

OVERVIEW

The natural environment is an important resource for DeWitt, but it also can be something people take for granted. The Natural Environment chapter will focus on these main areas:

- Protect the natural environment and ensure that all DeWitt residents have access to clean air, water, and land.
- Plan for and mitigate damage from natural, human-made, and technological hazards.

AIR QUALITY

Everyone needs clean air. The Air Quality Bureau at the Iowa Department of Natural Resources (DNR) notes that poor air quality is unhealthy for everyone, but especially for children, older adults, and people with respiratory conditions like asthma. People who work or exercise outdoors also can be affected. Cleaner air means fewer trips to the emergency room and lower respiratory illness rates. Clean air also helps Iowa's livestock, wildlife, crops, and other plant life. Historically, the City of DeWitt has met ambient air quality standards.

Cleaner, healthier air requires local and regional efforts, so the Iowa DNR partners with communities, business and industry, organizations, and individuals to address air quality issues. The Iowa DNR provides maps and metrics of current air quality conditions, active construction permit and Title V operating permit applications, asbestos notifications, as well as emissions and monitoring data on the Air Quality Dashboard. Access these resources at <https://www.iowadnr.gov/Environmental-Protection/Air-Quality>

Air Pollutants

The Federal Clean Air Act requires the U.S. Environmental Protection Agency (USEPA) to establish standards using human health-based and environmentally-based criteria that set maximum levels in ambient air for these six common **criteria air pollutants**: particle pollution (particulate matter), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. The Iowa DNR monitors these criteria air pollutants across the state. Ozone and particulate matter present the most widespread health threats. Table 5-1 lists the common sources for the criteria air pollutants.

The USEPA and Iowa DNR also regulate 188 **hazardous air pollutants** known or suspected to cause cancer or other serious health effects. More localized than the criteria air pollutants, their highest levels are close to their sources. Common sources of most hazardous air pollutants are: vehicles, factories, power plants, refineries, some building materials, and cleaning solvents. Examples include benzene (in gasoline), perchloroethylene (emitted from some dry-cleaning facilities), methylene chloride (solvent and paint stripper), dioxin, asbestos, toluene, and metals such as cadmium, mercury, chromium, and lead compounds.

Learn more at <https://www.iowadnr.gov/Environmental-Protection/Air-Quality/Air-Pollutants>

Table 5-1. Common sources for Criteria Air Pollutants

Criteria Air Pollutant	Common Sources
Carbon monoxide (CO)	Motor vehicle exhaust
Coarse particulate matter (PM ₁₀)	Moving dry, dusty materials (sand, gravel, grain, coal); cutting, grinding and crushing; plants and fungus
Fine particulate matter (PM _{2.5})	Motor vehicle exhaust; power plants; wood burning; some industrial processes
Lead (Pb)	Lead smelters, waste incinerators, coal combustion, lead-acid battery manufacturers, aircraft using leaded aviation gasoline
Nitrogen oxides (NO _x)	Motor vehicle and aircraft exhaust, boilers; power plants
Sulfur dioxide (SO ₂)	Burning of gasoline, coal and fuel oil
Volatile organic compounds (VOC)	Evaporation of gasoline, paint, solvents, consumer products, varnishes, and industry chemicals
Ozone (O ₃) at ground level	Reaction of VOC and NO _x during warm, windless days with bright sunlight

Source: Iowa DNR

Construction and Operating Permits

The Iowa DNR requires that when businesses plan to build or expand, they must apply for a construction permit to show how they will meet state and federal air quality standards. All new or modified equipment and control equipment that emits air pollutants must have a construction permit unless the equipment is exempt. Iowa DNR issues construction permits for projects from paint booths at an auto body shop to coal-fired boilers at a power plant. From January 2002 to January 2024, there have been 74 air quality construction permits issued in DeWitt.

The Iowa DNR also issues five-year operating permits to ensure certain major facilities and equipment continue to perform as designed, to protect ambient air quality under Title V of the Federal Clean Air Act. As of April 2024 in DeWitt, Guardian Industries Corporation and Latham Pool Products, Inc. have Title V Operating Permits. For more information on these permits, visit <https://programs.iowadnr.gov/easyair/Public/GovEnt/Shared/Pages/Main/Login.aspx>

Greenhouse Gas Emissions

Each year the Iowa DNR estimates greenhouse gas emissions based on statewide activity data from agriculture, fossil fuel combustion, industrial processes, natural gas transmission and distribution, transportation, solid waste, and wastewater treatment. It also includes carbon sequestered or emitted from land use, land use change, and forestry. The gases included in the inventory are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), perfluorocarbons (PFC), hydrofluorocarbons (HFC), and sulfur hexafluoride (SF₆). According to the USEPA's Facility-Level Information on Greenhouse Gases Tool (FLIGHT), Guardian Industries in DeWitt is a large, industrial greenhouse gas-emitting facility that emits primarily carbon dioxide. Learn more at <https://www.iowadnr.gov/Environmental-Protection/Air-Quality/Greenhouse-Gas-Emissions>

Emissions Inventory

The Iowa DNR is responsible for reviewing and estimating air pollution data from a variety of sources throughout the state. Examples of emissions inventory data include:

- *Point Sources:* Stationary sources, such as smoke stacks from industrial facilities.
- *Mobile Sources:* Both on-road sources (cars and trucks) and nonroad sources (agricultural equipment, construction equipment, trains, airplanes, etc.)
- *Biogenic Sources:* Trees and vegetation, oil and gas seeps, and microbial activity.
- *Nonpoint Sources:* Sources such as residential fuel use and landfills.

Major sources (i.e. those facilities subject to the Federal Title V Operating Permit Program) are required to report emissions annually. A major source in DeWitt is Guardian Industries Corporation, which manufactures a variety of glass products.

Minor sources (i.e. facilities not subject to the Title V Operating Permit Program) are required to submit emissions inventories once every three years. A minor source in DeWitt, Wendling Quarries, Inc. produces crushed stone, sand, gravel, recycled concrete and asphalt, topsoil, turf, and landscaping products.

Community resources on air quality are available from the Iowa DNR Air Quality Bureau at <https://www.iowadnr.gov/Environmental-Protection/Air-Quality/In-Your-Neighborhood>

WATER QUALITY

From drinking water to wastewater, and from wetlands to rivers, ensuring clean water is an important priority for DeWitt. Drinking water, wastewater, and stormwater are discussed in Chapter 7. Infrastructure, Services, and Facilities of this comprehensive plan. This section discusses water quality for surface water and groundwater as an environmental resource.

Watersheds

The Iowa DNR notes that cleaner water begins in the watershed -- an area of land that drains into a lake or river. DeWitt is located within the HUC-8 Lower Wapsipinicon Watershed of the Wapsipinicon River, which empties into the Mississippi River. DeWitt is drained by two small creeks, Ames Creek and Silver Creek. Both Ames Creek and Silver Creeks flow into the Wapsipinicon River 2.5 miles to the south. (HUC = Hydrologic Unit Code, which refers to the size of the watershed.)

As shown in Figure 5-1, DeWitt lies within smaller HUC-12 subwatersheds formed by Ames Creek and Silver Creek. DeWitt also lies in potential karst areas. "Karst" refers to geologic landforms characterized by the presence of limestone and dolomite bedrock near the ground

surface. Water easily dissolves this bedrock, so karst areas often have sinkholes at the land surface, springs that flow from rocky hillsides, and streams that disappear into the ground.

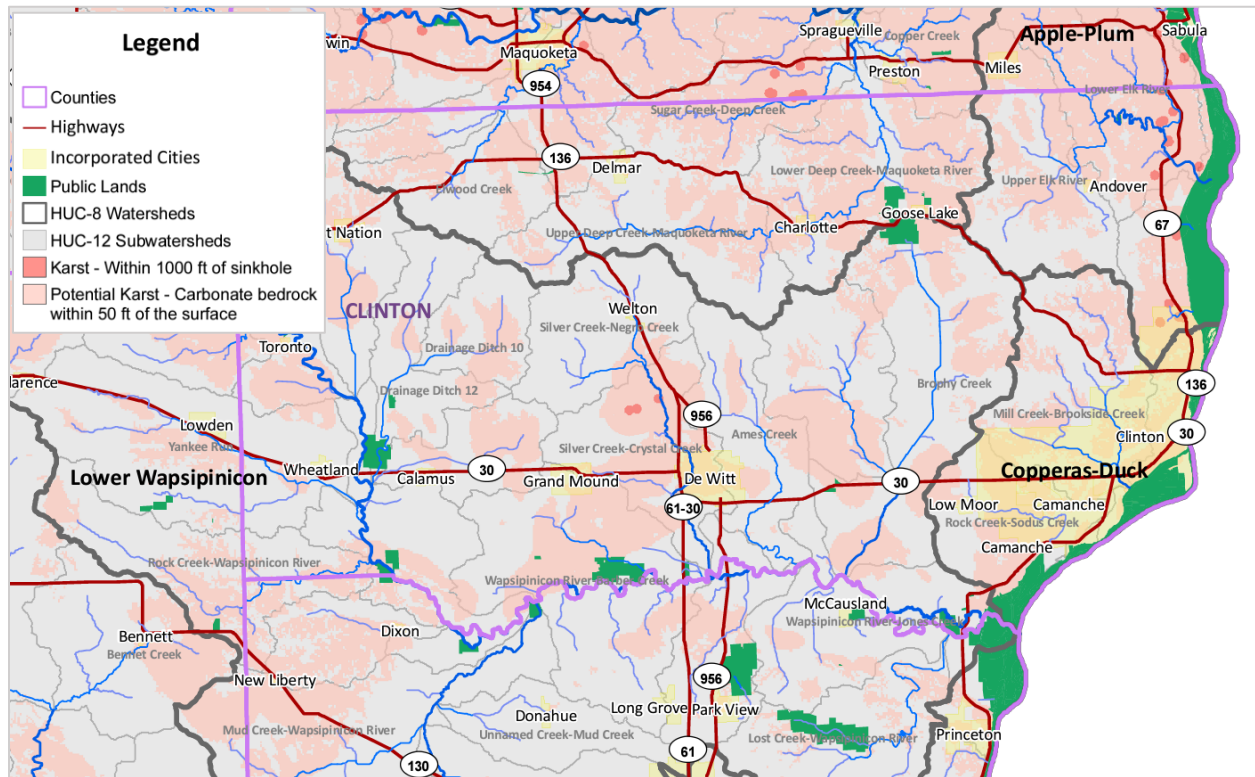


Figure 5-1. Map of Watersheds and Karst Areas in Vicinity of DeWitt

Source: NE Iowa Watershed and Karst Map, Iowa DNR

Water Quality Standards

The Iowa DNR enforces the State's water quality standards, which help ensure that Iowa's surface waters are fishable and swimmable to the fullest extent practicable and that water resources that are put to their best uses. The Ambient Water Monitoring Programs provide information about the condition of Iowa's surface and groundwater resources so that decisions regarding the development, management, and protection of these resources may be improved. Figure 5-2 is a map of the Iowa DNR Water Monitoring Sites in the DeWitt area.

The sampling data are used to make water quality "assessments" of Iowa's waterbodies. Every two years, the Iowa DNR compiles an impaired water list composed of those lakes, wetlands, streams, rivers, and portions of rivers that do not meet all state water quality standards. These "impaired waters" are placed in one of five categories. Category 5 indicates a waterbody is impaired, and the Iowa DNR is required to calculate total maximum daily loads (TMDLs) for pollutants causing impairments. The Wapsipinicon River is a Category 5 impaired water in the DeWitt area as shown in Figure 5-3.

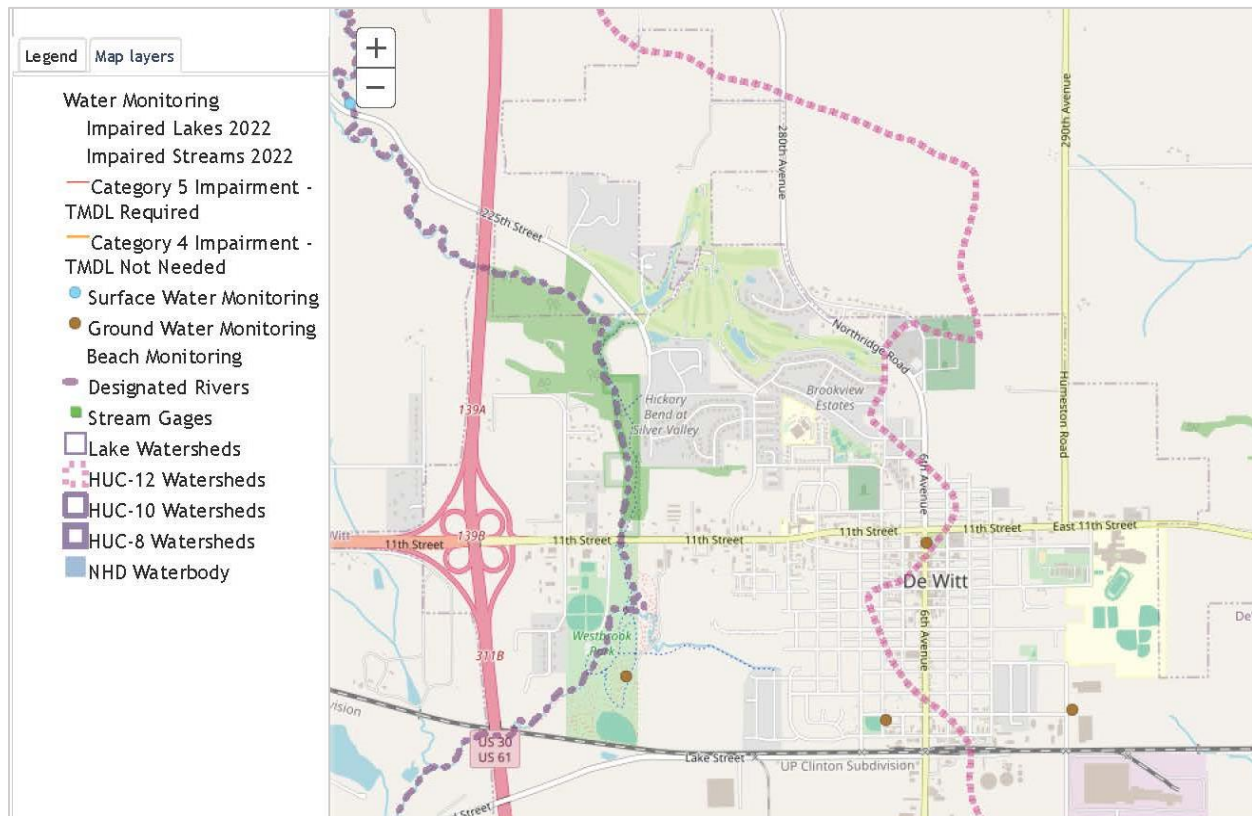


Figure 5-2. Map of Iowa DNR Water Monitoring Sites in DeWitt Area

Source: <https://programs.iowadnr.gov/maps/watermonitoring/> accessed April 2024



Figure 5.3. Map of Impaired Waters in DeWitt Area

Source: Iowa DNR 2022 Impaired Waters map

The Iowa DNR notes that the State's major water quality problem is nonpoint source pollution. The most common pollutants are soil (sediment) and nutrients picked up by runoff as it flows over land to surface waters. These pollutants may come from agricultural land, open spaces, urban areas, construction sites, roads, parking lots, and other areas. Other common pollutants include pesticides, pathogens (bacteria and viruses), salts, oil, and grease. The main solution is to keep excess sediment, nutrients, bacteria and other pollutants out of surface water and groundwater. Community resources are available at <https://www.iowadnr.gov/Environmental-Protection/Water-Quality/Watershed-Improvement/Watershed-Basics>

LAND QUALITY

Land quality refers to the extent that land is free from contamination and therefore suitable for a particular use. The physical attributes of land, water bodies, and climate shape the character of urban places and define the nature, extent, and location of future growth and development.

Climate

According to the 2022 Clinton County Hazard Mitigation Plan, Clinton County, like the entire state of Iowa, is within the humid continental zone. The mean annual temperature of the county is 50°F, with an average summer temperature of 73°F and a winter average of 25°F. Seasons fluctuate from being very wet to very dry, and temperatures can fluctuate greatly in spring and autumn months. Average annual precipitation is approximately 35.45 inches.

Clinton County frequently experiences severe weather events throughout all seasons. In the winter, the county experiences severe winter storms, while the spring and summer months can bring severe thunderstorms, hail, lightning, and tornadoes. In the summer, extremely high temperatures prove to be dangerous while more storms and early snow can affect the county in the fall.

Geology

The City of DeWitt is located on a layer of what geologists call Niagara Limestone, or dolomite, formed about 390 million years ago during the Silurian period. In the DeWitt area, all of the layers above the Niagara series have been eroded away, leaving limestone directly below the soil. This layer of rock is about 220 feet thick, with an older layer of Maquoketa Shale beneath. The importance of this limestone layer is that it is a major aquifer, or water-bearing rock layer, of the East Central Iowa area.

The DeWitt area was glaciated four times during the Pleistocene, most recently during the Wisconsin glacial period about 11,000 years ago. The glaciers left material composed of clay and loam and later fine windblown particles of clay called loess were deposited into the area. This material is known generally as glacial till, or specifically in this area, Iowa drift. This Iowa drift resulted in the extremely rich, deep and fertile soils found throughout the area and the relatively level landscape with few topographic constraints to development.

Landform

According to the Iowa Geological Survey, DeWitt lies in the landform region of sweeping, outstretched landscapes known as the Iowa Surface. The land surface usually appears slightly inclined to gently rolling with long slopes, low relief, and open views to the horizon. The hillslopes of the Iowan Surface have multi-leveled or stepped surfaces that occur in a gradual progression from the major stream valleys outward toward the low crests that mark their drainage divides. Erosion on a large scale is the key to the geological origins of the Iowan

Surface. Figure 5-4 illustrates the stratigraphy of the Iowa Surface landform. Stratigraphy is a branch of geology concerned with the study of rock layers (strata) and layering (stratification).

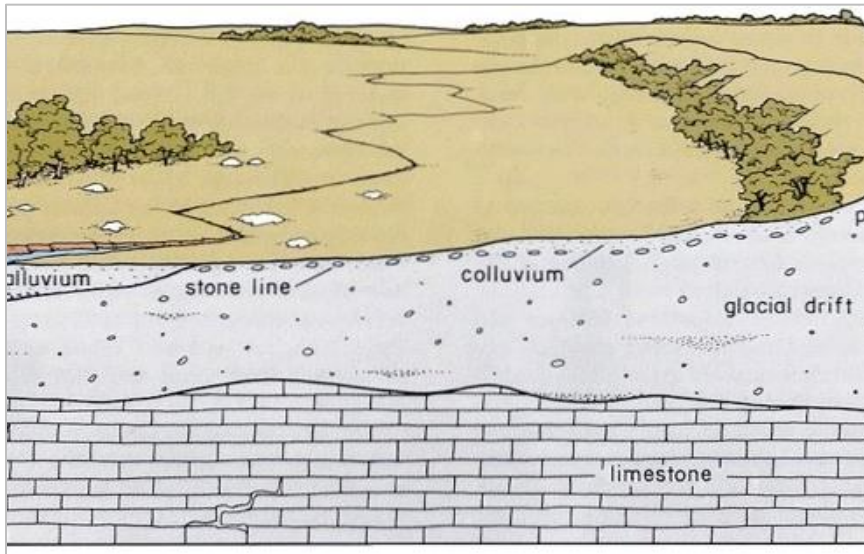


Figure 5-4. Stratigraphy of the Iowa Surface Landform

Source: Iowa Geological Survey

Topography

The elevation of the City of DeWitt varies from 670 to 750 feet above sea level, and the United States Geological Survey lists the official City elevation at 719 feet above sea level. Figure 5-5 is a topographic map of DeWitt and the surrounding area.

Land Cover

According to the U.S. Geological Service, the National Land Cover Database

(NLCD) provides nationwide data on land cover for characteristics of the land surface such as thematic class (e.g., urban, agriculture, and forest). Figure 5-6 is a land cover map of DeWitt and its environs, which predominately are in agricultural use for Cultivated Crops.

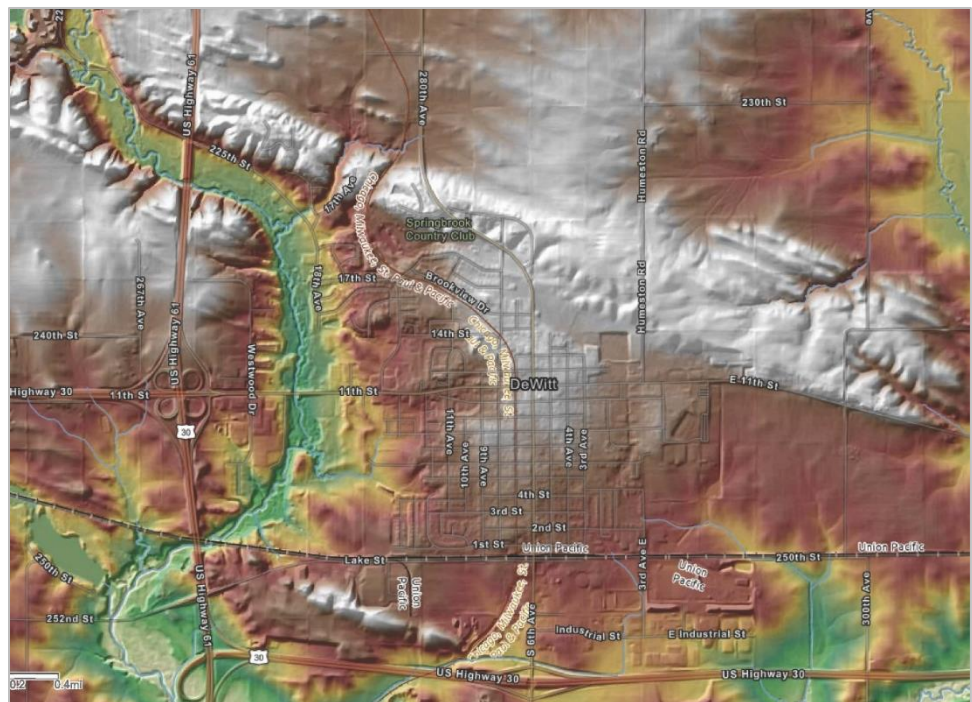


Figure 5-5. Topographic Map of DeWitt and surrounding area

Source: Iowa Geographic Map Server

The four categories of Development comprising the City of DeWitt are as follows:

- **Developed, Open Space** – large lot single-family homes, parks, golf courses, and landscaped areas with impervious surfaces covering less than 20%;
- **Developed, Low Intensity** – single-family homes with impervious surfaces of 20 to 49%;
- **Developed, Medium Intensity** -- single-family homes with impervious surfaces of 50 to 79%; and
- **Developed High Intensity** – usually includes apartment complexes, row houses, and commercial or industrial areas with impervious surfaces covering 80 to 100%.

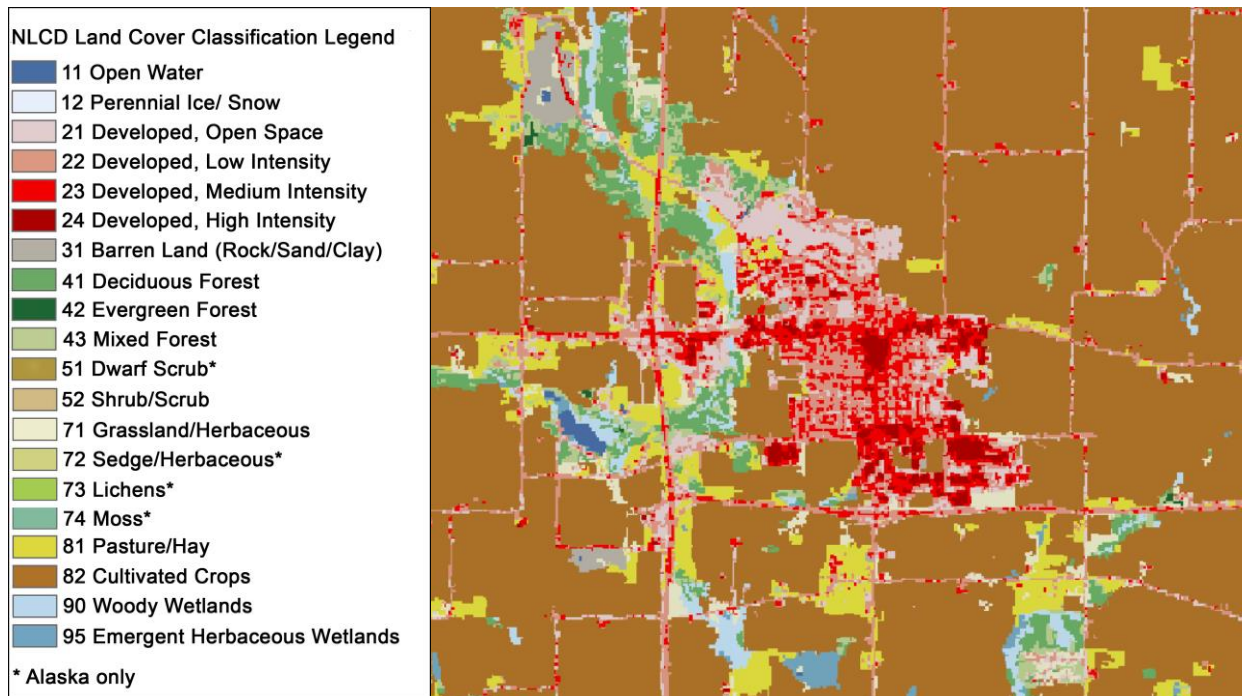


Figure 5.6. Land Cover Map of DeWitt and Environs (2021)

Source: Multi-Resolution Land Characteristics Consortium, <https://www.mrlc.gov/viewer//> April 2024

Land Suitability

Land suitability for development and redevelopment can be classified as follows:

- **Greenfield:** previously undeveloped sites with no prior industrial or commercial activity, and therefore where the threat of contamination is much lower than in urbanized areas.
- **Greyfield:** any previously developed property that does not have known environmental contaminants but is economically nonviable in its current state.
- **Brownfield:** a property for which expansion, redevelopment, or reuse may be complicated by the presence of a hazardous substance, pollutant, or contaminant.

The Iowa DNR's Land Quality Bureau protects Iowa's land resources by managing solid waste, remediating contaminated sites, flood permitting and dam safety, assisting Iowa businesses with innovative pollution prevention programs, and more. Solid waste is discussed in Chapter 7. Infrastructure, Services, and Facilities of this comprehensive plan.

The Contaminated Sites Section of the Iowa DNR deals with a range of situations that involve contamination caused by a release of hazardous materials or hazardous waste products.

Brownfields are abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination. Redeveloping a brownfield site can revitalize a neighborhood by: creating jobs, increasing the tax base, mitigating threats to human health and the environment, and reducing blight

Lead-based paint was widely used on buildings until 1978, when it was banned on residential structures by the Consumer Products Safety Commission. While concentrated lead exposure can have adverse effects on nearly all organ systems in the body, it is especially harmful to the developing brains and nervous systems of children under the age of six years.

The Iowa DNR works with the owners of sites on the detection, prevention and correction of releases of products from **storage tanks** used for the storage of regulated substances, primarily petroleum products. These consist of Underground Storage Tanks (UST), Leaking Underground Storage Tanks (LUST), and Above Ground Storage Tanks (AST). Figure 5-7 is a map of underground and above ground storage tanks in and near the City of DeWitt.

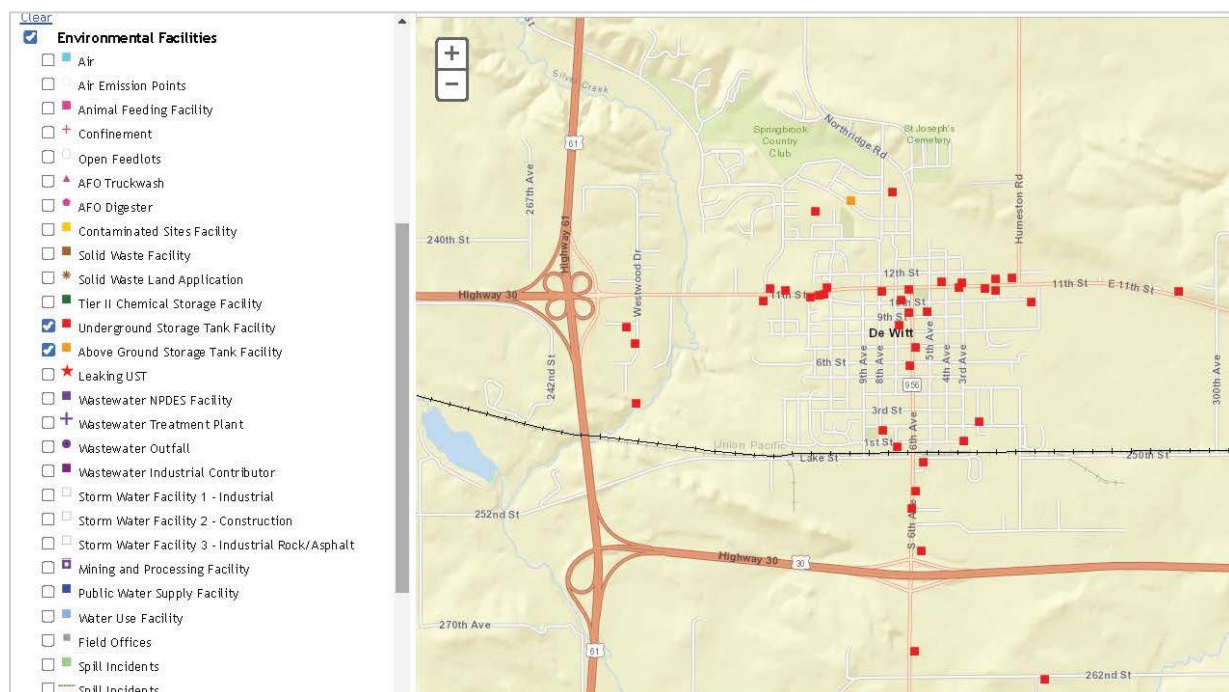


Figure 5-7. Map of Iowa DNR Regulated Environmental Facilities in and near DeWitt

Source: Iowa DNR Facility Explorer accessed April 2024

The Iowa DNR maintains the registry of **hazardous waste disposal sites**. All sites listed on the Registry are classified according to the relative priority listing for remedial action at the site. There are no hazardous waste disposal sites in DeWitt.

The **Land Recycling Program** allows owners or other stakeholders of a property to voluntarily assess and implement remedial actions at a site that is contaminated or is perceived to be contaminated. The assessment of the property must address the severity of the contamination problems and the risks associated with the contamination.

Community resources are available at <https://www.iowadnr.gov/Environmental-Protection/Land-Quality>

Floodplain Management

The Iowa DNR regulates construction on all floodplains and floodways in the state to protect life and property; and to promote the orderly development and wise use of Iowa's flood plains. The floodplain development regulations contain the minimum standards for projects located in Iowa's flood plains must meet. Flood Plain Development Permits are required for most work on the floodplains of streams and rivers throughout the State.

The Iowa DNR works with communities and counties to develop and administer local floodplain management programs, coordinates the National Flood Insurance Program, and assists the Federal Emergency Management Agency and the Iowa Emergency Management Division in responding to flood disasters. For more information contact the Iowa DNR Helpline at 866-849-0321 or floodplain-help@dnr.iowa.gov.

The City of DeWitt has adopted a Floodplain Management Ordinance to protect and preserve property of the City and its residents and to preserve and to minimize flood losses. The ordinance applies to all lands within the jurisdiction of the City which are located within the boundaries of the Floodplain (Overlay) District, which is based on the City's official Flood Insurance Rate Map. The City coordinates issuance of its own Floodplain Development Permits with the Iowa DNR in accordance with this ordinance.

Community resources are available at <https://www.iowadnr.gov/Environmental-Protection/Land-Quality/Flood-Plain-Management>

HAZARD MITIGATION

The following information in this section is taken directly from the 2022 Clinton County Hazard Mitigation Plan unless noted otherwise. Participating jurisdictions include Clinton County, the City of DeWitt and the other incorporated cities in Clinton County, and the school districts serving Clinton County. The hazard mitigation planning area is Clinton County.

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from disasters or hazardous events. Studies have found that hazard mitigation is extremely cost-effective, with every dollar spent on mitigation saving an average of \$6 in avoided future losses. The Federal Emergency Management Agency (FEMA) requires that Hazard Mitigation Plans (HMPs) be updated every five years for the jurisdictions to be eligible for federal mitigation assistance, specifically the FEMA hazard mitigation grants including the Hazard Mitigation Grant Program (HMGP), Building Resilient Infrastructure and Communities (BRIC) grant program, and Flood Mitigation Assistance (FMA) program.

Hazard Identification

Through the hazard identification review process, 20 natural, human-caused, and technological hazards with the potential to significantly affect the planning area were chosen for further analysis in the risk assessment.

Flooding

Flooding was divided into two main categories: Flash Flooding and Riverine Flooding.

A **flash flood** is an event that occurs when water levels rise at an extremely fast rate as a result of intense rainfall over a brief period, sometimes combined with rapid snowmelt, ice jam release, frozen ground, saturated soil or impermeable surfaces.

Flash flooding occurs in those locations of the planning area that are low-lying and/or do not have adequate drainage to carry away the amount of water that falls during intense rainfall events. The following locations in the City of DeWitt have a history of flash flooding events: Silver Creek, East 11th Street, East Industrial Street, and South 3rd Avenue East.

Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt, or ice melt. The areas adjacent to rivers and stream banks that carry excess floodwater during rapid runoff are called floodplains. A floodplain is defined as the lowland and relatively flat area adjoining a river or stream. The terms “base flood” and “100-year flood” refer to the area in the floodplain that is subject to a one percent or greater chance of flooding in any given year.

With the history of flooding in the planning area, it is likely that flooding of various levels will continue to occur. DeWitt, Toronto, and the unincorporated areas of Clinton County have the highest risk of flooding due to riverine or flash floods.

Flash floods are the number one weather-related killer in the United States. They can quickly inundate areas thought not to be flood-prone. Other impacts of flooding can include loss of life; property damage and destruction; damage and disruption of communications, transportation, electric service, and community services; crop and livestock damage and interruption of business. Hazards of fire, health and transportation accidents, and contamination of water

supplies are likely effects of flooding situations. DeWitt has experienced moderate to major flooding.

In DeWitt, stormwater has posed a significant problem for the sanitary sewer system. Large amounts of stormwater are channeled in the sanitary sewers which causes backups to occur. In 2008-2009, the City did complete a large improvement project on the east side of DeWitt. A large detention area was built in northeast DeWitt adjacent to the Humeston Road north of 11th Street. Additionally, the City cleaned and reshaped the existing drainage ditch from north of 11th Street to East 3rd Avenue. That project has reduced street and private property flooding in that area.

The geographic location/extent for river flooding will be considered as those areas at risk to the 100-year flood (also known as the 1-percent annual chance flood). The 1-percent annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes. Figure 5-8 is a map of the FEMA flood hazard areas for the City of DeWitt. The map includes flooded structures vulnerable to the 1% and 0.2% annual chance flood hazard areas.

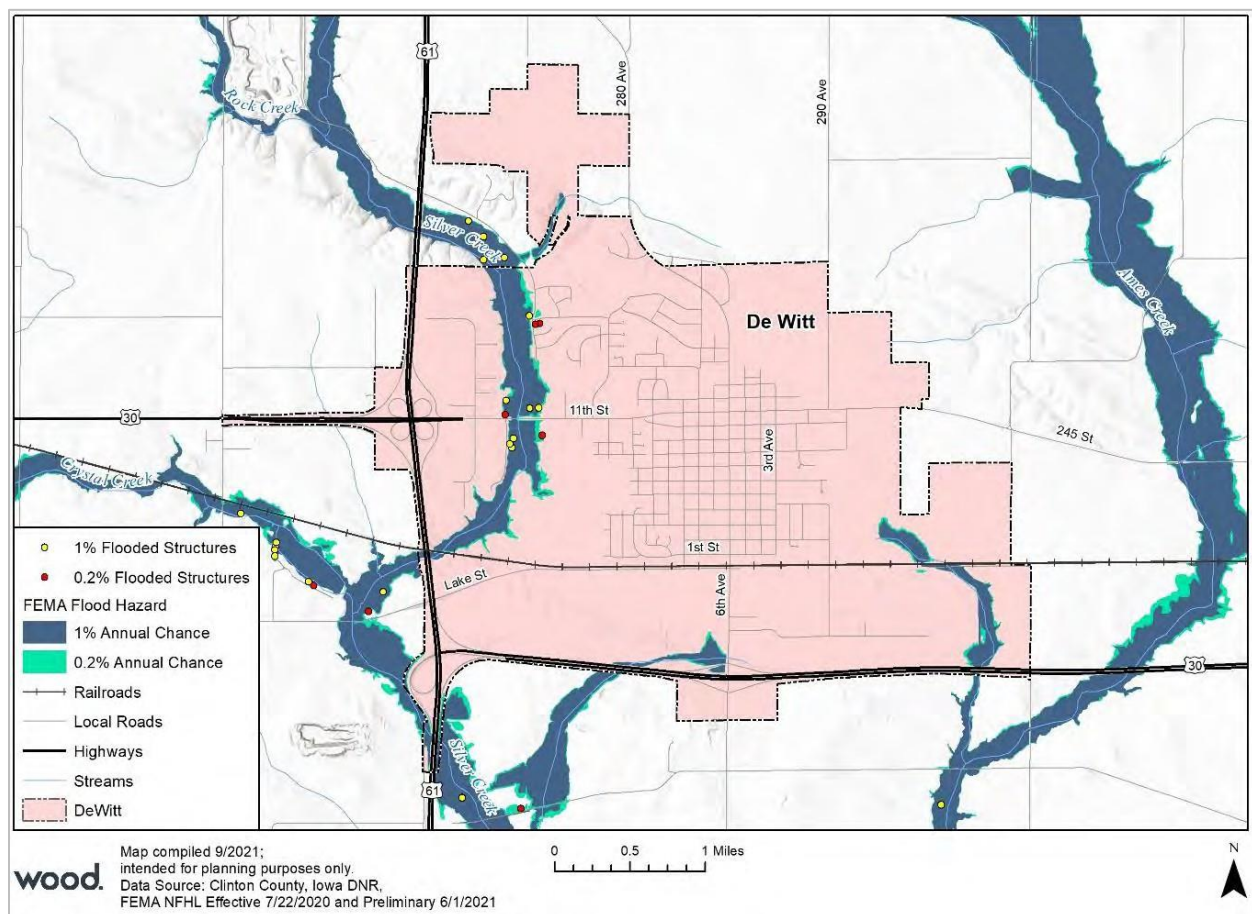


Figure 5-8. Map of City of DeWitt FEMA Flood Hazard Areas
Source: 2022 Clinton County Hazard Mitigation Plan

Fixed Hazardous Materials Incident

A hazardous substance is one that may cause damage to persons, property, or the environment when released to soil, water, or air. A fixed hazardous materials incident is the accidental release of chemical substances or mixtures during production or handling at a fixed facility.

According to the Iowa DNR, as of 2020, there were 36 sites in Clinton County that because of the volume or toxicity of the materials on site were designated as Tier II Facilities under the Superfund Amendments and Reauthorization Act. There are also 38 sites that reported materials that are Extremely Hazardous Substances (EHS). Table 5.2 provides the number of Tier II and EHS Facilities for each jurisdiction in the planning area. Figure 5-9 is a map of Tier II and EHS Facilities in Clinton County.

Table 5.2. Number of Tier II and EHS Facilities by Jurisdiction in Clinton County, 2020

Jurisdiction	# of Tier II Facilities	# of EHS Facilities
Calamus	1	1
Camanche	5	4
Clinton	17	18
DeWitt	8	6
Low Moor	-	2
Unincorporated	5	7
Grand Total	36	38

Source: 2022 Clinton County Hazard Mitigation Plan

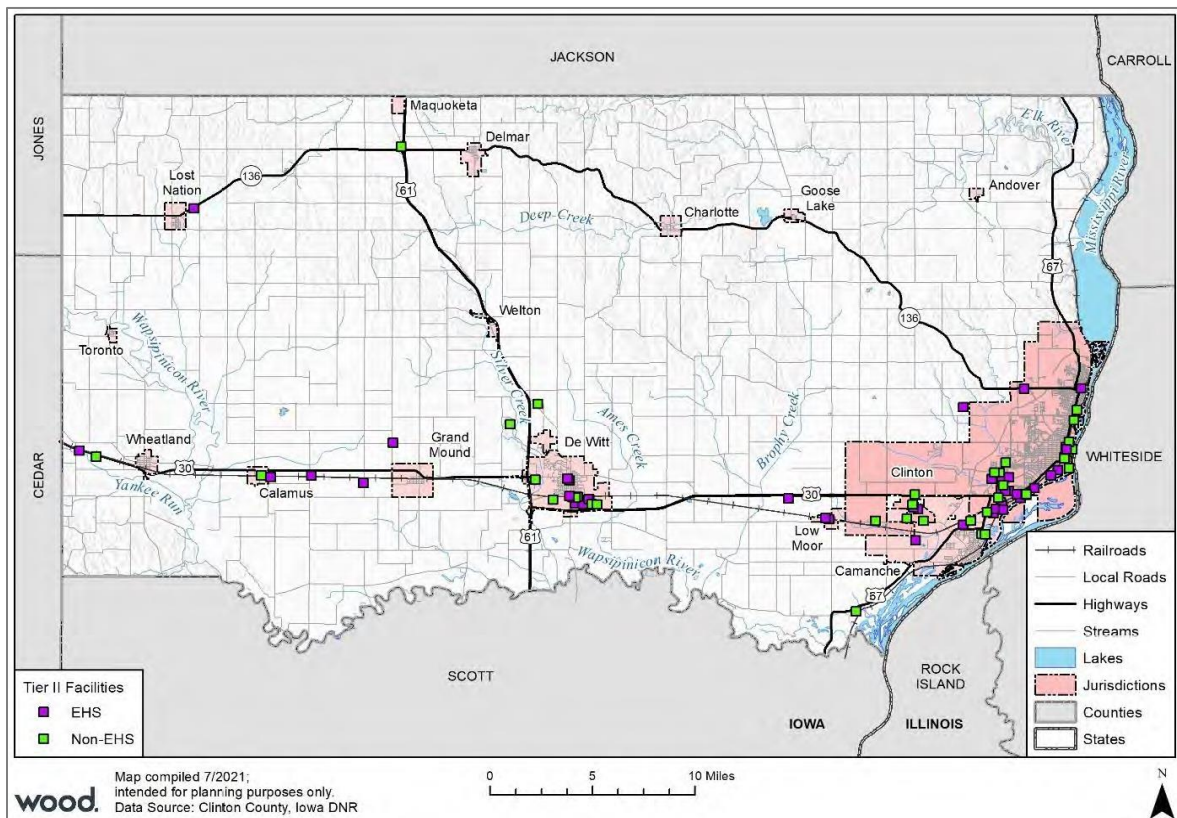


Figure 5.9. Map of Tier II and EHS Facilities in Clinton County

Source: 2022 Clinton County Hazard Mitigation Plan

Hazard Analysis Summary

Proposed mitigation actions were prioritized based on a hazard scoring system that considers four elements of risk: probability, magnitude/severity, warning time, and duration. Based on the hazard's overall weighted score, the hazards are categorized as follows: High (3.0-4.0), Moderate (2.0-2.9), and Low (1.0-1.9).

Table 5-3 provides a summary of the hazard rankings for the City of DeWitt and unincorporated Clinton County. (Note: hazards are listed in alphabetical order.) The seven hazards ranking as High for the City of DeWitt are: Cyber Attack, Hazardous Material Incident, Human Disease, Infrastructure Failure, Severe Winter Storm, Tornado/Windstorm, and Transportation Incident. The City of DeWitt's hazard mitigation strategy is set forth in the 2022 Clinton County Hazard Mitigation Plan and is incorporated by reference in this comprehensive plan.

Table 5-3. Hazard Ranking for City of DeWitt and Unincorporated Clinton County

Type of Hazard	City of DeWitt	Unincorporated Clinton County
1. Animal/Plant/Crop Disease	M	M
2. Cyber Attack	H	H
3. Dam/Levee Failure	--	L
4. Drought	M	H
5. Earthquake	L	L
6. Expansive Soils	L	L
7. Extreme Heat	M	M
8. Flash Flooding	M	H
9. Grass or Wildland Fire	M	M
10. Hazardous Materials Incident	H	M
11. Human Disease	H	M
12. Infrastructure Failure	H	H
13. Landslide	L	L
14. Radiological Incident	M	M
15. Riverine Flooding	M	M
16. Severe Winter Storm	H	H
17. Sinkholes	L	L
18. Terrorism	M	M
19. Thunderstorm/Lightning/Hail	M	M
20. Tornado/Windstorm	H	H
21. Transportation Incident	H	H

Source: 2022 Clinton County Hazard Mitigation Plan

NATURAL ENVIRONMENT RECOMMENDATIONS

Recommendations be added later