

# GALIEN RIVER WATERSHED MAP GALLERY

## DATA DESCRIPTIONS

*All of the original data is simplified to display more efficiently within ArcGIS Online maps which includes the map gallery and other applications. The extent of many of the data sets is limited to the area where the [Galien River Watershed](#) is located in Berrien County, Michigan.*

### POTENTIAL CONSERVATION AREAS (PCA) BERRIEN COUNTY

Potential Conservation Areas (PCA) are defined as places on the landscape dominated by native vegetation that have various levels of potential for harboring high quality natural areas and unique natural features. In addition these areas may provide critical ecological services such as maintaining water quality and quantity, soil development and stabilization, pollination of cropland, wildlife travel corridors, stopover sites for migratory birds, sources of genetic diversity, and floodwater retention. In the [Galien River Watershed](#) very high rankings of PCA are found in Chikaming, New Buffalo, and Three Oaks Townships along the Galien River. It includes 2,683 acres in total size and a core area of 701 acres. Warren Woods State Park and Galien River County Park are both located within this site.

Scoring criteria used to prioritize the sites included: total size, size of core area, length of stream corridor, landscape connectivity, restorability of surrounding land, vegetation quality, and biological rarity score. For a full description of the process used to select Potential Conservation Areas (PCA), view the report, [Berrien, Cass, and Van Buren Counties Potential Conservation Areas, Providing Ecological Information For a Green Infrastructure Plan](#)

The ranking data can be used by local municipalities, land trusts, watershed councils, and other agencies to prioritize conservation efforts and assist in finding opportunities to establish an open space system of linked natural areas in the region. However, the actual ecological value of these areas can only be truly ascertained through on the ground biological surveys. Also take into account the methodology of this analyses did not consider areas under 20 acres.

Source: Michigan Natural Features Inventory, 2007

### EXISTING WETLAND

A wetland is a land area that is saturated with water, either permanently or seasonally, such that it takes on the characteristics of a distinct ecosystem. Primarily, the factor that distinguishes wetlands from other land forms or water bodies is the characteristic vegetation that is adapted to its unique soil conditions. Main wetland types are swamps, marshes, and bogs. Wetlands are crucial to a watershed health. Forming the boundary between the uplands and open water, wetlands store

excess water, reduce flooding downstream, act as a filter for sediment and other pollutants, help to control erosion, provide habitat for a diverse collection of plants and animals and, in turn, are great places for recreation and scenic enjoyment. In the [Galien River Watershed](#) there are approximately 15,400 acres of wetlands which includes southern floodplain forests, a Great Lakes Marsh at the mouth of the River, a prairie fen, a wet prairie, and peat bogs. There is a consensus that the existing wetlands need to be protected, and/or enhanced to mitigate water quality issues occurring in the watershed and to protect unique wetland habitat. A specific concern in the watershed is the increase of flooding, damaging property and crop lands. Also the Galien River does not meet Michigan's water quality standards for E. coli. E. coli is a type of fecal coliform bacteria that comes from human and animal waste which greatly diminishes the quality of the water. Polluted runoff containing sediment and excess nutrients also degrade the water quality of the Galien River and its tributaries. Wetland can help to filter all these pollutants.

The [National Wetlands Inventory data](#) is the source for existing wetlands layer. The data product is developed and maintained by the U.S. Fish and Wildlife Service (FWS) in partnership with other agencies and is available for the entire United States. The National Wetlands Inventory data has a quilt work of information about the data due to the complexity and geographic variation of wetlands, the decades of data collection and the size of the geographic coverage. Classification of wetlands is by the Cowardin Classification Standard, [Classification of Wetlands and Deepwater Habitats in the United States](#).

The Existing Wetlands layers can be used to identify areas where wetlands should be protected or/and enhanced. Many of the environmental issues in the watershed can be improved upon with wetland restoration or enhancement. More information about wetlands "[Living With Michigan's Wetlands: A Landowner's Guide](#)"

The primary intended use is for regional and watershed graphic display and analysis, rather than specific project data analysis. Therefore, verification by field work is needed to validate the information from these data products. The map products were neither designed or intended to represent legal or regulatory products.

#### Sources

[Galien River Watershed Management Plan MDEQ Tracking Code #2000-0122](#)

EXISTING WETLANDS: U.S. Fish & Wildlife Service National Wetland Inventory, 2007 & Michigan Department of Environmental Quality, 2007

## LOST WETLAND

In the [Galien River Watershed](#) 52% of the original wetlands have been lost through human activities, which is very similar to a Nation-wide trend of wetlands lost at 50%. Historically wetlands have been filled to build roads and housing, dredging and channelization of streams to increase drainage, and fields tilled for agricultural purposes.

Lost Wetland identifies areas which have wet soils and may have been filled or drained. The layer is derived from the Natural Resources Conservation Service, Soil Survey Geographic ([SSURGO](#)) data base. Specifically, the presence of hydric soils are identified as "Presettlement Wetlands". This layer, Presettlement Wetlands, included the existing wetlands in the watershed. Consequently, to simplify the files, the existing wetlands were clipped out of this Presettlement data.

The Lost Wetlands layers can be used to identify areas where wetlands may be restored. The restoration of drained or altered wetlands re-establishes and adds important ecological functions to the landscape, including the creation of new wildlife habitat, increased flood storage, and the enhancement of water quality. Despite the realization of the significance of wetlands, they continue to be lost. There are a number of avenues to get involved with restoring and protecting existing wetlands. On a local level you can investigate the potential of restoring or improving a local wetland, to researching Federal and State funded initiatives that promote watershed management. More information on wetland restoration can be found at [Wetland Restoration and Watershed Planning](#) and [Wetland Reserve Program](#).

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#### Sources

[Galien River Watershed Management Plan MDEQ Tracking Code #2000-0122](#)

LOST WETLAND (PRESETTLEMENT WETLANDS): Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) data base. 2000

## WETLAND FUNCTIONAL ACCESSMENT MAPS

The biological, chemical, and physical operations of a wetland are known as wetland functions. Wetland functions include filtering sediment, storing nutrients, floodwater storage, fish and wildlife habitat, and biological productivity. This type of analysis assumes that given enough information about the properties of a wetland such as location in the landscape, water source, and water movement in and out of a wetland, it should be possible to make reasonable judgments on how these properties can be translated into wetland functions. The analysis is also applied to wetlands that have been lost in a watershed. More information about the individual wetland function maps are provided in the next subsections.

[Wetland Functions](#) are a derived product from the [National Wetlands Inventory data](#). In general, the method evaluates wetlands based on the physical properties and attributes of a wetland. Specifically three of these properties are

1. Landscape Position which refers to the location of the wetland to the surrounding landscape.
2. Landform is referencing the water source of the wetland.
3. Water Flow Path is the motion of water and the capacity of the water to work, for example transporting sediment.

The method applies general knowledge about wetlands and their functional properties to produce a watershed level classification scheme that highlights wetlands that are predicted to perform certain functions at high or moderate levels.

This type of analysis is meant to be an initial screening of the overall status and trends of the wetland resources within a watershed. In a nonregulatory sense, this analysis can help pinpoint enhancement and protection activities to appropriate areas of the watershed that are most in need of a particular wetland function. Function analyses have also been applied to areas of lost wetlands. In turn, this information can be used to investigate the potential for wetland restoration.

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#### Sources

[Assessing Cumulative Loss of Wetland Functions in the Paw Paw River Watershed Using Enhanced National Wetland Inventory Data](#)

[NWIPlus: Geospatial Database for Watershed-level Functional Assessment Correlating Enhanced National Wetlands Inventory Data with Wetland Functions for Watershed Assessments: A Rationale for Northeastern U.S. Wetlands](#)

## FLOOD WATER STORAGE

[Wetlands function](#) to store flood waters by acting as a sponge, temporarily storing flood waters and releasing them slowly. In addition, the physical properties of the vegetation in a wetland slows down the speed of water entering rivers and streams. Therefore, this function is important for reducing downstream flooding and lowering flood heights, both of which aid in minimizing property damage and personal injury from such events. High water velocity and ponding of water can do severe damage to vegetation, crops, and erode stream banks. Flooding waters also transport debris, trash, logs, and pollutants throughout the Watershed. In the [Galien River Watershed](#) valuable farmland and structures in the Watershed have experienced more frequent flooding in the past decade.

Wetlands dominated by trees and/or dense stand of shrubs are deemed highly significant to slow the flow of water to rivers and streams, thereby facilitating water to be absorbed in the ground. Just as significant are emergent wetlands along waterways to provide significant water detention. Emergent wetlands are characterized by the presence of abundant perennial plants, often referred to as marshes. Wetlands adjacent to streams especially where the landscape is flat serve as having a moderate significance to function for water detention.

This map shows existing and lost wetlands and ranks them based on how well the wetland can store excess water during flood events, reducing flooding to property and roads. The map can help to identify areas to target wetland restoration and protection efforts.

## SEDIMENT AND OTHER PARTICULATE RETENTION

[Wetlands function](#) as living filters by removing polluting nutrients and sediment from surface and ground water. Reducing sediment and pollutants improves wildlife habitat and lessen sediment build up in culverts, streams and harbors. This function by wetlands is especially important in agricultural areas where by nutrient rich run-off can occur. Water quality sampling in the [Galien River Watershed](#) indicate impaired water quality at levels high enough to classify sediment, E. coli, nutrients, and possibly pesticides as high priority concerns for the Watershed. In addition, sediment is impairing the warmwater and coldwater fisheries by covering river and stream bottoms thereby degrading spawning beds.

Numerous studies have found that forested wetlands along lakes, rivers and streams are important for retaining both nutrient and sediment during floods. This [function](#) by forested riparian wetlands is especially important when adjacent to agricultural areas. Isolated wetland or wetlands that

border ponds function similarly. Vegetated wetlands will likely favor sedimentation over nonvegetated wetlands and are therefore rated higher. Ponds within a stream are rated high since they occur within a stream network. Other ponds may be locally significant in retaining such materials, and are also designated as moderate. Depressional basins are likely to collect sediments having moderate capacity to retain sediment. River flat wetlands which are flooded only for brief periods due to their elevation are classified as having moderate potential for sediment retention

This map shows existing and lost wetlands and ranks them based on how well the wetland can retain sediment and other particulate material, reducing sediment build up in culverts, streams and harbors. The map can help to identify areas to target wetland restoration and protection efforts.

## FISH AND SHELLFISH HABITAT

Wetlands provide a critical habitat for freshwater fish where as many fish are considered wetland dependent. Fish feed in wetlands or on food produced there. Other wetlands may not be providing significant fish habitat themselves, however they support base flow of rivers and streams which are essential for aquatic life and often discharge groundwater to streams which keeps these streams cooler in summer. Other wetlands along water bodies provide food that supports aquatic organisms that are an important part of the diet of juvenile and some adult fishes.

[Wetlands function](#) at significant levels for fish and shellfish habitat are identified with longer duration of surface water. Forested wetlands along streams are recognized as important for maintaining fish and shellfish habitat since their canopies help moderate water temperatures and their leaf litter provides food for aquatic organisms. Ponds and the shallow marsh-open water zone of impoundments are identified as wetlands having moderate potential for fish and shellfish habitat.

This map shows existing and lost wetlands and ranks them based on how the wetland can provide fish habitat, targeting wetlands that provide sustaining water temperatures, cover, and food. The map can help to identify areas to target wetland restoration and protection efforts.

## NUTRIENT TRANSFORMATION

Wetlands performing this [function](#), nutrient transformation, help improve local water quality of streams and other watercourses. Vegetation in wetlands that slows the flow of water thereby causing deposition of mineral and organic particles will adsorb nutrients (nitrogen and phosphorus), whereas wet soils are the places where chemical transformations occur. Microbial action in the soil is the driving force behind chemical transformations in wetlands. Microbes need a food source to survive, so wetlands with high amounts of organic matter have an abundance of microflora to perform the nutrient cycling function. Riparian forested wetlands along rivers and streams often called “Riparian Buffers” are especially important to lessen nutrient runoff from agricultural areas. The presence of excess nutrients leads to increased algae in the water, impairing recreational activities by creating unsightly conditions of the waterways. Excess nutrients affect warmwater and coldwater fisheries by decreasing the dissolved oxygen in the water when oxygen is consumed to aid in the decomposition of the plants. In the [Galien River Watershed](#) pollutants that are impairing use include sediment, nutrients, and bacteria.

Forested wetlands along rivers and streams (riparian forested wetlands) are important for nutrient retention and sedimentation during floods, therefore these wetlands are rated with high significance

for nutrient transformation. Permanently saturated wetlands in nutrient-rich sites should also be rated as high for this function, whereas wetlands with this hydrology in nutrient-poor areas are rated as moderate. Vegetated wetlands with a seasonally saturated water regime are also considered as moderate, since they are usually wet longer during the non-growing season and for shorter periods during the growing season.

This map shows existing and lost wetlands and ranks them based on how the wetland can store and recycle nutrients which improves water quality in the rivers and streams of the watershed. The map can help to identify areas to target wetland restoration and protection efforts

## CONSERVATION OF RARE AND IMPERILED WETLANDS

Because of the uniqueness of rare wetlands, certain species of plants and wildlife are specifically adapted to live in these wetlands. Degradation of these wetlands usually begins a chain of events that will affect these specialized species. Wetlands that are of a rare type and in this case are found near the mouth of the Galien River is an area consisting of emergent marsh and wet meadow that is considered a quality Great Lakes marsh community. Great Lakes Marsh communities only occur within the Great Lakes coastal region and is severely pressured by development. This marsh is essentially a drowned river mouth and contains extensive, fertile wetland habitat. Another unique area in the [Galien River Watershed](#) is the forested corridor along the Galien River which hosts several bird species that are threatened or of special concern in Michigan.

Conservation of rare and imperiled wetlands, as the title implies, are areas with a unique ecosystem that harbor threatened or endangered species and may be pressured for development. Methods used to identify these areas are unique to a given region. This is the one layer of the [Wetland Function Maps](#) that does not include a Lost Wetland Layer.

This map shows very special types of wetlands in the Galien River Watershed. These wetlands harbor unique wildlife adapted to the ecosystem. Priority should be given to these wetlands to be protected.

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### LIST OF HYPERTEXT LINKS IN THIS DOCUMENT

Assessing Cumulative Loss of Wetland Functions in the Paw Paw River Watershed Using Enhanced National Wetland Inventory Data

[http://www.swmpc.org/downloads/pprw\\_WetlandFunctionAssmnt.pdf](http://www.swmpc.org/downloads/pprw_WetlandFunctionAssmnt.pdf)

Berrien, Cass, and Van Buren Counties Potential Conservation Areas Providing Ecological Information For a Green Infrastructure Plan

[http://www.swmpc.org/downloads/growgreen/GI\\_finalreport.pdf](http://www.swmpc.org/downloads/growgreen/GI_finalreport.pdf)

Classification of Wetlands and Deepwater Habitats in the United States

<http://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf>

Galien River Watershed Management Plan

[http://www.swmpc.org/downloads/GALIEN\\_watershed\\_plan.pdf](http://www.swmpc.org/downloads/GALIEN_watershed_plan.pdf)

Southwest Michigan Planning Commission, October 2012

Living With Michigan's Wetlands: A Landowner's Guide

[http://www.michigan.gov/documents/deq/LivingwithMIWetlands\\_339928\\_7.pdf](http://www.michigan.gov/documents/deq/LivingwithMIWetlands_339928_7.pdf)

Michigan Department of Environmental Quality Wetland Restoration and Watershed Planning

[http://www.michigan.gov/deq/0,4561,7-135-3313\\_3687-10419--,00.html](http://www.michigan.gov/deq/0,4561,7-135-3313_3687-10419--,00.html)

Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) data base

<http://soils.usda.gov/survey/geography/ssurgo/>

Southwest Michigan Planning Commission <http://www.swmpc.org/grw.asp>

Southwest Michigan Planning Commission: Galien River Watershed <http://www.swmpc.org/grw.asp>

USDA Natural Resources Conservation Service Wetlands Reserve Program

<http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/wetlands>

U.S. Fish & Wildlife Service NWIPlus: Geospatial Database for Watershed-level Functional

Assessment [http://www.fws.gov/northeast/EcologicalServices/es\\_test2/pdf/NWIPlus\\_FactSheet.pdf](http://www.fws.gov/northeast/EcologicalServices/es_test2/pdf/NWIPlus_FactSheet.pdf)

U.S. Fish & Wildlife Service National Wetland Inventory Data

<http://www.fws.gov/wetlands/Data/index.html>