

Environment & Natural Resources

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Introduction

Throughout the nation and across the globe, issues of sustainability, liveability, walkability, context sensitive design, smart growth and quality of life pervade our conversations about our communities. These terms have become an integral part of our discussion not because it is a trend, rather, because these issues are valid and important to the way each of us lives, works and plays.

Whatever your perspective on how we are affecting changes in our environment and global climate, there is a need and a growing interest in planning, designing and building our communities with a more thoughtful, careful and sustainable approach. This is much more than a design industry led initiative, this is being driven by public demand on a global scale. The need to re-examine how we approach design and development in our communities is because the impact of sprawl and disposable development is significant.



This section of this plan addresses the environmental aspects of sustainability as it relates to Morgan County's natural resources. It begins with an inventory of the existing resources available in the County. That is followed by a summary of threats to those resources as a direct result of development. Finally, the section includes recommended action

steps (best practices) for mitigating impacts of those threats.

Summary of Environmental Priorities

While the county plans to make progress toward several different environmental goals, two priorities have risen to the top in this process.

First, the county has made a renewed commitment toward protecting their floodplains from development. The June 2008 floods reinforced to the community the need to protect their floodplains and limit development in them accordingly.



This plan reflects this priority by designating undeveloped floodplains only for uses such as parks, open space and agriculture. It also goes further than most plans by not showing future development anywhere in a 500 year floodplain (not just the 100 year).

Second, this plan directs future development to where there is already sufficient water/wastewater infrastructure in place. The land use plan encourages short term residential development to occur directly adjacent to the town in areas where utilities already exist to support development. It further directs development away from the south and west sides of the town, where there currently are no sanitary sewers. This approach will help reduce urban sprawl,

will minimize problems historically associated with failing on-site septic systems in the area, and will help keep the from overextending infrastructure.

Development Principles

Since development in general is one the largest threats to Morgan County’s natural resources, the community needs to make every effort to direct development in a manner that preserves and enhances those resources. In past years, a goal of “do no harm” has been a guiding principle relating to environmental concerns. Today’s sustainability movement has established that communities need to go further to repair past damages - and work to help re-build and enhance the natural environment. As a result, development standards are being redefined in communities throughout Indiana and the nation to not just protect what exists – but to go a step further and improve the conditions by restoring habitat, reducing volumes of runoff, controlling non-point source pollution on-site and related measures.

Action steps/best practices listed in this section of the plan begin to outline some of the basic steps that communities can take to address these issues. They form the basis for future development ordinances to implement these measures.

Implementing sustainable practices does not necessarily rely on writing new ordinances. One of the most basic steps a community can take is to be more thorough in development plan reviews. The simple step of reviewing plans before they are built is a first step in identifying potential environmental impacts so that efforts can be made with the developer to update plans to meet those requirements. Another way to implement these goals is to encourage sustainable development by offering reduced permitting fees, faster review times or related incentives for projects that meet a recognized environmental development standard

such as LEED. The community can also demonstrate leadership by following sustainability practices on municipal projects such as streets, utility projects and government buildings.

LEED:
The LEED (Leadership in Energy & Environmental Design) Green Building Rating System is a voluntary, consensus-based standard to support and certify successful green building design, construction and operations. LEED was developed by the U.S. Green Building Council.

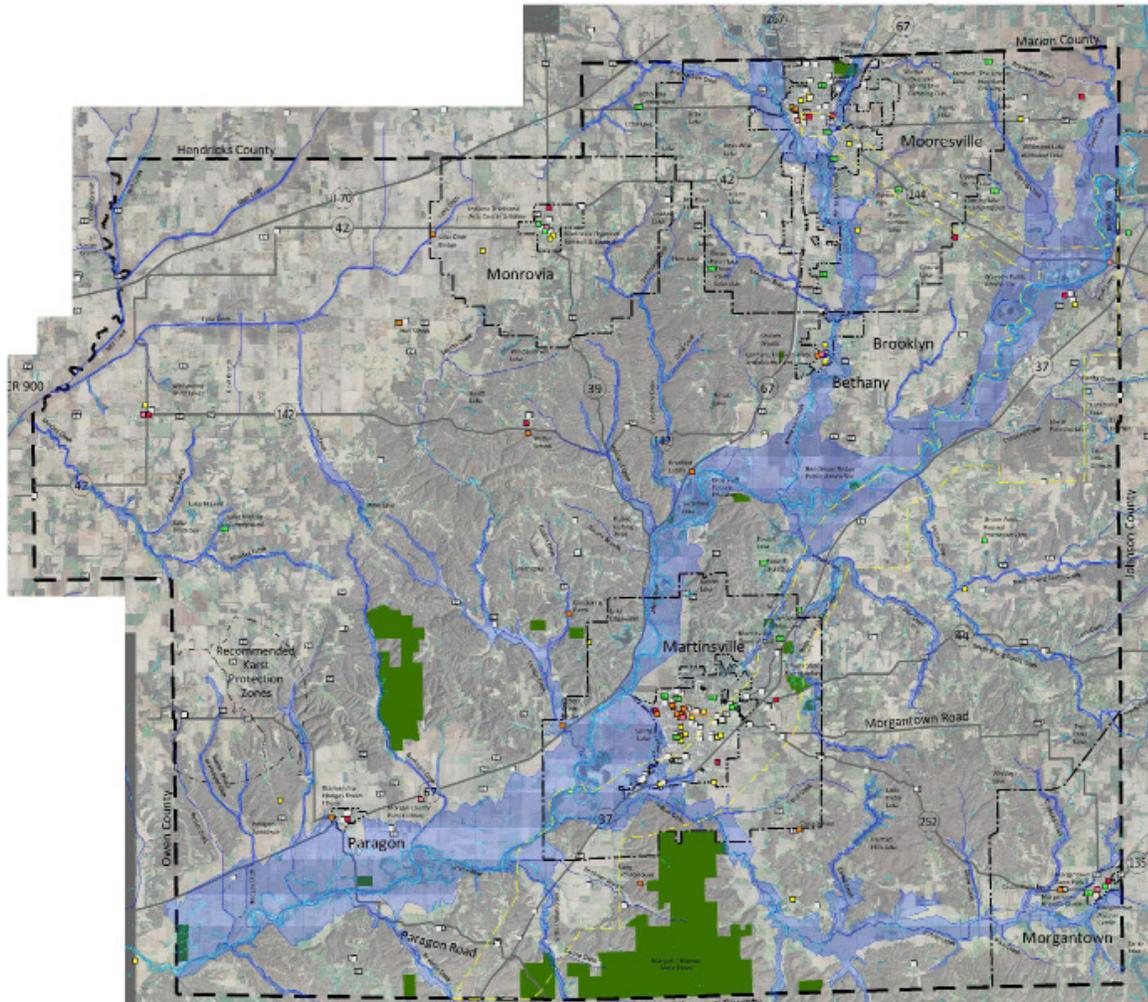
Priority Issues

Of the issues reviewed in the following pages, the following priorities have been established. Details relating to each issue are provided in this section.

1. Protect floodplains from development to preserve these areas and mitigate the impact of flooding on the community.
2. Enact a steep slopes ordinance to guard against deterioration of these features, and to protect scenic views in the community.
3. Encourage cluster development to allow development to occur in fringe areas in a responsible manner that preserves existing topography, habitat and/or unique features.
4. Implement standards for development in karst areas that provide for stricter stormwater runoff quality standards and encourages appropriate land uses in karst areas.

Natural Resources Map

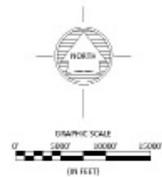
A summary of existing cultural and environmental resources is provided on the next page.



Legend	
Corporation Limits	Campground
Two Mile Fringe	Cemetery
SR 37 / 144 Corridor Overlay	Golf Course
Fire Department	Parks
Historical Site	Historic District
Law Enforcement	Managed Lands
Library	Floodplain
Museum	Lakes
Recreation	Streams
Religious	Wetlands
Schools	White River

Cultural and Environmental Map

Morgan County Comprehensive Plan



Rivers, Lakes and Streams

The White River runs from the northeast corner of Morgan County to the southwest corner. It is listed as an outstanding river by the Indiana Department of Natural Resources Division of Outdoor Recreation and the Natural Resources Commission. An outstanding river is a body of water that has particular environmental or aesthetic interest.

There also exist a number of lakes and smaller streams throughout Morgan County. One of them, White Lick Creek, enters Morgan County north of Mooresville, and travels south through Mooresville until it enters the White River about 3.5 miles north of the corporate limits of Martinsville.

THREATS	THREAT SUMMARY	ACTION STEPS (BEST PRACTICES):
<p>Non-point source pollution (pollution from stormwater runoff)</p>	<p>Non-point source pollution results from stormwater runoff moving over the ground. As this runoff moves along the ground, it collects various pollutants – chemicals, animal waste, trash, sediment – and deposits them into bodies of water.</p>	<p>Preserve natural vegetation to reduce stormwater runoff and protect natural habitats. (IDEM Indiana Stormwater Quality Manual)</p>
		<p>Develop ordinances or regulations that require nonpoint source pollution treatment, such as water quality swales, sedimentation basins, and vegetated filter strips. (EPA National Management Measures to Control Nonpoint Pollution from Urban Areas)</p>
		<p>Establish limits on impervious surfaces allowed on newly developed lots. (EPA National Management Measures to Control Nonpoint Pollution from Urban Areas)</p>
		<p>Revise stormwater ordinances to encourage structural Best Management Practice (BMP) devices to reduce pollutants from being discharged off-site.</p>

<p>Agricultural Runoff (pesticides, herbicides, and sediment from agriculture)</p>	<p>This is non-point source pollution as the direct result of runoff from agricultural lands.</p>	<p>Encourage integrated pest management strategies that require the use of appropriate amounts and types of pesticides at times when runoff will be minimal to reduce the amounts of toxic pesticides that get into streams and lakes. (EPA National Management Measures to Control Nonpoint Pollution from Agriculture)</p>
<p>Impervious Surfaces (increased runoff from surfaces that do not absorb water)</p>	<p>The construction of impervious surfaces is affecting more land, transforming natural greenspace into hard landscapes of buildings, parking facilities and road surfaces.</p>	<p>Construct on-site storm systems to utilize the infiltration capabilities of soils.</p> <p>Encourage the use of green roofs as a way to minimize runoff and store excess stormwater.</p> <p>Create a stormwater utility to generate revenue to address community stormwater runoff from increased impervious surfaces. These utilities assesses fees based on percent impervious area of each lot.</p> <p>Re-evaluate parking requirements set forth by the zoning ordinance</p> <p>Promote open space development or clustering as an alternative to traditional development.</p>
<p>Soil Erosion and Sedimentation</p>	<p>Sediment is the greatest pollutant by volume affecting streams and lakes.</p>	<p>Require the use of water body setbacks for all development near lakes and streams.</p>

Gravel Pit and Quarry Runoff	<p>There are many gravel pits and quarries in Morgan County along the White River. These gravel pits are important resources because there are limited areas in central Indiana where gravel can be extracted. Unfortunately, gravel pits and their operations can be significant contributors to nonpoint source pollution from stormwater runoff, from erosion and sedimentation to leaking equipment.</p>	<p>Utilize erosion control practices at the site. Minimize disturbances to natural vegetation whenever possible to prevent erosion. Replace vegetation in areas with bare soil.</p>
		<p>Treat stormwater runoff that has not been diverted by using oil/water separators, constructed wetlands, or other water treatment options.</p>
		<p>Require wheel washing and street sweeping at the gravel pit in order to minimize the amount of material being tracked offsite.</p>
		<p>Maintain buffer zones around the boundaries of gravel pits, especially those that are located near environmentally sensitive areas.</p>
		<p>Store equipment, fuel, and waste disposal away from the perimeter of the gravel pit, especially if mining below the water table.</p>
		<p>Cover and protect stockpiles from weather events such as wind and rain.</p>

Floodplains

The largest floodplain throughout Morgan County is the White River floodplain. Smaller floodplains surround the many streams that are also located throughout the county, including the White Lick Creek floodplain in the Mooresville area.

Flooding in Morgan County in June of 2008 provides evidence of the need to protect and manage floodplains more effectively. In that period, flooding extended well beyond the 100 year floodplains, and impacted areas even outside the 500 year floodplain. A committee has been formed to guide long term recovery plans and to make recommendations on future policies relating to drainage and floodplain issues. Consequently, detailed recommendations on policies are not included in this comprehensive plan – other to limit development in the floodplain and to work to implement the recommendations made by the committee.

It is noted that maps provided in these documents represent the 500 year floodplain boundaries.

THREATS	THREAT SUMMARY	ACTION STEPS (BEST PRACTICES):
Development within the floodplain	Development within the floodplain results in more areas being susceptible to flooding, and flooding is increased downstream because there is less floodplain area for stormwater storage.	Limit development in floodplains to uses devoted to green space preservation and uses that will limit damages and danger to human lives.
		Support and implement recommendations from the Drainage Task Force/Long Term Recovery Committee.

Wetlands

According to the National Wetland Inventory, a number of wetland areas are located throughout Morgan County, many near streams and lakes. The National Wetland Inventory is a guide that shows where wetlands may occur. If wetlands are suspected in an area to be developed, a wetland delineation must be performed by a wetland consultant to determine the presence of wetlands on the specific site.

Natural wetlands provide a variety of useful functions for the environment. In addition to providing recreational opportunities to people, wetlands also provide essential habitats to many threatened and endangered species. Wetland plants filter pollutants out of the water that flows through them. As a result, our surface and drinking waters are cleaner and safer. Wetlands also protect surrounding areas from floodwaters because they absorb and slowly release the water, prevent erosion of streambanks, and recharge aquifers that provide many peoples' drinking water.

THREATS	THREAT SUMMARY	ACTION STEPS (BEST PRACTICES):
Development of wetland areas	Development pressures for housing, industrial and commercial growth are eliminating wetland areas at an alarming rate.	Encourage preservation and reconstruction of wetlands along riparian corridors and lakes.
		Designate wetlands to be preserved on the zoning map.
Non-point source pollution	While wetlands can naturally filter pollutants to a degree, the volume of pollutants impacting wetlands must be managed	See action steps under Rivers, Lakes and Streams.

Karst Areas

Some karst areas exist on the west side of Morgan County, between S.R. 67 and S.R. 142. There are 11 caves in Morgan County, with 14 mapped entrances. There are also several sinkhole areas and sinking stream basins. These karst areas are generally located within the upper reaches of the Butler Creek-Butler Branch and Fall Creek (Morgan County) watershed. These locations are indicated on both the environmental resource graphic, and on the proposed land use plan.

Karst areas can provide many environmental and recreational benefits to communities. They provide groundwater recharge, stormwater storage, and important animal habitats for many of Indiana’s subterranean species. Caves are also home to several endangered species, including the Indiana bat and the cavefish. They also provide opportunities to explore the caves and underground streams, and to learn about different ecosystems.

THREATS	THREAT SUMMARY	ACTION STEPS (BEST PRACTICES):
Groundwater Contamination	Surface water and groundwater in karst areas are often directly connected through sinkholes and underground streams. As a result, many of the contamination issues that affect surface waters can also affect groundwater in karst areas. Pollutants do not have the opportunities to be filtered out of water in karst areas as they would in other areas.	Establish karst-related overlay zoning district to establish specific karst protections.
		Discourage land uses within the karst area that could result in point sources for water pollution. Examples could include industrial operations; wastewater treatment lagoons and septic systems, animal agriculture; underground storage tanks; and landfills.
		Develop stricter water quality performance standards for watersheds that include karst features. These standards should require best management practices be applied to any potential point or non-point source pollution sources in the watershed. This would include but not be limited to stormwater runoff quality, effluent for septic systems, and wellhead protection standards.

<p>Development in Karst Areas</p>	<p>Unmanaged development in karst areas can damage the structural integrity of cave systems and to surface improvements above the caves.</p>	<p>Discourage development and extension of municipal utilities into karst areas. Prohibit development that would include blasting, heavy loads, or vibrations that could damage underlying formations.</p>
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Groundwater

Groundwater is an important source of domestic drinking water in the area. Several public water systems service the Morgan County area, and each has prepared a wellhead protection plan to identify potential contamination sources for the drinking water (groundwater) and to develop a contingency plan if contamination should occur. Each wellhead protection plan designates a Wellhead Protection Area, which is an area surrounding the water system’s source wells where certain activities are restricted in order to protect the water supply. Wellhead Protection Areas for smaller water supplies are typically a fixed radius surrounding the source wells. For larger water supplies, the Wellhead Protection Areas are non-uniform shapes that are determined by the groundwater flow in the area.

THREATS	THREAT SUMMARY	ACTION STEPS (BEST PRACTICES):
Contamination of Public Water Supply	There are many potential sources of groundwater contamination. These can be point sources like industrial discharge, or nonpoint sources like pesticides from agricultural runoff. There are many methods for protecting groundwater, including structural BMP’s, regulatory practices, and public education and outreach.	Develop a land use plan that restricts potential point sources of pollution in areas sensitive to groundwater contamination
		Purchase land or develop conservation easements in Wellhead Protection Areas.
		Require secondary containment for hazardous substances and chemicals, like grease and oil traps.
		Require as a part of the site plan review process that monitoring wells be installed at sites identified as being vulnerable to groundwater contamination.
Non-point source pollution	Non-point source pollution impacts areas sensitive to groundwater contamination, including karst areas, and areas with highly permeable soils.	See action steps under Rivers, Lakes and Streams.

Steep Slopes

Morgan County has many areas with steep, forested slopes. The largest contiguous area with significant topography is located north of SR 67 between Paragon and Mooresville. South of Martinsville, the Morgan Monroe State Forest and surrounding areas also contain many steep forested slopes. These steep, forested slopes mix with agricultural lands at the far east and west edges of the county.

These steep, forested slopes are not only an environmental resource, but also serve as a key part of the rural character of the community. The hillsides frame scenic views, and the ridgetops are dotted with numerous homesites.

THREATS	THREAT SUMMARY	ACTION STEPS (BEST PRACTICES):
Erosion	Stable slopes help to reduce erosion. When development begins to occur in areas with steep terrain, clearing of vegetation from the slopes can cause extreme erosion to occur. This degrades water quality in surrounding water bodies and further damages surrounding areas.	Enact an ordinance restricting development on terrain determined to be steep.
		Create design standards for developers and property owners to address acceptable land uses for areas with steep slopes.
		Include requirements for preserving existing vegetative cover within steep slopes. The vegetation helps to slow stormwater runoff, minimizing erosion.
Elimination of Scenic Viewsheds	Development on steep slopes threatens to degrade the number and quality of scenic views throughout the county.	Prepare a prioritized inventory of viewsheds within the county and the hillsides that are included in each.
		Prepare development standards for priority viewsheds. Development standards should guide and limit development in priority areas. Standards should include development on slopes (regardless of the pitch), development on ridgetops and associated areas that comprise scenic views.

Wildlife Habitat

Wildlife exists everywhere. Woodlands, caves, agricultural lands, wetlands, lakes and streams are all homes for many different species of animals and plants. When these areas are disturbed by development or other human activities, the animal and plant populations that live there can suffer.

The Indiana Department of Natural Resources Division of Nature Preserves publishes a list of threatened and rare species by county in Indiana. The list for Morgan County includes many mollusk and bird species, as well as some fish, amphibians, reptiles, insects, mammals, and plants. Specific locations of endangered species are kept confidential for the purposes of protecting those species.

THREATS	THREAT SUMMARY	ACTION STEPS (BEST PRACTICES):
Habitat Destruction	As previously undeveloped lands begin to be built up, the natural land cover is cleared, and many wildlife species are displaced.	Utilize cluster development to help keep open space and wooded areas connected to prevent habitat fragmentation.
		Identify environmentally sensitive areas that provide habitat for endangered and threatened species, and avoid extending development in those areas.
		Encourage development on infill areas and redevelopment to prevent the destruction of habitats on undeveloped land. Preserve natural vegetation whenever possible to prevent habitat destruction. Replace native vegetation if preservation is not feasible
Habitat Fragmentation	When development is not continuous, habitats are fragmented, resulting in the relocation or destruction of species	Utilize cluster development to help keep open space and wooded areas connected to prevent habitat fragmentation.

Endangered Species

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Indiana County Endangered, Threatened and Rare Species List County: Morgan

Species Name	Common Name	FED	STATE	GRANK	SRANK
Mollusk: Bivalvia (Mussels)					
Cyprogenia stegaria	Eastern Fanshell Pearlymussel	LE	SE	G1	S1
Epioblasma torulosa rangiana	Northern Riffleshell	LE	SE	G2T2	S1
Lampsilis ovata	Pocketbook			G5	S2
Ligumia recta	Black Sandshell			G5	S2
Obovaria subrotunda	Round Hickorynut		SSC	G4	S2
Pleurobema clava	Clubshell	LE	SE	G2	S1
Pleurobema pyramidatum	Pyramid Pigtoe		SE	G2	S1
Ptychobranthus fasciolaris	Kidneyshell		SSC	G4G5	S2
Quadrula cylindrica cylindrica	Rabbitsfoot		SE	G3T3	S1
Villosa lienosa	Little Spectaclecase		SSC	G5	S2
Insect: Odonata (Dragonflies & Damselflies)					
Aeshna mutata	Spatterdock Darner		ST	G4	S1S2
Fish					
Percina evides	Gilt Darter		SE	G4	S1
Amphibian					
Hemidactylum scutatum	Four-toed Salamander		SE	G5	S2
Rana areolata circulosa	Northern Crawfish Frog		SE	G4T4	S2
Reptile					
Clonophis kirtlandii	Kirtland's Snake		SE	G2	S2
Crotalus horridus	Timber Rattlesnake		SE	G4	S2
Macrochelys temminckii	Alligator Snapping Turtle		SE	G3G4	S1
Ophedrys aestivus	Rough Green Snake		SSC	G5	S3
Bird					
Accipiter striatus	Sharp-shinned Hawk	No Status	SSC	G5	S2B
Aimophila aestivalis	Bachman's Sparrow			G3	SXB
Ammodramus henslowii	Henslow's Sparrow		SE	G4	S3B
Bartramia longicauda	Upland Sandpiper		SE	G5	S3B
Buteo lineatus	Red-shouldered Hawk		SSC	G5	S3
Buteo platypterus	Broad-winged Hawk	No Status	SSC	G5	S3B
Dendroica cerulea	Cerulean Warbler		SSC	G4	S3B
Haliaeetus leucocephalus	Bald Eagle	LT,PDL	SE	G5	S2
Helmitheros vermivorus	Worm-eating Warbler		SSC	G5	S3B
Lanius ludovicianus	Loggerhead Shrike	No Status	SE	G4	S3B
Mniotilta varia	Black-and-white Warbler		SSC	G5	S1S2B
Pandion haliaetus	Osprey		SE	G5	S1B
Thryomanes bewickii	Bewick's Wren			G5	S1B
Tyto alba	Barn Owl		SE	G5	S2
Wilsonia citrina	Hooded Warbler		SSC	G5	S3B
Mammal					
Lutra canadensis	Northern River Otter			G5	S2
Lynx rufus	Bobcat	No Status		G5	S1
Taxidea taxus	American Badger			G5	S2
Vascular Plant					
Epigaea repens	Trailing Arbutus		WL	G5	S3
Eupatorium incarnatum	Pink Thoroughwort		ST	G5	S2
Pinus strobus	Eastern White Pine		SR	G5	S2
Rubus centralis	Illinois Blackberry		SE	G2?Q	S1
Rubus odoratus	Purple Flowering Raspberry		ST	G5	S2
High Quality Natural Community					
Forest - upland dry-mesic	Dry-mesic Upland Forest		SG	G4	S4
Forest - upland mesic	Mesic Upland Forest		SG	G3?	S3
Primary - cliff eroding	Eroding Cliff		SG	G4	S1
Wetland - seep circumneutral	Circumneutral Seep		SG	GU	S1

Indiana Natural Heritage Data Center
Division of Nature Preserves
Indiana Department of Natural Resources
This data is not the result of comprehensive county surveys.

Fed: LE = Endangered; LT = Threatened; C = candidate; PDL = proposed for delisting
State: SE = state endangered; ST = state threatened; SR = state rare; SSC = state species of special concern; SX = state extirpated; SG = state significant; WL = watch list
GRANK: Global Heritage Rank: G1 = critically imperiled globally; G2 = imperiled globally; G3 = rare or uncommon globally; G4 = widespread and abundant globally but with long term concerns; G5 = widespread and abundant globally; G? = unranked; GX = extinct; Q = uncertain rank; T = taxonomic subunit rank
SRANK: State Heritage Rank: S1 = critically imperiled in state; S2 = imperiled in state; S3 = rare or uncommon in state; G4 = widespread and abundant in state but with long term concern; SG = state significant; SH = historical in state; SX = state extirpated; B = breeding status; S? = unranked; SNR = unranked; SNA = nonbreeding status unranked

