

CHAPTER 7  
Natural, Cultural, and Agricultural Resources

Town of Rockland residents identified “Maintaining the rural/country feel of the Town as it develops” as the top ranked issue of the Town’s Community Survey. Large tracts of agricultural lands, the Niagara Escarpment, Fox River, wetlands, woodlands, and East River floodway all help to create the rural/country feel of the Town that its residents wish to maintain. As development pressures increase in the Town, it will be necessary for Rockland to identify and work to preserve those features of the Town that keep long-time residents in Rockland and bring new residents to Rockland. This chapter will examine ways to build upon these resources to establish and promote community identity, while at the same time preserving the land and the rural way of life the residents enjoy.

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Soils

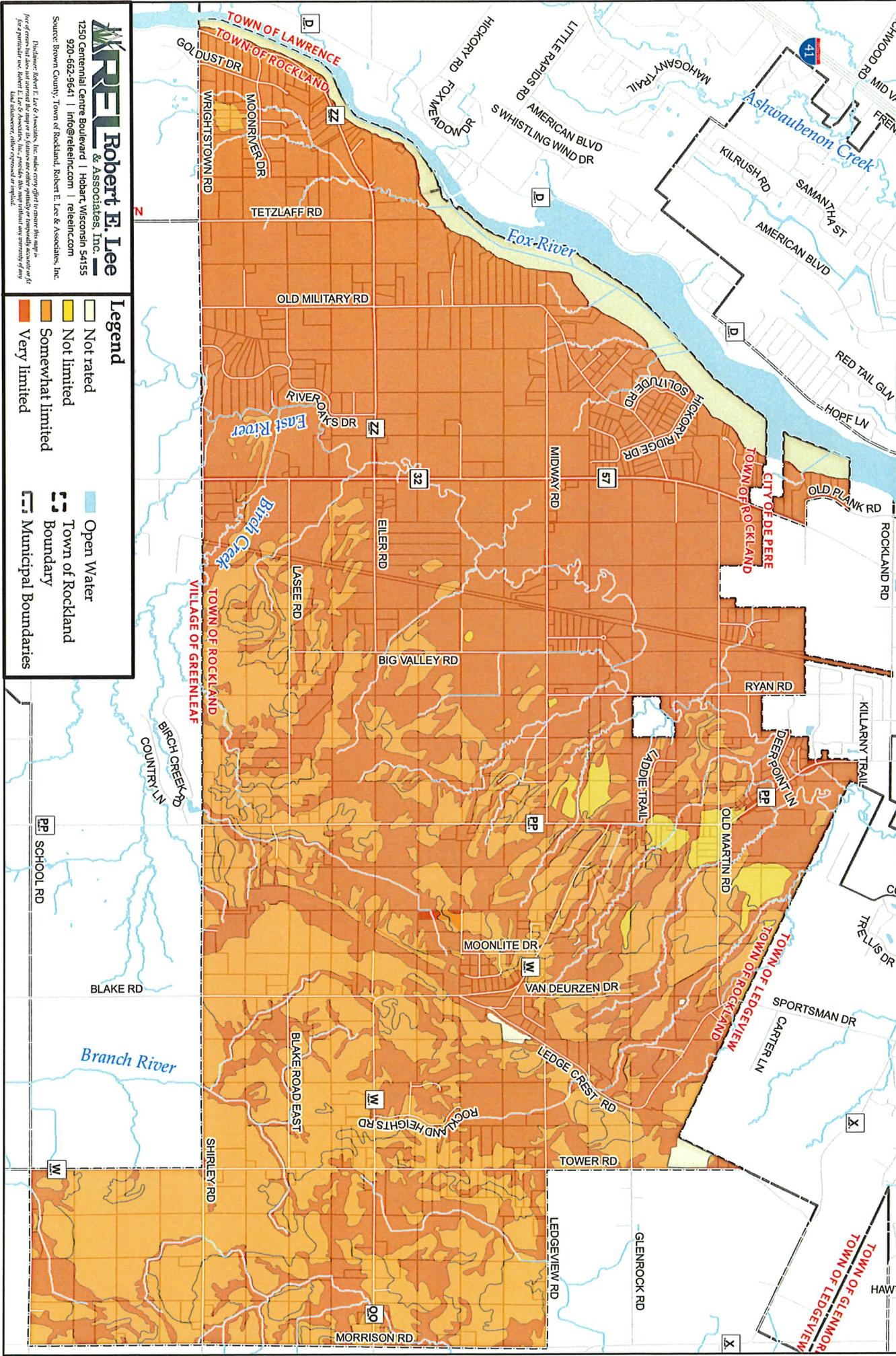
Soil is one of the major building blocks of the environment. It is the interface between what lies above the ground and what lies underneath. The relationship between soil and agriculture is obvious. However, the relationships between soil and other land uses, while almost as important, are often less apparent. In Brown County as elsewhere in North America, little attention is given to soils in regard to the location and type of future development. Among the reasons for this is the complacency by many that modern engineering technology can overcome any problems associated with soils. While this is true, the financial and environmental costs associated with overcoming soil limitations can often be prohibitive.



Soils in the Town of Rockland include Oshkosh, Kewaunee, Allendale, Manawa, and Bellevue silt loams, silty clay loams, and fine sandy loams. These soils range from being somewhat poorly drained to well-drained on lacustrine and glacial plains, on complex slopes, in floodplains, and along drainageways. Erosion, wetness, and flooding are the main hazards with these soils. However, the soils are generally well suited to the crops commonly grown in Brown County. Slopes are generally 0 to 6 percent with areas along the Niagara Escarpment and Fox River reaching 30 percent slopes. With regard to residential development, soil types should be reviewed when identifying potential sites for new homes. Figure 7-1 identifies soil limitations for dwellings with basements. These areas are typically located in very wet areas, along stream corridors, are with very shallow bedrock, and where there are very steep slopes. Although a certain area may be identified on the map as having slight or severe limitations, it is important to note that each potential building site is unique and may or may not have limitations on a specific site.



**Figure 7-1**  
**Soil Limitations for Dwellings with Basements**  
 Town of Rockland, Brown County, Wisconsin



**Legend**

- Not rated
- Not limited
- Somewhat limited
- Very limited
- Open Water
- Town of Rockland Boundary
- Municipal Boundaries

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This figure is a map of soil limitations for dwellings with basements. It is not intended to be used for any other purpose. The information is provided for informational purposes only. The information is not intended to be used for any other purpose. The information is provided for informational purposes only.

Figure 7-1: Soil Limitations for Dwellings with Basements

**Productive Agricultural Lands**

The 2019 Brown County Farmland Preservation Plan identifies Brown County’s farmlands as irreplaceable resources that are necessary to the continued well-being of the Town of Rockland’s and the county’s economy. The plan further states that the protection of these farmlands and orderly rural and urban growth are deemed to be in the broad public interest.

Based on the 2025 Rockland land use inventory update, the Town of Rockland has approximately 8,316 acres of land devoted to agriculture. This equates to approximately 60.7% percent of the total land area of the Town. There has been a 290-acre decrease in agricultural lands within the Town since 2014 due to the conversion of agricultural lands to rural residential use and annexation of agricultural lands to the City of De Pere. The town’s productive agricultural lands are located outside of existing stream corridors, wetlands, and the escarpment face. Rockland’s existing productive agricultural lands are summarized in Figure 7-2.

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As stated in the Economic Development chapter, agriculture is a major component of the economy of the Town and County. Agriculture also provides many of the residents of the Town with a large portion of the rural character that they wish to preserve. Since agriculture is such a large part of the economy and character of Rockland, the Town should encourage those agricultural producers who wish to continue farming by minimizing the impacts of residential development on active farming operations and informing new residents of Rockland that farms and their associated sights, sounds, and smells are active in the Town.

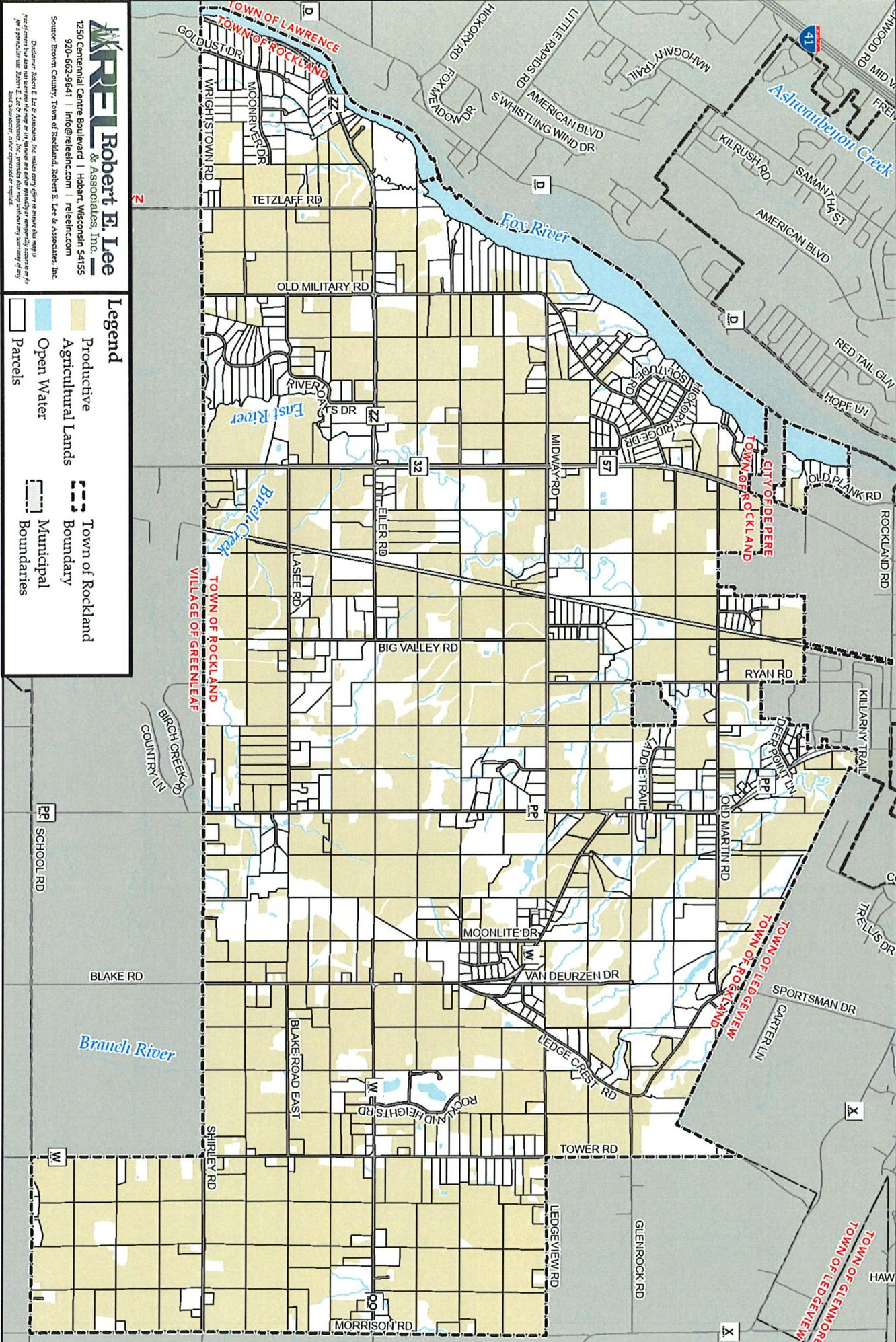
**Existing Regulations and Laws Affecting Livestock Facilities**

Because of the changing farm climate, municipalities in Brown County are seeing the creation of more large dairy farms. Many communities are thinking about enacting local requirements to regulate this type of farm operation. Before a community determines a need to enact local regulations to regulate large animal farms, it is important for a municipality to have knowledge of and understand the existing county and state regulations presently in place that regulates this type of farm.

Figure 7-2: Productive Agricultural Lands



# Figure 7-2 Productive Agricultural Lands Town of Rockland, Brown County, Wisconsin



**Legend**

- Productive Agricultural Lands
- Open Water
- Parcels
- Town of Rockland Boundary
- Municipal Boundaries

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September 2025

Brown County administers an Animal Waste Management Ordinance. This ordinance regulates the installation and design of animal waste storage facilities and animal feedlots so as to protect the health and safety of residents and the environment. Permits must be received from Brown County for animal feedlots that exceed 500 animal units, for construction of any animal waste storage facility, or for any animal feedlot that has received a notice of discharge under Wisconsin statutes. Animal waste facility and animal feedlot plans need to provide provisions for adequate drainage and control of runoff to prevent pollution of surface water and groundwater. Permits for the above mentioned uses require separation and setbacks from adjacent properties, from lakes and streams, and vertical separation from groundwater. The ordinance prohibits overflow of manure storage facilities, unconfined manure stacking adjacent to water bodies, direct runoff to water bodies, and prohibits unlimited livestock access to waters of the state where high concentrations of animals prevent adequate sod cover maintenance.

The State of Wisconsin through the Wisconsin Department of Natural Resources (DNR) regulates manure management for all farms that have 1,000 or more animal units. A concentrated animal feeding operations (CAFO) permit must be received from the DNR for farms exceeding 1,000 animal units. Once the permit is issued, the farm operators must comply with the terms of the permit by following approved construction specifications and manure spreading plans, conducting a monitoring and inspection program, and providing annual reports. The purpose of the implementation of the permit requirements is to ensure that no discharge of pollutants to navigable waters or groundwater occurs. Operators must also submit an application for permit renewal every five years and notify the DNR of any proposed construction or management changes.

The State of Wisconsin enacted the Livestock Facility Siting Law (93.90 Wis. Stats.) and administrative rule (ATCP 51) to establish state standards and procedures local governments must use if they choose to require conditional use or other permits for siting new and expanded livestock operations. The statute limits the exclusion of livestock facilities from agricultural zoning districts. ATCP 51 is administered by the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) and identifies best management practices and siting criteria for the siting of livestock facilities that exceed 500 animal units or exceed a conditional use permit level set by the local unit of government prior to July 19, 2003, within areas zoned agricultural. In order for local units of government to regulate the siting of livestock operations within agricultural zones, the local unit of government is required to adopt the state standards in ATCP 51. Any application for a new livestock operation or expansion of an existing facility must be approved if the site meets the state standards. The local unit of government may deny a permit only if the site is located in a zoning district that is not zoned agricultural. Furthermore, a local unit of government may only apply more stringent requirements than state standards if it bases the requirements on scientific findings that show a more stringent requirement is needed to protect public health and safety. To date, Rockland has not adopted the state Livestock Siting Standards due to the local administrative oversight required, and permits already required through the Brown County Land and Water Conservation Department and Wisconsin Department of Natural Resources.

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## Surface Water

Within the State of Wisconsin, waterways are generally governed as a component of the State's Public Trust Doctrine, as described in Article IX Section 1 of the Wisconsin Constitution and interpreted over time by Wisconsin courts and the state Attorney General's office. According to the Wisconsin Department of Natural Resources (WDNR), the public trust doctrine declares that all navigable waters are "common highways and forever free", and are held in trust by the WDNR for the public<sup>8</sup>. As a result of subsequent citizen action and court decisions, the public interest, once primarily interpreted to protect public rights to transportation on navigable waters, has been broadened to include protected public rights to water quality and quantity, recreational activities, and scenic beauty<sup>9</sup>.

Wisconsin's Public Trust Doctrine requires the state to intervene to protect public rights in the commercial or recreational use of navigable waters. The WDNR, as the state agent charged with this responsibility, can do so through permitting requirements for water projects, through court action to stop nuisances in navigable waters, and through statutes authorizing local zoning ordinances that limit development along navigable waterways.<sup>10</sup> The court has ruled WDNR staff, when they review projects that could impact Wisconsin lakes and rivers, must consider the cumulative impacts of individual projects in their decisions. In the 1966 Wisconsin Supreme Court Case, *Hixon V. PSC*, the justices wrote in their opinion the following: "A little fill here and there may seem to be nothing to become excited about. But one fill, though comparatively inconsequential, may lead to another, and another, and before long a great body may be eaten away until it may no longer exist. Our navigable waters are a precious natural heritage, once gone, they disappear forever."<sup>11</sup>

Surface water is one of the most important natural resources available in a community. Lakes, rivers, and streams offer enjoyment, peace, and solitude. Surface waters provide recreational and tourism opportunities to anglers, boaters, hunters, water skiers, swimmers, sailors, and casual observers alike. Surface waters provide an end source for drainage after heavy rains, provide habitat for countless plants, fish, and animals, are a source of drinking water for many communities, and are a source of process water for industry and agriculture. Lands immediately adjacent to such waters have an abundance of cultural and archeological significance because they were often the location of Native American and early European settlements. For all these reasons and more, surface waters are typically the most important natural resource a community contains.

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Because of this importance, numerous federal, state, and local laws and regulations have been created to protect surface waters. They range from the commerce clause of the United States Constitution to county floodland zoning regulations. The most heavily regulated waters are those that are determined to be natural and "navigable."

Figure 7-3 identifies the surface water resources within the Town of Rockland. Drainage within the Town consists of the Fox and East Rivers, along with their associated tributaries.

<sup>8</sup> <http://dnr.wi.gov/waterways/shoreland/doctrine.htm>

<sup>9</sup> Quick, John. 1994. *The Public Trust Doctrine in Wisconsin*. *Wisconsin Environmental Law Journal*, Vol. 1, No. 1.

<sup>10</sup> <http://dnr.wi.gov/waterways/shoreland/doctrine.htm>

<sup>11</sup> Quick, John. 1994. *The Public Trust Doctrine in Wisconsin*. *Wisconsin Environmental Law Journal*, Vol. 1, No. 1.

There are other smaller, intermittent streams in the eastern part of the Town tributary to either the Branch River or Bower Creek. Many of the streams are dry in the summer, and stormwater runoff provides the basis for much of the water within the streams. Since much of the base flow is from stormwater runoff, the streams tend to be muddy due to erosion of the banks of the streams, and bottom materials of the streams are generally composed of muck or silt.

The protection and preservation of the Town's surface waters should be one of its highest natural resources priorities. Doing so will help establish these waters as a benefit of and attraction to the community and will address many of the objectives of this plan and many of the important issues raised by the public during the visioning process.

### Fox River

The Fox River is the largest river in northeastern Wisconsin. It is a navigable river that extends 155 miles from its headwaters in southern Green Lake County in east-central Wisconsin to the Bay of Green Bay. Its basin drains over 2,700 square miles of east-central and northeastern Wisconsin. In Brown County, it extends 19 miles from the Village of Wrightstown, along the western border of the Town of Rockland, to its downstream end at the Bay of Green Bay and drains about 311 square miles, almost half of the County.



The Fox River is historically significant. For centuries Native Americans occupied the banks of the river and used it as a source of food and drinking water, as well as for recreation, transportation, and crop irrigation. The Fox River also served as the route into the interior of the state for European explorers and was the location of many early European settlements. As such, many historical, cultural, and archeological sites are located adjacent to it.

By the 1940s, however, pollution in the river had increased to the point that its fisheries were severely damaged and its scenic and recreational values were lost. As a result of the passage and implementation of the Clean Water Act in the early 1970s and more recently improvements to the management of urban stormwater runoff, the Fox River's water quality has improved substantially, which in turn has resulted in recovering fish populations, increased recreational use, and increased interest in residential development along its shores.

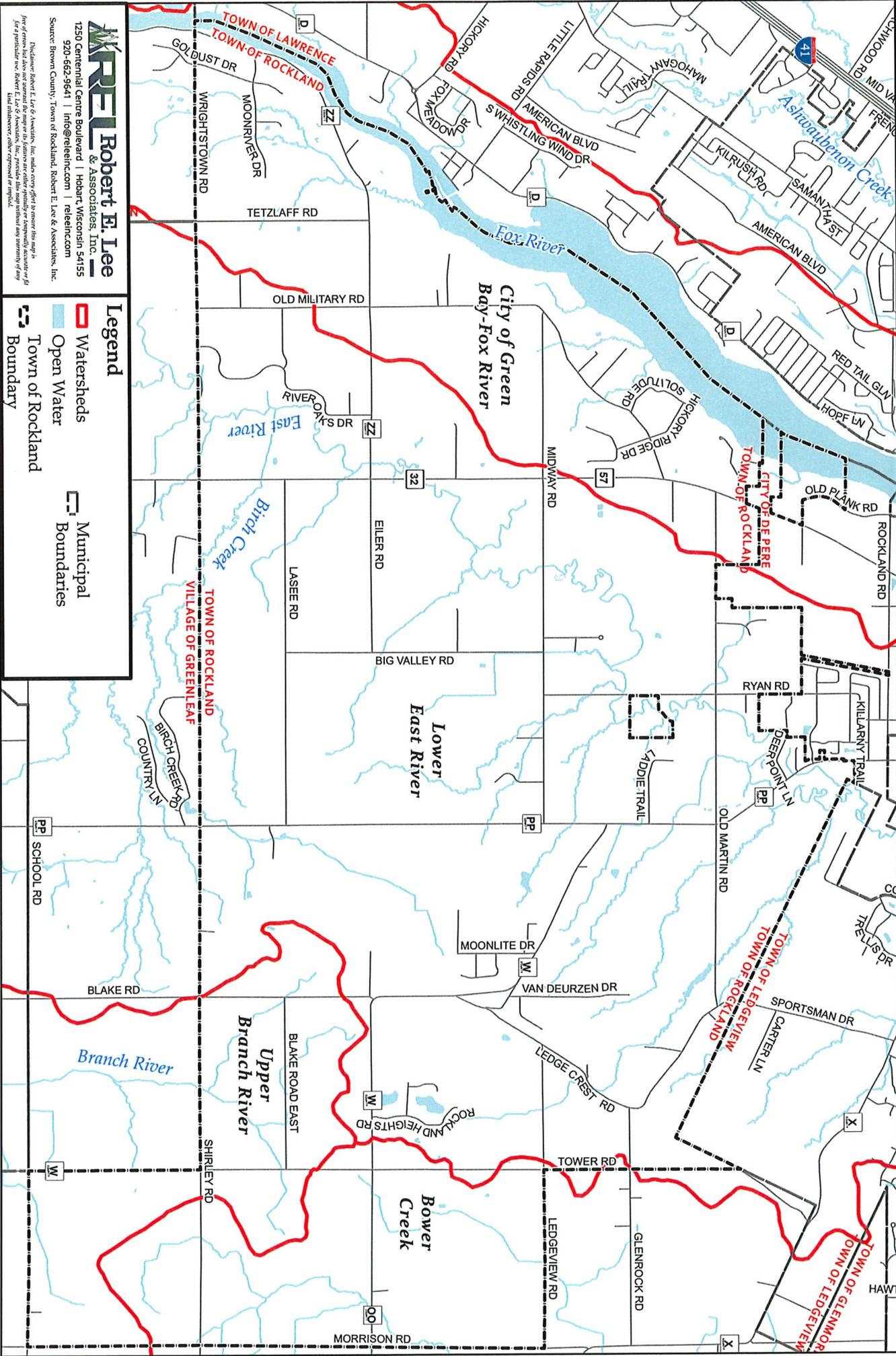
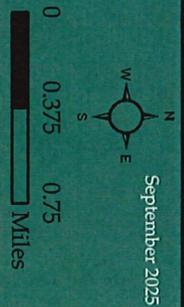
The Lower Fox River PCB cleanup effort began in 2004 and is one of the largest of its kind worldwide. After decades of scientific investigation and years of dredging river sediments and capping activities, all active remedial activities were completed in 2020. Monitoring of sediment caps, fish, and water is ongoing and has shown significant improvement following the remediation.

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# Figure 7-3 Surface Water Features & Watersheds Town of Rockland, Brown County, Wisconsin



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**Legend**

- Watersheds
- Open Water
- Town of Rockland Boundary
- Municipal Boundaries

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Although significant progress has been made in improving the water quality of the Lower Fox River (defined as the length of the Fox River from the Lake Winnebago outlet through the lower Bay of Green Bay), it is listed on the federal "303(d)" impaired waters list due to excessive total phosphorus (TP) and total suspended solids loadings (TSS) from non-point sources. Excessive TP and TSS loadings cause low dissolved oxygen levels, degraded habitat, and poor water quality. According to the U.S. Environmental Protection Agency, non-point source pollutants may include:

- Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas;
- Oil, grease, and toxic chemicals from urban runoff (streets, parking lots, roofs) and energy production;
- Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks;
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems<sup>12</sup>.

On May 18, 2012, the U.S. Environmental Protection Agency approved the Total Maximum Daily Load report (TMDL) for the Lower Fox River. A TMDL is required under the Clean Water Act for all 303(d) impaired waters. According to the TMDL, 63.0 percent of the sources of total phosphorus and 97.6 percent of the total suspended solids within the Lower Fox River Basin are from non-point sources, such as residential yards, streets, parking lots, farm fields, and barnyards. Proper management of Brown County's shoreland zones and environmentally sensitive areas will be a critical component of reducing total phosphorus and total suspended solids to attain the goals identified in the TMDL.

Lower Fox River TMDL restoration goals include<sup>13</sup>:

- *Reduce excess algal growth.* Aesthetic reasons aside, reducing blue-green algae will reduce the risks associated with algal toxins to recreational users of the river and bay. In addition, a decrease in algal cover will also increase light penetration into deeper waters of the bay.
- *Increase water clarity in Lower Green Bay.* Achieving an average Secchi depth measurement of at least 1.14 meters will allow photosynthesis to occur at deeper levels in the bay, as well as improve conditions for recreational activities such as swimming.
- *Increase growth of beneficial submerged aquatic vegetation in Lower Green Bay.* This will help reduce the re-suspension of sediment particles from the bottom of the bay up into the water column, which will increase water clarity.
- *Increase dissolved oxygen levels.* This will better support aquatic life in the tributary streams and main stem of the Lower Fox River.
- *Restore degraded habitat.* This will better support aquatic life.

<sup>12</sup> <http://www.epa.gov/owow/NPS/qa.html>

<sup>13</sup> *Total Maximum Daily Load and Watershed Management Plan for Total Phosphorus and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay*, December 2011. Cadmus Group. Page 3.

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During the early spring snowmelt period or immediately following spring and summer rain storms, the effect of nonpoint sources of pollution becomes very apparent in the Fox River. The water turns dark brown, loaded with suspended solids which carry excess nutrients and other pollutants from a multitude of nonpoint sources. The solids are carried into the lower bay and as the water flow slows, the solids drop out of the water column and are deposited in the lower bay. The photo shows a Fox River sediment plume.



A significant part of Rockland's identity is defined by the Fox River along the western boundary of the Town. Improving the quality of the water of the Fox River through proper shoreland management along the river and tributaries such as the East River will ensure the surface water quality of the bay and river does not degrade, but rather continues to improve. The health of the Fox River, Bay of Green Bay, and other rivers, creeks, and streams tributary to them have a profound impact on the regional economy.

Although much work remains to be done in the area of non-point source pollution, since the advent of the Clean Water Act, the waters of the Fox River have improved to the point where it is now a world-class walleye fishery, hosting anglers from throughout the United States during the spring spawning run. The Bay of Green Bay is now a well-known location for trophy-sized northern pike, muskellunge, and smallmouth bass. According to the Wisconsin Department of Natural Resources, sport fishing provides \$2.3 billion in economic impact per year in the State of Wisconsin<sup>15</sup>. By continuing to improve the water quality of the Fox River, Rockland can capture its share of this economic resource.

#### East River

The East River drains a 74-square-mile watershed and reaches into Calumet and Manitowoc Counties and terminating at its confluence with the Fox River near downtown Green Bay. The East River flows from the southwest to the northeast through the center of the Town of Rockland. The water quality of the East River is considered degraded due to low dissolved oxygen levels and high turbidity related to suspended solids from streambank erosion and agricultural and stormwater runoff.

#### Watersheds

A watershed is an area of land where all of the water on it and under it drains to the same place. Within this area of land, all living things are linked by the common waterway. Four watersheds are located in the Town of Rockland. They are the Fox River Watershed, East River Watershed, Bower Creek Watershed, and the Branch River Watershed.

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<sup>15</sup> Wisconsin Department of Natural Resources: [http://dnr.wi.gov/news/mediakit/mk\\_fish.asp](http://dnr.wi.gov/news/mediakit/mk_fish.asp).

The East River Watershed is the area comprised of the drainage area of all the tributaries to the East River and is the largest watershed in the Town. Only a rather narrow strip of land along the Town's western boundary drains directly to the Fox River Watershed. The Bower Creek Watershed drains a small portion of the eastern part of the Town, while the Branch River Watershed drains the extreme southeastern corner of the Town. The watersheds are depicted on Figure 7-3.

### Floodplains

Floodplains are natural extensions of waterways. All surface waters possess them; although, the size of the floodplain can vary greatly. They store floodwaters, reduce flood peaks and velocities and reduce sedimentation. They also provide habitat and serve as filters for pollution.

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Like surface waters, the importance of floodplains is also recognized and is regulated by federal, state, county, and local government. The State of Wisconsin mandates floodplain zoning for all communities under Wisconsin Administrative Code NR 117. These minimum standards must be implemented in order to meet eligibility requirements for federal flood insurance.

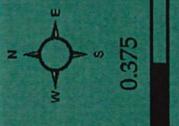
For regulatory, insurance, and planning purposes, the 100-year recurrence interval flood hazard area (also referred to as the regional flood) is most often used. This is the land that has a 1 percent chance of being flooded in any given year. Although all lakes, rivers, streams, and drainageways have floodplains, only major streams and rivers are generally mapped. The only mapped floodplain areas include the East River and a few of its tributaries and the Fox River. The East River floodplain extends broadly on either side of the East River, as a result of the relatively flat topography of the part of Rockland. In addition, flood studies may have been completed by local engineering firms for several waterways and/or landowners as part of development projects or road, bridge, or culvert crossings, so additional floodplain information may be available for portions of streams or small tributaries. The Town's 100-year floodplains are shown in Figure 7-4.

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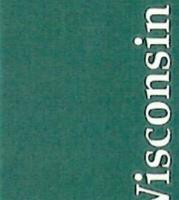
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Figure 7-5 presents a diagram of a floodplain and identifies its constituent parts, including both the floodway and flood fringe.

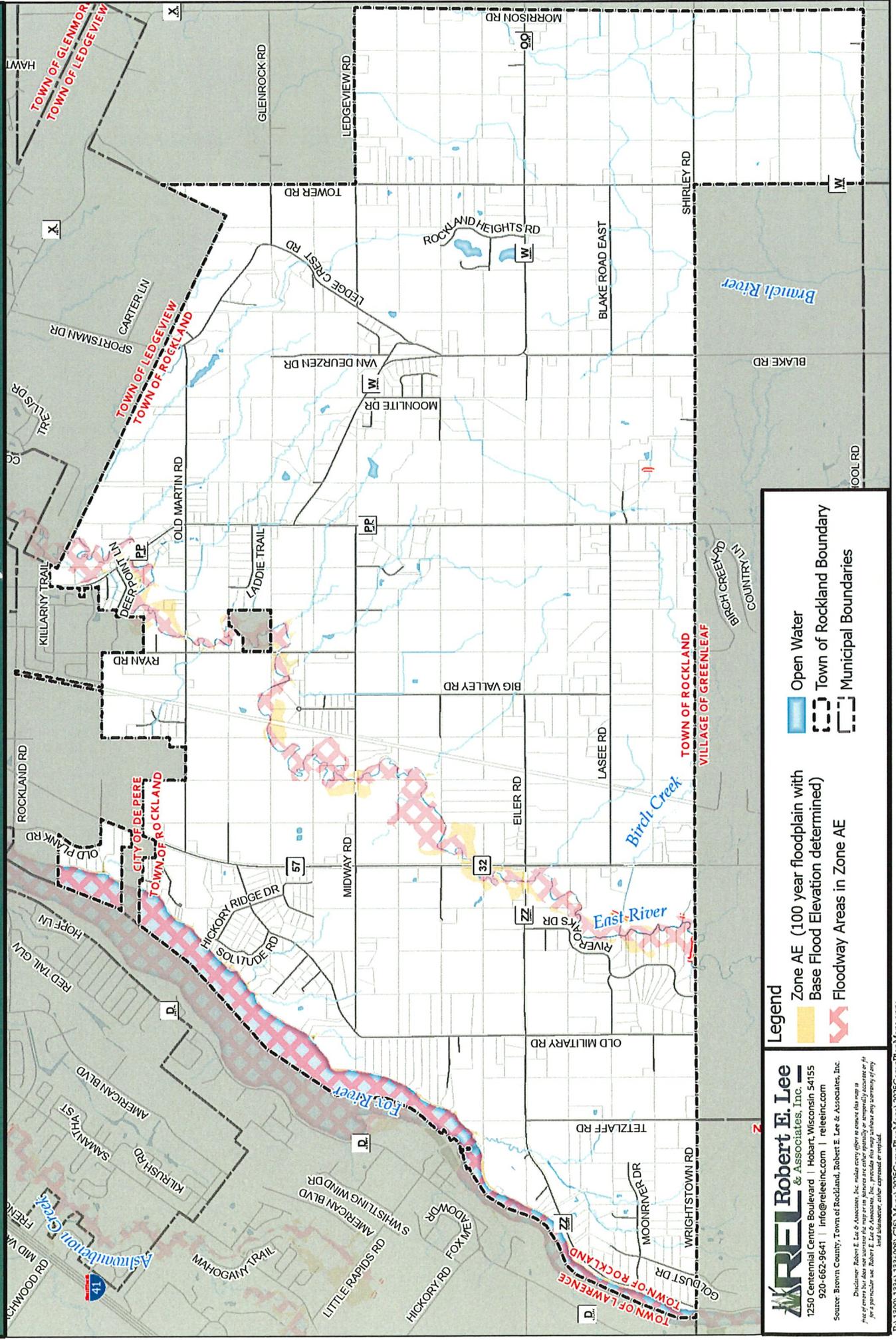
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# Figure 7-4 FEMA Floodplains Town of Rockland, Brown County, Wisconsin



**Town of Rockland**  
 agriculture - community - home



**Legend**

- Open Water
- Zone AE (100 year floodplain with Base Flood Elevation determined)
- Floodway Areas in Zone AE
- Town of Rockland Boundary
- Municipal Boundaries

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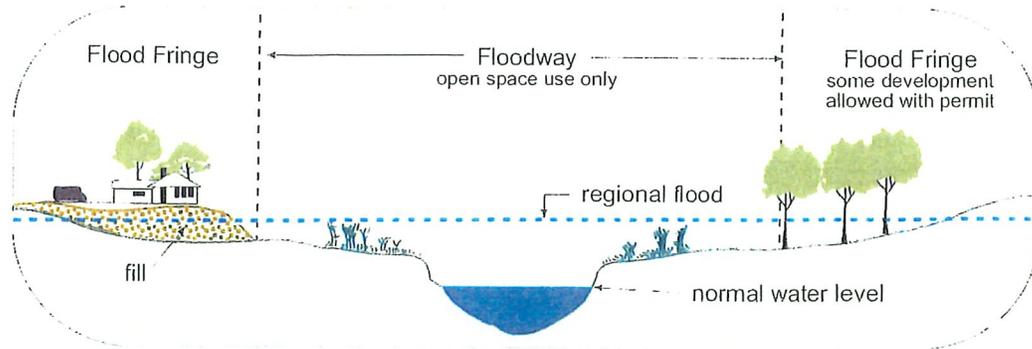
Source: Brown County, Town of Rockland, Robert E. Lee & Associates, Inc.

Disclaimer: Robert E. Lee & Associates, Inc. makes every effort to ensure this map is free of errors but, also not warrant the map or its contents are either spatially or temporally accurate or fit for a particular use. Robert E. Lee & Associates, Inc. shall not be liable for any errors or omissions in this map or its contents, whether caused in whole or in part by negligence, active or passive, or for any consequences arising from the use of the map or its contents, whether caused in whole or in part by negligence, active or passive.

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Figure 7-5

## Floodlands and Floodplain Zoning



### Definitions

**Floodplain** - That land which has been or may be covered by floodwater during the regional flood. The floodplain includes the floodway and flood fringe areas.

**Floodway** - The channel of a river or stream and those portions of the floodplain adjoining the channel required to carry the regional flood discharge. The floodway is the most dangerous of the floodplain. It is associated with moving water.

**Flood Fringe** - The portion of the floodplain outside of the floodway, which is covered by floodwater during the regional flood. It is associated with standing water rather than flowing water.

**Regional Flood** - That area where large floods are known to have occurred in Wisconsin, or which may be expected to occur, at a frequency of one percent during any given year. Also referred to as the 100-year floodplain or 100-year recurrence interval flood hazard area.

Source: Wisconsin Department of Natural Resources

There are several threats to floodplains and the resource values that they represent:

- **Filling**, which might diminish the flood storage capacity of the floodplain. This could have the effect of raising the flood elevation or increasing flow velocities to the detriment of upstream or downstream properties.
- **Grading**, which can degrade the resource functions of floodplains, such as filtering pollutants or providing habitat.
- **Impediments**, which include encroachment of buildings or undersized culverts and bridge openings. These manmade and natural impediments affect the size and proper functioning of floodplains and pose potential hazards to adjacent residents and passersby.
- **Impervious surfaces**, which can increase the velocity of the flood flows, increase the number of pollutants, reduce the amount of natural wildlife habitat, and limit the amount of infiltration of stormwater into the ground.

Due to the importance of floodplains for environmental, regulatory, and insurance purposes, it is recommended that flood studies be undertaken for all rivers and streams where development is proposed. Such flood studies should map both the floodway and the flood fringe portions of the 100-year recurrence interval flood hazard area, should be based upon full development of the drainage basin, and should be reviewed and approved by Brown County under the Brown County Floodplain Ordinance (Chapter 23), Wisconsin Department of Natural Resources and FEMA. If detailed flood studies are not undertaken and/or do not take into consideration the effects of future development of the watershed, future flooding events may be more extensive and cause greater property damage.

Under current regulatory requirements, the floodways would be off limits to development; although development could occur within the flood fringe areas with receipt of appropriate permits and approvals, and agricultural activities could continue within the floodplain.

However, based upon the importance of the Town's floodplains and their relationship to surface water, the Town should encourage greater protection of the entire floodplain whenever possible, with particular focus on the East River floodplain.

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#### Shorelands and Stream Corridors

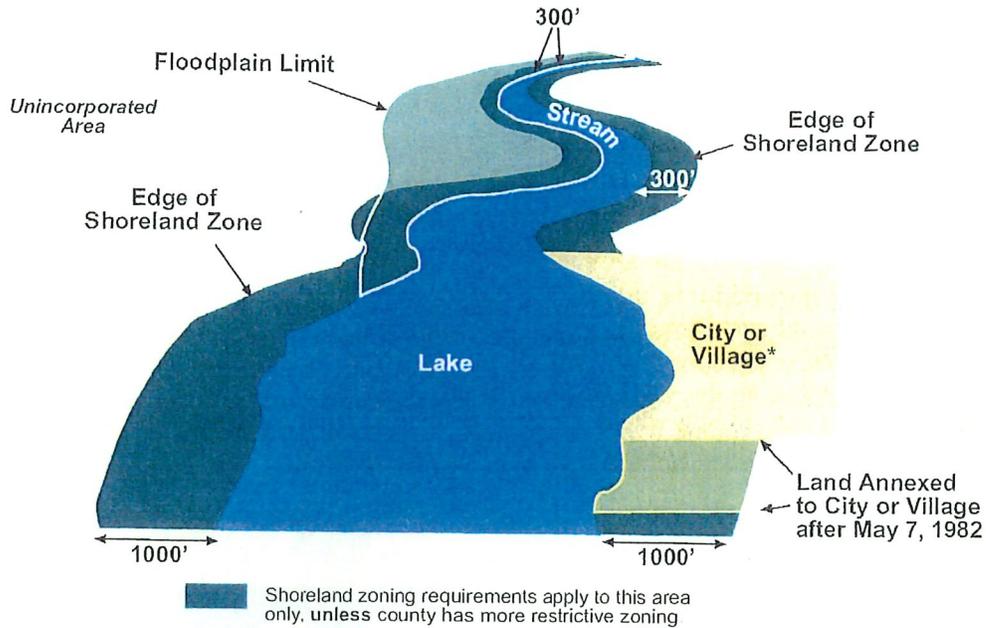
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Shorelands are the interface between land and water. In its natural condition, shorelands are comprised of thick and diverse vegetation that protect lakes, rivers, and streams. If these areas are developed, this vegetation is lost, and fish, wildlife, and water quality are damaged.

Like floodlands, the importance of shorelands is recognized and is regulated by state and local government. Wisconsin mandates shoreland zoning for all unincorporated communities under Wisconsin Administrative Code NR 115. Figure 7-6 presents a diagram of the state-mandated minimum shoreland zoning requirements.

Figure 7-6

## Shorelands and Shoreland Zoning



Cities and villages are required to zone wetlands within the shoreland.

### Definitions

**Shoreland Zone** - The shoreland zone is located within 1,000 feet of the ordinary high water mark (OHWM) of a "navigable" lake, pond, or flowage or within 300 feet of the OHWM of a "navigable" stream or river or to the landward side of the floodplain, whichever distance is greater.

**Ordinary High Water Mark** - The ordinary high water mark is the boundary between upland and lake or riverbed. It is the point on the bank or shore up to which the presence and action of the water is so continuous as to leave a distinct mark either by erosion, destruction of terrestrial vegetation, or other easily recognized characteristics.

**Navigable** - Generally, a waterway is navigable if it has a bed and banks and can float a canoe at some time each year - even if only during spring floods. Even small intermittent streams that are seasonally dry may meet the test of navigability. Navigable lakes and streams are public waterways protected by law for all citizens.

**Unincorporated Areas** - Lands lying outside of incorporated cities or villages

Shoreland zoning is primarily intended to control the intensity of development near and to create a buffer around lakes, rivers, and streams. The buffer is intended to remain an undeveloped strip of land that protects the water from the physical, chemical, hydrological, and visual impacts of nearby development. The Brown County Zoning Department is the agency that typically enforces these standards with oversight provided by the Wisconsin Department of Natural Resources.

These restrictions do not apply to non-navigable waters. However, all lakes, rivers, and streams, no matter how small, should be assumed to be navigable until determined otherwise by the DNR.

As shorelands are closely related to floodplains, so are the threats to the resource values shorelands represent. In addition, research being conducted by the DNR and others indicates that current state mandated shoreland zoning standards might not be adequate to properly protect water quality and shoreland ecosystems.

Under current regulatory requirements, the 75 feet closest to navigable waters are off limits to development; although, development could occur within the remainder of the shoreland area with receipt of appropriate permits and approvals, and agricultural activities could continue within the shoreland area.

One of the most effective methods to improve shorelands and the quality of water within them is through the planting of vegetative buffers or grassed waterways on either side of the water feature. Brown County Land and Water Conservation Department provides for a cost-share to implement 35' grass buffers on either side of waterways to provide effective filtration of sediments and nutrients prior to surface water runoff reaching the waterway. The Town of Rockland should encourage landowners to participate in the program to further improve the quality of surface water within the Town of Rockland.

Various cost-share programs in Wisconsin help landowners establish vegetative buffers, with funding available from federal, state, and county sources. These programs offer cost-sharing for practice installation, annual rental payments for land, and upfront incentives for enrollment. The primary program is the Conservation Reserve Enhancement Program (CREP), administered by a partnership of agencies. Primary program: Conservation Reserve Enhancement Program (CREP) Wisconsin's CREP is a key program that provides financial incentives for setting aside cropland or pastureland along waterways. It is a joint effort between federal (USDA Farm Service Agency), state (Wisconsin Department of Agriculture, Trade and Consumer Protection), and county governments.

Key features of CREP:

- Annual rental payments: Landowners receive yearly payments for up to 15 years, with rates based on soil type and county.
- Upfront incentives: The program offers two types of one-time payments:
  - A federal signing incentive for filter strips, riparian buffers, or grassed waterways.
  - A state incentive payment that varies based on the contract length.

- Cost-share assistance: Funds are provided to help cover the cost of practice installation.
  - The USDA may cover 50% to 90% of the installation costs.
  - The state may contribute an additional 20% cost-share.
- Contract options: Landowners can choose either a 15-year agreement or a perpetual conservation easement, with higher payments for the latter.
- Technical assistance: Landowners also receive support for developing a conservation plan.
- Eligible practices: In addition to riparian buffers and filter strips, CREP covers other practices like grassed waterways and wetland restorations.
- Eligibility: To be eligible, land must be in a designated CREP region, have a cropping history, and be within a certain distance of a waterway.

#### Other cost-share programs

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#### Federal programs

- Environmental Quality Incentives Program (EQIP): The USDA Natural Resources Conservation Service (NRCS) offers EQIP to provide financial and technical assistance to implement conservation practices, including buffers and grassed waterways.
- Regional Conservation Partnership Program (RCPP): This program funds large-scale, partner-led projects to help agricultural producers with conservation activities. Some Wisconsin RCPP projects focus on establishing permanent vegetation like buffers to improve water quality.

#### State and county programs

- Wisconsin Forest Landowner Grant Program (WFLGP): Administered by the Wisconsin Department of Natural Resources (DNR), this program reimburses qualified private forest landowners up to 50% for eligible practices, including those that benefit waters.
- Healthy Lakes & Rivers grants: The DNR provides these grants to support projects that protect and improve water quality, including installing buffers along shorelines.
- County-specific programs: Many Wisconsin counties provide their own cost-share assistance for conservation practices. For example:

To get started with a cost-share program for vegetative buffers, it's recommended to contact your local county Land Conservation Department. The process typically involves:

- Contacting the local USDA Service Center, which houses the Farm Service Agency (FSA) and NRCS.

- Working with agency staff to determine your land's eligibility and to develop a conservation plan.
- The county Land Conservation Department often assists with the state portion of the program.

Based upon the importance of the Town's shorelands and their relationship to surface water, the Town should encourage protection of the shoreland area whenever possible. In this regard, the Town should take full advantage of federal, state, and county funding and other assistance in the establishment of stream buffers. The Town should also consider conservancy zoning where appropriate if the Town determines that it has the capability to administer and enforce such a zoning classification.

### Wetlands

Wetlands are characterized by water at or near the ground level, by soils exhibiting physical or chemical characteristics of waterlogging, or by the presence of wetland-adapted vegetation. Wetlands are significant natural resources that have several important functions. They enhance water quality by absorbing excess nutrients within the roots, stems, and leaves of plants and by slowing the flow of water to let suspended pollutants settle out. Wetlands help regulate storm runoff, which minimizes floods and periods of low flow. They also provide essential habitat for many types of wildlife and offer recreational, educational, and aesthetic opportunities to the community.



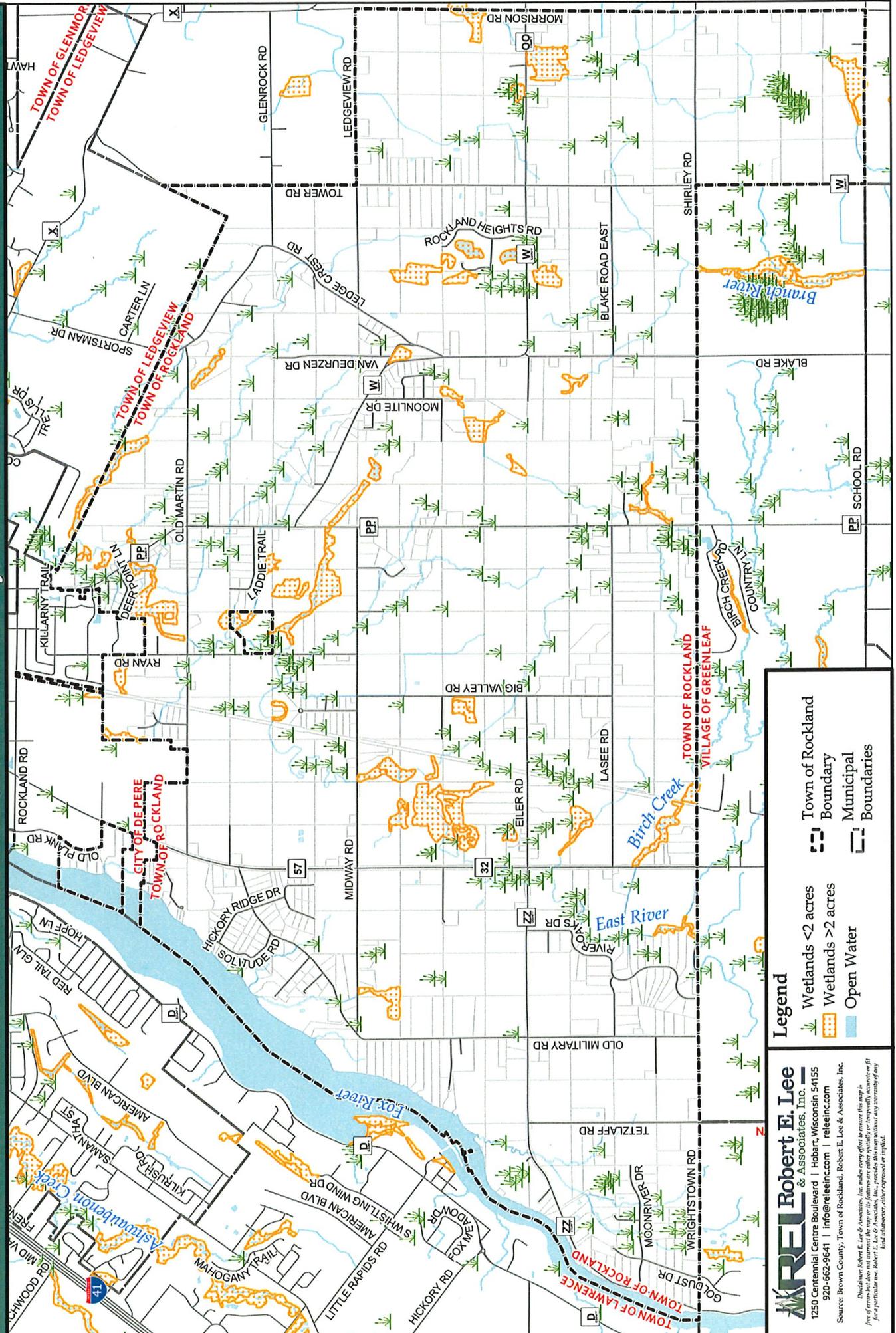
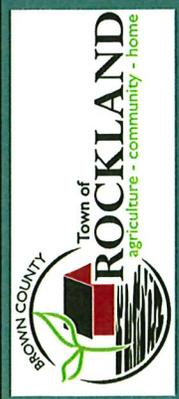
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As shorelands are closely related to floodplains, so are the threats to the resource values shorelands represent. In addition, research being conducted by the DNR and others indicates that current state-mandated shoreland zoning standards might not be adequate to properly protect water quality and shoreland ecosystems.¶  
Under current regulatory requirements, the 75 feet closest to navigable waters are off limits to development; although, development could occur within the remainder of the shoreland area with receipt of appropriate permits and approvals, and agricultural activities could continue within the shoreland area. ¶

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The Wisconsin Department of Natural Resources Wetlands Inventory Map identifies numerous wetlands throughout the Town. Wetlands that are less than two acres in size are identified with a symbol on the map. The WDNR digital wetlands inventory identifies approximately 402 acres of wetlands within the Town. The identified wetlands are located primarily along the East River and intermittent streams that flow from west of the escarpment to the East River. Other more isolated wetlands are scattered throughout the Town. Figure 7-7 depicts the Wisconsin Department of Natural Resources identified wetlands in the Town of Rockland.

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# Figure 7-7 WDNR Wetlands Town of Rockland, Brown County, Wisconsin



**Legend**

- Wetlands <2 acres
- Wetlands >2 acres
- Open Water
- Town of Rockland Boundary
- Municipal Boundaries

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The primary threat to wetlands is filling. Although an array of federal, state, and local regulations help protect them, wetlands (especially smaller ones) are still lost to road construction and other development activities. The draining of wetlands can also occur through tiling and rerouting of surface water. Even if wetlands are not directly filled, drained, or developed, they still can be impacted by adjacent uses. Siltation from erosion or pollutants entering via stormwater runoff can destroy the wetland. Previously healthy and diverse wetlands can be severely degraded to the point at which only the hardiest plants like cattails can survive. Invasive plant species, such as phragmites and purple loosestrife can also have a significant negative effect on wetlands by overrunning the native wetlands species and creating monocultures of unusable wetland habitat.

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Under current regulatory requirements, all wetlands are off limits to development unless appropriate permits and approvals are obtained. In addition, under certain situations, agricultural activities may be regulated within wetlands. In the Town of Rockland, and all other unincorporated parts of Brown County, wetlands within the shoreland zone of navigable waterways, as identified on the Wisconsin Wetland Inventory maps are zoned by Brown County through the Brown County Shoreland and Wetlands Ordinance (Chapter 22 of the Brown County Code of Ordinances). Wetlands within this zone are generally unavailable for development unless a wetlands zoning map amendment is reviewed and approved by Brown County and the State of Wisconsin Department of Natural Resources. In order to have a viable case for a rezoning, a property owner would need to hire a certified wetland delineator to identify the wetland boundaries and then document that the proposed development activity would not take place within the identified wetland.

Wetlands are also regulated through the Brown County Land Division Ordinance (Chapter 21) of the Brown County Code. Chapter 21 regulates wetlands as part of the land division process, and generally requires wetland delineations be performed as part of the county review process. In addition to the wetland itself, Chapter 21 requires a 35' environmentally sensitive area (ESA) setback from the wetland boundary to ensure the ecological functions of the wetland remain intact. Within the wetland ESA setback, no filling, cutting, grading, or development may occur. The wetland and ESA setbacks are identified on the recorded land division map to make future owners of the parcel aware of the building limitations on the site. In addition to the Brown County requirements, potential developers and land owners should be aware that the Wisconsin Department of Natural Resources and U.S. Army Corps of Engineers also regulate activity in wetlands.

**Environmentally Sensitive Areas**

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Environmentally sensitive areas (ESAs) are defined by the Brown County Planning Commission as "portions of the landscape consisting of valuable natural resource features that should be protected from intensive development." Identification and protection of ESAs are required by both state and county regulations under Wisconsin Administrative Code NR 121 and the Brown County Sewage Plan, as well as the Brown County Land Division and Subdivision Ordinance. ESAs include lakes, rivers, streams, wetlands, floodways, and other locally designated significant and unique natural resource features. ESAs also include a setback or buffer from the natural feature, as well as areas of steep slopes (slopes 20 percent or greater) when located within or adjacent to any of the surface water/wetland features previously noted (see Figure 7-8 for ESAs in the Town of

Rockland). Within portions of the county without sewer service area, regulation of ESAs occurs during the review and approval of all land divisions that are regulated by the Brown County Land Division and Subdivision Ordinance (Chapter 21 of the Brown County Code of Ordinances). Landowners within the Town with water-related natural resource features on their property are encouraged to contact the Brown County Planning Commission for information about regulations involving ESAs when considering splitting off land for land sale. The Town zoning administrator should also contact the Brown County Planning Commission about enforcement and regulation of ESAs that appear on subdivision plats and certified survey maps.

Development and associated filling, excavation, grading, and clearing are generally prohibited within ESAs. Farming and landscaping are allowed within ESAs and certain non-intensive uses, such as public utilities and public recreation, are often allowed within these areas. Research and experience indicate that the potential exists for significant adverse surface water quality impacts if these areas are developed, such as increased levels of nutrients, sedimentation, and resultant algae blooms. Additionally, development in these areas often leads to surface or ground water infiltration in basements.

Threats to ESAs are similar to those of floodplains and shorelands. The quality and effectiveness of ESAs can be severely reduced should adjacent development change drainage patterns or native vegetation be removed from the lands within or immediately adjacent to the ESAs. Such disturbances may also introduce invasive plant species to the ESAs, which results in loss of native vegetation, diversity, and wildlife habitat. In conjunction with proper erosion control and stormwater management practices, protection of the ESAs provide numerous benefits, including:

- Recharge of groundwater.
- Maintenance of surface water and groundwater quality.
- Attenuation of flood flows and stages.
- Maintenance of base flows of streams and watercourses.
- Reduction of soil erosion.
- Abatement of air pollution.
- Abatement of noise pollution.
- Favorable modification of micro-climates.
- Facilitation of the movement of wildlife and provision of game and non-game wildlife habitat.
- Facilitation of the dispersal of plant seeds.
- Protection of plant and animal diversity.
- Protection of rare, threatened, and endangered species.

ESAs located outside of sewer service areas (areas in a municipality where the extension of public sanitary sewer can be provided) do not come under protection by Brown County

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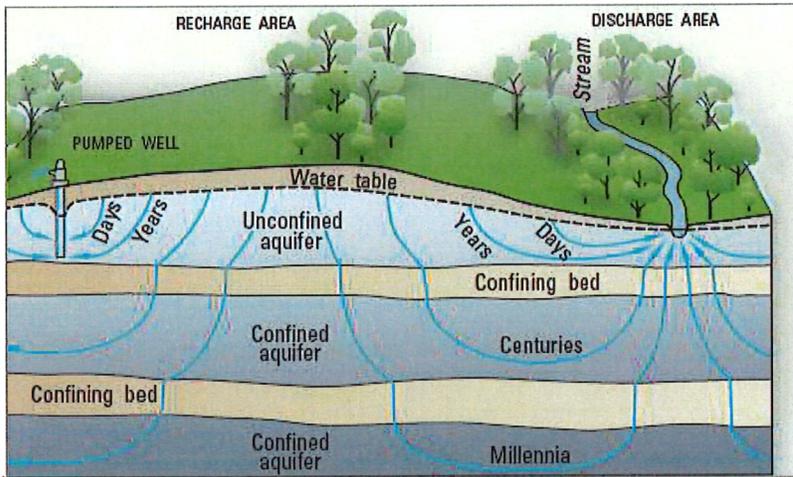
Planning Commission unless they are part of a proposed subdivision plat or certified survey map. While some level of protection of ESAs occurs via various levels of county, state, and federal government through enforcement of shoreland, floodplain and wetland regulations, ultimate protection of these important areas is best accomplished by the local unit of government.



## Groundwater

As shown in Figure 7-9, groundwater begins as precipitation (rain or snow) that falls upon the land. Precipitation may run off into lakes, rivers, streams, or wetlands, evaporate back into the atmosphere, or be absorbed by plants. Groundwater results from the precipitation that soaks into the ground past plant roots and down into the subsurface soil and rock. A layer of soil or rock that is capable of storing groundwater and yielding it to wells is called an aquifer. There can be a number of aquifers within an area, one above another. The top of the aquifer closest to the ground's surface is called the water table. It is the area below which all the openings between soil and rock particles are saturated with water. Like surface water, groundwater moves from high areas to low areas. It discharges at those places where the water table intersects the land's surface, such as in lakes, streams, and wetlands.

Figure 7-9: Groundwater Diagram



Source: United States Geological Survey

Groundwater is currently the only source of the Town of Rockland's drinking water. Drinking water for individual homes is drawn from the groundwater through private wells that vary in depth depending on location, soil characteristics, and depth to bedrock. In addition to providing a source of drinking water, groundwater provides base flows for some of the streams within the Town.

Since groundwater is currently the Town's only source of potable water, it is critically important that groundwater be protected. The greatest threats to groundwater are contamination and overuse, with contamination being the primary threat. As with many rural, agricultural communities, the most common sources of contamination include

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naturally occurring metals such as arsenic, pathogens such as bacteria or viruses, and pesticides or fertilizers. Pathogens typically enter groundwater from sources associated with either agricultural activity or failing private onsite wastewater treatment systems. The areas of the Town on top of Niagara Escarpment are particularly susceptible to groundwater contamination due to the many deep fractures in the limestone bedrock that lie just below the surface. These fractures can provide direct conduits for contaminants to enter the groundwater. In addition to fractured bedrock, improperly sealed and abandoned wells also provide conduits to the Town's groundwater. The prevention of contaminated groundwater is paramount to human and animal health. Residents can prevent contamination by drawing from deep wells with proper casings, and properly sealing wells when no longer in use.

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The Wisconsin Department of Natural Resources recommends testing private wells for coliform bacteria at least once a year or immediately any time there is a change in how the water looks, tastes, or smells. Even if the groundwater looks, tastes, and smells fine, there is a chance it may have harmful bacteria or viruses. Considering the number of people that move to Rockland from communities with public water supplies, the Town should provide new residents with information related to private well maintenance and testing, such as in the WDNR document "You and Your Well" which can be found on the WDNR website under the "Groundwater" link. <https://dnr.wisconsin.gov/topic/Groundwater>

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### Woodlands

Even with the large agricultural tracts in the Town, there are a number of contiguous large blocks of woodlands in Rockland. These woodlands are primarily located between the Niagara Escarpment and the East River and are typically associated with small intermittent streams that drain to the East River, or are directly associated with the escarpment. The Town's woodlands from the 2025 Brown County Land Use inventory are shown in Figure 7-10.

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Development is the primary threat to Rockland's remaining woodlands. Although many of the remaining woodlands are located within the East River floodplain or associated with wetlands areas, there are other areas, such as in proximity of the De Pere Sportsmen's Club, that are located in uplands. Since these areas are prized as settings for residential subdivisions, they are often targeted for development. Intensive development, especially if improperly planned, can destroy the scenic and natural values of the woodland resource and can disrupt the blocks and corridors necessary to provide refuge and passage for wildlife. Loss of these woodlands may also degrade the rural character and views of the Town.

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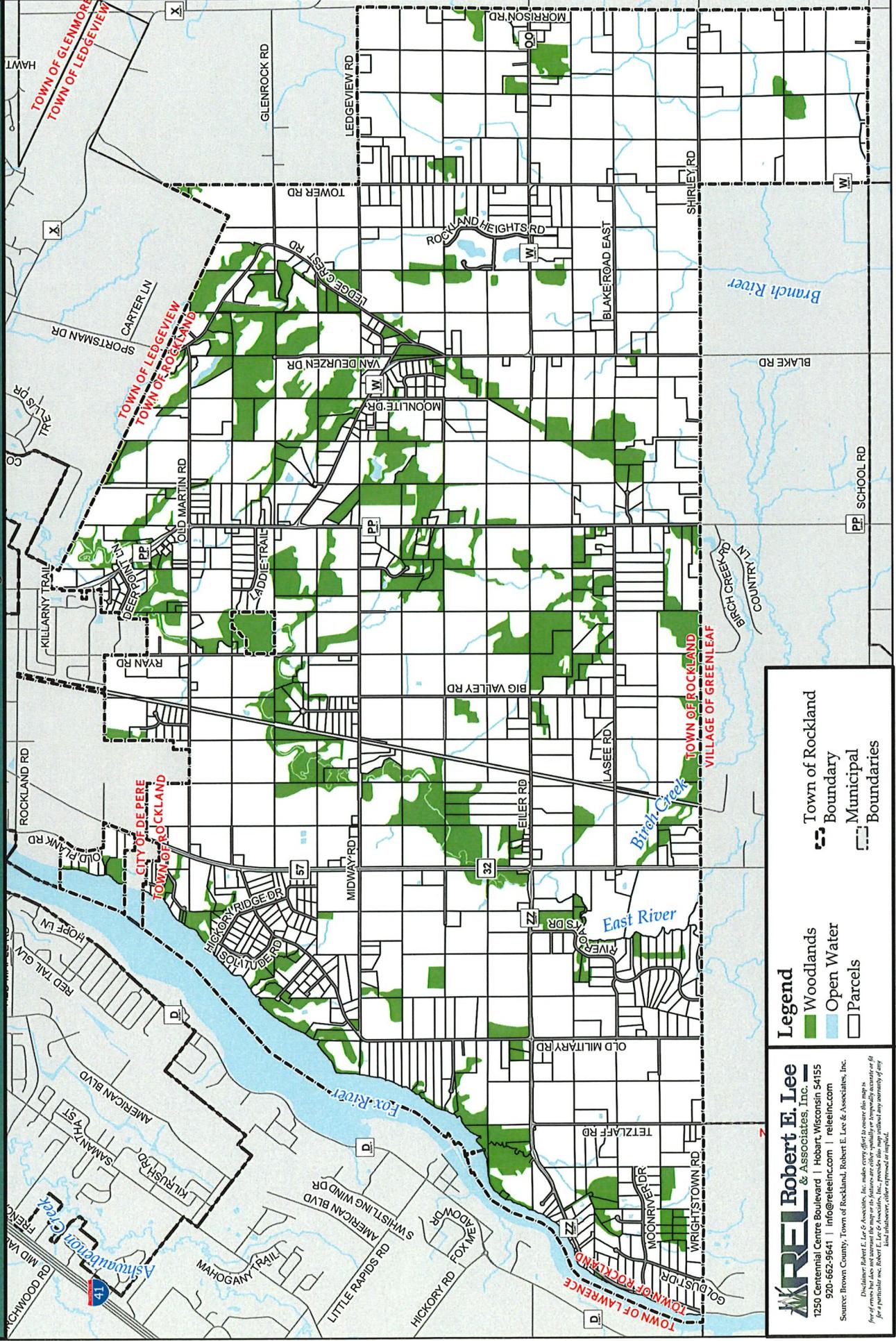
September 2025



Figure 7-10

# Woodlands

## Town of Rockland, Brown County, Wisconsin



**Legend**

- Woodlands
- Open Water
- Parcels
- Town of Rockland Boundary
- Municipal Boundaries

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Other threats to the woodlands of Rockland include improper management (such as the over harvesting or under harvesting of trees), haphazard utility and road construction and maintenance, and the introduction of exotic species and disease. If development is going to occur in a wooded area, such development concepts as conservation by design subdivisions are much preferred to conventional subdivision development for preserving as large a block of the woodlands as possible.

### Wildlife Habitat

Since much of the land in Rockland is actively being farmed, the most critical wildlife habitats within the Town are contained in its woodlands and wetlands. Tracts of woodlands or wetland-type vegetation offer areas for wildlife movement, and when connected by stream corridors through ESA designations, wildlife habitat corridors are created. Although federal, state, and county regulations generally preclude development in surface-water related wildlife habitats (floodplains, wetlands, streams), these areas are still impacted by development around their edges by regional issues, such as stormwater runoff, and by potential invasion of exotic species. Protection of the wooded areas and wetland areas of the Town is vitally important in providing wildlife habitat. Common wild game birds and mammals found in the Town include duck, geese, woodcock, pheasant, ruffed grouse, cottontail rabbit, fox and gray squirrel, muskrat, mink, raccoon, skunk, opossum, woodchuck, red fox, and whitetail deer.

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Preservation of wildlife habitat is another benefit from protecting surface waters, floodplains, shorelands, wetlands, and woodlands. It is assumed for purposes of this report that should these areas be adequately protected and preserved, so would its wildlife habitat functions.

### Threatened and Endangered Species

An endangered species is one whose continued existence is in jeopardy and may become extinct. A threatened species is one that is likely, within the foreseeable future, to become endangered. The Bureau of Endangered Resources within the Wisconsin Department of Natural Resources monitors endangered and threatened species and maintains the state's Natural Heritage Inventory (NHI). This program maintains data on the general locations and status of rare species in Wisconsin by township/range. The locations are purposefully vague to prevent the disturbance of threatened or endangered resources. According to the NHI, endangered or threatened species found or potentially found in Rockland include:

- Cherrystone Drop Snail (threatened).
- Midwest Pleistocene Vertigo Snail (endangered).

In addition to the listed threatened or endangered species, there are a number of other species of flora and fauna that are considered to be of "special concern" that may be listed as threatened or endangered in the future. The full list can be found at <https://dnr.wisconsin.gov/topic/EndangeredResources/ETList>. The most recent revising was January, 2014.

The primary threats to these species are the loss of wetlands and diminishing habitat along the Niagara Escarpment due to development and other factors. Federal and state

regulations discourage and sometimes prohibit development where such species are located. Since the Niagara Escarpment is such a critical habitat for a number of endangered, threatened, or special concern species throughout Brown County, protection of the escarpment ledge when possible should be of primary importance to the Town of Rockland.

### Scenic Resources and Topography

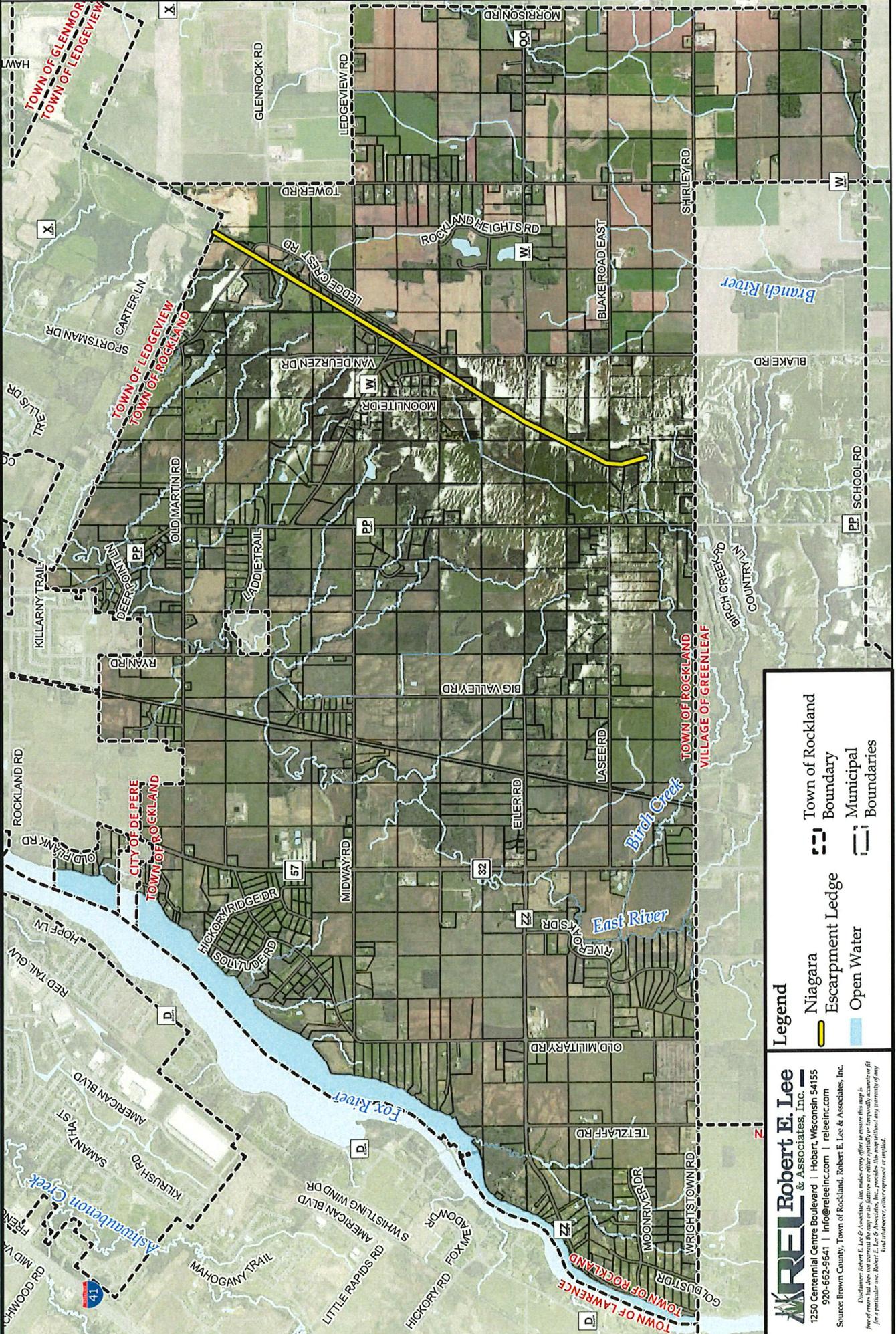
The topography in the Town of Rockland is very diverse, ranging from the Fox River to the flat broad floodplain of the East River to the steep change in elevation associated with the Niagara Escarpment. The Niagara Escarpment, or "ledge," is a geologic formation that underlies the eastern portion of the Town, running in a northeast to southwest direction. The escarpment is the result of years of geologic activity and erosion forces on the rock layers that underlay the Town's land surface. Niagara dolomite, which is much harder than the surrounding rock, did not completely succumb to nature's eroding forces, and as a result, the dolomite rock that formed the ledge stands much higher than the surrounding land surfaces of today. As a result of the scenic views from the top of the escarpment face, the escarpment has proven to be a very desirable site for residential development, resulting in increased fragmentation of the critical wildlife habitat corridor that exists along the ledge.

The Niagara Escarpment is under increasing stress from competing interests, including residential development, nonmetallic mining operations, and conservation interests. As Rockland continues to feel increasing development pressures, the competing interests for the ledge will also intensify. It is critical that the Town recognizes the escarpment as a very unique natural resource in the State of Wisconsin and works with developers, nonmetallic mining operators, and conservation groups to minimize the negative impacts of development on the ledge and works to preserve it whenever possible.

Other than the escarpment, Rockland has fairly level topography. The elevation ranges from approximately 580 feet above sea level in the western part of the Town along the Fox River to 960 feet at the highest point located in the southwestern part of Rockland. The difference in elevation between the two highest points in Rockland is only 380 feet. However, the escarpment provides the most visible change in elevation as it abruptly rises up to 100 feet in some areas of the Town.

New development proposed for areas along the escarpment should be designed to minimize visual impact on the ledge. Therefore, every effort should be made to preserve the existing trees and vegetation that make the ledge a very scenic area and help contribute to the rural feel of the Town. This could be accomplished through the use of very large lots to minimize the density of homes on the ledge, utilization of conservation easements, public purchase, purchase of development rights, overlay zoning district, or alternative subdivision design techniques. Figure 7-11 provides a generalized location of the Niagara Escarpment ledge face.

# Figure 7-11 Generalized Niagara Escarpment Ledge Town of Rockland, Brown County, Wisconsin



**Legend**

- Niagara Escarpment Ledge
- Open Water
- Town of Rockland Boundary
- Municipal Boundaries

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### Mineral Resources

While there are currently no active metallic mines in Wisconsin, nonmetallic mining is a widespread activity in Wisconsin, as well as in Brown County. In Wisconsin, there are an estimated 2,000 mines that provide aggregate for construction, sand, gravel and crushed stone for road building, and limestone for agricultural lime and manufacturing applications. Recently the western part of the State has experienced strong growth in silica sand quarries for use in the fracking process for oil production. In Brown County, there are a number of active quarries that mine dolomite, sandstone, limestone, or crushed stone (sand or gravel). The Niagara Escarpment, which extends through Brown County, contains some of the state's highest quality aggregate materials. Most commonly mined from the portion of the escarpment in Brown County is dimension limestone that is used primarily for landscaping.

The State of Wisconsin first passed a nonmetallic mining law in 1994. The law requires that all nonmetallic mining operations be registered. To be registered, the nonmetallic mineral deposit must be delineated by a professional geologist or registered engineer and certified to be economically viable. Additionally, if the land is zoned, the existing zoning at the time of registration must have allowed mining as a permitted use or as a conditional use. The state law further specifies that the registration lasts for ten years and could be renewed for an additional ten years. However, after 20 years, the full registration process must be undertaken once again. In addition, the law states that local zoning officials can deny the mining only if they can prove that the mineral deposit is not marketable or that the zoning at the time of the registration prohibits mining.

Wisconsin passed a second nonmetallic mining law in 2000, the Wisconsin State Statute Section 295.13(1) and Wisconsin Administrative Code NR 135. The state statute and administrative code require that all counties in the state adopt an ordinance in 2001 (consistent with the model ordinance prepared by the Wisconsin Department of Natural Resources) to establish a reclamation program capable of ensuring compliance with uniform state reclamation standards. The administrative code also allows cities, villages, and towns to adopt such an ordinance and administer the program within their own jurisdiction at any time. However, the administrative code further states that the county ordinance will apply to every city, village, or town within the county until such time as the city, village, or town adopts and administers an ordinance itself.

Brown County revised its Nonmetallic Mining Ordinance in 2007. Most communities in Brown County, including the Town of Rockland, opted to allow Brown County to retain jurisdiction within Rockland over non-metallic mines. Wisconsin's nonmetallic mining reclamation program requires that nonmetallic mining operators prepare a reclamation plan to state standards. These standards deal with topsoil salvage and storage, surface and groundwater protection, reclamation during mining to minimize the amount of land exposed to wind and water erosion, re-vegetation, site grading, erosion control, and a final land use consistent with local zoning requirements.

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There is one active dolomite quarry within the Town of Rockland in the far northeastern corner of the Town. Because of the presence of this high quality mineral resource in the Town of Rockland and because of the potential for both significant positive economic impacts and negative environmental and land use impacts, relevant Town ordinances

should be continually reviewed to ensure they adequately address issues along the escarpment, such as truck traffic, blasting, and endangered plant and animal resources.

It is also important for the Town to recognize that new residential uses are not typically compatible with active quarrying operations. Therefore, the Town should avoid approval of new residential developments near active quarries.

### **Historic Buildings**

The Wisconsin Architecture & History Inventory (AHI) is an official inventory maintained by the Wisconsin Historical Society (WHS) for tracking historically significant structures, sites, or objects. These structures collectively display Wisconsin's unique culture and history and, therefore, should be noted and protected/preserved when feasible.

There are 23 records listed in the AHI for the Town of Rockland, with the Little Kaukauna Lock and Dam Historic District also being listed on the National Historic Register. Of the remaining 22 records, no additional sites are listed on the state or national historic register. AHI listed structures are generally scattered throughout the town and include such buildings as a former school, and other various commercial and agricultural buildings.

Considering the Little Kaukauna Lock and Dam District is registered on the National Register of Historic Places, it may be of interest to historic tourists. Rehabilitation of the former lock tender house into a hostel or similar type rest stop for boaters, kayakers, and others interested in the history of the Fox River should be encouraged by the town. Both the State of Wisconsin and federal government provide an income tax credit up to 20 percent of the cost of rehabilitating a structure listed on the National Register.

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### **Archeological Resources**

Archeological sites provide a window to the past. They provide information and insight as to the culture, activities, and beliefs of the previous residents of the Town of Rockland. Current state law gives protection to all human burial sites, in addition to a number of programs and restrictions relating to other archeological sites.

In 2004, The Neville Public Museum provided an inventory and report detailing the archeological sites in the Town of Rockland. The following information is from that report, compiled by Janet M. Speth of the Neville Public Museum of Brown County.

An inventory completed by the Neville Public Museum of Brown County indicates that Rockland has had only one archeological survey completed, which was completed in conjunction with work along STH 32/57. Due to the survey being completed as part of the road project, the survey was limited to a narrow strip of the new right-of-way for the highway. Most other communities in Brown County have had a number of surveys as a result of highway or utility projects.

Probably as a result of there being only one archeological survey completed in Rockland, there are only five recorded archeological sites in the Town. Two sites lie between the East River and the top of the Niagara Escarpment. Three sites are located along the Fox River, which include two village sites and a mound group. The mound group is located on private property and includes at least one conical mound and possibly a linear mound

dating to the Late Woodland Period (AD 600 to AD 1200). However, it has been dug into at some point in the past. The two village sites have never been excavated, and collections of artifacts from these sites are stored at the Neville Public Museum of Brown County. The stone artifacts from these sites represent almost every period from Early Archaic (about 7000 BC) to late prehistoric (possibly AD 1500).

The archeological survey completed in conjunction with the STH 32/57 project resulted in four artifacts being recovered from the base of the Niagara Escarpment. They may date to the Early Woodland Period (about 500 BC). The second site at the base of the escarpment is known from private collectors. Artifacts recovered from this site include copper and stone axes and are stored at the Wisconsin Historical Society. Based on the presence of copper tools at the site, a date of 4000-1500 BC is possible.

The number of archeological sites within the Town of Rockland is undoubtedly higher than the five that are listed. Small campsites may occur along and atop the escarpment, and larger sites may be present along the Fox River. Rock overhangs and caves along the escarpment may also be the sites of prehistoric burials.

Developing these sites before they can be catalogued and studied is the threat to this resource. However, knowledge about archeological sites is typically kept confidential to prevent collectors from damaging them. Therefore, when developing in areas of the Town along the Niagara Escarpment, Fox River, or East River floodplain, builders should be aware that they may encounter archeological artifacts, and if so, officials of the Neville Public Museum should be notified.

#### **Recommended Policies, Programs, and Actions**

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There are many avenues the Town of Rockland can take to achieve the natural, cultural, and agricultural resources goal and objectives listed in the plan's Issues and Opportunities chapter. They range from specific one-time actions to broad ongoing programs. These recommendations are addressed in this section.

#### **Farmland Preservation**

Rockland is experiencing a slow loss of agricultural land to other use, mostly residential. There are several large scale farming operations within Rockland and a few smaller farms. The Community Survey showed respondents having an appreciation for the rural nature of the Town and wish to protect it. Slow residential growth with planned development will allow maximum protection of the agricultural community. Agriculture provides a large part of the rural feel that Town residents wish to maintain. Therefore, Rockland should encourage agricultural activity in the Town for as long as possible.

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### Purchase of Agricultural Conservation Easements

Some communities have had success with the purchase of agricultural conservation easements, also known as the purchase of development rights. This farmland preservation tool benefits the farmer, as well as the community. The farmer can benefit financially on the development potential of the land while still keeping it in production and maintaining all other rights to the land, including the right to live on the land, to continue to farm the land, and to exclude trespassers. The farmer may enjoy reduced income taxes and estate taxes. The monies received for the easement can be used for farm improvements, thus making the farm more productive and economically palatable to the community. In addition, the community will enjoy all of the environmental, aesthetic, and economic benefits of farming while preserving a large area of productive farmland.

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While this tool is an effective one for preserving farmland, it is expensive, and not all municipalities can afford its cost. The Town can explore many different options for funding this program, including an increase in building permit fees or property taxes. Rockland also could explore the many potential state or federal grant programs that could assist the Town in funding these efforts. One of these programs is the Farmland Preservation Program sponsored by the USDA. This program helps state, tribal, or local government entities purchase development rights to keep productive farmland in agricultural use. If the land qualifies, the USDA has provided up to 50 percent of the cost of purchasing the easement. To qualify, farmland must:



- Be part of a pending offer from a state, tribe, or local farmland preservation program.
- Be privately owned.
- Have a conservation plan.
- Be large enough to sustain agricultural production.
- Be accessible to markets for what the land produces.
- Have adequate infrastructure and agricultural support services.
- Have surrounding parcels of land that can support long-term agricultural production.

The Town of Dunn in Dane County has been very successful in preserving its agricultural land using purchase of development rights. Dunn has received multiple Farmland Preservation Program grants to help with its efforts, allowing them to preserve over 1,700 acres of valuable farmland.

### Creation of Parks or Conservancy Areas

Future parks not located to serve a specific population should, if possible, include or be adjacent to natural resource features, such as the Niagara Escarpment, Fox River, Fox River State Recreational Trail or other woodlands, wetlands, stream corridors, and scenic, historic, or archaeological sites to help preserve or enhance the rural feel of the Town. This allows greater public accessibility to natural and cultural resources and potentially enhances their protection through buffering and public ownership. It can also allow for connectivity of parks through natural resource corridors. Future parks and recreational facilities should also be coordinated with adjoining communities, as well as Brown County, to allow for potential regional trails, to avoid redundant or competing facilities, and to foster cooperation and efficiency. There is a more extensive discussion of future park facilities in the Utilities and Community Facilities Chapter of this comprehensive plan.

### Environmentally Sensitive Areas

The protection of environmentally sensitive areas (ESAs) keep intensive development out of stream corridors, water quality is improved, wildlife habitat is maintained, recreational opportunities are presented, and scenic values are preserved. As discussed in the environmentally sensitive area section of this chapter, ESAs generally follow stream corridors and include a 75' setback, the identified floodway of the stream and any adjacent wetlands and steep slopes. ESAs remain mostly undeveloped and serve as vital wildlife corridors, preserve natural beauty, provide stormwater management areas, and link ecologically important parts of the Town together.

### Create Vegetated Buffer Strips along Waterways

Through implementation of Chapter 10 of the Brown County Code of Ordinances (Agricultural Shoreland Management) the Brown County Land Conservation Department has been working with rural landowners to provide a cost-share for the installation of vegetated buffer strips along waterways that flow through agricultural areas. Historically, many of these waterways were plowed through and created direct vectors for fine sediments and nutrients such as phosphorus and nitrogen to enter the surface water system downstream.



Increased levels of phosphorus and nitrogen can lead to harmful algal blooms, decreased dissolved oxygen levels, and increased stress on forage and sport fish in downstream waterways. The vegetated buffer strips, typically consisting of native grasses, wildflowers, and shrubs, help to filter out suspended solids, nutrients (including phosphorus and nitrogen), fertilizers, and pesticides prior to reaching the actual waterway in the center of the buffer. Additionally, as the buffer strips mature, they create increasingly important wildlife habitat and travel corridors for songbirds, small mammals,

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reptiles, and amphibians. Rockland residents should follow USDA guidance for grassed Waterways (Code 412), which is referenced in this document as Appendix F.

#### **Niagara Escarpment Overlay Zoning**

In order to protect the most well-known attribute of the Town of Rockland, the town may want to consider the development of an overlay zoning district for the Niagara escarpment. The overlay zone may limit the density of residential development allowable, provide for minimum setbacks from the ledge face, or limit the clearing of vegetation. Providing additional protection to the Niagara escarpment would protect the threatened or endangered species living along the ecologically sensitive area as well as preserve the natural beauty of the ledge for future generations.

#### **Promotion of Flexible Development Practices**

Alternative development approaches, such as conservation subdivisions, offer benefits to agricultural and natural resources. New subdivisions can be designed to preserve natural drainage patterns, reduce fragmentation of wildlife habitat, and limit the amount of impervious surfaces, such as roads. By clustering development on a site, large blocks of environmentally sensitive areas or even prime farmland can be left as preserved open space.

Developers and Town officials should promote a harmonious relationship between the natural landscape and built environment and strive to encourage preservation of natural areas within newly developed areas. Conservation subdivisions with common open space and other alternative development methods to maintain natural resource features should be encouraged for developments that contain such features. Allowing reduced lot sizes, smaller setbacks, and/or narrower streets in exchange for preservation of natural resources should also be considered.

There are a number of other alternative zoning techniques that can allow some development within the Town while still retaining the rural atmosphere that the Town residents want. Alternatives, such as maximum lot sizes and encouraging development on nonproductive agricultural lands are options available to the Town.

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#### **Education and Citizen Participation**

Spreading knowledge of the importance of the Town's natural resources and ways to maintain them is an essential implementation tool. For example, educating property owners along creeks about nonpoint source pollution and providing tips on landscaping and buffering to prevent this pollution can help to achieve improved water quality. Periodic pamphlets or newsletters could be mailed to Rockland residents to provide information on such topics as tree trimming tips and other issues relating to natural resource protection. Water resource educational materials are available from the WDNR.

## Summary of Recommendations

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- If an adequate funding source could be found, a purchase of agricultural conservation easement (PACE) program could be a means to permanently protect tracts of agricultural lands from development in the Town.
- When siting locations for parks or conservancy areas, co-locate them in areas with unique or sensitive natural resource features, such as the Niagara escarpment, Fox River, or East River.
- Investigate public access points and/or parks along both the East River and the Fox River.
- The Town should provide new residents with information related to private well maintenance and testing, such as in the WDNR document "You and Your Well" which can be found at <https://dnr.wisconsin.gov/topic/Groundwater>
- Promote the use of flexible development techniques such as conservation subdivisions to minimize the visual impact of development on the Town's rural vistas.
- The Town of Rockland should encourage and support the efforts of the Brown County Land Conservation Department, the East River Collaborative and the Natural Resources Conservation Service to protect the soil resources of the Town. This would include support of agricultural best management practices as conservation tillage, crop rotation, grassed waterways and control of livestock access to streams.
- The Town should encourage and support the efforts of the Brown County Land Conservation Department, East River Collaborative and others regarding installation of stream buffers. This is likely the single most effective means to protect and even improve the water quality of the Town's rivers and small streams.
- Evaluate the need for an overlay zoning district on the Niagara escarpment to minimize the visual impact of residential development on top of the escarpment.
- The Town should require flood studies prior to land division or development adjacent to its rivers and small streams when such studies do not exist.
- Utilize the online ESA/shoreland zoning maps to ensure appropriate permits are obtained when development may occur in these areas.
- Ensure that the various competing interests for the Niagara Escarpment recognize its sensitivity and uniqueness in the state.
- Promote the rehabilitation of the former Little Kaukauna lock tender house into a hostel or similar type rest stop for boaters, kayakers, and others interested in the history of the Fox River.
- Rockland should work with the WDNR, private landowners, Niagara Escarpment Resource Network, and other public or nonprofit agencies to preserve parts of the escarpment whenever possible.
- Recognize the economic importance of nonmetallic mineral resources in the Town while ensuring that negative externalities associated with the quarrying (blasting, truck traffic, etc.) are minimized.
- Strongly discourage new residential development near active quarrying operations.

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United States  
Department of  
Agriculture

Appendix  
F

## Conservation Practice Overview

September 2020

### Grassed Waterway (Code 412)

A shaped or graded channel that is established with suitable vegetation to convey surface water at a nonerosive velocity using a broad and shallow cross section to a stable outlet.



### Practice Information

Waterways are constructed to convey runoff from concentrated-flow areas, terraces, or diversions where erosion control is needed. Waterways can be used to control gullies and/or improve the water quality of downstream water bodies by reducing the sediment carried by runoff water.

Grassed waterways are usually parabolic or trapezoidal in shape and are designed to allow farm equipment to cross without damaging the waterway or the equipment.

When possible, species of vegetation should be selected that can serve multiple purposes, such as benefiting wildlife, while still meeting the basic criteria needed for providing a stable conveyance for runoff. Tall bunch grasses and perennial forbs may also be planted along waterway margins to improve wildlife habitat. Including diverse legumes or other forbs that provide pollen and nectar will have the added benefit of providing habitat for native bees.

This practice has a minimum expected life of 10 years. Some maintenance will be needed to maintain the waterway capacity, vegetative cover, and outlet stability. This will include mowing (or controlled grazing), fertilizing, and sediment removal. Most of the damage that occurs to grassed waterways is caused by equipment or herbicides and can be avoided by careful management. Vegetation that is damaged by machinery, herbicides, or erosion must be repaired promptly.

### Common Associated Practices

NRCS Conservation Practice Standard (CPS) Grassed Waterway (Code 412) is commonly applied with other conservation practices such as NRCS CPSs Terrace (Code 600), Diversion (Code 362), Critical Area Planting (Code 342), Grade Stabilization Structure (Code 410), and other erosion control practices.

For further information, contact your local NRCS field office.

Natural Resources Conservation Service

**Helping People Help the Land**

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## Practice Specification Grassed Waterway (Code 412)

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### 1. SCOPE

The work shall consist of the construction of the Grassed Waterways at locations and grades shown on the drawings, or as stated in Section 5 of the specification.

### 2. MATERIALS

1. The earth material used in constructing the grassed waterway shall be obtained from the grassed waterway area or other approved sources.
2. Other required materials shall be as shown in the drawings or in Section 5 of this specification.

### 3. FOUNDATION PREPARATION

All trees, stumps, brush and similar material are to be removed from the site and disposed of in a manner consistent with environmental concerns and proper functioning of the grassed waterway. The area shall be stripped of vegetation, topsoil, and unsuitable material. Topsoil shall be stockpiled and spread uniformly over the finished waterway, unless stated otherwise in Section 5 of this Specification.

### 4. INSTALLATION

Fill shall contain no frozen materials, rocks greater than 6-inches in diameter, roots or wood greater than 2-inches in diameter or 4- inches in length, sod, brush, or other objectionable material.

The earth fill shall be compacted by routing the hauling and spreading equipment over the fill in such a manner that the entire surface of the fill will be traversed by not less than one tract tread of the loaded equipment. However, the compaction shall not be excessive so as to deter a suitable seedbed. The completed grassed waterway shall conform to the cross section(s) shown on the drawings.

When an excess of earth material results from cutting the grassed waterway to the required cross section and grade, it shall be spread adjacent to the grassed waterway without blocking surface runoff from reaching the waterway, or in another designated area where fill is needed.

Watershed runoff shall be diverted away from the waterway until vegetation is established, as shown in the drawings, or in Section 5 of this Specification. Any protective works shall then be removed, and the disturbed areas shall be seeded to permanent grass.

### 5. ADDITIONAL CONDITIONS WHICH APPLY TO THIS PROJECT ARE:



Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

GRASSED WATERWAY

CODE 412

(ac)

**DEFINITION**

A shaped or graded channel that is established with suitable vegetation to convey surface water at a nonerosive velocity using a broad and shallow cross section to a stable outlet.

**PURPOSE**

This practice is used to accomplish one or more of the following purposes:

- Convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding
- Prevent gully formation
- Protect/improve water quality

**CONDITIONS WHERE PRACTICE APPLIES**

This practice is applied in areas where added water conveyance capacity and vegetative protection are needed to prevent erosion and improve runoff water quality resulting from concentrated surface flow.

**CRITERIA**

**General Criteria Applicable to All Purposes**

Plan, design, and construct grassed waterways to comply with all Federal, State, and local laws and regulations.

**Capacity**

Design the waterway to convey the peak runoff expected from the 10-year frequency, 24-hour duration storm. Increase capacity as needed to account for potential volume of sediment expected to accumulate in the waterway between planned maintenance activities. When the waterway slope is less than 1 percent, out-of-bank flow may be permitted if such flow will not cause excessive erosion. Ensure that the design capacity, at a minimum, will remove the water before crops are damaged.

**Stability**

Determine the minimum depth and width requirements for stability of the grassed waterway using the procedures in the NRCS National Engineering Handbook (Title 210), Part 650, Chapter 7, "Grassed Waterways," or Agricultural Research Service Agriculture Handbook 667, "Stability Design of Grass-Lined Open Channels." Base stability computations on the peak runoff expected from a 10-year, 24-hour duration storm.

Ensure that the vegetative species selected are suited to the site conditions and intended uses. Select species that have the capacity to achieve adequate density, height, and vigor within an appropriate time frame to stabilize the waterway.

NRCS reviews and periodically updates conservation practice standards. To obtain the current version of this standard, contact your Natural Resources Conservation Service State office or visit the Field Office Technical Guide online by going to the NRCS website at <https://www.nrcs.usda.gov> and type FOTG in the search field.

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NRCS, NHCP  
September 2020

**Width**

Keep the bottom width of a trapezoidal waterway less than 100 feet unless multiple or divided waterways or other means are provided to prevent meandering of low flows.

**Side slopes**

Keep the side slopes flatter than a ratio of 2 horizontal to 1 vertical (2:1). Flatten the side slopes as needed to accommodate the equipment used for maintenance, tillage, and harvesting so that damage to the waterway is minimized.

**Depth**

The capacity of the waterway must be large enough so that the water surface of the waterway is below the water surface of the tributary channel, terrace, or diversion that flows into the waterway at design flow.

Provide 0.5 feet of freeboard above the designed depth when flow must be contained to prevent damage. Provide freeboard above the designed depth based on capacity conditions when the vegetation has the maximum expected retardance. To achieve the freeboard, extend side slopes at a slope equal to or flatter than the side slope of the design cross section.

**Drainage**

When needed to establish or maintain vegetation on sites having prolonged flows, high water tables, or seepage problems, use NRCS Conservation Practice Standards (CPSs) Subsurface Drain (Code 606), Underground Outlet (Code 620), or other suitable measures in waterway designs.

Where drainage practices are not practicable or adequate to solve these seepage problems, use NRCS CPS Lined Waterway or Outlet (Code 468) in place of NRCS CPS Grassed Waterway (Code 412).

**Outlets**

Provide a stable outlet with adequate capacity. The outlet can be another vegetated channel, an earthen ditch, a grade stabilization structure, filter strip, lined waterway, or other suitable outlet.

**Vegetative establishment**

Establish vegetation as soon as possible using the criteria listed under "Establishment of Vegetation" in NRCS CPS Critical Area Planting (Code 342) and/or the State planting guide. Use mulch; nurse crop; rock, straw, or hay bale dikes; fabric or rock checks; filter fences; or runoff diversion to protect the vegetation until it is established. Planting a close-growing crop (e.g., small grains or grasses) on the contributing watershed prior to construction of the grassed waterway can also significantly reduce the flow through the waterway during establishment. Provide livestock and vehicular crossings as necessary to prevent damage to the waterway and its vegetation.

**CONSIDERATIONS**

Where environmentally sensitive areas need to be protected from dissolved contaminants, pathogens, or sediment in runoff, consider establishment of an increased width of vegetation on the waterway above the flow area. Increasing the width of the established vegetation above the flow area will increase filtering of sediment and pathogens, and it will increase infiltration of runoff and nutrient removal.

Where sediment control is the primary concern, consider using vegetation in the waterway that can withstand partial burial and adding sediment control measures above the waterway, such as residue management. Consider increasing the channel depth and/or designing areas of increased width or decreased slope to trap and store sediment to reduce the amount of sediment that leaves a field. Provide for regular cleaning out of the waterway when trapping sediment in this manner.

Implement best management practices and use a system of additional conservation practices or a soil health management system in conjunction with the grassed waterway to minimize upstream runoff and concentrated flow.

Tillage and crop planting often takes place parallel to the waterway, resulting in preferential flow paths and erosion along the edges of the waterway. Consider installation of measures that ensure the runoff from adjacent areas will enter the waterway. Measures such as directing spoil placement or small swales can direct this preferential flow into the grassed waterway.

Livestock and vehicle crossings should occur perpendicular to the waterway. Consider locating crossings to minimize potential damage to the waterway. Crossing design must not interfere with design-flow capacity.

Avoid areas where unsuitable plant growth-limiting subsoil and/or substratum material, such as salts, acidity, root restrictions, etc., may be exposed during implementation of the practice. Where areas cannot be avoided, seek recommendations from a soil scientist for improving the condition; or, if not feasible, consider over-cutting the waterway and add topsoil over the cut area to facilitate vegetative establishment.

Avoid or protect, if possible, important wildlife habitat, such as woody cover or wetlands, when determining the location of the grassed waterway. Avoid placing trees and shrubs in or near the grassed waterway so they do not interfere with hydraulic functions or send roots into associated subsurface drainage. Medium or tall bunch grasses and perennial forbs may also be planted along waterway margins to improve wildlife habitat. Waterways with these wildlife features are more beneficial when connecting other habitat types (e.g., riparian areas, wooded tracts, and wetlands). When possible, select plant species that can serve multiple purposes, such as benefiting wildlife, while still meeting the basic criteria needed for providing a stable conveyance for runoff.

Water-tolerant vegetation may be an alternative to subsurface drains or stone center waterways on some wet sites.

Use irrigation in dry regions or supplemental irrigation as necessary to promote germination and vegetation establishment.

Wildlife habitat benefits can be provided by adding width of appropriate vegetation to the sides of the waterway. Care should be taken to avoid creating small isolated planting zones for wildlife. These can become population sinks where wildlife attracted to an area experience reproductive loss due to predation. Mowing may be appropriate to enhance wildlife values, but should be conducted to avoid peak nesting seasons and reduced winter cover whenever possible.

Consider planting diverse legumes, forbs, and flowering plants, such as milkweeds, that provide pollen and nectar for native bees and other pollinators adjacent to the waterway. In dry regions, these sites may be able to support flowering forbs with higher water requirements and thus provide bloom later in the summer.

For all organic or transitioning-to-organic operations, follow all National Organic Program rules.

## **PLANS AND SPECIFICATIONS**

Prepare plans and specifications for a grassed waterway that describe the requirements for applying the practice according to this standard. As a minimum, include—

- A plan view of the layout of the grassed waterway.
- Dimensions of the waterway, including length, grade, top width, bottom width, depth, and side slopes as applicable.
- Disposal requirements for excess soil material.
- Site-specific construction specifications that describe in writing the installation of the grassed waterway. Include specification for control of concentrated flow during construction and vegetative establishment.
- Vegetative establishment requirements.

## OPERATION AND MAINTENANCE

Provide an operation and maintenance plan to review with the landowner. Include the following items and others as appropriate in the plan:

- Establish a maintenance program to maintain waterway capacity, vegetative cover, and outlet stability. Vegetation damaged by machinery, herbicides, or erosion must be repaired promptly.
- Protect the waterway from concentrated flow by using diversion of runoff or mechanical means of stabilization, such as silt fences, mulching, hay bale barriers, etc., to stabilize grade during vegetation establishment as necessary.
- After vegetation is established, remove any temporary measures, such as diversions or silt fences, that were installed so as to not interfere with design flow.
- Minimize damage to vegetation by excluding livestock whenever possible, especially during wet periods. Permit grazing in the waterway only when a controlled grazing system is being implemented.
- Inspect grassed waterways regularly, especially following heavy rains. Fill, compact, and reseed damaged areas immediately. Remove sediment deposits to maintain capacity of the grassed waterway.
- Avoid use of herbicides or pesticides that would be harmful to the vegetation or pollinating insects in and adjacent to the waterway area.
- Avoid using waterways as turn rows during tillage and cultivation operations.
- Mow or periodically graze vegetation to maintain capacity, reduce sediment deposition, and maintain suitable plant composition and vigor.
- Apply supplemental nutrients as needed to maintain the desired species composition and stand density of the waterway.
- Control noxious weeds.
- Do not use waterways as a field road. Avoid crossing with heavy equipment when wet.
- Lift tillage equipment and turn off chemical application equipment when crossing the waterway.

## REFERENCES

USDA Agricultural Research Service. 1987. Stability Design of Grass-Lined Open Channels. Agriculture Handbook Number 667. Washington, D.C. <https://naldc-legacy.nal.usda.gov/catalog/CAT87216054>

USDA NRCS. 2007. National Engineering Handbook (Title 210), Part 650, Chapter 7, Grassed Waterways. Washington, D.C. <https://directives.sc.egov.usda.gov/>