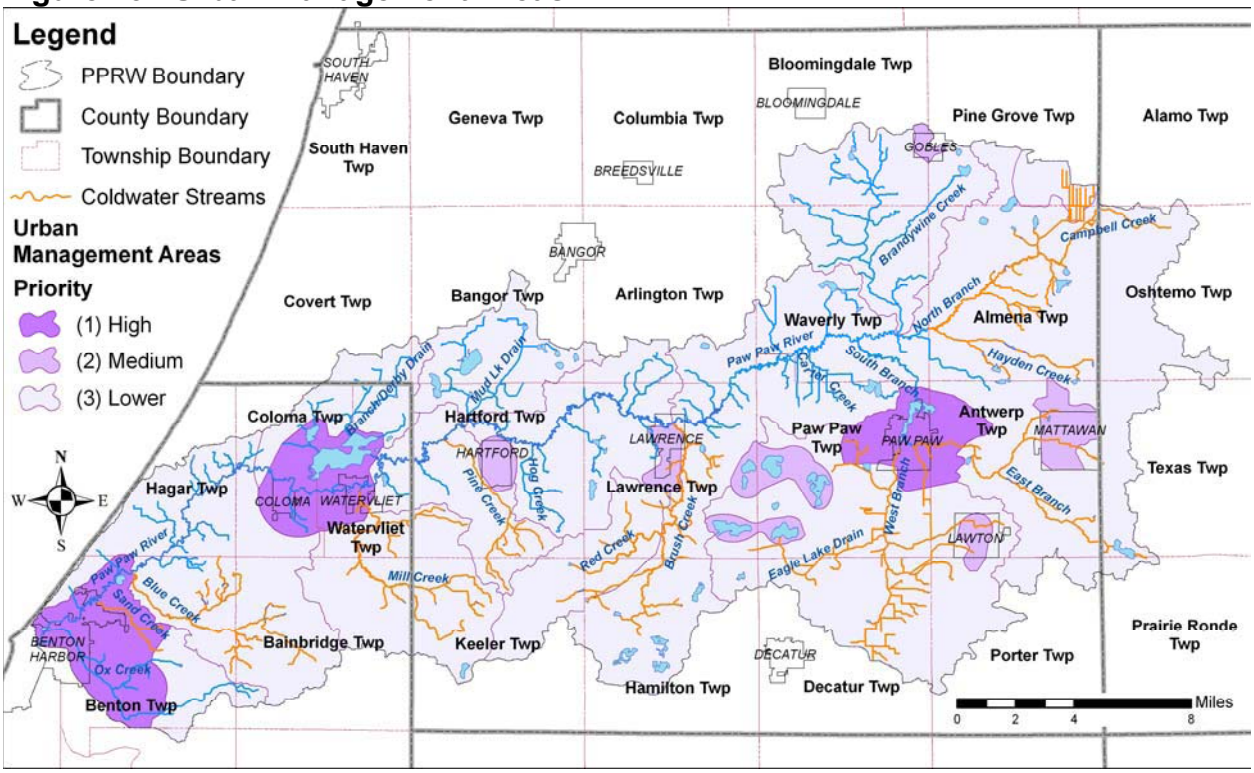
In the agricultural management areas, the pollutant sources are prioritized as follows:

1. **Streambanks –** Streambank erosion is a significant source of the highest priority pollutant (sediment). Streambank erosion was identified in biosurveys throughout the agricultural areas. In addition, recent fieldwork identified several streambank erosion sites on agricultural drains in the Paw Paw Lake (Berrien County) watershed.
2. **Livestock –** Two water bodies with scheduled TMDLs in agricultural management areas (Mill and Pine Creek) are being impacted by the application of livestock waste.
3. **Stormwater runoff –** Unmanaged runoff from agricultural lands can carry sediment, nutrients, bacteria and pathogens directly to surface water.
4. **Septage waste –** Failing septic systems and improper application or disposal of septage waste by septic haulers is a suspected source of nutrients, bacteria and pathogens in agricultural management areas.

8.3 Urban Management Areas

The prioritization of urban management areas is based on significant water body impairments, amount of urban land cover and problems identified by MDEQ staff, MDNR Fisheries staff, Van Buren County Drain Commissioner or through the volunteer inventory process. The PPRW is prioritized into three categories for urban management as shown in Figure 25. The high priority urban management areas are the downstream portions of the Ox and Sand Creek subwatersheds, the Paw Paw Lake area and the Village of Paw Paw. Medium priority areas include the Villages of Lawrence, Lawton and Mattawan, the Cities of Gobles and Hartford and the area around Eagle, Three Mile, Cora, Reynolds and Christie lakes (between Lawrence and Paw Paw Villages). The high and medium priority areas are suspected to contain a majority of the urban related pollutant sources impairing or threatening water quality in the PPRW. The remainder of the watershed is in a lower priority level for urban management efforts. However, since this analysis is at a landscape scale, there may be places in the lower priority area that need attention to improve water quality in the watershed.

Figure 25. Urban Management Areas



Urban Management Area Pollutants and Sources

In the urban management areas the prioritization of pollutants and sources is based on their suspected significance to impaired water quality in these areas.

In the urban management areas, the pollutants are prioritized as follows:

1. **Sediment** is a known pollutant causing impairments in urban areas, especially in Benton Harbor (Ox Creek) and the Village of Paw Paw (Maple Lake).

2. **Nutrients** are a known pollutant in urban stormwater runoff. A study of Paw Paw Lake attributed low dissolved oxygen levels to excess nutrients. Nutrients are also suspected to be a problem in other developed lakes in the watershed.
3. **Oil, grease and metals** are a known pollutant in Ox Creek and are suspected to be causing impairments.
4. **Bacteria and pathogens** are suspected to be a problem in highly developed lake areas without municipal sewer (Eagle, Three Mile, Cora, Reynolds and Christie lakes).
5. **Temperature** is a concern because impervious surfaces in urban areas can cause increases in temperature; however, most coldwater streams in the PPRW are not located in urban areas.
6. **Pesticides** are a pollutant of concern in urban areas because of improper application on lawns and golf courses in these areas; however no data was found documenting their significance in the PPRW.

In the urban management areas, the pollutant sources are prioritized as follows:

1. **Stormwater runoff –** A majority of pollutants impairing or threatening designated uses in urban areas are found in stormwater runoff, which largely results from impervious surfaces.
2. **Streambanks –** Impervious surfaces in urban areas can alter hydrology, which causes streambank erosion.
3. **Septage waste –** Septic systems are suspected to be a source of bacteria and pathogens in lake areas lacking municipal sewer services. In addition, the failure of sewer system infrastructure in urban areas has also led to releases of untreated wastewater.

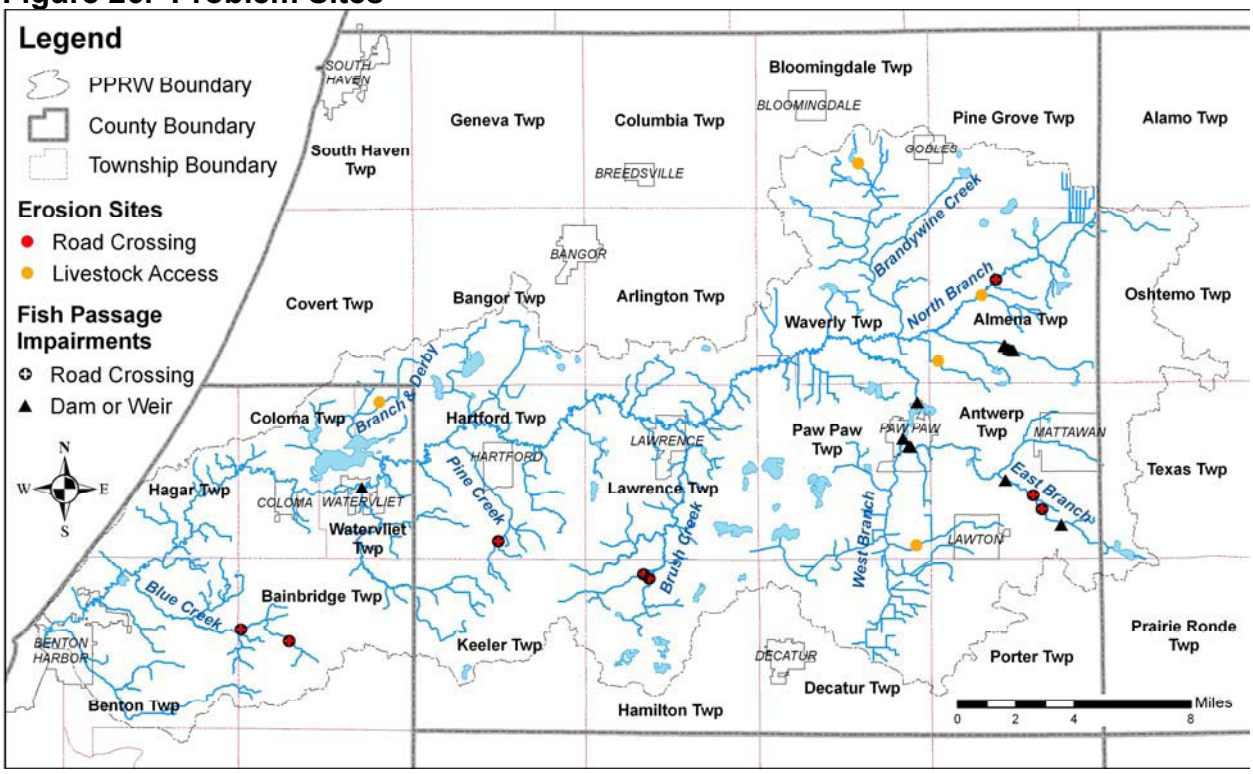
8.4 Problem Sites

Along with the priority areas, stakeholders identified several problem sites during the planning process that need attention. These sites included erosion sites, fish passage impairments and illegal wetland drainage or fill sites. A major problem site is located between Watervliet and Hartford along the Red Arrow Corridor, where a large wetland complex has been extensively ditched and drained altering the hydrology of the area.

Erosion and fish passage impairment sites are identified in Figure 26. Fish passage impairment sites result from a road crossing, dam or weir. An MDNR fisheries biologist identified the fish passage impairment sites. The fish passage sites may not be causing direct erosion problems, but may be disrupting the natural flow regime of several tributaries in the watershed. Further, the low head dams and weirs found in the watershed can impact the movement of fish and other organisms and limit their ability to reach headwater areas for spawning and nursery areas.

Following the map is a description of each erosion site, which is due to either a problematic road/stream crossing or unrestricted livestock access to a stream. Volunteers identified several of the livestock access problem sites during the Volunteer Inventory process. At the livestock access problem sites, the streambanks are eroding and most likely nutrients and bacteria/pathogens are entering the waterbodies.

Figure 26. Problem Sites



Blue Creek

There are two known impaired road/stream crossings along Blue Creek, both on Territorial Road. The first crossing has a failing culvert that is undersized causing erosion and a shifting sand bedload on top of the fine gravel streambed. Stormwater runoff at the second crossing is causing erosion and variable flow rates. The undersized culverts at this crossing are impacting fish passage, flow and sand/woody debris transport.

Branch and Derby Drain

There is one known pasture with unrestricted livestock access on Branch & Derby Drain between M-140 and North Watervliet Rd.

Pine Creek

There is one known impaired road/stream crossing along Pine Creek at 64th Street causing sedimentation. The bottom of this box culvert is elevated above the streambed resulting in a semi-perched condition affecting channel morphology.

Brush Creek

There are two known impaired road/stream crossings in the Brush Creek watershed. The CR 215 road crossing of White Creek is preventing fish passage and causing modifications to stream morphology. The CR 215 crossing of Brush Creek is preventing fish passage and causing streambank erosion.

West Branch
There is one known unrestricted livestock access site in the West Branch watershed. Sheep were reported to have unrestricted access to Lawton Drain near CR 665.

East Branch
There are two known impaired road/stream crossings along the East Branch. The crossing at 26th Street has a culvert that is poorly aligned with the stream dimensions and as a result is preventing fish passage upstream and causing scouring downstream. The crossing at 63rd Avenue is undersized and perched preventing fish passage, creating scouring downstream and impounding water upstream.

North Branch
There is one known impaired road/stream crossing north of Whiskey Run on CR 653 causing severe streambank erosion. The culverts are poorly aligned and undersized restricting flows and creating modifications to the stream dimensions. There are two known sites where livestock have unrestricted access to streams within the North Branch watershed. One site is located on Ritter Creek at 30th Street and the other is on the Paw Paw and Allegan Road Drain at 45th Street.

Brandywine Creek
There is one known unrestricted livestock access site in the Brandywine Creek watershed. The site was found during the volunteer inventory on Martin Lake Drain at 18th Ave.