
NATURAL RESOURCES

7.0 Introduction

Natural resources, including soils, topography, surface water resources, and other natural features, have a profound effect on a community's development. These physical features directly or indirectly constrain or encourage growth; for example, soil types often affect the ability of a community to provide high quality water and wastewater services. The natural resources that occur in certain areas are often a primary factor in the establishment and growth (or decline) of communities.

Natural resources are often interrelated, and a disturbance in one area can potentially affect other areas. From a planning standpoint, it is important to understand these interrelationships, and the role that natural resources play in determining a community's future development. The following element profile describes the natural resource characteristics found within the Galena area.

7.1 Topography

The City of Galena's topography is primarily the result of water erosion of the underlying bedrock. This erosion is evident in Galena as it lies in the "driftless" region. The driftless region was bypassed by the most recent advancement of glaciers. The region has been slowly eroded over 10 million years, and as such, exhibits a very rugged topography. The driftless region contains parts of northwestern Illinois, southwestern Wisconsin, northeastern Iowa, and southeastern Minnesota. The topography of Galena ranges from 600 feet above sea level along the Galena River to 900 feet in elevation near the Galena High School on the northern edge of the community. *Source: Comprehensive Plan of Galena, Illinois. 1991.*

Map #6 outlines the topography within the City and its planning area, and identifies those areas that are classified as having slopes in excess of 10 percent. The majority of the City and planning area have slopes in excess of 10 percent. The flattest areas are found along the Galena River and surrounding stream/river bottoms. Within the City's planning area, additional flat areas under 10 percent slope are found west and northwest of the City.

While steep slopes can provide attractive views and recreational opportunities, various types of land use and building development can be adversely impacted. Because of terrain issues in the Galena area, growth and development into outlying areas may require the construction of additional lift stations and pressure districts, increase the cost for developed lots, and possibly require erosion control measures.

7.2 Wetlands

Wetlands are defined as those areas between terrestrial and aquatic systems where the water table is at, near, or above the land surface for a significant part of most years, and include marshes, mudflats, wooded swamps, and wet meadows. The presence of

wetlands in an area can limit the type of development that can occur. Developments in wetland areas are regulated by the Illinois Department of Natural Resources and in some cases U.S. Army Corps of Engineer.

Wetlands exist along the Galena River throughout the City and its planning area, as shown in Map #6. These wetlands grow in size and frequency as the Galena River approaches the junction with the Mississippi River to the southwest of the City.

7.3 Flood Hazard Areas

The Galena River is highly susceptible to flooding by both storm water and snow melt. Galena's location only 4 miles upstream from the Mississippi River makes it accessible to backwater flooding from the Mississippi River. In addition, flash flooding and stormwater flooding from the Galena River watershed are common. *Source: Comprehensive Plan of Galena, Illinois. 1991.*

The 100-year floodplain of the Galena River encompasses a large area of undevelopable land, cutting the community in half. A large portion of this land contains the dike which is controlled and regulated by the Army Corps of Engineers. Other areas within the floodplain, located south of the City to the Mississippi River, exist as natural areas (see Map #6).

A 100-year flood hazard area is defined as an area in which there is a one percent chance of a flood occurring in any given year, while the 500-year flood hazard area has a 0.2 percent chance of a flood occurring in any given year. Due to the potential for property damage and health and safety risks, there are restrictions on development within designated flood hazard areas.

7.4 Surface Water Resources

The only surface water body in the City of Galena is the Galena River (Map #6). This river was once 275 feet wide during the riverboat era of the 1850's. Today, the river is approximately 30-40 feet wide and ranges in depth from 1-6 feet. Galena is approximately 4 miles upstream from the Mississippi River.

The reduction in size of the Galena River is primarily the result of two factors. The first factor was the construction of Lock and Dam #12 at Bellevue along the Mississippi River. The dam raised the water level on the Mississippi River reducing the slope and energy of the Galena River. Over time the raised water elevation prevented the Galena River from cleaning itself of eroded soil deposits and eventually silted in. The second factor was poor farming practices during the last century allowing heavy erosion to occur and be deposited in the Galena River.

Today, the Galena River is classified by the Army Corps of Engineers as "Historically Navigable" to the Highway 20 bridge. It would require considerable dredging and widening to permit any commercial reuse.

The entire City of Galena lies within the Galena River watershed which is further divided into sub watersheds. The north fork and the south fork are the two primary watersheds contributing to the Galena River.

Surface water resources, such as the Galena and Mississippi River, play an important economic role for communities. Recreational opportunities, including swimming, boating, and fishing attract tourists from outside the region. Recreational opportunities are successful because of the high water quality. Protection is necessary to maintain that high quality. Any growth and development along the Galena River, its tributaries and watershed should take into account the impact on the natural systems, and address potential pollution problems through natural resource management practices such as shore land buffers and environmental corridor protection. Additional management practices should also be designed to control storm water runoff rates and discharge quality to help protect these water resources.

Source: Comprehensive Plan of Galena, Illinois. 1991.

7.5 Soils

To better guide development and land use within the City of Galena it is important to know and understand soil properties and their limitations. Soil properties affecting potential land use decisions include depth to bedrock, slope, drainage/permeability, shrink-swell potential, and flooding. Soil characteristics can vary widely across a given area, but generalizations can be made based a soil series or association. A soil series has profiles that are almost alike, while a general soil association is made up of two or more geographically associated soils.

Soil data has been collected by the Natural Resource Conservation Service (NRCS) and compiled into the Jo Daviess Soil Survey, as shown in Map #7. From the soil survey, four dominant soil associations were identified within the City and its planning area. The soil associations found include the Fayette-Palsgorve-Rozzetta, Dubuque-Lacrescent-Dunbarton, Rozetta-Eleroy-Derinda, and Wakeland-Dorchester-Birds. The NRCS defines these soil associations as follows:

Fayette-Palsgorve-Rozzetta: Deep, gently sloping to very steep, well drained and moderately well drained silty soils. The sloping soils in this association are well suited to poorly suited on-site sanitary facilities. Major limitations include a high water table, restricted permeability, shrink-swell potential, and excessive slope. In some areas wetness and the depth to bedrock are limitations for dwellings with basements.

Dubuque-Lacrescent-Dunbarton: Shallow to deep, sloping to very steep, well drained, silty soils. Most areas of this association are used for crops or hay. Erosion is a major hazard on steep slopes. The sloping to very steep slopes are generally poorly suited for on-site septic facilities, and dwellings with or without basements. Depth to bedrock, poor filtering capacity, slope, and shrink-swell potential are the major limitations.

Rozetta-Eleroy-Derinda: Deep and moderately deep, gently sloping to very steep, moderately well drained, silty soils. The sloping to very steep slopes are generally poorly suited for on-site septic facilities, and dwellings with basements. Depth to bedrock, poor filtering capacity, slope, and shrink-swell potential are the major limitations.

Wakeland-Dorchester-Birds: Deep, nearly level, moderately well drained to poorly drained, silty soils. Due to seasonal high water table and flood hazards this soil association is generally unsuited to on-site septic facilities and dwellings.

Restrictive features for a given soil property identified above are rated slight, moderate, or severe. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easy to overcome; *moderate* limitations if soil properties or site features are not favorable for the indicated use and a special planning or design is needed to overcome the limitation; and *severe* limitations if soil properties or site features are so unfavorable or difficult to overcome that special design and significant construction costs are required.

The building site development and sanitary facility limitations for each soil type found in the City of Galena are detailed in Table 7-1. Severe limitations for dwellings with basements and septic tank absorption fields are graphically depicted on map #8. For septic tank absorption fields, soil properties are evaluated for absorption of the effluent in addition to the construction of the system. Septic system suitability ratings for the area are generally listed as severe throughout the City.

For construction of dwellings with basements, soils are rated for dwellings less than three stories in height built on shallow foundations on undisturbed soil. Soil suitability ratings for dwellings are determined by several factors, including a high water table, flooding, and/or shrink-swell potential.

**Table 7-1
Building Site Development and Sanitary Facility Limitations in the Galena Area by
Soil Types**

Soil Type	Dwelling without Basements	Dwellings with Basements	Small Commercial Buildings	Local Roads and Streets	Septic Suitability
1334	Severe	Severe	Severe	Severe	Severe
175B	Slight	Moderate	Moderate	Slight	Severe
175D2	Moderate	Severe	Moderate	Moderate	Severe
261	Severe	Severe	Severe	Severe	Severe
274B2	Slight	Slight	Severe	Slight	Moderate
274C2	Slight	Moderate	Severe	Slight	Severe
274D2	Moderate	Severe	Severe	Moderate	Severe
274E2	Severe	Severe	Severe	Severe	Severe
274F	Severe	Severe	Severe	Severe	Severe
279B	Moderate	Moderate	Severe	Slight	Moderate
279C2	Moderate	Moderate	Severe	Slight	Severe
279D2	Moderate	Severe	Severe	Moderate	Severe
280B2	Moderate	Moderate	Severe	Slight	Moderate
280C2	Moderate	Moderate	Severe	Slight	Severe
280D2	Moderate	Severe	Severe	Moderate	Severe
280E2	Severe	Severe	Severe	Severe	Severe
280F	Severe	Severe	Severe	Severe	Severe
29C2	Severe	Moderate	Severe	Moderate	Severe
29D2	Severe	Severe	Severe	Moderate	Severe
3077	Severe	Severe	Severe	Moderate	Severe
3333	Severe	Severe	Severe	Severe	Severe
3451	Severe	Severe	Severe	Severe	Severe
3579	Severe	Severe	Severe	Severe	Severe
36B	Moderate	Moderate	Severe	Slight	Moderate
36C	Moderate	Moderate	Severe	Slight	Severe
386B	Moderate	Moderate	Severe	Slight	Moderate
386C2	Moderate	Moderate	Severe	Slight	Severe
403D	Severe	Severe	Severe	Severe	Severe
417D2	Moderate	Severe	Severe	Moderate	Severe
417E2	Severe	Severe	Severe	Severe	Severe
417F	Severe	Severe	Severe	Severe	Severe
41B	Severe	Moderate	Severe	Slight	Severe
429B2	Moderate	Moderate	Severe	Slight	Moderate
429C2	Moderate	Moderate	Severe	Slight	Severe
429D2	Moderate	Severe	Severe	Moderate	Severe
429E2	Severe	Severe	Severe	Severe	Severe
53D	Moderate	Severe	Moderate	Moderate	Severe
547C2	Moderate	Moderate	Severe	Slight	Severe

Soil Type	Dwelling Without Basements	Dwellings With Basements	Small Commercial Buildings	Local Roads and Streets	Septic Suitability
547D2	Moderate	Severe	Severe	Moderate	Severe
547E2	Severe	Severe	Severe	Severe	Severe
565C2	Slight	Moderate	Severe	Slight	Severe
569C2	Severe	Severe	Severe	Slight	Severe
569F2	Severe	Severe	Severe	Severe	Severe
576	Severe	Severe	Severe	Moderate	Severe
61B	Severe	Severe	Severe	Moderate	Severe
681E	Severe	Severe	Severe	Severe	Severe
731C2	Moderate	Moderate	Severe	Slight	Severe
731D2	Moderate	Severe	Severe	Moderate	Severe
755F2	Severe	Severe	Severe	Severe	Severe
779F	Severe	Severe	Severe	Severe	Severe
785F	Severe	Severe	Severe	Severe	Severe
785G	Severe	Severe	Severe	Severe	Severe
801B	Moderate	Moderate	Moderate	Slight	Moderate
8239	Severe	Severe	Severe	Moderate	Severe
8284	Severe	Severe	Severe	Moderate	Severe
8415	Severe	Severe	Severe	Moderate	Severe
873D2	Severe	Severe	Severe	Severe_Moderate	Severe
873E2	Severe	Severe	Severe	Severe	Severe
88B	Slight	Moderate	Slight	Moderate	Severe

Source: United States Department of Agriculture, Soil Conservation Service

7.7 Agricultural Lands

Land in agricultural production is found throughout the Galena area (Plan Area Land Use Map, Map #9), with the majority of this land located within the northern half of the City’s planning area. Because of area topography and soil limitations agricultural lands falling under the NRCS prime farmland designation are concentrated along the Galena River bottom, and the northwest portion of the planning area (Map #10).

Only a few areas of isolated agricultural land exist within the City limits. These are located in the far north and northeast portions of the City.

7.8 Woodlands

The Galena area contains scattered areas of woodlands (Map #9). At present, there is not much logging activity occurring within the planning area. Most of the area’s woodlands are found in the surrounding towns on privately owned parcels of land. The majority of these parcels are a mix of wooded and agricultural/open areas. Typically, the woodland portions of these parcels are located in areas not well suited for agricultural production, including wetlands, areas along rivers/creeks, and hilly topography.

7.9 Mineral Resources

The Galena area has available sources of construction aggregates, road stone, concrete aggregates, and agricultural limestone. These sources come from the Galena and Platteville groups, which range approximately 350 feet in thickness and also serve as an important groundwater reservoir for the region. *Source: Comprehensive Plan of Galena, Illinois. 1991.*

Currently, three quarries are identified within the planning area. The largest is located just southwest of the City corporate limits. The remaining two are located along West Stagecoach Trail, on the far east side of the planning area.

7.10 Bedrock

The depth to bedrock is an important issue to discuss as it can limit the possibilities for development. The depth to bedrock is shown in Map #11.

The depth to bedrock is a specific concern in the City of Galena as it can make service extension expensive. The extension of services, particularly sewer and water service, is extremely difficult if bedrock lies near the surface. Extending services can require blasting through this rock.

Areas in Galena that have deeper bedrock lie primarily to the northwest of the City, in the area of the City's industrial park. While there are other areas close to the City that have moderate constraints on shallow excavations, they are generally only accessible after having crossed a ridge line or a deep gully. These natural features are very difficult to deal with when placing utilities in the ground, thereby increasing the cost of developing the land beyond them.

7.11 Issues, Opportunities, and Constraints

- The northeast portion of the City of Galena lies atop very shallow bedrock. This depth is a concern for construction of structures, extension of services, and storm water runoff.
- The City of Galena is located on soils that do not hold storm water runoff. This contributes to flooding problems.
- The eastern entrance into the City along Highway 20 has some conservation easements.
- The far eastern extent of the current Highway 20 is not within City limits, but is within its extra territorial area.
- The City and County should coordinate efforts to preserve the eastern entrance into the City of Galena.
- The eastern entrance to the City of Galena is experiencing pressure from landowners who wish to sell their land for development.
- The City of Galena wishes to preserve the eastern entrance into the community as a natural view shed, agricultural area, and wilderness.
- The northwestern entrance into the City is developing and will continue to develop as the Highway 20 bypass is completed.
- Design controls should be enacted for the entranceways to the City.
- The City of Galena should consider the purchase of the right of first refusal for properties in and around the northwestern end of the future Highway 20 Galena Bypass area. This will allow the City to control how the land develops, while at the same time not requiring it to annex all of the property.
- The City should distinguish between areas labeled as “Parks” and areas labeled as “Recreation Areas”.
- The percent of land covered with impervious surfaces is a concern to the City of Galena, particularly because of the storm water runoff issues.
- Currently, the maximum coverage of impervious surface is 50%.