Door County
Invasive Species Strategy
2024-2029

Land Conservation Committee
Accepted:

Prepared by:

Jason Miller - Door County Soil & Water Conservation Department & DCIST Coordinator
Samantha Koyen - Door County Soil & Water Conservation Department & Former DCIST Coordinator
Brooke Dreshek - Door County Soil & Water Conservation Department & Former DCIST Coordinator
Jesse Koyen – Door County Land Trust
Tina Lee – Door County Land Trust
Kari Hagenow – The Nature Conservancy
Jacob Kobernick – Wisconsin Department of Natural Resources State Natural Area
Samuel Hoffman – The Ridges Sanctuary
Bobbie Webster – University of Wisconsin Green Bay
Andrew LaPlant - University of Wisconsin Green Bay

421 Nebraska St.
Sturgeon Bay, WI 54311
http://www.co.door.wi.gov/

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AIS	Aquatic Invasive Species
CBCW	Clean Boats Clean Waters
CISMA	Cooperative Invasive Species Management Area
CLMN	Citizen Lake Monitoring Network
CWMA	Cooperative Weed Management Area
DCIST	Door County Invasive Species Team
DCLT	Door County Land Trust
EDRR	Early Detection and Rapid Response
GLEDN	Great Lakes Early Detection Network
GLRI	Great Lakes Restoration Initiative
GPS	Global Positioning System
LMPN	Lakes Monitoring and Protection Network
LNRP	Lakeshore Natural Resources Partnership
NHI	Natural Heritage Inventory data
NNIS	Non-native Invasive Species
PCG	Play Clean Go
SNA	State Natural Area
SWCD	Door County Soil & Water Conservation Department
SWIMS	Surface Water Integrated Monitoring System
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
WDNR	Wisconsin Department of Natural Resources

Executive Summary

Invasive species are a continued environmental, health, and economic threat to Door County. Invasive species are defined as non-native species that negatively impact the environment, economy, and/or human health. Door County has a two-decade long legacy of invasive species control that has resulted in an active and effective cooperative weed management area (CWMA) the Door County Invasive Species Team. The goal of this CWMA is to continue the systematic management and outreach related to invasive species populations in order to maintain ecological diversity and resiliency, protect the health of the community, and to minimize the economic impacts. The current threats posed by invasive species in Door County are significant. To continue these efforts, Door County Soil & Water Conservation Department, as coordinator, and the Door County Invasive Species Team partners developed the updated 2024 Door County Invasive Species Strategic Plan.

The objectives of this Strategic Plan are to prevent new invaders from establishing in Door County, to slow and, where possible, reverse the spread of existing invasive species, and to reduce the harmful impacts of existing invasive species. This plan highlights work that has been undertaken, strategies utilized, identifies potential areas of growth, and outlines future actions necessary to meet the objectives of the Strategic Plan. This Strategic Plan also emphasizes the need for continued collaboration and coordination with local municipalities and partners to maintain historic efforts regarding education and outreach, inventory, monitoring, and management efforts.

To be successful in preventing the introduction and spread of invasive species, both government and non-government organizations, stakeholders, municipal government agencies, and members of the public must be involved. This plan aims to bolster and supplement existing partner management plans and highlights some of the important work that has been undertaken by stakeholders and members of the public and suggests further ways these partners can help fight invasive species.

This document further explains the seriousness of invasive plants and identifies the four goals (pillars) generated by the Door County Invasive Species Team Partners. These goals reflect the need to provide a coordinated approach to managing invasive species throughout Door County and serve as the Door County's intended approach towards invasive species management. To extend the useful life of this Plan, it should be considered a living document and be updated as new information becomes available and/or during the five-year assessment period.

Land Acknowledgement

The Door County Soil & Water Conservation Department respectfully acknowledges the First Nations People of Wisconsin and the original inhabitants of Door County as the original custodians of the land and water on which we rely and operate. We pay our respects to Elders past, present and future. We acknowledge the continued cultural, social and spiritual connections of inhabitants from the earliest post-glacial people known as the Oneota through the more recent indigenous peoples known to live in the area, including the Bodéwadmiakiwen (Potawatomi), Odawa, Menominee, Miami and Očeti Šakówiŋ (Sioux). We recognize and value the essential and continuing contribution of the First Nations people to the region. We apologize if any indigenous or First Nations peoples have been omitted from this land acknowledgement.

Finally, we most respectfully acknowledge the lives and actions of the native biota in providing the peoples of the area with the resources we have used to support our societies, culture and livelihoods in this region.

Section 1: Introduction & Background to Door County

1.1. Door County Landscape

Door County, despite its relatively small size of only 492 square miles, boasts 300 miles of Lake Michigan shoreline, five state parks, and 19 county parks. It is also one of the most biologically diverse counties in Wisconsin. The Wisconsin Department of Natural Resources (WDNR) Natural Heritage Inventory (NHI) analysis of listed state and federal species, including those of special concern, threatened, or endangered status, revealed in its July 2017 update that Door County contains 154 different rare species and natural habitats, including alvar, boreal forest, and Great Lakes ridge and swale communities. Out of the 72 counties in Wisconsin, Door ranks second in rare species element occurrences. Additionally, the Towns of Baileys Harbor, Liberty Grove, and Washington Island rank 4th, 5th and 8th, respectively, out of 1,259. This diversity and wealth of natural resources has also led to the establishment of several protected areas, including the Gravel Island and Green Bay National Wildlife Refuges, 28 Wisconsin State Natural Areas (SNAs), and an additional 11,000 acres of land under conservation ownership by non-profit conservation organizations and land trusts. All of these areas are managed for the public's responsible use and enjoyment.

These rich resources face numerous threats that compromise their ecological integrity. Human activities such as residential and commercial development, and unsustainable agricultural practices disrupt natural processes, leading to habitat fragmentation and water pollution. Significant habitats along the Lake Michigan and Green Bay shorelines are increasingly threatened by shoreline hardening and dredging, which compromise natural sediment movement, disrupt wetland ecosystems, and exacerbate erosion.

The county's water quality is further jeopardized by agricultural runoff, nonpoint source pollution, and altered stream flow patterns. Further, the distinct karst topography also makes it vulnerable to groundwater contamination. Invasive species, deer overbrowsing, and pests like spongy moth pose challenges to the county's native ecosystems. Combined with the effects of shoreline erosion and expanding infrastructure, these stressors underscore the urgent need for sustainable land use and conservation strategies to preserve Door County's natural heritage for future generations. The diverse cultural, recreational, and natural resources of Door County have also resulted in a varied group of stakeholders when it comes to invasive species education, management, and control.

Photo 1.2: Federally threatened dune thistle *(Cirsium pitcher*).

Photo 1.1: Federally threatened dwarf lake iris (*Iris lacustris*).

1.2. Significant Habitat and Natural Areas in Door County

The following are brief overviews of areas collectively identified for conservation to protect Door County's plant and animal life and their habitats. Please refer to the document A Guide to Significant Wildlife Habitat and Natural Areas or Door County, Wisconsin (2003) for a more in-depth analysis of each area.

Ahnapee River Corridor

This approximately 5,200-acre corridor is a complex ecosystem encompassing the Ahnapee River, Keyes Creek, Brussels Hill, and Gardner Swamp. It provides a vital habitat connection from Kewaunee County to the waters of Green Bay. Predominantly surrounded by woodlands and farmland, the area faces significant threats from agricultural runoff and development pressure along the Ahnapee river floodplain.

Black Ash Swamp

Spanning approximately 5,000 acres across Door and Kewaunee counties with approximately 2,100 acres in Door County itself, The Black Ash Swamp is the largest contiguous block of forested land in southern Door County and represents a critically important ecological habitat. The surrounding landscape is primarily agricultural. Key threats to the Black Ash Swamp include unsustainable logging practices that jeopardize its ecological value, an increasing Spongy Moth population, and poor agricultural practices in surrounding areas.

Delwiche-Sand Hill Pineries & Fabry Creek Complex

Known for its old-growth red and white pines, the Delwiche-Sand Hill Pineries & Fabry Creek Complex encompasses 930 acres and serves as a vital north-south wildlife corridor along the western edge of the Niagara Escarpment in southern Door County. The area is predominantly forested, interspersed with farmland and logged woodlands. Fabry Creek, a 3.7-mile waterway within the corridor, suffers from pollution caused by agricultural runoff, including excess nutrients, sediment, and bacteria. Unfortunately, the creek lacks protective buffers as a result of past ditching, grazing, and its proximity to livestock operations.

Renard Swamp

Renard Swamp is a significant ecological complex covering 1,570 acres near Green Bay. It features diverse habitats such as southern hardwood swamps, mesic-wet beach ridges, and Renard Creek, which is home to a substantial, largely undisturbed stand of southern hardwoods. Despite being predominantly surrounded woodlands, some sections along Renard Creek lack protective buffers due to adjacent pasture and cropland. The swamp faces various threats, including unsustainable logging practices, sediment influx, pollution from agricultural runoff, and invasive plant species.

Stony Creek Wetlands Complex

As the largest creek system in southern Door County, the Stony Creek Wetlands Complex encompasses approximately 6,370 acres of interconnected wetlands, forests, and waterways. Flooded hardwood swamps and perennial wetlands feed Stony Creek, which meanders through expansive marshes before flowing through a forested terrace. This ecologically vital system is regarded as the second most important wildlife area in the region. The complex presents a mosaic of second-growth forests, farmland, and extensive wetlands, all of which are threatened by agricultural and residential encroachment, nonpoint source pollution, groundwater contamination due to shallow soils and fractured bedrock, and invasive plant species.

Brussels Hill/Keyes Creek/Gardner Swamp Complex

This area features a prominent landmark in southern Door County, the Brussels Hill, an expression of the Upper Ordovician and Silurian bedrock that forms the Niagara Escarpment. Karst formations, including exposed creviced bedrock, sinkholes and pit caves are prominent in this area. This 7,215-acre complex is composed of largely contiguous tracts of forests, wetlands, and dolostone karst features. Adjacent to Brussels Hill, the Gardner Swamp area is a 5-square mile wetland complex dominated by sugar maple forests, upland islands, and lowland forests. 1.5-square miles of the swamp are protected as the Gardner Marsh State Wildlife Area. Keyes Creek flows through the swamp, originating at Brussels Hill and discharging into Green Bay at Little Sturgeon Bay. The surrounding

land use is primarily agriculture, with some woodlots and residential areas. The area faces threats from increased residential and commercial development, water quality degradation, and the loss of open spaces.

Hungry Settlement Marsh

This area is a 375-acre complex, located in south-central Door County, is a unique association of bog, alder thicket, and tamarack swamp, mostly surrounded by upland forest and wetlands. The marsh remains relatively undisturbed, with minimal human impact and few invasive species. A small tributary connects the marsh to Stony Creek. The surrounding land is primarily agricultural and rural residential. Due to the bog nature of this area, there is little threat of development or road construction.

Southern Lake Michigan Shoreline

Stretching for approximately 16 miles, the Southern Lake Michigan Shoreline, encompasses 16,200 acres of diverse habitats, including sand dunes, swale forests, wetlands, bedrock outcrops, and upland forests. This rich tapestry of habitats, including lakes, streams, and shorelines, is an ecologically significant area boasting impressive biodiversity and natural features. Several protected areas, such as Whitefish Dunes State Park and the Nature Conservancy's Shivering Sands project, showcase the region's unique character. Shivering Sands is a 4,000-acre complex featuring diverse habitats, including shoreline, forests, wetlands, and unique geological features. Dunes Lake, the largest of three lakes within the complex, is fed by Geisel Creek and several springs and outlets to Lake Michigan via Shivering Sands Creek. Two smaller shallow embayment lakes; Schwartz and Arbter lie to the north of Dunes Lake. Lily Bay Creek, an important ecological corridor, connects the lakeshore to the interior of the peninsula, winding through agricultural lands and woodlots before discharging into Lake Michigan.

Kellner Fen is a 60-80-acre embayment wetland that has no natural outlet to Lake Michigan. This unique fen boasts a floating peat mat with a network of interconnected open-water pools at its center. The fen is bordered by a variety of ecosystems, including a sand ridge or dune and swale complex, a white cedar swamp and a conifer hardwood forest. The surrounding land is primarily composed of woodlots, natural areas, orchards, old fields, and a landscape nursery. The Sturgeon Bay Ship Canal, constructed in the 1870s, cuts through an area of extensive ridges and swales. This area is a mix of dry sites with pine, hemlock and birch, and lowlands between the ridges with cedar, green ash, and alder. Land use in the area is predominantly recreational near the canal and agricultural away from the shore. The Clay Banks area is a section of approximately 1.5 miles of relatively undeveloped shoreline featuring a mix of cedar and hardwood forests. Wetlands in the lower areas provide drainage to Lake Michigan via several small creeks. The land cover is primarily wooded along the shoreline, with some residential homes and recreational areas. Inland areas are predominantly agricultural. Development pressures, invasive species, and poor logging practices pose significant threats to the entire Southern Lake Michigan Shoreline. Additionally, poor agricultural practices can negatively impact wetland and surface water areas.

Sawyer Harbor/Lost Creek & Larson Creek Watersheds Complex

Located in west-central Door County, this complex spans approximately 4,590 acres. Together with the Stony Creek Wetlands Complex, it forms a critical habitat corridor connecting Green Bay to Lake Michigan. This habitat corridor is crucial for protecting surface and groundwater quality. The complex features lowland cedar and ash swamps that provide vital terrestrial habitat, while the surface waters discharging to Green Bay at Sawyer Harbor and Sand Bay are important for fish spawning. Sawyer Harbor is a popular recreational area due to its sheltered nature and its proximity to Potawatomi State Park. The surrounding land use is predominantly recreational with some residential areas. Lost Creek is a 2.5-mile stream flowing through a 2.2-square-mile watershed primarily consisting of cropland. A golf course and the county landfill are in close proximity to this stream. Larson Creek is a 4-mile intermittent stream originating in Cunningham Swamp and flows through cropland, pasture, and residential areas before discharging to the bay of Green Bay at Sand Bay; it is part of an 8.9-square mile watershed. Threats to this complex include land-use changes such as agricultural practices and residential development, as well as sedimentation to wetlands. Sinkholes and other karst features, like caves and underground channels, in this complex pose a threat to water quality due to nonpoint sources of pollution.

West Branch Whitefish Bay Creek Corridor

The West Branch Whitefish Bay Creek Corridor is a 2,150-acre complex of upland forests and lowland swamps. Originating from a natural spring and a small ephemeral pond, the West Branch of Whitefish Bay Creek is 4.8 miles in length and flows south to Whitefish Dunes State Park. This corridor is ecologically significant due to the contiguous nature of the riparian habitat as well as several intact

forest types and wetlands in the headwaters and throughout the entire site. Surrounding land use is predominantly cropland with some woodland and plantation forests. Primary threats include poor agricultural practices, stream contamination, and residential development.

Bay Shore Bluff Lands

Located along the western shore of Door County on the bay of Green Bay, Bay Shore Bluff Lands covers approximately 3,250 acres. This area features the Niagara Escarpment, resulting in many karst features like caves and sinkholes. The Door County Land Trust owns a 124-acre parcel along the bluffs designated as a State Natural Area. This area showcases diverse habitats, including hardwood swamps, open cliff faces, and dry mesic forests. The base of the escarpment features seeps, while the north end has springs and ponds. These differing habitats also support a diversity of rare or uncommon species. Land use surrounding this area is largely cropland, woodlots and orchards with some residential areas and recreational land. Within the larger Bay Shore Bluff Lands, the Spring Lane Hardwood Swamp, is a 15-acre spring-fed swamp that is drained by several sinkholes. This area is predominantly wooded with fewer instances of residential, cropland and orchards. Threats to this area are predominantly related to development in the form of loss of forest cover, destruction of bedrock, filling of wetlands and karst features and increased impervious surfaces. Other threats include poor logging practices, invasive species, Spongy Moth invasion and increased deer herbivory as subdivisions increase.

Logan Creek/Lost Lake Corridor

This corridor spans approximately 4,950 acres that includes Logan Creek, a 5.4-mile Outstanding Water Resource, and Lost Lake, a spring-fed, shallow, marl-bottomed seepage lake. The corridor's significance lies in Lost Lake's quality and the presence of several state-significant species. This area features a diverse wetland complex north of Lost Lake and an extensive conifer forest along Logan Creek. Surrounding land use includes cropland, pasture, and orchards. Threats to the corridor include agricultural runoff, livestock grazing near the creek, and potential future residential expansion.

Bay to Lake Wildlife Corridor

The Bay to Lake Wildlife Corridor, encompassing 15,200 acres in north-central Door County, is a vital ecological link between Green Bay and Lake Michigan. This corridor is comprised of two branches and is home to a rich diversity of habitats, including forests, wetlands, and streams.

The first branch includes the Fish Creek Watershed, featuring the 1.5-mile Fish Creek and forested wetlands with the prominent feature being the Niagara Escarpment; Thorp Pond, a 6.4-acre lake with no defined inlet or outlet and its associated wetlands that connect to the Fish Creek watershed. Hibbards Creek, a 7.4-mile stream originating southeast of Thorp Pond, drains a 21.9-square mile watershed and flows through wetlands, conifer swamps, dry-mesic woodlands, and ridge-swale complexes; ultimately discharging into Lake Michigan. Land use in this branch ranges from woodlots, idle farmland, orchards and single-family residences on the west end to primarily agriculture and residential on the east shore. The continuation of development poses the largest threat to this branch, leading to habitat loss, water pollution, and stream degradation.

The second branch, Piel Creek-Kangaroo Lake system, is located in a shallow trough of the Niagara Escarpment. Piel Creek is a 2.5-mile stream originating in a large wetland complex and flows to the north end of Kangaroo Lake. Numerous springs discharge to the creek and several are present where it discharges to the lake. Kangaroo Lake is an embayment lake formed by sand deposition and dune formation following glacial recession. The lake is dissected by a causeway with three culverts connecting the north end with the south. Hines Creek, a one-mile stream draining through a ridge-swale complex, provides the outlet for Kangaroo Lake and connects it to Lake Michigan. The south shores of Kangaroo Lake are highly developed with residential homes. Situated along these shores is Meridian Park, a 155-acre area of protected land that helps create an ecological corridor connecting Kangaroo Lake to Lake Michigan, offering valuable habitat for wildlife amid the surrounding development. Surrounding land use is primarily woodlands in the Piel Creek corridor, with extensive development along Kangaroo Lake's shores. The north end of the lake remains undeveloped with much of the property owned by The Nature Conservancy and the Door County Land Trust. Threats to this branch include poor agricultural practices near Hibbards Creek, leading to nonpoint source pollution and stream degradation from livestock grazing. Additionally, poor logging practices, recreational vehicle use, and the invasion of exotic species pose challenges. Continued development near Thorp Pond,

Kangaroo Lake, and along the Piel Creek corridor, along with increased road traffic, will exacerbate habitat fragmentation, water pollution risks, and stream degradation.

Ephraim/Baileys Harbor Forest Corridor & North Bay Lowlands

Encompassing 11,100 acres in northeastern Door County, this extensive complex is a mosaic of natural areas managed by various entities, including The University of Wisconsin-Green Bay, the Ridges Sanctuary, The Nature Conservancy, The Door County Land Trust and the Wisconsin Department of Natural Resources. Characterized by cedar swamps, glacial landforms and a forest corridor with few roads, this area is a valuable ecological resource. Ephraim Swamp, a lowland swamp extending from the west shore of Door County at Eagle Harbor to the southeast towards Baileys Harbor. Hidden Springs Creek, an Exceptional Resource Water, originates in Ephraim Swamp and outlets to the bay of Green Bay. The Baileys Harbor Forest Corridor, composed primarily of lowland swamp species such as black spruce, tamarack, and white cedar, continues from the perimeter of Ephraim Swamp to the Lake Michigan shoreline. Two creeks flow into this swamp: Hidden Brook Creek, which follows a ridge/swale system and an unnamed stream that flows into Mud Lake, a 155-acre drainage lake that empties into Lake Michigan at Moonlight Bay via Rieboldts Creek. The North Bay Lowlands/Three Springs area comprises 4,700 acres and contains 8,500 feet of shoreline along North Bay in Lake Michigan, a very significant stretch of pristine shoreline in the county. This area contains several rare species including the federally endangered Hines emerald dragonfly. Land use in this corridor ranges from cropland, recreational public land and natural areas surrounding Ephraim Swamp to predominantly woodlots in the Baileys Harbor Forest Corridor and the Lake Michigan shoreline. Threats to this large corridor include habitat fragmentation from residential development, disruption of surface and groundwater flow regimes, recreational vehicle use, poor logging practices, and nonpoint source pollution from sewage, road maintenance, and poor agricultural practices.

Mink River/Rowley's Bay System

This area comprises approximately 2,900 acres and includes the Mink River Estuary, an Outstanding Resource Water and State Natural Area. The Nature Conservancy owns much of the surrounding property. Upland areas feature abandoned cropland and orchards, interspersed with some active agriculture and low-density residential areas. Lower segments are largely undisturbed wetlands and marshes with sand ridges and swales near the Lake Michigan shoreline. Threats to this significant system include groundwater contamination from failing septic systems or nutrient loading, invasive species, and development pressures.

Europe Lake Forest Area

This system is made up of 1,700 acres of northern mesic forest and features Europe Lake, Wisconsin Bay, and Table Bluff. Europe Lake is a 273-acre seepage lake separated from Lake Michigan by a dolostone ledge and sand dune topography. The southern edge of the forest area and the lake is bordered by Newport State Park, with a portion designated as Europe Bay Woods State Natural Area, creating a significant ecological habitat. The land use surrounding this area is primarily natural areas with some idle cropland, orchards and residential lots. Development pressures pose the biggest threat to this area, potentially causing habitat fragmentation.

Grand Traverse Islands

Made up of all major islands in the surrounding waters of Door County, most these 19 islands are underlain by Silurian dolostone, which outcrops on the shoreline and occasionally in the interior. Washington Island features several State Natural Areas, including, Jackson Harbor Ridges, Big Marsh, Little Marsh, and Coffee Swamp as well as 850 acres of wetlands. Rock Island is a state park with a large portion, Rock Island Woods, designated as a State Natural Area. Collectively, these islands have been inventoried and found to contain 64 rare species of animals, invertebrates, and plants among 18 natural community types. Threats that exist for these islands include forest management practices, deer herbivory, invasive species, dominance by colonial water birds on some smaller islands and human pressures from development and recreation on some of the larger islands.

1.3. Wisconsin Land Legacy Places

These areas have been identified by the Department of Natural Resources (DNR) as places critical to meeting Wisconsin's conservation and outdoor recreation needs over the next 50 years. Over a three-year period, from 1999 to 2002, the DNR hosted numerous public and staff meetings to gather information, local knowledge, and opinions about Wisconsin's land and water. The

following places are those identified as meeting those criteria in Door County. Please refer to the document Wisconsin Land Legacy Report for a more in-depth analysis of each area and a more detailed discussion of the specific resource concerns.

Chambers Island

The forests on the island are excellent, extensive, second-growth mixed beech, hemlock, sugar maple, and red oak. The absence of deer for approximately ten years has allowed for robust tree regeneration. To protect the island's natural communities and plant species, continued cooperation among the WDNR, Door County Land Trust and the Chambers Island Landowners Association is essential.

Colonial Waterbird Nesting Islands

Scattered throughout Green Bay and along the Lake Michigan coast, numerous small islands are used primarily by colonial waterbirds for nesting. Examples include Hat, Little Strawberry, Jack, Adventure, Spider, Gravel, Pilot, Hog, and Fish Islands. Ownership varies, with some islands belonging to the U.S. Coast Guard and others in private hands.

Door Peninsula Hardwood Swamps

Scattered along the southern Door Peninsula are several large wetlands dominated by black ash and red maple. Examples include Duvall, Gardner, Cunningham, May, Stony Creek, Maplewood, Black Ash, and Lipsk Swamps. These wetlands provide consistent water flow to creeks and streams and serve as habitat for various wildlife. While their wet nature limits recreational opportunities, protecting surrounding lands could enable the development of trails.

Eagle Harbor to Toft Point Corridor

A lowland corridor of predominantly wooded swamps runs across Door County. Ephraim Swamp and Baileys Harbor Swamp, both containing extensive forested wetlands of maple, ash, and cedar, act as an ecological corridor across the Door Peninsula. The federally Endangered Hine's Emerald dragonfly occurs in the corridor. Given the wet nature of this corridor, recreation opportunities would be limited.

Grand Traverse Islands

The Grand Traverse Islands, extending off the north end of the Door Peninsula, include Plum, Detroit, Washington, and Rock Islands, along with other small outcroppings. With the exception of Washington Island, they are predominantly forested. The islands are generally rocky and are subject to severe weather conditions. The islands are frequented by water birds during migration. Many rare natural communities occur on the islands, including Great Lakes alkaline rock shore. Some islands support large deer populations. Washington Island, the largest of Lake Michigan's islands, has a diverse landscape with some agriculture, fallow farm fields, forests, and wetlands. On the island's northeast side, Jackson Harbor Ridges State Natural Area contains an excellent assemblage of rare and uncommon vascular plants. The beach features undulating sand dunes and interdunal swales with a unique community that prefers wet calcareous soils. Coffee Swamp State Natural Area, located about ½ mile inland from the north coast, contains a high-quality fen with boreal components. Expanding protection efforts north to include part of the shoreline of Lake Michigan would increase the protection of this ecologically important site. Big Marsh, a complex of boreal rich fen, high quality northern wet-mesic forest, and an unusual emergent aquatic community, features large expanses of seasonally dry marl and dolostone gravel "pavement." Although much of the island's shoreline is developed with seasonal and permanent houses, some valuable sand dunes remain worthy of protection.

Kangaroo Lake

Kangaroo Lake was formed by a combination of dune deposition, receding lake levels, and post-glacial land rebound. The lake is shallow with a marl bottom and calcium rich water. Surrounded by a matrix of agricultural, residential, and forest land, it harbors high quality natural communities and rare species at both its north and south ends. At the north end are plant species characteristic of fens, sedge meadows, marshes, and shrub-carrs. Plants that can tolerate high levels of calcium in the soil, such as shrubby cinquefoil, hoary and bog willow, twig-rush and wire-leaved sedges, are present. The south end of Kangaroo Lake features a complex of old beach ridges and dunes, now wooded with hemlock, sugar maple, and yellow birch. Also present are beech, red maple, white cedar and a few super-canopy white pines. This mesic forest type on a stabilized lake sand dune is quite rare in Wisconsin.

Mink River Estuary-Newport State Park-Europe Lake

The Mink River Estuary provides critical spawning habitat for Lake Michigan fish and is a very important migration site for many birds. Estuaries, areas where river water mixes with oceans or lakes large enough to experience tides, or "seiches," are highly productive ecosystems; yet, very fragile and susceptible to disturbance. The Mink River originates in a series of hardwater springs and flows through lowland forest dominated by white cedar. After a short distance, it enters a large marsh and eventually empties into Rowley's Bay. The marsh, which includes both shallow and deep-water sections, is a mix of shrubs (willow, dogwood, and alder), sedges, and bulrushes. Changing lake levels play a significant role in maintaining the diverse and dynamic habitats, exposing mud flats and flooding vegetation. More than 200 bird species pass through the estuary each year, including a wide variety of ducks, herons, gulls, bitterns, cormorants, and loons. Fishing is popular in the bay and throughout the estuary. Due to temperature differences between the river and Lake Michigan, northern pike and bass are the primary game fish that use this area. Less commonly steelhead and brown trout migrate up the river and its tributaries. The estuary's diverse habitats support numerous mammals, reptiles, amphibians, and invertebrates.

Europe Lake was a bay of Lake Michigan; however, the action of waves and currents transformed it by creating a bar of gravel and sand across the mouth of the embayment. There is a forest of virgin red and white pine and old-growth beech-sugar maple mesic forest between Europe Lake and Lake Michigan. Swampy pockets of boreal forest occur east of Europe Lake, and this habitat supports many rare plants. A small portion of the site is now within Newport Beach State Park.

Niagara Escarpment

The Niagara Escarpment, a long dolostone ridge, runs from Door County's tip south along Lake Winnebago's east side, eventually receding underground in Dodge County. The Escarpment continues eastward through Michigan's Upper Peninsula, into Canada, and then resurfaces to form Niagara Falls. This linear, high ridge provides many of the state's most spectacular views and is the logical means to link many existing protected areas on and near the Escarpment. Ellison Bluff, Red Banks Alvar, Carlsville Bluff, High Cliff State Park, and Horicon Ledge are some of the best-known places along the Escarpment. Due to its length and proximity to the Fox River Valley cities, it is one of the most frequently visited features in the state, and there is considerable interest in protecting additional areas to meet conservation and recreation needs. The Escarpment's numerous rock outcrops, cliffs, and talus slopes support unusual habitats and uncommon species. Pockets of ancient cedar trees, cold springs, and areas where cool air gently flows out of the rocky hillsides are scattered along the Escarpment. These fragile microhabitats support delicate ferns, flowers, and perhaps most notably, a collection of extraordinarily rare snails. Areas along the Escarpment, particularly in Door County, have relatively thin soil deposits as a result of glacial scouring and little post-glacial deposition. These soil conditions, combined with the fractured nature of the dolostone, can lead to groundwater contamination problems.

North Bay to Bailey's Harbor

This shoreline is one of the highest-quality and most ecologically valuable stretches of shoreline in the Midwest, featuring boreal forest, ridge-swale complexes, northern wet-mesic forest, sedge meadow, and cobble and bedrock beach. Along Bailey's Harbor lies the Ridges Sanctuary, which harbors a series of Lake Michigan beach ridges forested with black spruce, white spruce, balsam fir, and white pine, with wet swales between the ridges. Some swales contain swamp conifers, while others are filled with marsh and bog flora. Portions of the ridges are open, wet, and calcareous and support a remarkable assemblage of rare and endangered plants. This site has the largest known population of the federally-Endangered Hine's emerald dragonfly. The peninsula between Bailey's Harbor and Moonlight Bay features several diverse plant communities within a relatively short distance. The vegetation of the eastern shoreline, influenced by the cooling effects of Lake Michigan, consists of a narrow strip of relict boreal forest dominated by balsam fir and white spruce. A fine example of the rare cobble beach natural community exists along the point. The remainder of this peninsula is a mesic forest of sugar maple, yellow birch, hemlock, and scattered white pine. To the north, along Moonlight Bay, an extensive sedge meadow transitions into shrub-carr and wet-mesic forest. The wet-mesic forest is dominated by white cedar with occasional paper birch and black ash. The site, along with the adjacent Ridges Sanctuary, contains many area- sensitive bird species including seventeen species of nesting warblers. Inland from Moonlight Bay lies Mud Lake, a shallow, hard-water drainage lake surrounded by an extensive shrub and timber swamp. The lakebed is predominantly marl, although dolostone bedrock is found in some areas. There are many old snags present and water levels fluctuate with seasonal precipitation. Aquatic plants are most diverse in the outlet stream and include bur

reed, coontail, pondweeds and wild rice. The lake features softstem bulrush, yellow water lily, giant reed, and cattail. The plants under the old snags include sweet gale, dogwood, and willow. Rieboldt Creek, flowing from Mud Lake to Lake Michigan, has historically been stocked with trout and the creek has potential to support a trout spawning run. Waterfowl use is occasionally heavy. Migratory shorebirds and waterfowl are attracted to this stretch of Lake Michigan shoreline, and this site is one of the few known nesting sites in Wisconsin for the common goldeneye. Inland communities also support a wide variety of Neotropical birds, including species associated with northern boreal forests and wetland communities. Baileys Harbor, Moonlight Bay, and North Bay also provide significant spawning habitat for the whitefish population.

Peninsula State Park

Peninsula State Park, established in 1909, is a 3,770-acre state treasure on the western side of the peninsula. Nearly seven miles of Green Bay shoreline wrap around a landscape of forests, meadows, and wetlands. Rocky bluffs ascend over 150 feet above the bay. Considered by many to be Wisconsin's most complete park, Peninsula is also one of the most popular camping destinations in the state. Visitors can hike, bike, boat, golf, and swim during spring, summer, and fall. Winter offers cross country skiing, snowshoeing, sledding, and snowmobiling. Camping, nature programs, and sightseeing are offered year-round.

Peninsula State Park to Jacksonport Corridor

This north-south corridor across Door County follows a series of upland forests and grasslands from the park to the headwaters of Hibbard Creek and then along the creek valley down to Jacksonport. This predominantly upland corridor acts as an ecological connection across the Door Peninsula and could provide various trail opportunities. This corridor is a complement to the nearby Eagle Harbor-Toft Point linkage.

Red Hill Woods-Brussels Grassland

Brussels Township contains a mosaic of hay and small grain farm fields interspersed with open grasslands. This combination supports numerous grassland birds, including upland sandpipers. North of this large open area lies Red Hill, which contains the largest remaining maple-beech forest in this ecological landscape. Together, this area forms a valuable corridor between Gardner and Black Ash Swamps.

Shivering Sands

Running from Cave Point County Park to Rocky Point south of the Sturgeon Bay Canal, the shore and near shore areas here feature high quality dunes, wetlands, and forests. Whitefish Dunes State Park contains both active dunes dominated by shifting sands and herbaceous plants, as well as stabilized dunes supporting American beech, hemlock, and sugar maple. Further south is a large white cedar swamp surrounding three undeveloped lakes. Orchids flourish amidst mosses and downed trees in this swamp. The open fen community bordering the lake harbors rare species like tussock bulrush and coast sedge, while dwarf lake iris blooms in the dolostone-based upland conifer forest east of the central cedar swamp. Near the ship canal, additional large wetland complexes, including some high-quality cedar swamp and northern fens, are present. The entire area supports an impressive suite of mammals including fisher, otter, black bear, snowshoe hare, porcupine, and mink. The site is also home to many breeding birds, including all three accipiters known in Wisconsin (Cooper's hawk, goshawk, and sharp-shinned hawk). Black terns as well as sandhill cranes are regular breeders on Dune's Lake, while the ridge and swale forest host numerous Canada warblers and northern water thrushes, among others. A total of 110 species of birds have been recorded on breeding bird surveys from the area.

1.4. Current Conditions of Surface Water Bodies in Door County

1.4.1. Streams, Creeks and Rivers

There are 38 named streams throughout Door County, and the majority of all streams are relatively short (less than six miles in length) and many have limited intermittent flow. For a complete description of Door County lakes and ponds, please refer to the *Surface Water Inventory of Door County* prepared by the SWCD in December of 2000. Included within each of the watershed sections is a summary of recent water quality and habitat monitoring data collected by Door County Soil & Water Conservation Department staff and/or partners including the University of Wisconsin – Oshkosh, the Wisconsin Department of Natural Resources, and conservation nonprofits including The Ridges Sanctuary, The Door County Land Trust, The Nature Conservancy, and Crossroads at Big Creek. Other water quality data exists for some of these streams and the results presented here are an overview of general conditions, not an exhaustive inventory of available data.

1.4.2. Major Watersheds

Red River/Sturgeon Bay Watershed

The Red River/Sturgeon Bay Watershed, spanning approximately 89,200 acres (139 mi^2), encompasses several creeks that flow to Green Bay.

This watershed lies within the counties of Door (78%), Kewaunee (13%) and Brown (9%) and is primarily agricultural with approximately 60% of the watershed comprised of cropland, farmsteads/pastures, and conservation reserve land. Dairy farming is the dominant agricultural land use. This watershed has historically been ranked medium for nonpoint source issues affecting streams and high for nonpoint source issues affecting groundwater. Table 2-5 summarizes characteristics and Figure 2-21 illustrates the locations of creeks located in the Red River/Sturgeon Bay Watershed.

Figure 1.1: Locations of streams in the Red River/Sturgeon Bay watershed.

Creek	Length (Miles)	Width (Ft)	Gradient (ft/mi)	Flow	Substrate	Watershed (mi^2)	Aquatic Invasive Species Documented
Fabry (WBIC 100800)	3.7	4	43	Intermittent	Rock/Cobble, Sand, Gravel	2.7	
Renard (WBIC 100600)	6	6	35	Continuous	Gravel, Silt	7.2	
Silver (WBIC 5013558)	2.5	6	32	Intermittent	Gravel	2.5	
Sugar (WBIC 100500)	9	9	17.8	Continuous/Intermittent	Rock/Cobble	11.6	Rusty Crayfish
Twin Harbor (WBIC 5012298)	2		20	Intermittent	Rock/Cobble	3.3	
Keyes (WBIC 100400)	9.8	4	8	Continuous	Sand, Gravel	17	Flowering Rush, Rusty Crayfish, Starry Stonewort
Malvitz (WBIC 5012585)	2.2	6	17.4	Intermittent	Rock/Cobble	1	
Krueger (WBIC 3000031)	2.7		20	Intermittent	Rock/Cobble	5.6	
May (WBIC 100300)	5		14.6	Intermittent	Rock/Cobble, Silt	5.3	
Larson (WBIC 100200)	4	6.3	46.5	Intermittent	Sand, Gravel	8.9	
Lost (WBIC 3000417)	2.5		8	Intermittent	Silt	2.2	
Unnamed #2 (WBIC 5012454)	2.7		10	Intermittent	Silt	3.3	
Samuelson (WBIC 5012498)	1.25		24	Intermittent	Rock/Cobble	3.7	Non-native phragmites
Unnamed #1 (WBIC 5012410)	1		120	Intermittent	Silt	1.6	
Strawberry (WBIC 100150)	1.6	12	12.5	Continuous	Sand	4.4	Purple loosestrife, non-native phragmites, rusty crayfish, reed canary grass

Table 1.1: Characteristics of streams in the Red River/Sturgeon Bay watershed.

Ahnapee River Watershed

The Ahnapee River, 14.7-miles long, originates in southern Door County and flows southeast through Kewaunee County and enters Lake Michigan at the City of Algoma. The Door County portion of the Ahnapee River is approximately 8.5 miles in length and averages approximately 25-feet in width. The Ahnapee River and its tributaries encompass a watershed of approximately 31,200 acres. Analysis of the land use in the Ahnapee River Watershed reveals that approximately 53% is dedicated agricultural activities. The Ahnapee originates in a wetland and spring complex and is fed by several tributaries. Silver Creek, located in the Town of Brussels, is the river's only named tributary, draining a primarily agricultural landscape and jones the Ahnapee River near its headwaters. The Door County portion of the Ahnapee River enters the Forestville Millpond, a 94-acre impoundment created by a dam constructed in 1877. Table 2-7 summarizes characteristics and Figure 2-22 illustrates the locations of the Ahnapee River, Silver Creek and the Forestville Millpond.

Figure 1.2: Locations of Streams in the Ahnapee River watershed.

Creek/River	Length (Miles)	Width (Feet)	Gradient (ft/mi)	Flow	Substrate	Watershed (mi^2)	Aquatic Invasive Species Documented
Silver (Brussels) (WBIC 95900)	5.25	8	5.3	Continuous	Sand, Silt	7.6	
Ahnapee River (WBIC 94800)	8.5 (in Door County)	25	7.7	Continuous	Rock/Cobble, Sand, Gravel	4.8	Curly leaf pondweed, Eurasian Water milfoil, non-native Phragmites

Table 1.2: Characteristics of streams in the Ahnapee River watershed.

Stony Creek Watershed

The Stony Creek Watershed is approximately 34,500 acres and consists of Stony Creek with two named tributaries, as well as five smaller creeks that drain to Lake Michigan. Stony Creek is a 13.6-mile, relatively low gradient creek that has been ditched in some sections, originates in Door County and outlets to Lake Michigan in the northeast corner of Kewaunee County. The upper 11 miles are classified as a Warm Water Fish Forage community while the lower 5 miles are classified as Cold Class II water. Agricultural activities comprise approximately 61% of the land use in the Stony Creek Watershed. Improper handling, storage, and disposal of animal waste has historically been considered a serious potential source of nonpoint pollution. Table 2-8 summarizes characteristics and Figure 2-23 illustrates the locations of creeks located in the Stony Creek Watershed.

Figure 1.3: Locations of Streams in the Stony Creek watershed.

Creek	Length (Miles)	Width (Feet)	Gradient (ft/mi)	Flow	Substrate	Watershed (mi^2)	Aquatic Invasive Species Documented
Clay Banks (WBIC 96635)		6	10.5	Intermittent	Sand	2.9	
Woodard (WBIC 96600)	4.7	5.5	44	Continuous/ Intermittent	Rock/Cobble, Silt	2.8	
Schuyler (WBIC 96500)	4	6.6	12.7	Continuous/ Intermittent	Rock/Cobble	4.4	
Bear (WBIC 96400)	4	5.9	33.3	Continuous/ Intermittent	Rock/Cobble	4.9	
Kolstad (WBIC 013004)	3	23	0.2	Intermittent	Silt	4.3	
Kramer (WBIC 96300)	2	10.5	14	Intermittent	Sand	3.7	
Stony (WBIC 96100)	13.6	16	8.5	Continuous/ Intermittent	Rock/Cobble	16.2	
Silver (Forestville) (WBIC 96000)	2 (in Door County)	8.9	16	Intermittent	Rock/Cobble	4	

Table 1.3: Characteristics of streams in the Stony Creek watershed.

Upper Door Watershed

The Upper Door Watershed includes all land north of the Sturgeon Bay shipping canal including Washington and Chambers Islands and comprises approximately 184,000 acres.

The southern portion, from the canal north to a line drawn approximately from Fish Creek to Baileys Harbor, is predominantly agricultural. Agriculture is less prevalent north of this line. Most of the conservation land and areas of ecological interest are located within this watershed. Table 2-10 summarizes characteristics and Figure 2-24 illustrates the named rivers and creeks that are located in the Upper Door Watershed.

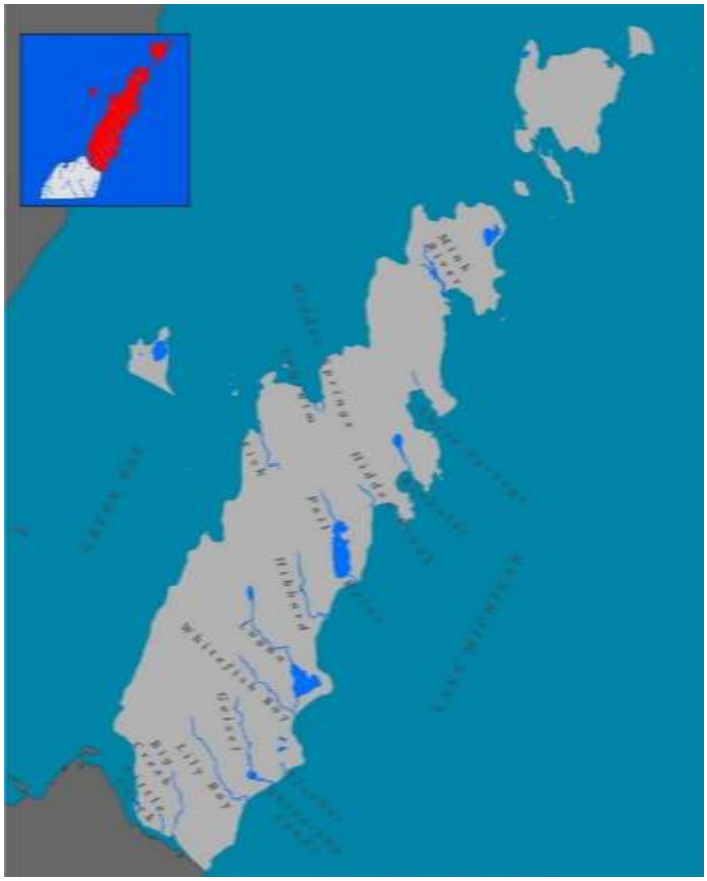

Figure 1.4: Locations of streams in the Upper Door watershed.

Creek/River	Length (Miles)	Width (Feet)	Gradient (ft/mi)	Flow	Substrate	Watershed (mi^2)	Aquatic Invasive Species Documented
Little (WBIC 5012117)						3.6	Knotweed species, reed canary grass
Big (WBIC 100100)	13.0	4.5					Reed canary grass, glossy buckthorn, non-native phragmites, curly leaf pondweed, purple loosestrife, Eurasian water milfoil
Lily Bay (WBIC 97100)	3.4	5	19.1	Continuous/ Intermittent	Silt, Sand	13	
Geisel (WBIC 97400)	3.6	20	9.7	Continuous	Rock/Cobble, Gravel	9.8	Yellow iris, red canary grass, glossy buckthorn, non-native phragmites
Shivering Sands (WBIC 97200)	1.1	27	12.5	Continuous			
Fischer (WBIC 5011520)	2.0						
Whitefish Bay (WBIC 97500)	1.1	28		Continuous			
Logan (WBIC 97800)	5.4	8	17.7	Continuous	Rock/Cobble, Gravel, Silt	12.0	
Hibbard* (WBIC 98200)	7.4	15	7.6	Continuous	Rock/Cobble, Gravel	17.0	
Fish (WBIC 99800)	1.5	8	15	Intermittent	Rock/Cobble, Gravel, Silt	2.0	Rusty crayfish, reed canary grass, European frog-bit
Peil* (WBIC 98700)	2.5	16.4	6.3	Continuous	Silt		
Heins* (WBIC 98400)	2.9	14	7.8	Continuous			
Ephraim* (WBIC 99700)	1.5	9	15	Intermittent	Rock/Cobble	3.9	
Hidden Brook							
Rieboldt (WBIC 99000)	5.4		5	Continuous			
Hidden Springs* (WBIC 99600)	1.0			Intermittent			Round Goby
Three Springs* (WBIC 99300)	2.3	4	10.9	Intermittent	Gravel, Silt	5.0	Non-native phrag, reed canary grass
Mink River (WBIC 99500)	1.4						Non-native phragmites

Table 1.4: Characteristics of streams in the Upper Door watershed.

1.4.3. Lakes

There are 25 named lakes and ponds in Door County, with most of the lakes located in the northern half of the county. For a complete description of Door County lakes and ponds, please refer to the *Surface Water Inventory of Door County* prepared by the SWCD in December of 2000. Figure 2-25 illustrates the some of the major lakes and ponds located throughout the county and Table 2-12 summarizes some of the characteristics.

Lake Types

The following are categories that are used in the classification of lakes regarding their source.

Drainage Lakes - primary water source is overland flow from relatively large watersheds that are high flushing making them least sensitive to shoreland-derived pollutants. Permanent inlet and outlet streams are present.

Riverine Impoundment - also known as reservoirs, artificially created standing water bodies, produced by dams on streams or rivers. Because of the diverse nature of streams, rivers, and dams, these waterbodies can vary greatly in size, configuration, flow patterns, water chemistry, and biota.

Seepage Lakes - water sources are primarily rainfall and groundwater. Watersheds are generally small and very low flushing making them sensitive to shoreland-derived pollutants. They have no inlet or outlet (land locked).

Spring Lakes - primary water source is groundwater. Watershed size is relatively small. They have permanent outlets with substantial flow, but seldom have inlet streams. These high-volume outlets make them rather insensitive to shoreland-derived pollutants.

Trophic Status

The trophic status of a lake is a classification of the level of biological activity, or productivity, as measured by metrics such as the phosphorous content, algae abundance, and depth of light penetration. Varying trophic status is a way of describing the process by which a body of water becomes enriched in dissolved nutrients (such as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen, or eutrophication. The range of trophic statuses are as follows:

Oligotrophic – Low nutrient levels. Low populations of aquatic plants, animals and algae.

Mesotrophic – Moderate nutrient levels. Healthy and diverse populations of aquatic plants, fish and algae.

Eutrophic – High nutrient levels. Large populations of aquatic plants, fish and algae. Plants and algae populations often grow to nuisance levels. Fish species tolerant of warm temperatures and low dissolved oxygen concentrations.

Figure 1.5: Location of major lakes in Door County.

Hypereutrophic – Very high nutrient levels. Often exhibit large algae blooms. Fish populations are dominated by carp and other species that tolerate warm temperatures and low dissolved oxygen concentrations.

Lake	Surface Area (Acres)	Max Depth (Feet)	Lake Type	Bottom Type	Trophic Status	Aquatic Invasive Species Documented
Arbter (WBIC 2600)	16	2	Drainage	Muck	Eutrophic	
Bradley (WBIC 100000)	19	7	Seepage	Sand	Eutrophic	Non-native phragmites, purple loosestrife, reed canary grass, Eurasian Water Milfoil
Clark (WBIC 97700)	868	25	Drainage	Marl, Rock, Sand	Oligotrophic	Purple loosestrife, non-native phragmites, Eurasian water milfoil, reed canary grass, round goby, Curly-Leaf Pondweed, Zebra Mussel
Dunes (WBIC 97300)	80	1	Drainage	Marl, Muck, Silt	Eutrophic	Eurasian water milfoil, non-native phragmites, reed canary grass
Europe (WBIC 93100)	273	10	Seepage	Marl, Gravel, Silt	Oligotrophic	Banded Mystery Snail, non-native phragmites
Forestville Millpond (WBIC 95700)	94	6	Riverine Impoundment	Silt, Muck	Eutrophic	Curly leaf pondweed, Eurasian Water milfoil, non-native Phragmites
Kangaroo (WBIC 98600)	1,123	12	Drainage	Marl, Rock, Gravel, Sand	Mesotrophic	Non-native phragmites, reed canary grass, Eurasian Water-Milfoil, Zebra Mussel
Krause (WBIC 93200)	4	24	Spring	Muck	Mesotrophic	
Little (WBIC 93300)	24	6	Spring	Muck, Rock, Gravel	Eutrophic	Non-native phragmites, yellow iris
Lost (WBIC 97900)	91	5	Seepage	Muck, Silt	Hypereutrophic	Non-native phragmites, reed canary grass, glossy buckthorn
Mackaysee (WBIC 93500)	347	27	Spring	Sand, Rock, Gravel, Silt	Mesotrophic	Non-native phragmites, Eurasian Water Milfoil
Mink River Lake (WBIC 99500)	101	13	Spring	Sand, Muck	Eutrophic	Non-native phragmites
Mud (WBIC 99100)	155	5	Drainage	Marl	Eutrophic	Non-native phragmites
Schwartz (WBIC 93700)	30	4	Seepage	Muck	Eutrophic	

Table 1.5: Characteristics of major lakes and ponds in Door County.

1.5. What are invasive species?

Wisconsin Statute defines invasive species as "nonindigenous species whose introduction causes or is likely to cause economic or environmental harm or harm to human health." These species can be aquatic or terrestrial weeds, insect pests, nuisance animals, or disease-causing organisms. They can occur in all types of habitats and affect urban and rural areas throughout the state. These species have been introduced both deliberately and accidentally. In general, aquatic and terrestrial invasive species may cause the following impacts, among others:

- Outcompete native species for food and habitat causing displacement or reduced populations of native species.
- Change the composition and structure of both aquatic and terrestrial communities that may have a negative cascading effect throughout food webs and nutrient cycles.
- Degrade habitat and negatively affect water quality and wildlife, including commercially valuable species.
- Alter recreational opportunities by impeding navigation in aquatic habitats or reduced accessibility within terrestrial habitats.
- Degrade shorelines and beaches both physically and aesthetically leading to negative impacts to recreation and tourism.
- Decrease property values and increase costs to utilities and municipalities.
- Negative impact human health through dermatological rashes, impacting water quality by increasing water contaminants, and potentially harboring problematic compounds and chemical elements.

1.6. The Economic Impact of Invasive Species

Large-scale economic analyses show that invasive species cost the United States $120 billion annually (Pimentel, Zuniga, & Morrison, 2005) while ballast-borne invasive species cost Great Lakes states $230 million annually (Rothlisberger, Finnoff, Cooke, & Lodge, 2012). Terrestrial and aquatic invasive species not only impact the county's environment, but they can also be an economic burden to Door County.

According to the WDNR Invasive Species Team 2018-2019 Performance Report:

- Aquatic invasive species, like the zebra mussel, have a financial impact on industries that use water for cooling and municipalities that rely on lakes for drinking water. Zebra and quagga mussels cost the United States economy up to $1 billion annually. Costs associated with invasive species that originate in the ballast water of ocean-going vessels visiting the Great Lakes have been estimated at $138 million annually but could be as much as $800 million annually.
- Invasive species, including weeds, pests, and diseases, negatively impact Wisconsin's $105 billion agriculture industry (437,700 jobs) by increasing production costs and reducing crop yields. Canada thistle, a major agricultural pest, costs tens of millions of dollars in direct crop losses annually and additional millions in control costs.
- Wisconsin's forestry industry, a $25 billion industry (64,000 jobs), is impacted by oak wilt, spongy moth, and more recently emerald ash borer and beech bark disease. These invasive diseases and pests both damage and kill tree species within the State and County. Costs to respond to the emerald ash borer in our region, including the treatment, removal, and replacement of ash trees, has a current annual effect of $280.5 million on municipal budgets - a figure that does not include the value of trees on private property. This beetle also increases electrical utility budgets with the removal of dead trees that could fall onto utility lines.
- Natural regrowth of tree seedlings, especially of the sugar maple, our state tree, is being limited by invasive plants and non-native earthworms. Over the long term, this will change the composition of our forests and the economic benefits they provide.
- Terrestrial invasive species, such as garlic mustard and wild parsnip, invade and degrade our forests and grasslands and reduce enjoyment of our trails and parks. Eurasian water milfoil and other invasive aquatic plants may harm our lakes and rivers. Chemical herbicides used to control Eurasian water milfoil can cost from $200 to $2,000 per acre. Mechanical control methods range from $300 to $600 per acre and must be repeated all summer.
- Outdoor recreation is one of the top reasons visitors come to Wisconsin. In 2023, Wisconsin visitors reached 113 million and their associated spending had an estimated $25 billion impact on the state's economy. As invasive species continue to change our environment and negatively impact the accessibility and beauty of our waterways, forests, and other

natural areas, Wisconsin may see a reduction in visitor spending. Door County is ranked seventh of Wisconsin's 72 counties in visitor spending with $620 million in 2023 (greenbaypressgazette.com).

Section 2: Door County Government

Door County Government, established in 1851, provides services to the County's 30,066 year-round residents, as well as a fluctuating seasonal population throughout the year. The county seat is the City of Sturgeon Bay. The county consists of the city, fourteen towns and four villages covering 492 square miles of the Door Peninsula.

2.1. Door County Invasive Species Team Partnership

The Door County Soil and Water Conservation Department (SWCD) has a responsibility and directive under Chapter 92 Wisconsin State Statute to promote land uses and programs which advance conservation and the protection of Door County's natural resources, which is also identified as one of the Door County's strategic priorities. Mission statement and summary of responsibilities:

> The Door County Soil and Water Conservation Department is created under the authority of Chapter 92 of Wisconsin Statutes. Chapter 92 gives the SWCD the responsibility of the administration of the County soil and water conservation program and the authority to exercise the powers granted to the Land Conservation Committee. The legislative declared policy of the State in Chapter 92 is to halt and reverse the depletion of the State's soil resources and pollution of its waters. The SWCD has a responsibility, and directive under Chapter 92, to promote land uses and programs which advance conservation and the protection of Door County's natural resources. The mission of conservation and environmental advocacy is the standard by which SWCD programs are developed and implemented.

Door County land management partners including The Door County Land Trust, The Ridges, The Nature Conservancy, Crossroads at Big Creek, University of Wisconsin Green Bay Cofrin Center for Biodiversity, Door County Facilities and Parks, and Wisconsin Department of Natural Resources. All partners aim to be leaders in stewardship by preserving and cultivating land legacies of ecological resilience throughout Door County and are active partners within the DCIST partnership. Each organization under their mission statements have identified and taken on this responsibility under their guiding principles. Each organization has individual focuses that aim to support overall county and statewide efforts to preserve the ecological resilience of Door.

Door County in 2003 identified the need for invasive species management after witnessing the habitat degradation and safety hazards *Phragmites australis* and wild parsnip created throughout the county. During this time SWCD took on the role to help support the DCIST partnership through securing funding via various grants to fund a part time coordinator position housed with a variety of partnerships throughout DCISTs history. The role of SWCD grew to a full-time position housed with Door County Soil & Water in 2019 to help coordinate and grow invasive species outreach and management and address funding concerns.

2.2. SWCD Invasive Species Investments

During 2008 - 2022, The Door County SWCD has secured funding through public and private grants, as well as public and private donations affording a total of $1,234,674. These monies afforded the SWCD opportunity to educate the public and expand control of invasive plants within private properties throughout the county. These investments include the following SWCD-led projects:

- 2009-2011: Phragmites control on 10-acres of public and private land on Detroit and Washington Island. Efforts largely funded through the Lakeshore Natural Resources Partnership (LNRP) and private donations allowed for treatment expansion.
- 2011-2018: Control of non-native Phragmites on Door County shorelines and right-of-ways. Shoreline treatments were an expansion to private properties outside of the areas identified and treated by a WDNR-led project to control Phragmites and Lyme grass on Lake Michigan shorelines within WDNR Conservation Opportunity Areas (COAs). Funding through SWCD was largely provided by the United States Forest Service (USFS) as well as public and private donations. The two projects funded two consecutive treatments of SWCD and volunteer inventoried Phragmites across

300 miles of Lake Michigan shoreline and more than 30 inventoried Phragmites acres along right-of-ways within Door County.

- 2020-ongoing: Control of non-native Phragmites on Door County shorelines, right-of-ways, and private properties. 206 acres of 333 inventoried of non-native phragmites have been treated by these efforts. Funded in part by United States Fish and Wildlife Service Sustain Our Great Lakes, USFS, County of Door American Rescue Plan Act funds, WDNR Surface Water Grant Program, and public donations.
- 2013-2019: Control of wild parsnip along 122 miles of road right-of-way. Funded largely through a federal grant from the USFS as well as private and public donations.
- 2020-ongoing: Control of 109 acres of 111 inventoried acres of wild parsnip along road right-of-ways and private properties. Funded through federal grants provided by USFS.
- 2020-ongoing: Control of 2.4 acres of 5.7 inventoried acres of teasel species along road right-of-ways and private properties. Funded through federal grants provided by USFS.
- 2020-ongoing: Control of 8.2 acres of the 12.4 inventoried acres of knotweed species along road right-of-ways and private properties. Funded through federal grants provided by USFS and WDNR Surface Water Grants.
- 2016-ongoing: Recommend Door County municipalities adopt a noxious weed ordinance and implement an invasive plant control program with guidance and support from SWCD Conservationist and the DCIST program and partners. This push was made due to the uncertainty of grant dollars which directly correlates with the size of the role SWCD can play with regards to on the ground invasive species management. WDNR Aquatic Invasive Species (AIS), USFS, and private donor funding have provided for the invasive species identification workshops and priority species inventories that support this effort.
- 2018-ongoing: Implementation of a cost share program for municipalities to conduct treatment of priority invasive species listed in their noxious weed ordinance. Funded through DCIST donations.
- 2020-ongoing: Control of early detection species including prohibited species whenever and wherever they occur. Funding through WDNR Surface water grants, USFS, and private donor funding.
    - 2020-2022 Porcelain berry City of Sturgeon Bay
    - 2020-2022 5-leaf akebia vine Town of Sevastopol
    - 2017-ongoing Black swallowwort Town of Baileys Harbor
    - 2022-ongoing European frog-bit Town of Gardener, Town of Gibraltar, & Town of Nasewaupee

	Federal Grants	*State Grants*	*Other Grant Sources*	*Private Donations*
Aquatic Invasive Species	$214,209	$489,876	$135,967	$20,666
Terrestrial Invasive Species	$283,235	$28,900	$15,300	$45,920
Total Expenditures	$497,444	$518,776	$151,867	$66,587

Table 2.1: Door County SWCD invasive species expenditures from 2008-2022 broken down by type of invasive species and funding source.

2.3. Door County Priority Invasive Species

The SWCD utilizes the Wisconsin NR-40 administrative rule to guide educational and outreach efforts and the recommended focal species, found later in this document, help support and narrow priority species selection. The county's priority species and control efforts are determined by historical financial investments of SWCD within private lands and along ROWs as well as several other factors including:

1. Public health and safety
2. Economic impact
3. Ecological impact
4. Current abundance within County

Using these criteria, four species have been selected as priority species in which the SWCD and the Door County will focus their efforts. All four of these species, shown in table below, are listed as restricted in Wisconsin within Chapter NR-40. Restricted species are subject to a ban on transport, transfer and introduction.

Common Name	Latin Name	NR-40 Status
Common reed	*Phragmites australis*	R
Common/Cut-leaved teasel	*Dipsacus sp.*	R
Japanese knotweed	*Polygonum cuspidatum*	R
Wild parsnip	*Pastinaca sativa*	R

Table 2.2: Priority species for the SWCD and Door County.

2.4. Purpose

To help mitigate the threat of invasive species in Door County, SWCD and its partner organizations in the Door County Invasive Species Team (DCIST) have been successful competing for state and federal grant funding to address aquatic and terrestrial invasive species issues and carry out numerous individual small-scale invasive species projects. It is known that many listed invasive species including Japanese knotweed, European marsh thistle, Phragmites, reed canary grass, glossy buckthorn, and narrow-leaved cattail are present within the County at varying abundance and density. This plan is designed to guide future SWCD invasive species education and control efforts. This plan also provides a framework from which partners may collaborate to continue efforts to prevent, manage, and control the harmful invasive species within Door County.

SWCD efforts will continue to be focused on priority species. This plan also lists focal species that may be addressed as funding and future program initiatives allow.

This plan addresses county-wide invasive plant prevention, monitoring, and control efforts and aims to heighten awareness of the problems associated with invasive species. The best way for the SWCD and DCIST to achieve long-term and relevant advances in the battle against invasive species is to work collaboratively with all stakeholders in a deliberate manner. This plan provides a strategic and focused direction for implementing an invasive species management program. Providing strategic guidance to all partners, citizens, and municipalities will help increase efficiencies, reduce redundancies, and foster collaboration and compliance across the invasive species spectrum. In addition, many aspects of invasive species management are constantly in flux, including policies, threats and available funding. This plan is intended to be dynamic and allow flexibility as needed to address changing needs and priorities. It is intended that this plan be reviewed annually and updated every five years to reflect current conditions.

Photo 2.1: Four priority invasive species for Door County. Starting top left and clockwise: Common reed (*Phragmites australis*), teasel (*Dipsacus* spp.), Japanese knotweed (*Polygonum cuspidatum*), and wild parsnip (*Pastinaca sativa*).

Section 3: The Door County Invasive Species Team

3.1. The Door County Invasive Species Team

The Door County Invasive Species Team (DCIST), which is comprised of the Door County SWCD, USFWS, WDNR, University of Wisconsin Extension, Door County Land Trust, The Ridges Sanctuary, and The Nature Conservancy, have been working collaboratively since 2000 managing invasive species within Door County's unique places. Maintaining and protecting high quality habitats are necessary for the survival of native species and communities. The DCIST addresses the nonindigenous species that disturb the ecologic and economic balance of Door County and believes it can promote biodiversity and help ensure the continued viability of our tourism, land and water resources, and quality of life for Door County visitors and residents alike. The DCIST is overseen by a steering committee comprised of partner organizations and concerned citizens. SWCD was designated as the fiscal manager of the DCIST in 2003 and remains the fiscal manager. A funding policy was adopted by the Door County Land Conservation Committee in 2018 on appropriate handling of DICST funds. The structure of the organization itself has been informal, with support for the group not being expressed under a Memorandum of Understanding (MOU) or similar document.

The overall goal of the DCIST, and thus this Plan, is to maintain the integrity of Door County's native terrestrial and aquatic species by preventing and managing invasive species, using an integrated approach that maximizes the effectiveness of the action while minimizing the undesirable impacts of the invasive species and the management action.

While the DCIST has maintained an active invasive species outreach and education program since 2000. This updated plan builds upon the first comprehensive invasive species plan implemented in 2018. Updating the plan provides inclusive and actualized guidance and documentation for project managers and cooperators, provides a context for systematic evaluation and adaptive management, facilitates the transfer of information to the public and DCIST partners, improves fiscal accountability by focusing on species and/or places where efforts yield the most benefit, enhances the effectiveness of the program by providing the required environmental analysis of more aggressive control measures, improves efficiency by identifying and eliminating redundancies between program elements, and finally, lays a course for the future by identifying additional program elements that are needed to achieve the DCIST's invasive species management goals.

This plan will function as an extension to the report titled "Door County Invasive Species Strategy 2018-2023", which was generated for the Door County Soil and Water Conservation Department and serves as a Strategic Plan for the DCIST partnership.

This plan builds upon DCIST's 2018 report and addresses:

- The change in the invasion landscape from 2018 to current conditions to determine updated management and control priorities provided to limit the spread and impact of invasive species.
- Pathways of introduction and spread have become more apparent and steps that DCIST and its partner organizations may take to address these pathways are clearly defined.
- DCIST has changed through new partners, programs, and funding opportunities. Updates in this plan will help DCIST benefit most from these partnerships and resources.
- Provides guidance should funding not be attained for continued outreach and control efforts.
- Clearly define the roles and responsibilities of the partnership.

3.2. Funding for DCIST

As the fiscal manager for the DCIST, Door County SWCD handles incoming donations, grant monies, and designated funds for the DCIST program, often at the discretion of the steering committee. State, Federal and local grants are a major contributor to the funding of a part-time DCIST coordinator and to control activities across Door County. These grants are sought after and administered by the Door County SWCD with support of the DCIST steering committee. In 2018, to provide more formality and accountability the Door County Land Conservation Committee approved a policy of how the SWCD may apply for, accept, and utilize invasive species funding. SWCD holds donations in accounts designated solely for the purpose of managing invasive

species within Door County. In accordance with SWCD policy 20-DCIST Donation Fund Policy, activities funded with donations must be directly linked to managing priority invasive species and yield tangible, on the ground benefits.

Use of DCIST funds will be considered for one or any of the following:

i. SWCD invasive species grant application match
ii. SWCD-recognized and DCIST-identified invasive species project administration and activities
iii. SWCD Municipal Cost Share Program

The diverse habitats of the Door Peninsula (starting top left and clockwise):

Great Lakes beach and dune complex, Newport State Park, Door County. *Photo by Eric Epstein, WDNR.*

Interdunal Wetland and Boreal Forest. Jackson Harbor Ridges SNA, Washington Island. *Photo by Eric Epstein, WDNR.*

Second-growth mesic hardwood with substantial component of American beech. *Photo by Drew Feldkirchner, WDNR.*

Rich fen dominated by wire-leaved sedges, bordered by a conifer swamp and sandy ridges Northeastern Door Peninsula. *Photo by Eric Epstein, WDNR.*

Photo 3.1: Diverse habitats of the Door Peninsula.

3.3. Mission Statement of DCIST

To address invasive species to sustain resilient ecosystems within Door County, for current and future generations.

DCIST is committed to providing educational resources and engagement, minimizing and preventing the introduction of new populations, and reducing the impact of existing populations. The DCIST partnership promotes an open information exchange, public and private sector coordination, citizen involvement, education, and the comprehensive and cooperative management of local resources that is intended to protect biodiversity within Door County.

3.4. Vision Statement of DCIST

Coordinate a network of functions and processes that work in concert to effectively manage populations and detect early invaders to respond quickly.

DCIST envisions a system that prevents invasive plants outbreaks through active monitoring, management, and early detection and rapid response programs which can reduce long-term management costs and preserve pristine habitats. This is fostered through education and training of both DCIST partners, members, and private landowners to identify, inventory, and monitor priority invasive plants within Door County.

3.5. Current DCIST Staff

Since 2007, DCIST has hired a paid, part-time coordinator funded through grants from several State and Federal sources. This coordinator is hired under contract with the SWCD and in the past, have been private contractors, staff at The Ridges Sanctuary, and staff at The Nature Conservancy. This coordinator has been tasked with convening the steering committee regularly, hosting public meetings and trainings, assisting private landowners in identifying and controlling priority invasive plants, collecting inventory data, and other tasks specific to the grants which fund the position.

In addition, when funding is available, the SWCD has hired one to three limited-term employees (LTE) that support SWCD and DCIST invasive species efforts. These employees carry out activities such as the inventory and control of invasive plants or conducting outreach with private landowners.

Year	*AIS funding*	*Terrestrial IS Funding*
2013	$41,454	$7,274
2014	$41,863	$16,115
2015	$40,237	$8,220
2016	$41,411	$24,912
2017	$46,194	$33,154
2018	$53,918	$16,957
2019	$32,755	$11,299
2020	$62,809	$8,866
2021	$68,029	$28,685
2022	$71,069	$26,446
Total	$499,739	$181,928

Table 3.1: DCIST staff expenditures separated by year and the type of funding utilized (aquatic or terrestrial).

Photo 0.1: Examples of efforts taken on by DICST.

Section 4: A County Strategy

The mission of the DCIST reflects the partnership's desire to reduce the economic and environmental damage which can be caused by invasive species. The strategic plan's four goals (pillars) which support DCIST's mission are: prevention; early detection and monitoring; control and management; and communication. Supporting these pillars are five foundational activities that help guide and meet the four goals. These foundational activities are leadership, adaptive management, research, outreach & education, and regulation & policy. Each of the following sections within this plan address one of these pillars and activity areas that the DCIST will work within to achieve that pillar's goal(s)

Figure 4.1: Pillars and activity areas of the Door County Invasive Species Strategy. The pillars reflect goals that support the mission of the DCIST and the five activity areas below the pillars address specific elements that are needed to achieve that mission.

Section 5: Prevention

Overall Goal:

1) **Limit the number of invasive species introduced to Door County and slow the spread of those invasive species already present within the county.**

Preventing the introduction of non-native, invasive species is the most efficient, economical, and effective option to addressing invasive species. Pathways are the means by which invasive species are introduced or spread from one geographic area to another. While natural dispersal and range expansion exists, nearly every problematic biological invasive has been human mediated. Human behavior is often responsible for the initial introduction of that species to a new geographic location or habitat. Since human behavior can change and actions can be taken to reduce or eliminate the risk of invasions resulting from that activity, every invasion is theoretically preventable. Preventing the continued movement of invasive species in Door County will protect the economy, environment, and social quality. The greatest prevention benefit can come from identifying and addressing the pathways that lead to the introduction of new species. Some of these pathways in Door County include recreational and commercial watercraft, horticulture, aquaculture, commerce, tourism, or travel. Closing these pathways can not only prevent new species from establishing in Door County but can also contain those already present.

5.1. Common Pathways of Invasive Species Introduction

DCIST and its partners strive to prevent the introduction and spread of invasive species through new and existing pathways. This includes engaging both the public and partners in managing invasive species pathways, potential impacts, and preventing the introduction of new invasive species into the County. Several common pathways and sub-pathways of species introduction have been identified in the table below. The DCIST partnership is actively working to address and educate on several of these key pathways including, but not limited to, recreational use of firewood, habitat alteration, highway rights-of-way, nursery plant stock, recreational trail and boat users, and equipment cleaning.

Pathways	***Sub-Pathways***
Firewood or Wood	Recreational use Commercial use
Habitat Alteration and Restoration	Mowing Land clearing/development Logging Revegetation
Hitchhikers	Travelers Baggage and gear Shipped materials Pets and animals
Organisms in Trade	Whole plants/plant parts Pet trade Food and game animals
Recreation	Trail users (cyclists, hikers, etc.) Hunters and anglers Wildlife viewers
Transportation	Cars, trucks, buses, semis Construction and Maintenance equipment Helicopters, planes, trains

Table 5.1: Common pathways and sub-pathways by which invasive species are introduced and spread.

5.2. Aquatic Invasive Species Prevention Activities & Actions

5.2.1. Clean Boats, Clean Waters

Door County's exceptional water resources make it a popular place for water-based recreation, including recreational boating, fishing, diving, and hunting. The travel and tourism associated with these activities is a boon to Door County's economy and are part of life in northeastern Wisconsin. Unfortunately, any activity that involves traveling between different waterbodies presents some risk of transporting aquatic invasive species (AIS). Any gear or equipment used on the water may become fouled with AIS or material that contains AIS, and the transportation and use of that gear or equipment on a different waterbody could introduce AIS. This is of even greater concern as much of Door County is situated on Lake Michigan and the bay of Green Bay, which host a wide array of AIS not presently found in the inland lakes of Door County and much of Wisconsin's 15,000 lakes and 84,000 river miles. These species include starry stonewort, a macro-alga, and the spiny waterflea, a microscopic zooplankton.

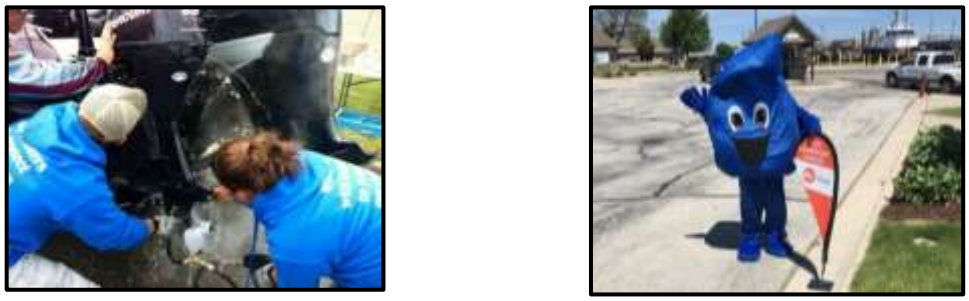

Photo 5.1: DICST efforts with Clean Boats, Clean Waters

The state of Wisconsin has embarked on many initiatives to help address the spread of AIS through the recreational boating pathway. This includes the passage of Wisconsin's NR-40 administrative rule, which makes it illegal to transport aquatic vegetation and bilge and live well water on public roadways. Additionally, the Clean Boats, Clean Waters (CBCW) program, which started as a small volunteer program in 2002, is a statewide boater education program that inspects more than 100,000 boats each year. Door County has participated in the CBCW program since 2008 using the DCIST coordinator's and LTE's time. DCIST has maintained this effort using Wisconsin DNR's AIS education grants, Wisconsin DNR's Surface Water Clean Boat Clean Waters grants, and Wisconsin DNR's Surface Water Lake Monitoring and Protection Network Funding. As invited by the Wisconsin DNR, Door County has also participated in CBCW special projects in the past, which aim to collect expanded data that can be used to further analyze boater attitude and behavior.

As a member of DCIST, SWCD secured grant funding from the Wisconsin Coastal Management Program and from Wisconsin DNR to install boat cleaning stations at County owned high boat traffic areas. Two stations installed were CD3 boat cleaning stations paid for by the Wisconsin Coast Management Program. These stations were placed at the county boat launches with the greatest amount of traffic, Carmody, and Pinney Park boat launches. Two lower tech boat cleaning stations paid for by the Wisconsin DNR were installed at Murphy Park's and Chaudoir's boat launches.

Photo 5.3: CD3 boat cleaning station at Pinney Park.

Photo 5.2: Low tech boat cleaning station at Murphy Park.

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Total Boats Inspected	1,166	917	755	763	539	769	818	860	858	609	652	8706
Total People Contacted	2,192	1,916	1,363	1,177	1,090	1,522	1,444	1,914	1,707	1,143	1,118	16586
Hours Spent on CBCW (Volunteer)	0	0	0	0	0	1	46	0	0	26.25	33.25	106.5
Hours Spent on CBCW (Paid)	611	326	300	336	215	408	293	226	237	192	204	3348

Table 5.2: Clean Boats, Clean Waters efforts in Door County for the past 10-years. Unless noted, these numbers reflect overall effort by not only Door County SWCD staff, but also the Wisconsin DNR, Wisconsin Sea Grant, and other organizations.

Boaters on Lake Michigan who interacted with CBCW volunteers and staff at landings were most often in the following water bodies five days prior to visiting Lake Michigan: Lake Winnebago, Clark Lake, Kangaroo Lake, and the Fox River. Those who were boaters on Clark Lake responded that they had previously been boating in Green Bay, High Falls Reservoir, and Sturgeon Bay Ship Canal. While most boaters questioned were not on another waterbody in the past five days, it is clearly important for Door County to continue to address the recreational boating pathway to prevent the spread of AIS from Lake Michigan and Green Bay to other waterbodies in the northeastern Wisconsin.

Action Items:

- Continue to implement the CBCW program at priority boat launches – *Ongoing as funding is available, SWCD staff (LTE's).*
- Host CBCW trainings and recruit volunteers to adopt boat landings. – *Annually as funding is available, DCIST coordinator*
- Continue coordination of statewide CBCW outreach campaigns that target recreational boaters and anglers (e.g., Drain Campaign and July 4th Landing Blitz) – *Annually as funding is available, DCIST coordinator & SWCD staff.*

5.2.2. Other AIS Prevention Strategies: Bait Dealer Initiative, Fishing Tournament Outreach, etc.

Starting in 2021 DCIST has begun targeting other recreational activity pathways including, recreational outfitters, bait shop dealers, and dock service providers. In 2020, 2021, & 2022, DCIST reached out to all known recreation outfitters, bait shop dealer, providing outreach materials to display. Additionally, in 2023 DCIST began providing all known dock service providers in Door County with information on how not to spread AIS and what species they may encounter in Door County. These efforts have been funded through the Wisconsin DNR's Surface Water Lake Monitoring and Protection Network funds.

An audience not addressed through previous efforts are marinas and aquatic plant harvesters. Future efforts should explore the impact of this influential water user group in Door County and the potential to engage this community in the boater education aspect.

DCIST partners and other entities should also be aware of best management practices (BMPs) preventing the spread of AIS on any small vessels, water quality testing equipment, aquatic plant rakes, or other equipment that they may employ to conduct aquatic surveys or collect information on the status of water quality, biological communities, and habitat. When any equipment is used in multiple waterbodies including lakes, river, and wetlands within the County or state the most up-to-date BMPs from the Wisconsin DNR should be employed. Currently, the *DNR Boat, Gear, and Equipment Decontamination and Disinfection Manual Code 9183.1* outlines the minimum decontamination requirements to be followed by DNR employees, agents, or service providers. The Wisconsin DNR requires permittees to follow this manual code. It is advised that DCIST staff and partners also follow this manual code to help prevent the spread of AIS within Door County.

Action Items:

- Continue participation in the WDNR Bait Dealer Initiative by providing local bait shops with consistent information to display and distribute on AIS prevention steps – *Ongoing as funding allows, SWCD staff.*
- The DCIST coordinator will share resources and BMPs for decontamination with partners and volunteers including the WDNR Manual Code. A training on proper disinfection should be provided for DCIST partners (may take the form of a website with a Q&A document, recorded webinar, videos or in-person training) – *Ongoing, DCIST coordinator and WDNR staff.*
- As opportunities arise, have a presence at professional and local fishing tournaments to educate both anglers and attendees on preventing AIS spread. – *Ongoing, DCIST coordinator*
- Determine high-risk user groups in Door County that may require additional actions to reduce that risk (e.g., paddleboards, kayaks, personal watercraft) and utilize points of contact through distributors – *Ongoing, DCIST coordinator*

Photo 5.4: AIS Outreach at a local event.

5.3. Terrestrial Invasive Species Prevention Activities & Actions

5.3.1. PlayCleanGo

With partial funding from the USDA Forest Service, the Minnesota Department of Natural Resources (MNDNR) launched the outreach campaign **PlayCleanGo: Stop Invasive Species in Your Tracks®** in 2012. Since then, the campaign has expanded and currently is comprised of more than 500 partner organizations across North America, including DCIST.

The campaign's goal is to protect valuable natural resources while encouraging folks to enjoy the great outdoors. Using community based social marketing to build brand recognition, the objective is to slow (and where possible to stop) the spread of invasive species by changing public and worker behaviors at risk of spreading harmful pests living on land or in water. **PlayCleanGo** promotes awareness, understanding, and cooperation by providing a clear call to action to be informed, attentive and accountable for stopping the spread of all invasive species.

Action Items:

- Incorporate as needed **PlayCleanGo** branded materials specific to Door County to provide foundational concepts for recreational use. Materials should include simple steps for that user group to take to prevent the spread of invasive species – *as funding allows, DCIST coordinator*
- Conduct outreach with these user groups on invasive species prevention and provide materials for display throughout the County. – *as funding allows, DCIST coordinator, SWCD staff (interns), & DCIST partners*

Photo 5.5: DCIST educational outreach. Images Left to Right: DCIST at FarmTech Days; County wide LTE invasive species workshop; DCIST at Land Trust buckthorn blast.

5.3.2. Right-of-way and Transportation Corridors

With 107 miles of State roads, 279 miles of County roads, and 650 miles of Town roads within Door County, DCIST also recognizes that transportation corridors are a pathway for the spread of invasive species in Door County. Although this pathway is largely focused on terrestrial species, these corridors often require draining which creates opportunities for wetland invasive plants such as Phragmites, to move along roadside ditches and other transportation corridors. Species that spread along roadways and corridors threaten public safety (i.e. increased risk of fires, impaired views, improper drainage, etc.) and ecological functions and values when they intersect adjacent habitats.

DCIST's wild parsnip treatments from 2012-2023 and *Phragmites australis* from 2011-2023 continue to mitigate a number of those concerns. The Door County Highway Department, a DCIST partner as of 2017, has made invasive species within county right-of-ways a management priority. The department utilizes the State of Wisconsin's Department of Transportation's Highway

Maintenance Manual; specifically, Chapter 7 Roadside Management, which can be found at http://wisconsindot.gov/Pages/doing-bus/local-gov/hwy-mnt/mntc-manual/chapter07.aspx, or summarized in Appendix A in this report.

Best management practices have also been created to help manage many of the aspects of this pathway. The Wisconsin Council on Forestry has created a "Utility and Transportation Rights-of-way Best Management Practices (BMPs) Manual" that covers a broad set of voluntary practices to minimize the further introduction and spread of invasive species within transportation and utility corridors. Transportation corridors are primarily roads and railroads. The right-of-way (ROW) for roads are either owned by local or state governments or on easements across private property. Utility-type corridors are used for a variety of lines and pipelines and can include underground or above ground lines and pipelines.

Photo 5.7: *Phragmites australis* in right-of-way.

Photo 5.6: Wild parsnip in right-of-way.

Action Items:

- Share these BMPs with DCIST partners, volunteers, and other relevant stakeholders. Encourage all DCIST partners to follow these BMPs when doing projects in recreational, transportation, and utility corridors – *Ongoing, DCIST coordinator*
- Any time DCIST funds are utilized to hire a private contractor to conduct invasive species work, it shall be required within the contract that the above BMPs be followed to the extent possible during all phases of the project – *Ongoing, SWCD, DCIST coordinator & DCIST partners if applicable*
- Provide training on transportation and right-of-way BMPs to County Highway Department staff, DCIST partners, municipal staff and private contractors as applicable – *Ongoing, SWCD staff & DCIST coordinator*

5.3.3. Organisms in Trade

Plants and animals introduced through trade pose a significant threat to Door County's land and water. Many of these plants and animals have been deliberately obtained for a specific purpose, such as landscaping, as pets, for bait. This trade can occur through traditional sales to retail stores or markets, biological suppliers, and increasingly through the global internet marketplace. Invasive species obtained through trade can enter the environment through a variety of pathways. Uneducated consumers may purposefully release unwanted pets or plant species and associated pathogens, believing it is a humane action without known the potential consequences. Plants and animals may also be distributed unintentionally through sales as contaminant species associated with legitimately sold species (e.g., jumping worms), or through misidentification and unfamiliarity with a given species' common or scientific name.

The Wisconsin DNR is working on the organisms in trade pathway by using the NR-40 administrative code to control what species are available in trade and to require industry to take actions to prevent the spread of invasive species through transportation of organisms in trade. The Wisconsin Department of Agriculture, Trade, and Consumer Protection also has

authority over licensed nurseries with sales of more than $500 annually and regulates the industry through a permit and inspection program.

Action Items:

- Generate a catalog of outreach materials that highlight native alternatives to invasive plants that are commercially available or commonly used in landscaping or forestry in Door County – *Ongoing as funding allows, DCIST coordinator*
- Conduct outreach with landscapers and nurseries to raise awareness of NR-40, especially those who bring in less than $500 annually and are not permitted by DATCP – *Ongoing as funding allows, DCIST coordinator & SWCD staff*
- Educate the public about selecting non-invasive plants and pets and to properly dispose of unwanted plants and animals – *Ongoing as funding allows, DCIST coordinator*
    - ✓ Consider participation in or the hosting of a Habitatitude event for the safe surrender of exotic pets – Ongoing *as funding allows, DCIST coordinator*

Figure 5.1: Samples of educational materials for the Habitatiude program and organisms in trade.

Section 6: Early Detection and Monitoring

Overall Goals:

1) **Increase the likelihood that invasive species in Door County will be identified and reported to DCIST.**
2) **Develop and enhance the capacity of the DCIST partnership address early detection species with emphasis on priority EDRR species and those listed as prohibited under Wisconsin's NR-40 Administrative Rule.**
3) **Coordinate data collection and management throughout the DCIST partnership and ensure that data collected in Door County is compatible with technology information systems within the State and region.**

Successful management of an invasive species is most likely to succeed when the established population is small, making it worthwhile to invest in early detection efforts to detect very low numbers of target species. Rapidly responding to new invasions is dependent on a complete and adequate early detection system and coordination within DCIST. This section addresses monitoring in the context of prevention and early detection, as opposed to control, which will be addressed in the next section. Monitoring activities for prevention purposes help partners and stakeholders understand the distribution of invasive species, enabling better allocation of prevention resources, improved understanding of invasion pathways, and increased potential for eradicating newly established species. Recording the locations of invasive species searches, documenting past control efforts, and sharing this information with partners is also critical to successful invasive species management.

6.1. Statewide Programs and Initiatives

DCIST and its partners have been participating in a number of statewide programs and initiatives that focus on or contribute to the detection of new invasive species infestations. Since 1986, the Citizen Lake Monitoring Network, jointly administered by the University of Wisconsin Extension Lakes program and the Wisconsin DNR, has trained thousands of volunteers across the state to monitor the physical and biological aspects of lakes. The CLMN program includes protocols for monitoring 12 AIS in Wisconsin and has proven to be an effective tool for engaging citizens in monitoring efforts. More information on the CLMN program can be found at https://dnr.wi.gov/lakes/CLMN/ and https://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/programs/clmn/default.aspx.

In 2009, The River Alliance of Wisconsin initiated Project Riverine Early Detectors (RED) and, more recently, AIS Bridge Snapshot Day to train citizens to monitor for AIS along streams and rivers. DCIST participates in the WDNR's Bait Shop Initiative through education and outreach. Additionally, the Water Action Volunteers (WAV) is a citizen scientist project that aims to collect water quality data in rivers and streams. DCIST's role in these programs has been to respond to AIS findings and provide educational opportunities to community members. In 2014, DCIST partner, Ridges Sanctuary hosted a Project RED workshop, and the Ridges continues to be a hub for WAV volunteers. DCIST participated in AIS Bridge Snapshot Day from 2019 to 2022, but volunteer numbers were low due to time of year and program constraints. In 2023, DCIST adapted the AIS Snapshot Day approach, spreading out efforts over multiple days to gather AIS along streams and waterbodies. This modified approach yielded better results. Future efforts should look at offering snapshot day like trainings for the various waterbody associations and continue utilizing snapshot day approach but over the course of the field season.

The Wisconsin First Detector Network (WIFDN), coordinated through the University of Wisconsin – Extension, is a citizen science network that empowers people to take action against invasive species through monitoring, management, and outreach. WIFDN provides training and resources through a combination of webinars, instructional videos, and hands-on workshops, in addition to providing volunteer opportunities to citizen scientists. Training topics include terrestrial and aquatic invasive species biology, identification, and reporting. The program emphasizes species of concern to Wisconsin (e.g., emerald ash borer, late blight, giant hogweed), but also discusses general resources for other species. In 2016, DCIST hosted a WIFDN training in Sturgeon Bay where participants were trained to recognize early detection species in northeastern Wisconsin and in the use of the Great Lakes Early Detection (GLEDN) phone application for reporting.

Action Items:

- Participate in a modified AIS Bridge Snapshot Day. – *Ongoing, DCIST coordinator*
    - ✓ Inventory and prioritize bridges, boat launches and parks in Door County – *Ongoing, DCIST partnership*
- Utilize AIS Bridge Snapshot Day to replicate efforts with various waterbody related associations. – *2025, DCIST coordinator*
    - ✓ Inventory and prioritize bridges, various waterbodies in Door County – *Ongoing, DCIST partnership*
- Utilize the Wisconsin First Detector Network (WIFDN) to help train and mobilize volunteers in Door County to recognize new pests, diseases, and invasive plants.
    - ✓ Host one WIFDN training in Door County– *Ongoing, DCIST coordinator*
- Continue to engage and coordinate volunteers through the Citizen Lake Monitoring Network, as a means of tracking water quality within Door County's Inland Lakes and observing changes in the aquatic vegetation or animal community within these lakes. – *Ongoing, currently coordinated through UW-Extension Lakes and the Wisconsin Lakes Partnership.*

6.2. Priority Early Detection Species

Wisconsin's NR-40 administrative rule identifies and classifies invasive species as either prohibited or restricted in Wisconsin. NR-40 defines invasive species as non-native species whose introductions will cause economic or environmental harm, or harm to human health. Species listed as prohibited are either not currently present in the State or have very limited distribution. Prohibited species represent the highest priority for prevention, containment and control. These species are a priority for all pillars of this plan including monitoring, control and communications. Restricted species are invasive species that are known to be present in Wisconsin and are often the focus of management activities and citizen action. Efforts to prevent the arrival and contain the spread of prohibited species is the highest priority. A current list of the NR-40 regulated species can be found on the Wisconsin DNR website (dnr.wi.gov) by doing a keyword search for "NR-40". The complete list is also included as Appendix B. In addition, DCIST has developed a priority species list for Door County that are shown in Table 2 on the following page. This list includes the designation of early detection species considered to be the biggest threat or most likely to be found in Door County based on proximity of infestations to Door County, vectors for species spread, and other factors.

Action Items:

- Review priority species list with DCIST partners, other natural resources professionals, and relevant stakeholders. Determine the top ten early detection species citizen monitors are most likely to find in coming years and focus educational efforts on these species. – *Ongoing, DCIST partnership*
    - ✓ Develop and implement a ranking system that considers NNIS impacts on species and communities of greatest conservation need, quality of life in Door County, current distribution of species, and feasibility of management. – *Ongoing, DCIST partnership*
- Annually reassess and if necessary, reprioritize species list based on new findings and current distributions of species. Biannually review national and regional NNIS alert system databases for new terrestrial and aquatic species threats to Door County and northeast Wisconsin. – *Ongoing, DCIST coordinator*
    - ✓ Evaluate newly found species for inclusion in DCIST LOOKOUT flyers, alerts, and/or outreach materials – *As needed, DCIST steering committee*

Common Name	Latin Name	NR-40 Status in Door	Plant Type
Amur cork tree	*Phellodendron amurense*	Prohibited	Tree
Princess tree	*Paulownia tomentosa*	Prohibited	Tree
Callery pear	*Pyrus calleryana*	Non-restricted	Ornamental shrub
Amur maple	*Acer tataricum subsp. Ginnala*	Restricted	Tree/shrub
Amur honeysuckle	*Lonicera maackii*	Prohibited	Shrub
Common barberry	*Berberis vulgaris*	Prohibited	Shrub
Porcelain berry	*Ampelopsis brevipedunculata*	Prohibited	Perennial vine
Japanese honeysuckle	*Lonicera japonica*	Prohibited	Perennial vine
Lesser celandine	*Ranunculus ficaria*	Prohibited	Herbaceous groundcover
Policeman's helmet	*Impatiens glandulifera*	Prohibited	Herbaceous annual
Balfour's touch-me-not	*Impatiens balfourii*	Restricted	Herbaceous annual
Grecian foxglove	*Digitalis lanata*	Prohibited	Herbaceous perennial
Yellow bedstraw	*Galium verum*	Not listed	Herbaceous perennial
Yellow archangel	*Lamium galeobdolon*	Not listed	Herbaceous perennial
Brown knapweed	*Centaurea jacea*	Restricted	Herbaceous perennial
Chinese lespedeza	*Lespedeza cuneate*	Prohibited	Herbaceous perennial
Scotch broom	*Cytisus scoparius*	Prohibited	Shrub
Perennial pepperweed	*Lepidium latifolium*	Prohibited	Herbaceous perennial
Hill mustard	*Bunias orientalis*	Prohibited	Herbaceous biennial
Herb bennet	*Geum urbanum*	Not listed	Herbaceous perennial
Japanese hedgeparsley	*Torilis japonica*	Restricted	Herbaceous biennial
Wild chervil	*Anthriscus sylvestris*	Prohibited	Herbaceous, monocarpic perennial
Giant hogweed	*Heracleum mantegazzianum*	Prohibited	Herbaceous biennial/monocarpic perennial
Japanese Hops	*Humulus japonicus*	Prohibited	Perennial vine
Johnsongrass	*Sorghum halepense*	Prohibited	Warm-season perennial grass
Graceful cattail	*Typha laxmanii*	Prohibited	Perennial wetland plant
Southern cattail	*Typha domingensis*	Prohibited	Perennial wetland plant
Japanese stilt grass	*Microstegium vimineum*	Prohibited	Annual grass
Palmer amaranth	*Amaranthus palmeri*	Not listed	Herbaceous annual
Black Swallow-wort	*Vincetoxicum nigrum*	Prohibited	Perennial vine
Java waterdrop	*Oenanthe javanica*	Prohibited	Herbaceous perennial
5-Leaf Akebia Vine	*Akebia quinata*	Prohibited	Perennial vine
European Frog-Bit	*Hydrocharis morsus-ranae*	Prohibited	Aquatic, floating perennial
Water lettuce	*Pistia stratiotes*	Prohibited	Aquatic, floating perennial
Cinnamon-vine	*Dioscorea oppositifolia*	Prohibited	Perennial vine
Water hyacinth	*Eichhornia azurea, E. crassipes*	Prohibited	Aquatic, anchored or floating perennials
Strawberry groundcherry,	*Physalis alkekengi*	Not listed	Herbaceous perennial
Tall manna grass	*Glyceria maxima*	Restricted	Semi-aquatic, perennial grass

Table 6.1: Priority early detection species for Door County. Based on those NR-40 species which are most likely to be found in Door County based on their current distributions, vectors for spread, and the level of risk posed with their establishment. Some early detection populations are found in Door County in isolated small populations.

6.3. Finding, Reporting & Responding to Early Detection Species

The Wisconsin DNR's Invasive Species Response Framework was developed in 2012 to aid resource managers who are responsible for responding to newly discovered populations of AIS. The framework provides guidance on the necessary components of an effective response while acting as an internal protocol for responding to newly detected populations of suspected invasive species. This framework will be followed by DCIST when:

- A terrestrial species that is listed as prohibited in Door County is found.
- An aquatic invasive species that is listed as prohibited in Door County is found.
- A restricted invasive species that has not been discovered in Door County is identified.

Occurrences meeting the criteria listed above will be reported to the Wisconsin DNR for verification and then communicated to stakeholders. A team of DCIST partners with insight from the Wisconsin DNR will identify resources to develop and implement a plan for further reconnaissance, control and outreach/education. The plan should assess areas to inventory for the species, verify available resources (both staff and potential funding), determine the appropriate response, identify additional stakeholders, ascertain necessary permits or permissions, and recognize outreach needs to adjacent private landowners. Following plan implementation, monitoring and evaluation will assess project success and guide restoration.

Because new invasions are dynamic, the Wisconsin DNR's framework does not attempt to provide answers or solutions to all the issues associated with rapid responses. How an individual species invades – their number, density and distribution, proximity to other known invasions, the time of the year, and numerous other factors – determines what actions are possible and useful.

The framework is designed to be applied to a wide range of invasion types, as well as being adaptable over time as staff of program needs change. The framework's *Invasive Species Response Process Overview & Checklist* is included under Appendix C of this plan.

Photo 6.1: DCIST participation in a starry stonewort, an early detection species, field day in Sturgeon Bay hosted by Michelle Nault of the WDNR.

Action Items:

- Utilize the WDNR Invasive Species Response Framework as described above to communicate when a new or prohibited species is identified in Door County. Using the framework, work with other state and local organizations to ensure consistent responses to new invasions – *Ongoing, SWCD and County staff, DCIST coordinator, DCIST partners, etc.*

- Make the rapid response framework/communications protocol widely available to DCIST partners and any other stakeholders conducting invasive species inventory or control – *Ongoing, DCIST coordinator*
- Develop an AIS monitoring protocol and toolkits for Door County utilizing statewide structure – *2018, DCIST coordinator & SWCD staff*
- Support DCIST partners, volunteers and members of the public by assisting in the identification of unknown species – *Ongoing, DCIST coordinator, SWCD staff & DCIST steering committee*
- Improve detection of early detection species by expanding the network of partners and volunteers that are able to recognize these species within Door County and efficiently and effectively report them – *Ongoing, DCIST coordinator & partners*
    - ✓ Host a minimum of one training annually for partners, volunteers and citizens on invasive species mapping reporting techniques. Include information on the identification of new and imminent early detection species – *Annually, DCIST coordinator and WIFDN*
    - ✓ Encourage all partners, members, cooperators, and contractors to report new NNIS sightings to DCIST and the WDNR. Maintain a list of regional partners, cooperators and contractors – *Ongoing, DCIST coordinator*.
- Identify priority locations in Door County that need early detection mapping and/or monitoring. Examples include areas deemed "high risk" as likely invasive species entry or spread points (e.g., parks, roads). Utilize upcoming models such as the habitat suitability models being developed by the Renz Lab/UW-Extension in Madison to guide these efforts – *Ongoing, DCIST coordinator & steering committee*
- Make DCIST partners and volunteers aware of new findings by implementing an alert notification through the DCIST website, e-newsletter, and email – *Ongoing, as funding allows, DCIST coordinator*
- Develop an NNIS alert network with CISMAs within northeastern Wisconsin. Communicate through this network as new threats and emerging issues are identified – *Ongoing as funding allows, DCIST coordinator*

6.4. Technology and Data Management

An important component in invasive species early detection and rapid response is the ability to track and monitor the locations of invasive plants within Door County and northeastern Wisconsin. Tracking is done through surveying or inventory efforts, which are typically completed by the DCIST coordinator, partners or volunteers. Maintaining a database of all known infestations can both help identify the "leading edge" of an invasive plant species and stop or minimize it while it is still a manageable problem. It also allows DCIST to prioritize control needs and strategies at a county-wide scale ensuring that the greatest invasive species threat is being addressed. Several web-based mapping systems for invasive species exist in the Midwest including the Early Detection & Distribution Mapping System (EDDMaps), the Great Lakes Early Detection Network (GLEDN), and the Midwest Invasive Species Information Network (MISIN). These systems are designed to be user-friendly and require no GIS experience or software. They also aggregate data from other mapping projects and cooperators to display invasive species distributions at a county, state and national level scales. For aquatic invasive species occurrences, the WDNR has the Surface Water Integrated Monitoring System (SWIMS).

In 2020 DCIST began to utilize ArcOnline and various Esri app interfaces to collect data from partners and the public. In addition, DCIST utilized habitat suitability modeling data from UW-Madison The Renz Lab to identify highly susceptible areas to specific invasive species, and the Green Print Initiative data to identify areas of ecological importance to help created a targeted approach for focusing efforts.

In the past five years, the DCIST partnership has begun aggregating data on invasive species in Door County into one GIS database. This database will facilitate better planning and coordination on a county-wide scale and ensure that DCIST is truly addressing the highest priority species in Door County. The data was also made available for public viewing through the Door County's Web Map found at https://gis.co.door.wi.us/gismap/.

In addition, DCIST has begun encouraging partners and staff to report invasive species infestations through the GLEDN smartphone app. This easy-to-use smartphone app allows users to record data offline using their phone's GPS, and later upload it using cellular data or a Wi-Fi connection. Any infestations reported within Door County automatically go to the DCIST coordinator or a natural resources professional for verification. Regardless of who verifies the report, the DCIST coordinator is alerted to the sighting and can add it to the DCIST database and in turn the County Web Map at the end of each season. In addition, the data is stored in the GLEDN online database and contributes to a more comprehensive, Great Lakes wide dataset that can be utilized for large-scale planning and research. The app can be downloaded at https://apps.bugwood.org/apps/gledn/. Currently, DCIST data is provided to the WDNR at the end of each field season and is paired with and entered into their SWIMS site through the WDN Water Resources Management Specialist.

Figure 6.1: Sample of handheld GPS unit available for loan to volunteers through Soil & Water Conservation Department for invasive inventory, EDDMapS webpage, and home page of the GLEDN application available for smartphones (left to right).

Action Items:

- Evaluate and select one regionally- or nationally-recognized invasive species database (i.e. GLEDN, EDDMaps, MISIN) to receive DCIST NNIS data – *Ongoing, as funding allows, SWCD and DCIST steering committee.*
- Establish standardized protocols for reporting and addressing early detection species in Door County for use by DCIST staff, partners, and volunteers. These protocols should be compatible with the requirements of a selected regional or national database – *Ongoing, SWCD, DCIST coordinator & DCIST steering committee*.
    - ✓ Distribute these protocols through multi-media outlets including the DCIST webpage, YouTube videos, printed documents, and other methods – *Ongoing, DCIST coordinator,*
- Develop a user-friendly geodatabase and management system to serve as a central warehouse for data collection and viewing by DCIST partners and the public. Utilize Esri Fieldmaps to collect data and ArcOnline to readily share data. Ensure that this database will integrate with the selected regional or national database and that information about newly discovered invasive species is available in a useful and accessible format for stakeholders and partners – *Ongoing, DCIST coordinator & steering committee.*
    - ✓ Continue to share static invasive species occurrences with members of the public and volunteers through the Door County Web Map and SWIMS until another database is available for online viewing – *Ongoing, SWCD*
    - ✓ Train DCIST partners in the use of the geodatabase and determine whom will have capabilities for inputting data – *Ongoing, DCIST coordinator & steering committee*.
- Use new geodatabase and management system to identify high priority geographical areas and species which DCIST would target through education and control efforts – *Ongoing, SWCD, DCIST coordinator & steering committee.*

Photo 6.2: DCIST Invasive Species LTE's managing *Dipsacus fullonum* (left) and *Phragmites australis* (right) in Door County.

Section 7: Control & Management

Overall Goals:

1) **Maintain Phragmites australis as the county's focal species until fewer than 10 acres remains throughout the county and its shorelines.**
2) **Determine the next highest priority species for management and control in Door County and use an integrated pest management approach to make recommendations to the public and conduct control activities.**
3) **Foster municipal invasive species programs.**
4) **Seek funding to continue large-scale control initiatives for priority species within the county.**
5) **Coordinate data collection and management throughout the DCIST partnership and ensure that data collected in Door County is compatible with technology information systems within the State and region.**

Once an invasive species is established throughout Door County, it can be difficult, if not impossible or cost prohibitive to eliminate it. While eradication of a species may not be feasible, tools do exist to manage existing populations and reduce the negative impacts of that species. Control activities not only benefit the habitat that they are taking place in, but also reduce the potential for that species to further spread within the County. It should be noted that eradication is often the exception, rather than the rule, and that tempered expectations should exist when undertaking control efforts. This includes understanding that suppression of populations can still achieve desirable management goals.

7.1. Past & Ongoing Control Activities in Door County

Since 2008, the SWCD, with support from the DCIST, has managed an invasive species control program that includes activities outlined in section 1.2.2. of this plan. With grant funding becoming increasingly competitive, there is uncertainty about obtaining consistent funding to continue treatment projects. SWCD and DCIST have a new approach to continue management efforts that goes beyond grants by encouraging local municipalities to redefine, adopt, and implement a noxious weed ordinance for priority species.

DCIST strives to create an informed, invested, and involved community by educating landowners and municipal leaders. An ordinance allows a municipality to treat invasives on private properties, but more importantly, provides a mechanism for dealing

with vacant and/or absent owner properties. With an ordinance in place, landowners actively controlling invasive species on their property will not be hindered by others who are unable or unwilling to do their part. A noxious weed ordinance shows community members that municipalities are serious about protecting their community's property values, aesthetic values, and recreational opportunities.

SWCD's efforts have resulted in 11 out of 14 Towns within Door County adopting a noxious weed ordinance (https://doorinvasives.org/municipal-ordinances). With assistance from DCIST partners, municipalities have begun to finance and continue management efforts on their own with the support of the SWCD and DCIST program. The relationships that the SWCD holds with the municipalities provides opportunity for sincere discussions and guidance for an individualized invasive species management program. Since 2015, the Shores of Jacksonport Association (SOJA) has been inventorying Phragmites in the Town of Jacksonport and coordinating treatments utilizing contractors and volunteers. In 2017, the Town of Nasewaupee took inventory data collected by DCIST and hired a private contractor to treat Phragmites within road right-of-ways and on private lands in the town. Also, in 2017 the Town of Sevastopol utilized data collected by DCIST and volunteers to hire a contractor to treat Phragmites on right-of-ways and private lands. While each Town is carrying out treatments slightly differently, an overall model is emerging for municipal leadership, coordination and financial support for invasive species efforts.

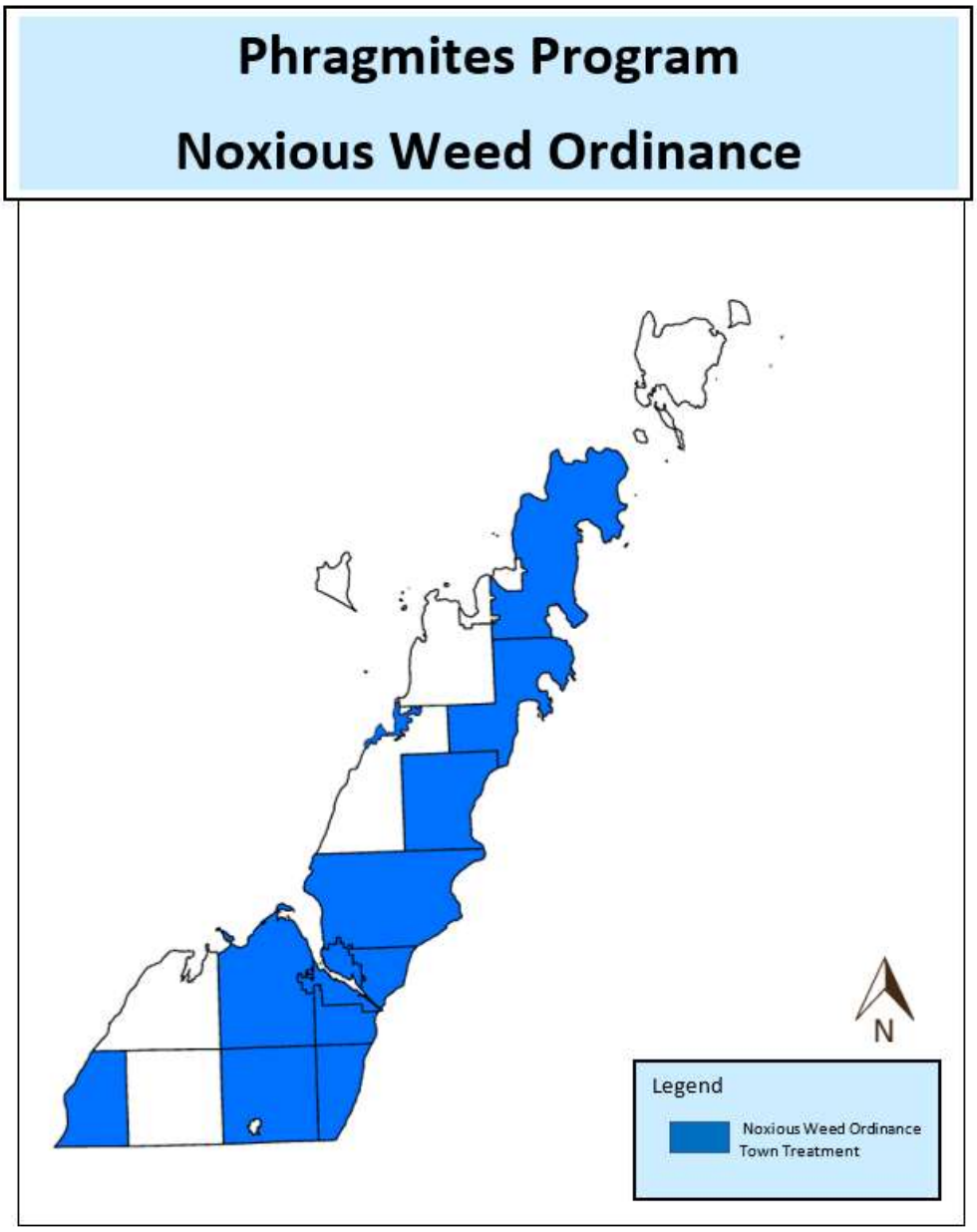

Figure 7.1: Townships with noxious weed ordinances.

DCIST and the Door County SWCD will continue large-scale treatment activities on priority species as funding allows. Large-scale treatments may take place on public or private land or within the road right-of-way. When conducting control work with staff and/or volunteers, DCIST will adhere to all legal requirements regarding property ownership, herbicide application and permitting, and equipment use. Staff, partners and volunteers will follow all equipment and herbicide label instructions, and document landowner permission, required certifications, and records of control activities.

The DCIST coordinator also works with private landowners who wish to control invasive species on their own property. The coordinator serves in an educator role – doing one-on-one site visits with landowners to identify invasive species, providing

resources, materials and best management practices. Typically, 20-40 site visits will be conducted in a given growing season. This model has proved to be successful, with landowners who received a visit often carrying out or hiring contractors to control populations independently on their property afterward.

Action Items:

- Develop and maintain a list of recommended private contractors for NNIS control efforts and make referrals for restoration activities that go beyond the scope of DCIST's assistance – *Ongoing, SWCD & DCIST coordinator*
- Continue to offer landowner one-on-one site visits. Provide landowners with information on control and management options that would be appropriate for their property – on*going, DCIST coordinator.*
- Initiate a municipal cost-share program with DCIST donation monies – *Ongoing, SWCD*
- Identify and recruit volunteers that will represent each Township that has passed an ordinance related to invasive species – *ongoing, DCIST coordinator & SWCD*
- Assist towns that have passed ordinances with inventory and data compiling as needed. Provide Towns with educational presentations and materials as requested – *ongoing, DCIST coordinator & SWCD*
- Attend town board meetings and encourage Towns that have not yet passed a noxious weed ordinance to do so – *ongoing, SWCD with support of DCIST coordinator.*
- Continue to carry out large-scale treatments for Phragmites and wild parsnip in rights-of-way and on private land, or other priority species as determined by the DCIST steering committee and SWCD. Seek funding to continue these initiatives if none is currently available – *ongoing, SWCD & DCIST coordinator*
- Continue to hire LTE(s) to aide in priority control projects and programs - *Seasonally as funding allows, SWCD*
- Generate handout with cost-share options for landowners seeking to control invasive plants on their property – *2019, DCIST coordinator*

Photo 7.1: DICST volunteers treating invasive species.

7.2. WDNR's NR-40 Species

Species listed as prohibited and restricted under Wisconsin's NR-40 administrative rule are illegal to transport, transfer (buy/sell) and introduce. Prohibited species are also illegal to possess and the Wisconsin DNR has a legal authority to mandate control actions on prohibited species when they do appear. DCIST recognizes that species listed as prohibited are the highest priority for control, however there are few of these species currently known to Door County. Therefore, controlling the impact of restricted species on a more local scale is a priority in Door County.

7.3. Priorities for Control & Management in Door County

This list, while not comprehensive, is intended to serve as a guideline for DCIST staff and partners, as well as others managing invasive species in Door County. Species are separated into three categories based on overall distribution within the county as well as other ranking considerations such as ecological and health threats. A species may be considered early detection in one area, but more widespread in another (e.g., wild parsnip in southern and northern Door County). As such, when prioritizing control efforts, managers should examine the local abundance of a species as well as the population size, density, and negative impacts to gauge its control priority. This list will be reviewed annually and adjusted as needed based on changes in species distribution, research, and state regulations.

Early Detection Rapid Response (Highest Priority) - When an early detection species, or state listed prohibited species are identified, DCIST will seek to use a Wisconsin DNR Early Detection Rapid Response Grant or DCIST Donations to address the initial infestation. See also: Section 6.2 for table of early detection species.

Tier 1 – High Priority: Overall, species placed in this category exist only in isolated or scattered populations throughout The County. Several species on this list have yet to be found in Door County, but their listing under the Wisconsin NR-40 administrative rule and their proximity to this region of the state make them a detection priority.

Common Name	Latin Name	NR-40 Status
Common reed (Phragmites)	*Phragmites australis*	Restricted
Common/Cut-leaved teasel	*Dipsacus sp.*	Restricted
Flowering rush	*Butomus umbellatus*	Restricted
Knotweed Species (Hybrid, Japanese, or Giant)	*Polygonum sp.*	Prohibited/Restricted
Leafy /Cypress spurge	*Euphorbia spp*	Restricted
Lyme grass	*Leymus arenarius*	Restricted
Multiflora Rose	*Rosa multiflora*	Restricted
Non-native bittersweet	*Celastrus orbiculatus*	Restricted
Purple loosestrife	*Lythrum salicaria*	Restricted
Tall manna grass	*Glyceria maxima*	Restricted
Wild parsnip	*Pastinaca sativa*	Restricted

Table 7.1: Tier 1 - high priority invasive species within Door County.

Tier 2 – Mid Priority: This category consists of species that are more widespread than Tier 1 species, but at levels still considered manageable. Species in this category can negatively impact natural areas, requiring control and management efforts, but due to their wider distribution eradication of the species may be unlikely.

Common Name	Latin Name	NR-40 Status
Aquatic forget-me-not	*Myosotis scorpioides*	Restricted
Autumn/Russian olive	*Eleagnus spp*	Restricted
Bull/musk thistle	*Cirsium spp.*	Restricted
Common buckthorn	*Rhamnus cathartica*	Restricted
Common tansy	*Tanacetum vulgare*	Restricted
Crown vetch	*Coronilla varia*	Restricted
European bush-honeysuckles	*Lonicera spp.*	Restricted
European marsh thistle	*Cirsium palustre*	Restricted
Garden valerian	*Valeriana officinalis*	Restricted
Glossy buckthorn	*Frangula alnus*	Restricted
Hairy willow-herb	*Epilobium hirsutum*	Restricted
Hounds tongue	*Cynoglossum officinale*	Restricted
Japanese barberry	*Berberis thunbergii*	Restricted
Poison hemlock	*Conium maculatum*	Restricted
Yellow iris	*Iris pseudacorus*	Restricted

Table 7.2: Tier 2 - mid-priority invasive species in Door County.

Tier 3 – Low Priority: These species are considered to be low priority within Door County. This category includes species considered very widespread in the area, making control efforts extremely difficult and reoccurrence likely. Species that are not considered high ecological threats may also be added to this category.

Common Name	Latin Name	NR-40 Status
Bishop's goutweed	*Aegopodium podagraria*	Restricted
Curly-leaved pondweed	*Potamogeton crispus*	Restricted
Dame's rocket	*Hesperis matronalis*	Restricted
Garlic mustard	*Alliaria petiolate*	Restricted
Heliborine orchid	*Epipacatis helleborine*	Restricted
Hybrid/narrow-leaved cattail	*Typha spp.*	Restricted
Lily-of-the-valley	*Concallaria majalis*	Not Listed
Periwinkle	*Vince minor*	Not Listed
Reed canary grass	*Phalaris arundinacea*	Restricted
Spotted knapweed	*Centaurea stoebe*	Restricted
Sweet clover	*Melilotus spp.*	Not Listed
Woodland forget-me-not	*Myosotis sylvatica*	Restricted

Table 7.3: Tier 3 - low priority invasive species for Door County.

Action Items:

- Refine the above tiered species lists based on species' potential ecological and economic impacts, past control efforts, management objectives of infested areas, feasibility of management and distribution in the County, available resources, and human health and safety impacts – *2023, DCIST steering committee with input from other natural resources professionals*

- Seek an existing or develop a new prioritization tool to rank infestations for follow-up action, monitoring, further research, or further control. (e.g., WRISC prioritization tool) – *2023, DCIST coordinator & steering committee.*
- Maintain and revisit the agreed upon DCIST priority invasive species list – *annually, DCIST steering committee*
- Identify high priority geographical areas to address invasive species control and management processes and identify key partners and species present within those areas. Previous areas identified in DCIST planning efforts were Newport/Mink River, Washington/Rock/Plum/Pilot/Detroit Islands, Ridges/Toft Point/North Bay/Mud Lake, Kangaroo Lake/Meridian Park/Piel Creek, Clark Lake/Lost Lake/Whitefish Dunes/Cave Point/Logan Creek, Southern Lake Michigan Shoreline, Little Sturgeon Bay/Brussels Hill/Kayes Creek/Gardner Swamp Complex, Bay Shore Bluff Area, Ahnapee River Corridor, North End Black Ash Swamp, Potawatomi Park/Sawyer Harbor, Chambers Island, Ephraim Swamp, Peninsula State Park, Hibbards Creek/Thorp Pond, White Cliff Fen, Ellison Bluff County Park, Door Bluff County Park, Oak Road Wetland Complex, Hungry Settlement Swamp, Little Sister Bay, Bjorklunden – *Ongoing, DCIST steering committee*

7.4. Tools for Integrated Pest Management

DCIST has numerous control tools at its disposal including physical, chemical and biological control options, depending on the species and timing. Chemical and physical control methods have been are effective in mitigating the impacts of well-established populations and preventing the spread of smaller, localized populations. Targeted manual removal efforts have also proven successful in containing smaller populations. An integrated pest management program that combines these approaches – along with education and outreach, which will be discussed in the next section – is the foundation for achieving desirable environmental outcomes.

Natural areas are vulnerable to invasion by both native and nonnative. Some of these species may require control, either by management goals or by law. The question of what to do in such cases can be perplexing. The consequences of an invasion can range from a minor nuisance to a serious complication in management operations or even a threat to the integrity of the preserved ecosystem. While minor nuisances may be best ignored, the more significant consequences are the focus of these guidelines. The primary objective is to preserve whole communities and their inherent natural processes. The interactions, synergisms, and dynamics of ecosystems literally tie each entity, abiotic as well as biotic, to all other components of the ecosystem. Altering one component invariably affects others, at least to some degree. Hence, monitoring to detect adverse effects of control methods is important in order maximize success while minimizing potential negative impacts. Any decision to control unwanted species, either plant or animal, needs careful consideration based on clear, specific management objectives. Choices should be grounded in sound logic, best management practices, and a vetted strategy.

7.4.1. Careful Consideration of Pesticide Use

Consideration of pesticides to control populations requires careful consideration. Site conditions should be evaluated, and utilization of such tools requires applicators to be well versed in pesticide rules, regulations, and knowledgeable about the pesticide being applied. Pesticides are an important tool in a land manager's toolbox. Careful site consideration, understanding of best management practices, and setting up clear goal objectives should always be considered while selecting a pesticide.

Before pesticide use is recommended the following conditions should be considered:

- Other control methods have been tried and found ineffective.
- Persistence of the unwanted species is proving to be detrimental to management objectives.

Photo 7.2: Techniques recommended by DCIST, and its partners are pictured above. Photos left to right: Foliar treatment using a backpack sprayer, cut stump treatments after cutting using an herbicide dabber, and a honeysuckle cut stump treated-only the outer edge.

- Preferred treatment strategies should minimize collateral damage, e.g., stump application using applicator dabbers or application to individual leaves via hand-wicking, etc.
- The pesticide being used should have proven efficacy and if possible, quickly degrades into benign substances.
- The pesticide must be applied by individuals trained in the application and handling of pesticides and instructed in the use of such substances. Additionally, applicators should be trained and made aware of site considerations and requirements e.g., treatment guidelines in State Natural Areas, treatment guidelines in threatened and endangered species habitats, WDNR Aquatic Plant Management rules and regulations etc.

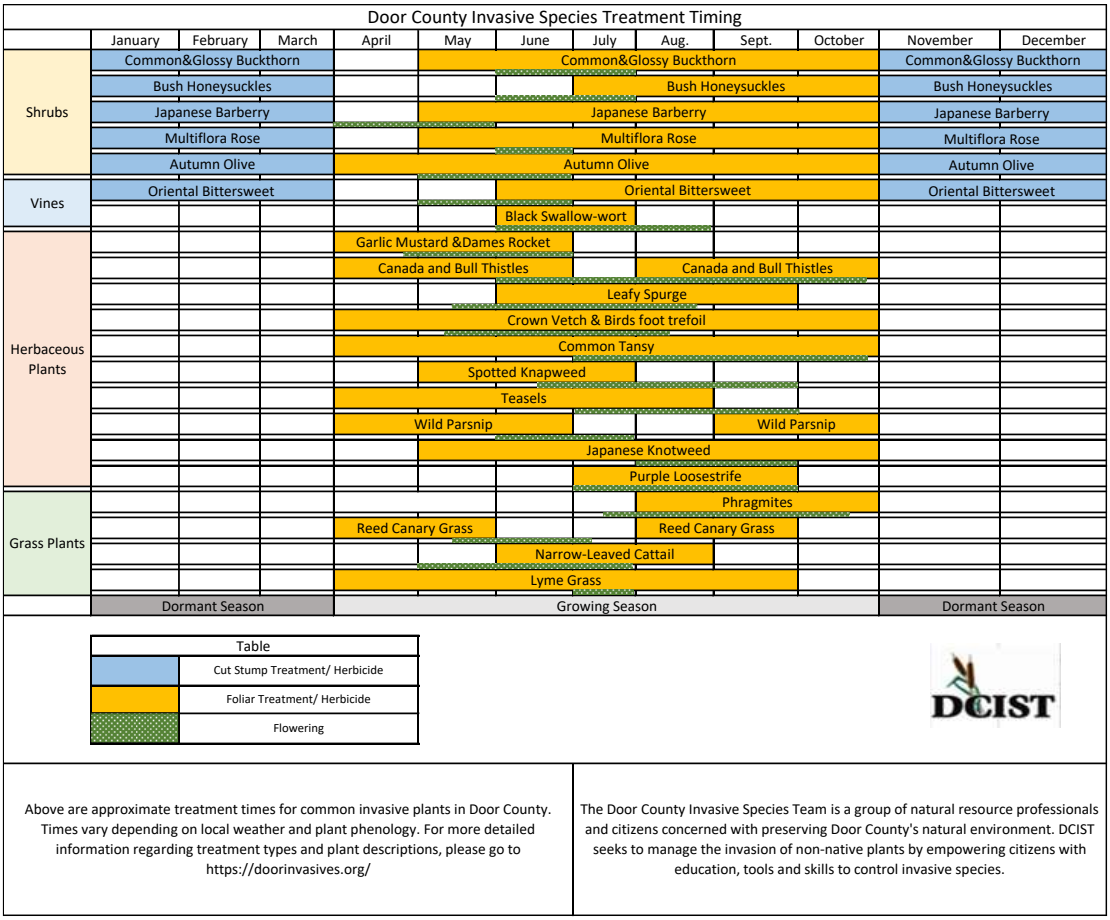

Figure 7.2: Door County Invasive Species Treatment Timing table showing common invasives.

7.4.2. Careful Consideration of Mechanical Use

Mechanical control is often more broadly supported by the public; however, these public perceptions may be unfounded, and the misuse of mechanical controls can further accelerate invasive species establishment. When addressing any management tool, it is important to highlight various options and weigh the pros and cons before making a decision. Disturbance—whether mechanical, chemical, or biological—can create opportunities for new invaders to establish. Therefore, selecting the right management tool is essential for maximizing success. It is also crucial to monitor the effects of any management action, both on the target species and the surrounding habitat, in order to fully understand the impacts of those choices. Decisions to control unwanted species, either plant or animal, should be based on clear, specific management objectives. Any choices made should be supported with clear logic, best management practices, and a vetted strategy.

Before mechanical use is recommended the following conditions should be considered:

- Evaluate the site for species present and establish management goals.
- Establish resources available to sustain efforts (money, time, etc.).
- Persistence of the unwanted species is proving to be detrimental to management objectives.
- Preferred treatment strategies should minimize collateral damage, e.g., tarping of a site should not occur if there are large desirable populations within the tarped area, mowing should not be considered if spreading fragments increase rate of spread etc.

- The mechanical method should have proven efficacy.
- The mechanical method should limit negative impacts to sensitive habitats and species.

7.4.3. Careful Consideration of Biological Control Use

Biocontrol, or biological control, is the use of another organism to control an unwanted species. There are a few biocontrol options available on the market. Biocontrol species are often highly vetted by federal and state agencies so as to limit problematic introduction. Biocontrol should be considered in conjunction with another method, or on its own to maintain populations at an ecological integrated level.

Before utilizing a biocontrol agent, it is recommended the following conditions should be considered:

- Evaluate the sites eligibility for biocontrol release, determine pioneer biocontrol population size, resource accessibility, etc.
- Establish if there are other non-target species potentially at risk by the biocontrol agent.
- Persistence of the unwanted species is proving to be detrimental to management objectives.
- Seek required permitting and track released populations to evaluate efforts.

Action Items:

- Advocate integrated pest management (IPM) practices, utilizing a combination of control techniques to effectively manage invasive populations on a case-by-case basis while limiting the economic and environmental impacts of treatment. A general overview of the methods that may be employed is given below. Explore resources available for outreach with private landowners on IPM strategies – *ongoing, DCIST coordinator*
    - ✓ Manual and mechanical treatments such as pulling, cutting or otherwise stressing or physically removing plants can be used to control some invasive plants, particularly if the population is relatively small.
    - ✓ Chemical - In some instances, herbicide application is the only practical way to control an invasive species due to the physiology of the plant or the extent of the population.
    - ✓ Biological control, or biocontrol for short, is the use of animals, fungi, or other microbes to feed upon, parasitize or otherwise stress a targeted pest species. Successful biocontrol projects significantly reduce the abundance of the pest or prevent the damage caused by the pest.
    - ✓ Cultural control involves the use of methods such as flooding, smothering (covering with a light barrier), controlled by prescribed or wildfire, or the use of cover vegetation to reduce the impact of invasive species.

- Assemble a clear and consistent set of outreach materials for the control of priority invasive species in Door County, including guidelines, policies, procedures, approved methods, and timing charts. Provide training sessions on the control of these species to landowners annually – *ongoing, DCIST coordinator*
- Monitor and document results of control work and conduct follow-up treatments as needed and able. *Ongoing, DCIST Coordinator & SWCD staff*
- Include invasive species considerations in guidance for restoration projects. This includes advising partners, agencies, townships, highway departments, landowners and other interested parties on best management practices and appropriate restoration methods using native species. - *Ongoing, DCIST Coordinator & SWCD staff with guidance from committee*
- Include restoration as a component in DCIST control efforts when able and where appropriate. - *ongoing*, *DCIST Coordinator*

7.5. Funding Control Projects

When an early detection (e.g., prohibited) species is identified, DCIST will seek to use a Wisconsin DNR Early Detection Rapid Response grant or DCIST donations to address the initial infestation. DCIST also seeks to have a WDNR-approved AIS Management Plan for the Door Peninsula, which will allow DCIST to apply for AIS control grants from the state in the future. Additional sources of funding for control and post-control site restoration should continue to be sought.

Section 8: Communication

Overall Goals: Expand the public's awareness of and involvement in DCIST and invasive species efforts. Build both financial and volunteer support for these efforts. Maintain organizational integrity of the DCIST partnership.

Addressing the problems caused by invasive species through strong communication instills and/or improves public awareness of invasive species and those of concern throughout the county. It shares the resource professional's knowledge of invasive species impacts, and what individuals can do to prevent their introduction and spread. However, reaching each person whose activities may affect our natural environment is a daunting task. Collaboration, cooperation and coordination across federal and state agencies, local governments, and the public and private sectors is necessary for a successful program and facilitating this effort is a primary goal of DCIST.

To accomplish this, DCIST has:

- Developed informational websites;
- Conducted workshops and training events;
- Created outreach materials for local distribution that include traveling displays, species pamphlets, invasive species identification cards, fact sheets on proper control methods and disposal and similar items.

8.1. Outreach and Education

The goal of education and outreach is to expand the public's awareness of and involvement in DCIST and invasive species - in a sense creating a network of well-informed land stewards across the landscape. Providing up-to-date information on invasive species lends the opportunity of prevention, early detection and proper control. Materials that are shared includes information intended for the public as well as specific information for target audiences. All information that is generated is provided by DCIST partners and is conveyed in plain language for the understanding of all potential audiences. Through these outreach efforts DCIST can build a network of citizens that report invasive species occurrences, maintain up-to-date information on invasive species threats, management and research as well as a list of regional partners, cooperators and contractors.

Action Items

- Work with steering committee to determine target audiences for education and outreach campaigns based on projects occurring within their respective properties or species of concern – *Ongoing, SWCD, DCIST Steering Committee & Coordinator.*
- Utilize a variety of resources (peer reviewed literature, paper/digital publications, webinars, professional contacts, etc.) to keep DCIST staff, partners, and members knowledgeable and up to date on current invasive species issues – *Ongoing, DCIST Coordinator.*
- Promote the sharing of information among partners, members, natural resources professionals, and other interested parties – *Monthly, All DCIST Partners through organized steering committee meetings and public events.*

- Encourage DCIST staff and partners to attend local and regional invasive species conferences, conventions, and meetings as able – *Ongoing, opportunities are shared by SWCD staff and DCIST coordinator.*
- Develop, maintain, and advertise online workday calendar and DCIST equipment loan program – *ongoing, DCIST coordinator*
- Work with partners to provide NNIS identification and control training workshops targeting parks, right-of-way, nursery and landscape professionals, seasonal employees/LTEs within Door County, and private citizens. Keep abreast and share current advances in invasive species control methods – *as funding allows, DCIST Coordinator*
- Host a partner and member forum/meeting that is open to the public – *annually, DCIST Steering Committee*
- Continue to publish and release DCIST newsletters. Increase recipients of e-newsletter to 1,000 by 2022. The e-newsletter will include updates on DCIST meetings, events, and pertinent invasive species science and research updates – *ongoing, DCIST coordinator*
- Develop and offer education programs targeting land managers, staff, and volunteers who work to manage high priority natural areas. Provide training in identification and control of high priority invasives and recent advances in invasive species control methods – *Ongoing as funding allows, DCIST coordinator & SWCD staff*
- Host at least two educational events annually to build public engagement and raise invasive species awareness. This may include hosting guest speakers, showing invasive species documentaries, providing a presentation as part of another Door County event, or other similar events – *annually as funding allows, DCIST coordinator.*
- Provide DCIST representation and invasive species education at area meetings, conferences, and other functions that would advance the mission of DCIST by reaching citizens, municipalities, etc. Examples of this may include home and garden shows, Farm Technology Days, etc. – *as opportunity arises, DCIST coordinator & steering committee*
- Develop additional educational materials as able; distribute at public functions and places; examples include pens, magnets, posters, signs, buttons, pamphlets, calendars, booklets, etc. – *As funding allows, SWCD staff & DCIST coordinator*
- Utilize traditional media (i.e., press releases, newspapers, radio, and television) to reach Door County residents- *Ongoing, DCIST Coordinator and SWCD staff- ongoing*
- Maintain the DCIST email (dcist1@gmail.com) as a consistent and convenient contact for the public. Email should be checked a minimum of two times weekly. Maintain a member email list used to inform public and partners of events and invasive species news – *ongoing, DCIST coordinator*
- Reach a broader audience using social media including Facebook and Instagram. Through weekly updates, provide accurate, detailed and updated information via these accounts and the DCIST website – *ongoing, DCIST coordinator*
    - ✓ Develop communications/education/outreach social marketing plan (assemble existing material, identify new additional materials needed, develop partnership strategy) – *2020-2021, DCIST coordinator & steering committee*
- Create a traveling invasive species display to engage the public in understanding the impacts of invasive plants. Maintain a list of table display venues and speaking opportunities. Coordinate display schedule, transport, set-up, maintenance, updates and staffing. Explore options for purchase of table display and/or large poster for display with equipment, etc. – *Ongoing, DCIST coordinator, SWCD staff, and steering committee*
- Co-promote invasive species activities during Wisconsin's Invasive Species Action Month held annually each June – *Ongoing, DCIST coordinator*
- Update, print and distribute the general DCIST brochure and "Top 15" invasive species brochure – *2023, DCIST coordinator & SWCD staff*

- Develop a list of strategic partners and organizations in Door County that would help promote the mission of DCIST. Introduce these entities to the DCIST and the tools available to them – *Ongoing, DCIST coordinator*

Photo 8.1: DCIST training workshop for volunteers.

Photo 8.2: DCIST informational board on display.

8.2. Organizational

The overall objective of organization action items is to maintain and expand the DCIST partnership while building on the strong foundation that currently exists. Invasive plants are a shared concern for the many agencies and organizations that comprise the partnership, as well as for the citizens DCIST works with across the landscape. Partnerships are unique arrangements, with each collaboration bringing its own culture and internal dynamics. The best outcomes from strategic partnerships generally occur when each partner excels in their areas of expertise, contributing to the overall goals of the group. By leveraging the DCIST partnership, each partner can focus on its strengths, whilst having reliable people in other organizations to cover the areas outside its expertise. Growing partners and members within the DCIST network will increase both on-the-ground and financial support within Door County for this effort.

Organizational structure is about identifying and maintaining leadership to accomplish control, education, outreach and other objectives through cooperation of resources and team building. It is expected that the entire partnership, including the coordinator, SWCD and DCIST steering committee member organizations, will work toward these action items to maintain the partnership into the future. Therefore, some of these action items do not specify the entity that will take the lead on that item.

Action Items:

- Maintain the DCIST structure and partnership and steering committee - *ongoing*
  - ✓ Maintain at least one DCIST staff position to serve as the group coordinator and project manager; determine if organizational independence is desired and/or feasible and if MOU or similar agreement is wanted.
  - ✓ Create long-term goal(s) for DCIST's organizational status - *2023*
- Work across jurisdictional and geographical boundaries to strengthen the coordination among current and potential partners – *DCIST Coordinator- ongoing*
  - ✓ Continue to participate in the Phragmites Advisory Council led by Bay Lake Regional Planning
  - ✓ Continue to participate in the Green Bay Conservation Partners round table.
  - ✓ Continue to participate in AIS and CISMA workshops provided by WDNR
- Seek funding opportunities to support DCIST activities. Raise a minimum of $25,000 annually in grant awards or private donations to support general operations, a part-time coordinator, programs, and annual work plans - *ongoing*
  - ✓ Continue to seek funding through competitive grants and gifts, exploring federal, state and local sources. The type and availability of funding opportunities varies. Update and manage a list of Foundations and grant programs complementary to the DCIST goals and objectives – *ongoing*

- ✓ Explore additional ways to raise undesignated funds: donations, sales, auctions, meeting fees, etc.
  - Funding opportunities will be reviewed on a regular basis with proposals being drafted and reviewed as able by DCIST staff, steering committee members, and fiscal administrator.

- Develop a diverse, stable funding mechanism to oversee partnership coordination and maintain partnership cohesiveness.
  - ✓ Establish an annual budget and job responsibilities for a county-wide invasive species coordinator – *annually, SWCD staff & DCIST steering committee*.
- Recruit and/or maintain a steering committee with a minimum of eight and a maximum of 15 active members that possess the skills and commitment to strengthen DCIST. Define and prioritize steering committee responsibilities and member expectations – *2019 and ongoing, DCIST coordinator & steering committee*
- Schedule bi-monthly steering committee meetings and post the dates on the website
  - ✓ Develop and distribute the agenda, financial report and past meeting minutes prior to each meeting– *minimum of six times per year, DCIST coordinator & SWCD for financial report*
- Evaluate need for control and management, education and outreach, early detection and mapping sub-committees within the larger steering committee – other sub-committees could include monitoring, AIS and Terrestrial, funding, technical, policy – *DCIST Coordinator and steering committee partners 2020-2023*
- Following this strategic plan develop annual work plans for the DCIST coordinator and the partnership using clearly defined criteria to evaluate and prioritize activities – annually, *DCIST coordinator, SWCD staff with input from steering committee*
- Explore means by which to recruit, engage and maintain members who will serve as volunteers and ambassadors for the program. Continue to identify community "champions" that will work within their municipality to advance the DCIST efforts and SWCD invasive species work with a goal of having a person identified within each municipality within the timeframe of this plan – *DCIST coordinator & SWCD staff 2018-2023*

Figure 8.1: DCIST outreach efforts through newsletter distribution (left) that highlights an invasive species on a monthly basis. The new DCIST website home page allow for the most current information, google calendar and much more. Viewable at www.doorinvasives.org.

Appendices

Appendix A: State of Wisconsin's Department of Transportation's Highway Maintenance Manual - Chapter 7 Roadside Management recommended BMP summary.

Appendix B: Complete Wisconsin NR-40 species list.

Appendix C: Wisconsin DNR's Invasive Species Response Framework's *Invasive Species Response Process Overview & Checklist*

Appendix A: State of Wisconsin's Department of Transportation's Highway Maintenance Manual - Chapter 7 Roadside Management recommended BMP summary

An overview of the Utility and Transportation Rights-of-way BMPs relevant to invasive species prevention and control in Door County. Considerations for each of these BMPs can be found in the full manual. Additional BMPs for forestry, recreational activities, and more can be found at https://councilonforestry.wi.gov/Pages/InvasiveSpecies/Overview.aspx.

Soil Disturbance BMPs

- BMP SD 1: Prior to implementing activities, scout for and locate invasive species infestations, consistent with the scale and intensity of the operations that are to occur at the site.
- BMP SD 2: Consider the need for action based on: 1) the degree of invasiveness; 2) severity of the current infestation; 3) amount of additional habitat or hosts at risk for invasion; and 4) potential impacts; and 5) feasibility of control with available methods and resources
- BMP SD 3: Plan activities to limit the potential for introduction and spread of invasive species, prior to construction.
- BMP SD 4: Provide appropriate resources in identification of known species for corridor workers.
- BMP SD 5: Minimize soil disturbance which may include using existing roads, access points, staging areas and/or alternative construction methods.
- BMP SD 6: Avoid invasive species populations when feasible and minimize the spread of invasive species during soil disturbance activities.
- BMP SD 7: Prior to moving equipment out of an infested area and then into an un-infested area, clean soils, seeds, plant parts, or invertebrates from exterior surfaces, to the extent practical, to minimize the risk of transporting propagules.
- BMP SD 8: Stabilize disturbed soils using erosion control/storm water management technical standards as soon as possible.
- BMP SD 9: Use non-invasive or native seed for cover crops or revegetation.

Vegetation Management and Inspection/Monitoring BMPs

- BMP VM 1: Prior to implementing activities, scout for, locate and document invasive species infestations.
- BMP VM 2: Plan activities to limit the potential introduction and spread of invasive species, prior to construction.
- BMP VM 3: Assess available resources and seed new resources to prevent invasive species spread.
- BMP VM 4: Provide training in identification, control and prevention of known invasive species to employees and contractors performing vegetation management activities.
- BMP VM 5: Prior to moving equipment out of an infested area and then into an un-infested area, clean soils, seeds, plant parts or invertebrates from exterior surfaces, to the extent practical, to minimize the risk of transporting propagules.
- BMP VM 6: Inspect and clean clothing, footwear, and gear for soils, seeds, plant parts, and invertebrates before and after activities.
- BMP VM 7: Properly dispose of soils, seeds, plant parts or invertebrates found during inspection and cleaning.
- BMP VM 8: Locate and use staging areas that are free of invasive plants to avoid spreading seeds and other viable plant parts.
- BMP VM 9: Consider the likely response of invasive species when conducting activities that result in disturbed soil, increased sunlight, fire, etc.
- BMP VM 10: Ensure that invasive species control treatments are applied within the appropriate time window.
- BMP VM 11: Monitor right-of-ways during day-to-day activities and post-management activities; determine necessary treatments based on the presence of invasive species.

Transportation of Material BMPs

BMP TM 1: Take steps to avoid the movement of invasives to non-infested areas during transport activities.

BMP TM 2: Prior to transporting materials, manage the load to limit the spread of invasive species.

BMP TM 3: Prior to moving equipment out of an infested area and then into an un-infested area, clean soils, seeds, plant parts or invertebrates from exterior surfaces, to the extent practical, to minimize the risk of transporting propagules.

BMP TM 4: Dispose of soils, seeds, plant parts or invertebrates found during inspection and cleaning.

BMP TM 5: Establish staging areas and temporary facilities in locations that are free of invasive species.

BMP TM 6: Use soil and aggregate material from sources that are free of invasive species.

BMP TM 7: Manage stock piles to limit the spread of invasive species.

BMP TM 8: Do not transport woody material that may contain invasive species.

BMP TM 9: If you must transport woody material that may contain invasive species, bring them to a designated area for appropriate disposal.

BMP TM 10: Keep and reuse onsite materials rather than importing new materials.

Revegetation and Landscaping BMPs

BMP RV 1: Plan activities to limit the potential introduction and spread of invasive species, prior to revegetation.

BMP RV 2: Select non-invasive or native species for revegetation and landscaping activities.

BMP RV 3: Inspect and clean clothing, footwear and gear for soils, seeds, plant parts or invertebrates before and after activities.

BMP RV 4: Prior to moving equipment out of an infested area and into an un-infested area clean soil and debris from exterior surfaces, to the extent practical, to minimize the risk of transporting propagules.

BMP RV 5: Revegetate disturbed soils as soon as feasible to minimize invasive species establishment.

BMP RV 6: Allow natural revegetation of the ground lay to occur only where site conditions permit.

BMP RV 7: Ensure the species specified in the plan are the ones being used.

BMP RV 8: Monitor the revegetation site for invasive species.

Appendix B: Wisconsin's NR-40 Listed Species

WISCONSIN CH. NR 40 INVASIVE SPECIES LIST

EFFECTIVE LISTING DATE
September 1, 2009 [A]
June 1, 2011 [B]
May 1, 2015 [C]

ALGAE AND CYANOBACTERIA

PROHIBITED CATEGORY:

1. *Caulerpa taxifolia* (Killer algae)[C]
2. *Cylindrospermopsis raciborskii* (Cylindro, cyanobacteria)[A]
3. *Didymosphenia geminata* (Didymo or rock snot)[A] except in Lake Superior
4. *Nitellopsis obtusa* (Starry stonewort, alga)[A]
5. *Prymnesium parvum* (Golden alga)[A]
6. *Stigonematales* spp. (Novel cyanobacterial epiphyte of the order Stigonematales linked with avian vacuolar)[A]
7. *Ulva* species (including species previously known as Enteromorpha species)[A]

RESTRICTED CATEGORY:

None.

PLANTS

PROHIBITED CATEGORY:

1. *Achyranthes japonica* (Japanese chaff flower)[C]
2. *Akebia quinata* (Fiveleaf akebia or Chocolate vine)[C]
3. *Ampelopsis brevipedunculata* (Porcelain berry)[A] including the variegated cultivar
4. *Arundo donax* (Giant reed)[C]
5. *Azolla pinnata* (Mosquito fern)[C]
6. *Berberis vulgaris* (Common barberry)[C]
7. *Cabomba caroliniana* (Fanwort, Carolina fanwort)[A]
8. *Cardamine impatiens* (Narrow leaf bittercress)[C]
9. *Celastrus loeseneri* (Asian loeseneri bittersweet)[C]
10. *Centaurea diffusa* (Diffuse knapweed)[C]
11. *Centaurea repens* (Russian knapweed)[C]
12. *Centaurea solstitialis* (Yellow star thistle)[A]
13. *Crassula helmsii* (Australian swamp crop or New Zealand pygmyweed)[A]
14. *Cytisus scoparius* (Scotch broom)[A]
15. *Digitalis lanata* (Grecian foxglove)[C]
16. *Dioscorea batatas* or *Dioscorea polystacha* (Chinese yam)[C]
17. *Dioscorea oppositifolia* (Indian yam)[A]
18. *Egeria densa* (Brazilian waterweed or wide-leaf anacharis)[A]
19. *Eichhornia azurea* (Anchored water hyacinth)[C]
20. *Eichhornia crassipes* (Water hyacinth, floating)[C]
21. *Fallopia sachalinensis* or Polygonum sachalinense (Giant knotweed)[A]
22. *Fallopia* x *bohemicum* or *F.* x *bohemica* or *Polygonum* x *bohemicum* (Bohemian knotweed)[C]
23. *Glossostigma cleistanthum* (Mudmat)[C]
24. *Heracleum mantegazzianum* (Giant hogweed)[A]
25. *Hydrilla verticillata* (Hydrilla)[A]
26. *Hydrocharis morsus–ranae* (European frogbit)[A]
27. *Hydrocotyle ranunculoides* (Floating marsh pennywort)[C]
28. *Hygrophila polysperma* (Indian Swampweed)[C]
29. *Impatiens glandulifera* (Policeman's helmet)[C]
30. *Ipomoea aquatica* (Water spinach, swamp morning-glory)[C]
31. *Lagarosiphon major* (Oxygen–weed, African elodea or African waterweed)[A]
32. *Lepidium latifolium* (Perennial or broadleaved pepperweed)[A]
33. *Lespedeza cuneata* or *Lespedeza sericea* (Sericea or Chinese lespedeza)[A]
34. *Limnophila sessiliflora* (Asian marshweed)[C]
35. *Lonicera japonica* (Japanese honeysuckle)[A]
36. *Lythrum virgatum* (Wanded loosestrife)[C]
37. *Microstegium vimineum* (Japanese stilt grass)[A]
38. *Myriophyllum aquaticum* (Parrot feather)[A]
39. *Najas minor* (Brittle naiad, or lesser, bushy, slender, spiny or minor naiad or waternymph)[A]
40. *Nelumbo nucifera* (Sacred Lotus)[C]
41. *Nymphoides peltata* (Yellow floating heart)[A]
42. *Oenanthe javanica* (Java waterdropwort or Vietnamese parsley)[C]
43. *Oplismenus hirtellus* ssp. *undulatifolius* (Wavy leaf basket grass)[C]
44. *Ottelia alismoides* (Ducklettuce)[C]
45. *Paulownia tomentosa* (Princess tree)[A]
46. *Petasites hybridus* (Butterfly dock)[C]
47. *Phellodendron amurense* (Amur Cork Tree)[C] except male cultivars and seedling rootstock
48. *Pistia stratiotes* (Water lettuce)[C]
49. *Polygonum perfoliatum* or *Persicaria perfoliata* (Mile–a–minute vine)[A]
50. *Pueraria montana* or *P. lobata* (Kudzu)[A]
51. *Quercus acutissima* (Sawtooth oak)[A]
52. *Ranunculus ficaria* (Lesser celandine)[C]
53. *Rubus armeniacus* (Himalayan blackberry)[C]
54. *Rubus phoenicolasius* (Wineberry or wine raspberry)[A]
55. *Sagittaria sagittifolia* (Hawaii arrowhead)[C]
56. *Salvinia herzogii* (Giant Salvinia)[C]
57. *Salvinia molesta* (Giant salvinia)[C]
58. *Sorghum halepense* (Johnsongrass)[C]
59. *Stratiotes aloides* (Water Soldiers)[C]
60. *Taeniatherum caput-medusae* (Medusahead)[C]
61. *Torilis arvensis* (Spreading hedgeparsley)[A]
62. *Trapa natans* (Water chestnut)[A]
63. *Tussilago farfara* (Colt's foot)[C]
64. *Typha domingensis* (Southern cattail)[C]
65. *Typha laxmannii* (Graceful cattail)[C]
66. *Vincetoxicum rossicum* or *Cynanchum rossicum* (Pale or European swallow–wort)[A]
67. *Wisteria floribunda* (Japanese wisteria)[C]
68. *Wisteria sinensis* (Chinese wisteria)[C]

PROHIBITED/RESTRICTED CATEGORY:

1. *Anthriscus sylvestris* (Wild chervil)[A] restricted in Adams, Barron, Chippewa, Crawford, Columbia, Dane, Dodge, Dunn, Fond du Lac, Grant, Green, Green Lake, Iowa, Jefferson, Juneau, Kenosha, Lacrosse, Lafayette, Marquette, Milwaukee, Monroe, Ozaukee, Polk , Racine, Richland, Rock, Sauk, Sheboygan, Taylor, Vernon, Walworth, Waukesha, and Washington counties; prohibited elsewhere – Updated county list in 2015
2. *Bunias orientalis* (Hill mustard)[A] restricted in Dane, Grant, Green, Iowa, Lafayette, and Rock counties; prohibited elsewhere – Updated county list in 2015
3. *Cirsium palustre* (European marsh thistle)[A] restricted in Ashland, Bayfield, Chippewa, Clark, Door, Florence, Forest, Iron, Langlade, Lincoln, Marathon, Marinette, Menominee, Oconto, Oneida, Price, Rusk, Sawyer, Shawano, Taylor and Vilas counties; prohibited elsewhere – Updated county list in 2015
4. *Conium maculatum* (Poison hemlock)[A] restricted in Buffalo, Crawford, Dane, Grant, Green, Iowa, Jefferson, Kenosha, La Crosse, Lafayette, Milwaukee, Monroe, Ozaukee, Racine, Richland, Rock, Sauk, Sheboygan, Trempealeau, Vernon, Walworth, and Waukesha counties; prohibited elsewhere – Updated county list in 2015
5. *Epilobium hirsutum* (Hairy willow herb)[A] restricted in Brown, Calumet, Door, Kenosha, Kewaunee, and Manitowoc counties; prohibited elsewhere – Updated county list in 2015
6. *Glyceria maxima* (Tall or reed mannagrass)[A] restricted in Brown, Calumet, Columbia, Dane, Dodge, Door, Fond du Lac, Green, Jefferson, Kenosha, Kewaunee, Manitowoc, Milwaukee, Outagamie, Ozaukee, Racine, Rock, Sheboygan, Walworth, Washington, Waukesha and Winnebago counties; prohibited elsewhere – Updated county list in 2015
7. *Humulus japonicus* (Japanese hops)[A] restricted in Buffalo, Crawford, Dane, Grant, Green, Iowa, Jackson, La Crosse, Lafayette, Monroe, Pepin, Richland, Sauk, Trempealeau, and Vernon counties; prohibited elsewhere – Updated county list in 2015
8. *Leymus arenarius* or *Elymus arenarius* (Lyme grass or sand ryegrass)[A] restricted in Door, Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, and Sheboygan counties; prohibited elsewhere – Updated county list in 2015
9. *Linaria dalmatica* (Dalmatian toadflax)[C] restricted in Juneau and Bayfield counties; prohibited elsewhere
10. *Lonicera maackii* (Amur honeysuckle)[A] restricted in Adams, Brown, Buffalo, Calumet, Columbia, Crawford, Dane, Dodge, Fond du Lac, Grant, Green, Green Lake, Iowa, Jefferson, Juneau, Kenosha, Kewaunee, La Crosse, Lafayette, Manitowoc, Marquette, Milwaukee, Monroe, Outagamie, Ozaukee, Racine, Richland, Rock, Sauk, Sheboygan, Vernon, Walworth, Washington, Waukesha, Waupaca, Waushara and Winnebago counties; prohibited elsewhere – Updated county list in 2015
11. *Phragmites australis* non-native ecotype (Phragmites or Common reed non-native ecotype)[A] restricted in Brown, Calumet, Columbia, Dane, Dodge, Door, Florence, Fond du Lac, Forest, Green Lake, Jefferson, Kenosha, Kewaunee, Langlade, Manitowoc, Marathon, Marinette, Marquette, Menominee, Milwaukee, Oconto, Outagamie, Ozaukee, Portage, Racine, Rock, Shawano, Sheboygan, Walworth, Washington, Waukesha, Waupaca, Waushara, and Winnebago counties; prohibited elsewhere - Moved to Prohibited/Restricted from Restricted in 2015
12. *Solidago sempervirens* (Seaside goldenrod)[C] restricted in Kenosha, Milwaukee and Racine counties; prohibited elsewhere
13. *Torilis japonica* (Japanese hedgeparsley or erect hedgeparsley)[A] restricted in Adams, Brown, Calumet, Columbia, Crawford, Dane, Dodge, Door, Fond du Lac, Grant, Green, Green Lake, Iowa, Jefferson, Juneau, Kenosha, Kewaunee, La Crosse, Lafayette, Langlade, Manitowoc, Marathon, Marinette, Marquette, Menominee, Milwaukee, Monroe, Oconto, Outagamie, Ozaukee, Portage, Racine, Richland, Rock, Sauk, Shawano, Sheboygan, Vernon, Walworth, Washington, Waukesha, Waupaca, Waushara, and Winnebago counties; prohibited elsewhere – Updated county list in 2015
14. *Vincetoxicum nigrum* or *Cynanchum louiseae* (Black or Louise's swallow–wort)[A] restricted in Columbia, Crawford, Dane, Grant, Green, Iowa, Jefferson, Juneau, Kenosha, La Crosse, Lafayette, Milwaukee, Monroe, Racine, Richland, Rock, Sauk, Vernon, Walworth and Waukesha counties; prohibited elsewhere

RESTRICTED CATEGORY:

1. *Acer tataricum* subsp. *ginnala* (Amur maple)[C] *except all cultivars
2. *Aegopodium podagraria* (Bishop's goutweed)[C]
3. *Ailanthus altissima* (Tree of heaven)[A]
4. *Alliaria petiolata* (Garlic mustard)[A]
5. *Alnus glutinosa* (Black alder)[C] *except all cultivars and hybrids
6. *Artemisia absinthium* (Wormwood)[C]
7. *Berberis thunbergii* (Japanese barberry)[C] *This restriction only applies to the parent type, the variety atropurpurea, the hybrid of B. thunbergii x B. Koreana, and the following cultivars. Berberis thunbergii cultivars: Sparkle, 'Anderson' Lustre Green™, Erecta, 'Bailgreen' Jade Carousel®, Angel Wings, Painter's Palette, Inermis ('Thornless'), Pow Wow, Golden Ring, Kelleriis, Kobold, 'JN Variegated' Stardust™ and Antares. Variety atropurpurea cultivars: Marshall Upright ('Erecta'), Crimson Velvet, 'Bailtwo' Burgundy Carousel®, Red Rocket, 'Monomb' Cherry Bomb™, 'Bailone' Ruby Carousel®, JN Redleaf, Rose Glow and Silver Mile. Hybrid of B. thunbergii x B. koreana cultivars: Tara and 'Bailsel' Golden Carousel®
8. *Butomus umbellatus* (Flowering rush)[A]
9. *Campanula rapunculoides* (Creeping bellflower)[A]
10. *Caragana arborescens* (Siberian peashrub)[C] *except the cultivars Lorbergii, Pendula, and Walkerii
11. *Carduus acanthoides* (Plumeless thistle)[A]
12. *Carduus nutans* (Musk thistle or Nodding thistle)[A]
13. *Celastrus orbiculatus* (Oriental bittersweet)[A]
14. *Centaurea biebersteinii, Centaurea maculosa* or *Centaurea stoebe* (Spotted knapweed)[A]

15. *Centaurea jacea* (Brown knapweed)[C]
16. *Centaurea nigra* (Black knapweed)[C]
17. *Centaurea nigrescens* (Tyrol knapweed)[C]
18. *Chelidonium majus* (Celandine)[A] - Moved to Restricted from Prohibited/Restricted in 2015
19. *Cirsium arvense* (Canada thistle)[A]
20. *Coronilla varia* (Crown vetch)[C]
21. *Cynoglossum officinale* (Hound's tongue)[A]
22. *Dipsacus laciniatus* (Cut–leaved teasel)[A]
23. *Dipsacus sylvestris* or *Dipsacus fullonum* (Common teasel)[A]
24. *Elaeagnus angustifolia* (Russian olive)[A]
25. *Elaeagnus umbellata* (Autumn olive)[A]
26. *Epipactis helleborine* (Helleborine orchid)[A]
27. *Euonymus alatus* (Burning bush)[C] *including the cultivar 'Nordine' and excluding all other cultivars
28. *Euphorbia cyparissias* (Cypress spurge)[A]
29. *Euphorbia esula* (Leafy spurge)[A]
30. *Fallopia japonica* or *Polygonum cuspidatum* (Japanese knotweed)[A]
31. *Filipendula ulmaria* (Queen of the meadow)[C]
32. *Galeopsis tetrahit* (Hemp nettle, brittlestem hemp nettle)[A]
33. *Galium mollugo* (White bedstraw)[C]
34. *Hesperis matronalis* (Dame's rocket)[A]
35. *Impatiens balfourii* (Balfour's touch-me-not)[C]
36. *Iris pseudacorus* (Yellow iris)[C]
37. *Knautia arvensis* (Field scabiosa)[C]
38. *Lonicera morrowii* (Morrow's honeysuckle)[A]
39. *Lonicera tatarica* (Tartarian honeysuckle)[A]
40. *Lonicera* x *bella* (Bell's or showy bush honeysuckle)[A]
41. *Lysimachia nummularia* or *L. nummelaria* (Moneywort)[A] *except the cultivar Aurea and yellow and gold leaf forms
42. *Lysimachia vulgaris* (Garden yellow loosestrife)[C]
43. *Lythrum salicaria* (Purple loosestrife)[A]
44. *Morus alba* (White mulberry)[C] *except male cultivars
45. *Myosotis scorpioides* (Aquatic forget-me-not)[C]
46. *Myosotis sylvatica* or *M. sylvaticum* (Woodland forget-me-not)[C]
47. *Myriophyllum spicatum* (Eurasian watermilfoil)[A]
48. *Najas marina* (Spiny naiad)[C]
49. *Pastinaca sativa* (Wild parsnip)[A] *except for the garden vegetable form
50. *Phalaris arundinacea* var. *picta* (ribbon grass or gardener's garters and other ornamental variegated varieties and cultivars)[C] *this restriction does not include the parent type - reed canary grass.
51. *Pimpinella saxifraga* (Scarlet pimpernel or Burnet saxifrage)[C]
52. *Populus alba* (White poplar)[C]
53. *Potamogeton crispus* (Curly–leaf pondweed)[A]
54. *Rhamnus cathartica* (Common buckthorn)[A]
55. *Rhamnus frangula* or *Frangula alnus* (Glossy buckthorn)[A] *including the Columnaris (tall hedge) cultivar but excluding the cultivars Asplenifolia and Fineline (Ron Williams)
56. *Robinia hispida* (Rose acacia or Bristly locust)[C]
57. *Robinia pseudoacacia* (Black locust)[C] *except all cultivars
58. *Rosa multiflora* (Multiflora rose)[A]
59. *Tanacetum vulgare* (Tansy)[A] *except the cultivars Aureum and Crispum
60. *Typha angustifolia* (Narrow-leaf cattail)[A]
61. *Typha* x *glauca* (Hybrid cattail)[A]
62. *Ulmus pumila* (Siberian elm)[C] *except hybrids and individuals used as rootstock
63. *Valeriana officinalis* (Garden heliotrope or Valerian)[C]

Phase-out: Restricted only plants located in Wisconsin prior to their effective listing date may be transported, transferred, and introduced without a permit for a period not to exceed 3 years for herbaceous plants and woody vines, or 5 years for trees and shrubs, from their effective listing date.

FISH AND CRAYFISH

PROHIBITED CATEGORY:

1. Channidae (Snakehead family)[A] including *Channa argus* (Northern snakehead) , *Channa bleheri* (Rainbow snakehead), *Channa gachua* (Dwarf snakehead), *Channa maculata* (Blotched snakehead), *Channa marulius* (Bullseye snakehead), *Channa punctata* (Spotted snakehead), and *Channa striata* (Chevron snakehead)
2. *Ctenopharyngodon idella* (Grass carp)[A]
3. *Cyprinella lutrensis* (Red shiner)[A]
4. *Hypophthalmichthys molitrix* (Silver carp)[A]
5. *Hypophthalmichthys nobilis* (Bighead carp)[A]
6. *Mylopharyngodon piceus* (Black carp)[A]
7. *Sander lucioperca* (Zander)[A]
8. *Scardinius erythrophthalmus* (Rudd)[A]
9. *Tinca tinca* (Tench)[A]
10. All other nonnative fish and nonnative crayfish except:
    a. Established nonnative fish species and established nonnative crayfish species
    b. Nonnative viable fish species in the aquarium trade
    c. Nonnative fish species in the aquaculture industry
    d. Nonviable fish species
    e. Genetically modified fish species

RESTRICTED CATEGORY:

1. Established nonnative fish species and established nonnative crayfish species
    a. *Alosa pseudoharengus* (Alewive)[A]
    b. *Cyprinus carpio* (Common carp)[A]
    c. *Gambusia affinis* (Western mosquitofish)[A] - Moved to Restricted from Prohibited in 2015
    d. *Gambusia holbrooki* (Eastern mosquitofish)[A] - Moved to Restricted from Prohibited in 2015
    e. *Gasterosteus aculeatus* (Three-spine stickleback)[A]
    f. *Gymnocephalus cernuus* (Ruffe)[A]
    g. *Morone americana* (White perch)[A]
    h. *Neogobius melanostomus* (Round goby)[A]
    i. *Orconectes rusticus* (Rusty crayfish)[A]
    j. *Osmerus mordax* (Rainbow smelt)[A]

k. *Petromyzon marinus* (Sea lamprey)[A]
l. *Proterorhinus marmoratus* (Tubenose Goby)[A]

2. Nonnative viable fish species in the aquarium trade
   a. *Acipenser ruthenus* (Sterlet)[A]
   b. *Carassius auratus* (Goldfish)[A]
   c. *Cyprinus carpio* (Koi carp)[A]
   d. *Leuciscus idus* (Ide)[A]
   e. *Misgurnus anguillicaudatus* (Weather loach)[A]
   f. *Myxocyprinus asiaticus* (Chinese hi-fin banded shark)[A]
   g. *Rhodeus* spp. (Bitterling)[A]
3. Nonnative fish species in the aquaculture industry
   a. *Lepomis microlophus* (Redear sunfish)[A]
   b. *Oncorhynchus gorbuscha* (Pink salmon)[A]
   c. *Oncorhynchus kisutch* (Coho salmon)[A]
   d. *Oncorhynchus mykiss* (Rainbow trout)[A]
   e. *Oncorhynchus tshawytscha* (Chinook salmon)[A]
   f. *Salmo salar* (Atlantic salmon)[A]
   g. *Salmo trutta* (Brown trout)[A]
   h. *Salvelinus alpinus* (Arctic char)[A]
   i. *Salvelinus fontinalis* x *Salmo trutta* (Tiger trout)[A]
   j. *Tilapia* spp. (Tilapia)[A]
4. Nonviable fish species
5. Viable genetically modified native and nonnative fish species.

Aquatic Invertebrates Except Crayfish

PROHIBITED CATEGORY:

1. *Bithynia tentaculata* (Faucet snail)[A]
2. *Bythotrephes cederstroemi* (Spiny water flea)[A]
3. *Cercopagis pengoi* (Fishhook water flea)[A]
4. *Corbicula fluminea* (Asian clam)[A]
5. *Daphnia lumholtzi* (Water flea)[A]
6. *Dikerogammarus villosus* (Killer Shrimp)[C]
7. *Dreissena rostriformis* (Quagga mussel)[A]
8. *Eriocheir sinensi* (Chinese mitten crabs)[A]
9. *Hemimysis anomala* (Bloody shrimp)[A]
10. *Limnoperna fortunei* (Golden mussel)[C]
11. *Melanoides tuberculata* (Malaysian trumpet snail)[C]
12. *Potamopyrgus antipodarum* (New Zealand mud snail)[A]

RESTRICTED CATEGORY:

1. *Cipangopaludina chinensis* (Chinese mystery snail)[A]
2. *Cipangopaludina japonica* (Japanese trapdoor snail or Japanese mystery snail)[C]
3. *Dreissena polymorpha* (Zebra mussel)[A]
4. *Valvata piscinalis* (European valve snail)[C]
5. *Viviparus georgianus* (Banded mystery snail)[C]

Terrestrial Invertebrates and Plant Disease-Causing Microorganisms

PROHIBITED CATEGORY:

1. *Adelges tsugae* (Hemlock woolly adelgid)[A]
2. *Anoplophora glabripennis* (Asian longhorned beetle)[A]
3. *Dendroctonus ponderosae* (Mountain Pine Beetle)[C]
4. *Geosmithia morbida* (Thousand cankers disease of walnut)[C]
5. *Lymantria dispar* (Asian race)[A] (Asian Gypsy moth)[A]
6. *Phytophthora ramorum* (Sudden oak death pathogen)[A]
7. *Pityophthorus juglandis* (Walnut twig beetle)[C]

RESTRICTED CATEGORY:

1. *Agrilus planipennis* (Emerald ash borer)[A] - Moved to Restricted from Prohibited in 2015
2. *Amynthas* or *Amynthus* species (Jumping worm)[A] - Moved to Restricted from Prohibited in 2015
3. *Lymantria dispar* (European Gypsy moth)[A]

Cryptococcus fagisuga (Scale associated with beech bark disease)[A] - removed from ch. NR 40 on May 1, 2015

Terrestrial and Aquatic Vertebrates Except Fish

PROHIBITED CATEGORY:

1. *Myiopsitta monachus* (Monk or Quaker parakeet or parrot)[A]
2. *Myocastor coypus* (Nutria)[C]
3. *Sus domestica* (Feral domestic swine)[A]
4. *Sus scrofa* (Russian boar & other wild swine)[A]

RESTRICTED CATEGORY:

None.

Trachemys scripta elegans (Red-eared slider with a carapace (top shell) length of less than 4 inches)[A] - removed from ch. NR 40 on May 1, 2015

Fungus

PROHIBITED CATEGORY:

6. *Pseudogymnoascus destructans* (White-nose syndrome fungal pathogen)[B]

RESTRICTED CATEGORY:

None.

Appendix C: Wisconsin DNR's Invasive Species Response Framework's *Invasive Species Response Process Overview & Checklist*

THE INVASIVE SPECIES RESPONSE PROCESS OVERVIEW & CHECKLIST

Early Detection & Reporting (p. 6)

- ☐ Report new populations of suspected invasive species on the DNR website at http://dnr.wi.gov/topic/Invasives/report.html or by contacting the Invasive Species Program Specialist at invasive.species@wisconsin.gov.
- ☐ Document possible invasives with photographs when possible

Verification (p. 7)

- ☐ Interview the reporter to validate the detection
- ☐ Get verification of identification by a recognized expert, accredited lab, or herbarium
- ☐ Voucher a specimen, when appropriate
- ☐ Conduct a site visit to verify location and population size
- ☐ For Prohibited species, obtain a definitive confirmation of identification via a second expert and/or biological analysis

Communication (p. 9)

- ☐ Notify appropriate resource managers at the local, regional, state, and national levels
- ☐ Notify local stakeholders and consider a local or statewide press release
- ☐ Select members for management team and identify a lead coordinator
- ☐ Establish an internal communications plan
- ☐ Begin planning external communications

Assessment (p. 12)

- ☐ Delimit the population and determine demographics of population
- ☐ Determine appropriate timeline based on level of threat
- ☐ Compile a knowledge base – literature reviews and species expert interviews
- ☐ Prevent the spread – identify dispersal vectors/pathways and restrict where feasible
- ☐ Begin marshalling resources – estimate needs and identify potential sources

Planning (p. 14)

- ☐ Decide on a reasonable and feasible control action (containment, eradication, partial or temporary suppression, or no action)
- ☐ Determine which management actions to undertake for selected control
- ☐ Secure permits, if needed

Implementation (p. 17)

- ☐ Lead coordinator facilitates implementation of response plan
- ☐ Continue public outreach efforts

Monitoring & Evaluation (p. 18)

- ☐ Monitor progress and adapt the plan, as needed
- ☐ Conduct response action effectiveness monitoring – evaluate the effectiveness of the response
- ☐ Conduct surveillance monitoring – confirm that the population was contained
- ☐ Document and disseminate findings and "lessons learned"

Restoration (p. 20)

- ☐ Develop and implement a site restoration plan to restore impacted areas, if needed