

Appendix A:

Species of greatest conservation need occurring in the coastal area.

This appendix lists the Species of Greatest Conservation Need (SGCN), as determined through the state's recently completed Wildlife Action Plan (WAP), occurring in the ecological landscapes bordering Lakes Michigan and Superior. The WAP focused on identifying species in need of significant conservation action, as well as their habitat associations and where these habitats generally occur. The WAP did not identify precise locations of the occurrences of these species. As a result, the following tables will be most effective at identifying opportunities to protect species in conservation need and their habitats rather than specific sites. Although many of the species listed in these tables occur distant from the Great Lakes, many others do (or could) occur in the coastal area if suitable habitat is protected or restored.

More information about the process used to select the SGCN can be found at:

<http://dnr.wi.gov/org/land/er/wwap/>.

The first table for each ecological landscape lists the SGCN based on their level of probability of occurring in the landscape. The second table combines this information with habitat information (and the importance of the habitats within the landscapes) to identify priority species-habitat combinations.

Vertebrate Species of Greatest Conservation Need occurring in the *Superior Coastal Plain Ecological Landscape*:

	Species with a high degree of probability of occurring in this Ecological Landscape	Species with a moderate degree of probability of occurring in this Ecological Landscape	Species with a low degree of probability of occurring in this Ecological Landscape
Mammals	Gray Wolf	Moose	
	Northern Flying Squirrel	Silver-haired Bat	
	Woodland Jumping Mouse	Eastern Red Bat	
	Water Shrew	Hoary Bat	
	Franklin's Ground Squirrel	American Marten	
		Northern Long-eared Bat	
Birds	Horned Grebe	Canvasback	American Black Duck
	American Bittern	Sharp-tailed Grouse	Osprey
	Trumpeter Swan	Yellow Rail	Red-shouldered Hawk
	Blue-winged Teal	Solitary Sandpiper	Caspian Tern
	Lesser Scaup	Hudsonian Godwit	Yellow-billed Cuckoo
	Bald Eagle	Black-backed Woodpecker	Whip-poor-will
	Northern Harrier	Olive-sided Flycatcher	Red-headed Woodpecker
	Peregrine Falcon	Rusty Blackbird	Willow Flycatcher
	American Golden Plover	Red Crossbill	Loggerhead Shrike
	Piping Plover		Connecticut Warbler
	Upland Sandpiper		Dickcissel
	Whimbrel		Field Sparrow
	Marbled Godwit		Vesper Sparrow
	Dunlin		Grasshopper Sparrow
	Buff-breasted Sandpiper		Henslow's Sparrow
	Short-billed Dowitcher		Western Meadowlark
	American Woodcock		
	Common Tern		
	Black Tern		
	Black-billed Cuckoo		
	Least Flycatcher		
	Veery		
	Wood Thrush		
	Brown Thrasher		
	Golden-winged Warbler		
	Black-throated Blue Warbler		
Canada Warbler			
Le Conte's Sparrow			
Bobolink			
Eastern Meadowlark			
Herptiles	Wood Turtle		Blanding's Turtle
	Four-toed Salamander		
	Mudpuppy		
	Boreal Chorus Frog		
	Mink Frog		
Fishes	Lake Sturgeon	Pickerel Frog	American Eel
	Kiyi		
	Shortjaw Cisco		

Ecological Priority habitat-species opportunities within the *Superior Coastal Plain Ecological Landscape*:

Community Group	Natural Communities that are Major Opportunities in the Superior Coastal Plain Ecological Landscape	Species of Greatest Conservation Need Determined to be high priority based on their Community-Landscape combination scores	
Northern Forest	Boreal Forest	Birds (5) Black-backed Woodpecker Olive-sided Flycatcher Least Flycatcher Veery Canada Warbler	Mammals (9) Water Shrew Silver-haired Bat Eastern Red Bat Hoary Bat Northern Flying Squirrel Woodland Jumping Mouse Gray Wolf Herptiles (1) Four-toed Salamander <i>American Marten</i> Moose
Barrens	Great Lakes Barrens	Herptiles (1) Wood Turtle	Mammals (1) Northern Flying Squirrel
Wetlands	Emergent Aquatic	Birds (14) American Bittern Trumpeter Swan Blue-winged Teal American Golden Plover Solitary Sandpiper Whimbrel Hudsonian Godwit Marbled Godwit Dunlin Buff-breasted Sandpiper Short-billed Dowitcher Common Tern Black Tern Rusty Blackbird	Herptiles (4) Four-toed Salamander Boreal Chorus Frog Pickerel Frog Mink Frog Mammals (5) Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat Moose
	Emergent Aquatic-Wild Rice	Birds (5) Trumpeter Swan Blue-winged Teal Canvasback Lesser Scaup Black Tern	Herptiles (1) Mink Frog
	Great Lakes Coastal Fen	Birds (3) Trumpeter Swan Yellow Rail Le Conte's Sparrow Herptiles (3) Four-toed Salamander	Mammals (3) Eastern Red Bat Hoary Bat Silver-haired Bat

Wisconsin Coastal and Estuarine Land Conservation Plan

		Boreal Chorus Frog Pickerel Frog	
	Interdunal Wetland	Birds (1) Solitary Sandpiper	Herptiles (1) Boreal Chorus Frog
	Open Bog	Birds (9) American Bittern Northern Harrier Yellow Rail Solitary Sandpiper Olive-sided Flycatcher Golden-winged Warbler Le Conte's Sparrow Bobolink Rusty Blackbird	Herptiles (4) Four-toed Salamander Boreal Chorus Frog Pickerel Frog Mink Frog Mammals (6) Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat Gray Wolf Moose
	Submergent Aquatic	Birds (6) Trumpeter Swan Blue-winged Teal Canvasback Lesser Scaup Bald Eagle Black Tern	Herptiles (3) Pickerel Frog Mink Frog Wood Turtle Mammals (5) Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat Moose
Miscellaneous Communities	Dry Cliff	Birds (1) Peregrine Falcon	
	Great Lakes Beach	Birds (1) Piping Plover Whimbrel Dunlin Common Tern	
	Great Lakes Dune	Birds (1) Piping Plover	Mammals (1) Franklin's Ground Squirrel
	Moist Cliff	None identified	
Aquatic	Coldwater streams	Birds (1) Solitary Sandpiper Herptiles (5) Four-toed Salamander Mudpuppy Pickerel Frog Mink Frog Wood Turtle	Mammals (5) Water Shrew Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat
Aquatic	Coolwater streams	Birds (1)	Mammals (5)

Wisconsin Coastal and Estuarine Land Conservation Plan

(cont.)		Solitary Sandpiper	Water Shrew Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat
	Lake Superior	<i>Herptiles (4)</i> Four-toed Salamander Pickerel Frog Mink Frog Wood Turtle	<i>Herptiles (1)</i> Mudpuppy
	Warmwater streams	<i>Birds (3)</i> Horned Grebe Bald Eagle Common Tern <i>Fish (3)</i> Lake Sturgeon <i>Kiji</i> <i>Shortjaw Cisco</i>	<i>Mammals (6)</i> Water Shrew Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat Moose

Vertebrate Species of Greatest Conservation Need occurring in the Northern Lake Michigan Coastal Ecological Landscape:

	Species with a high degree of probability of occurring in this Ecological Landscape	Species with a moderate degree of probability of occurring in this Ecological Landscape	Species with a low degree of probability of occurring in this Ecological Landscape
Mammals	Northern Flying Squirrel	Gray Wolf	Woodland Vole
	Water Shrew	Woodland Jumping Mouse	
		Eastern Red Bat	
		Silver-haired Bat	
		Hoary Bat	
	Northern Long-eared Bat		
Birds	Horned Grebe	American Bittern	Trumpeter Swan
	Great Egret	Snowy Egret	American Black Duck
	Blue-winged Teal	Yellow Rail	Redhead
	Canvasback	Piping Plover	Louisiana Waterthrush
	Lesser Scaup	Solitary Sandpiper	
	Osprey	Marbled Godwit	
	Bald Eagle	Buff-breasted Sandpiper	
	Northern Harrier	Yellow-billed Cuckoo	
	Northern Goshawk	Loggerhead Shrike	
	Red-shouldered Hawk	Blue-winged Warbler	
	Peregrine Falcon	Golden-winged Warbler	
	American Golden Plover	Dickcissel	
	Upland Sandpiper	Grasshopper Sparrow	
	Whimbrel	Henslow's Sparrow	
	Hudsonian Godwit	Western Meadowlark	
	Dunlin	Rusty Blackbird	
	Short-billed Dowitcher		
	American Woodcock		
	Caspian Tern		
	Common Tern		
	Forster's Tern		
	Black Tern		
	Black-billed Cuckoo		
	Whip-poor-will		
	Red-headed Woodpecker		
	Olive-sided Flycatcher		
	Willow Flycatcher		
	Least Flycatcher		
	Veery		
	Wood Thrush		
	Brown Thrasher		
	Black-throated Blue Warbler		
	Canada Warbler		
Field Sparrow			
Vesper Sparrow			
Bobolink			
Eastern Meadowlark			
Herptiles	Wood Turtle	Four-toed Salamander	Northern Ribbon Snake
	Mudpuppy	Pickereel Frog	

Wisconsin Coastal and Estuarine Land Conservation Plan

	Mink Frog	Blanding's Turtle	
Fishes	Lake Sturgeon	Greater Redhorse	American Eel
	Shoal Chub (Speckled Chub)	Western Sand Darter	Skipjack Herring
	Banded Killifish	Redfin Shiner	
		Longear Sunfish	
		Pugnose Shiner	

Ecological Priority habitat-species opportunities within the Northern Lake Michigan Coastal Ecological Landscape:

Community Group	Natural Communities that are Major Opportunities in the Northern Lake Michigan Coastal Ecological Landscape	Species of Greatest Conservation Need determined to be high priority based on their Community-Landscape combination scores	
Northern Forest	Northern Mesic Forest	Birds (10) Northern Goshawk Red-shouldered Hawk American Woodcock Black-billed Cuckoo Least Flycatcher Veery Wood Thrush Golden-winged Warbler Black-throated Blue Warbler Canada Warbler	Herptiles (3) Four-toed Salamander Pickerel Frog Wood Turtle Mammals (8) Water Shrew Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat Northern Flying Squirrel Woodland Jumping Mouse Gray Wolf
	Northern Wet-Mesic Forest	Birds (2) Olive-sided Flycatcher Canada Warbler Herptiles (3) Four-toed Salamander Pickerel Frog Wood Turtle	Mammals (7) Water Shrew Silver-haired Bat Eastern Red Bat Hoary Bat Northern Flying Squirrel Woodland Jumping Mouse Gray Wolf
Wetland	Boreal Rich Fen	Birds (1) Canada Warbler Herptiles (1) Mink Frog	Mammals (4) Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat
	Emergent Aquatic	Birds (16) American Bittern Great Egret <i>Snowy Egret</i> Blue-winged Teal American Golden Plover Solitary Sandpiper	Herptiles (4) Four-toed Salamander Pickerel Frog Mink Frog Blanding's Turtle Mammals (4)

Wisconsin Coastal and Estuarine Land Conservation Plan

		Whimbrel Hudsonian Godwit Marbled Godwit Dunlin Buff-breasted Sandpiper Short-billed Dowitcher Common Tern Forster's Tern Black Tern Rusty Blackbird	Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat
	Northern Sedge Meadow	Birds (6) American Bittern Blue-winged Teal Northern Harrier Yellow Rail Black Tern Bobolink	Herptiles (5) Four-toed Salamander Pickerel Frog Mink Frog Wood Turtle Blanding's Turtle Mammals (4) Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat
	Shrub Carr	Birds (8) American Woodcock Black-billed Cuckoo Yellow-billed Cuckoo Willow Flycatcher Veery Blue-winged Warbler Golden-winged Warbler Rusty Blackbird	Herptiles (5) Four-toed Salamander Pickerel Frog Mink Frog Wood Turtle Blanding's Turtle Mammals (5) Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat Gray Wolf
Miscellaneous Communities	Dry Cliff	Birds (1) Peregrine Falcon	
	Forested Ridge and Swale	Birds (9) Solitary Sandpiper Black-billed Cuckoo Olive-sided Flycatcher Least Flycatcher Veery Wood Thrush Brown Thrasher Canada Warbler Rusty Blackbird	Herptiles (1) Four-toed Salamander Mammals (1) Northern Flying Squirrel
	Great Lakes Beach	Birds (5) Piping Plover Whimbrel	

Wisconsin Coastal and Estuarine Land Conservation Plan

		Dunlin <i>Caspian Tern</i> Common Tern	
	Great Lakes Dune	Birds (1) Piping Plover	
	Great Lakes Rockshore	None identified	
Aquatic	Lake Michigan	Birds (4) Bald Eagle Horned Grebe <i>Caspian Tern</i> Common Tern	Fish (3) Lake Sturgeon Greater Redhorse Banded Killifish Herptiles (1) Mudpuppy
	Warmwater rivers	Birds (6) Great Egret Canvasback Lesser Scaup Osprey Bald Eagle Dunlin Fish (6) Lake Sturgeon Redfin Shiner Shoal Chub (Speckled Chub) Greater Redhorse Longear Sunfish Western Sand Darter	Herptiles (5) Mudpuppy Pickerel Frog Mink Frog Wood Turtle Blanding's Turtle Mammals (4) Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat
	Warmwater streams	Birds (1) Solitary Sandpiper Fish (4) Pugnose Shiner Redfin Shiner Greater Redhorse Longear Sunfish	Herptiles (4) Pickerel Frog Mink Frog Wood Turtle Blanding's Turtle Mammals (5) Water Shrew Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat

Vertebrate Species of Greatest Conservation Need occurring in the *Central Lake Michigan Coastal Ecological Landscape*:

	Species with a high degree of probability of occurring in this Ecological Landscape	Species with a moderate degree of probability of occurring in this Ecological Landscape	Species with a low degree of probability of occurring in this Ecological Landscape
Mammals		Eastern Red Bat	Northern Flying Squirrel
		Silver-haired Bat	Water Shrew
		Hoary Bat	Woodland Jumping Mouse
		Northern Long-eared Bat	Woodland Vole
			Prairie Vole
Birds	Horned Grebe	American Bittern	Trumpeter Swan
	Great Egret	Snowy Egret	Redhead
	Blue-winged Teal	Yellow-crowned Night-Heron	Red-shouldered Hawk
	Lesser Scaup	Canvasback	Red Crossbill
	Osprey	Bald Eagle	
	Northern Harrier	King Rail	
	Peregrine Falcon	American Golden Plover	
	Upland Sandpiper	Piping Plover	
	Whimbrel	Solitary Sandpiper	
	Hudsonian Godwit	Marbled Godwit	
	Dunlin	Buff-breasted Sandpiper	
	Short-billed Dowitcher	Wilson's Phalarope	
	American Woodcock	Caspian Tern	
	Common Tern	Yellow-billed Cuckoo	
	Forster's Tern	Short-eared Owl	
	Black Tern	Whip-poor-will	
	Black-billed Cuckoo	Acadian Flycatcher	
	Red-headed Woodpecker	Loggerhead Shrike	
	Willow Flycatcher	Blue-winged Warbler	
	Least Flycatcher	Golden-winged Warbler	
	Veery	Black-throated Blue Warbler	
	Wood Thrush	Hooded Warbler	
	Brown Thrasher	Canada Warbler	
	Cerulean Warbler	Grasshopper Sparrow	
	Prothonotary Warbler	Henslow's Sparrow	
	Dickcissel	Western Meadowlark	
Field Sparrow	Rusty Blackbird		
Vesper Sparrow			
Bobolink			
Eastern Meadowlark			
Herptiles	Mudpuppy	Wood Turtle	Blanchard's Cricket Frog
	Four-toed Salamander	Pickerel Frog	Queen Snake
	Northern Ribbon Snake	Blanding's Turtle	
		Butler's Garter Snake	
Fishes	Lake Sturgeon	Banded Killifish	American Eel
		Greater Redhorse	Skipjack Herring
		Western Sand Darter	Least Darter
		Redside Dace	Lake Chubsucker
		Shoal Chub (Speckled Chub)	

	River Redhorse	
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Ecological Priority habitat-species opportunities within the *Central Lake Michigan Coastal Ecological Landscape*:

Community Group	Natural Communities that are Major Opportunities in the Central Lake Michigan Coastal Ecological Landscape	Species of Greatest Conservation Need determined to be high priority based on their Community-Landscape combination scores	
Miscellaneous Communities	Dry Cliff	<i>Birds (1)</i> Peregrine Falcon	
	Forested Ridge and Swale	<i>Birds (8)</i> Solitary Sandpiper Black-billed Cuckoo Least Flycatcher Veery Wood Thrush Brown Thrasher Canada Warbler Rusty Blackbird	<i>Herptiles (1)</i> Four-toed Salamander
	Great Lakes Beach	<i>Birds (5)</i> Piping Plover Whimbrel Dunlin <i>Caspian Tern</i> Common Tern	
	Great Lakes Dune	<i>Birds (1)</i> Piping Plover	
Aquatic	Lake Michigan	<i>Birds (4)</i> Horned Grebe Bald Eagle <i>Caspian Tern</i> Common Tern	<i>Fish (3)</i> Lake Sturgeon Greater Redhorse Banded Killifish <i>Herptiles (1)</i> Mudpuppy
	Warmwater rivers	<i>Birds (7)</i> Great Egret Yellow-crowned Night-Heron Canvasback Lesser Scaup Osprey Bald Eagle Dunlin <i>Fish (5)</i>	<i>Herptiles (4)</i> Mudpuppy Pickerel Frog Wood Turtle Blanding's Turtle <i>Mammals (4)</i> Northern Long-eared Bat Silver-haired Bat Eastern Red Bat

Wisconsin Coastal and Estuarine Land Conservation Plan

		Lake Sturgeon Shoal Chub (Speckled Chub) River Redhorse Greater Redhorse Western Sand Darter	Hoary Bat
Aquatic (cont.)	Warmwater streams	<i>Birds (1)</i> Solitary Sandpiper <i>Fish (2)</i> Redside Dace Greater Redhorse	<i>Herptiles (3)</i> Pickerel Frog Wood Turtle Blanding's Turtle <i>Mammals (4)</i> Northern Long-eared Bat Silver-haired Bat Eastern Red Bat Hoary Bat

Vertebrate Species of Greatest Conservation Need occurring in the *Southern Lake Michigan Coastal Ecological Landscape*:

	Species with a high degree of probability of occurring in this Ecological Landscape	Species with a moderate degree of probability of occurring in this Ecological Landscape	Species with a low degree of probability of occurring in this Ecological Landscape
Mammals	Franklin's Ground Squirrel	Prairie Vole	Northern Long-eared Bat
			Eastern Red Bat
			Woodland Vole
			Silver-haired Bat
			Hoary Bat
		Water Shrew	
Birds	Horned Grebe	American Bittern	Canvasback
	Lesser Scaup	Yellow-crowned Night-Heron	Osprey
	Peregrine Falcon	Blue-winged Teal	Bald Eagle
	Whimbrel	Northern Harrier	Red-shouldered Hawk
	Dunlin	King Rail	American Golden Plover
	Buff-breasted Sandpiper	Piping Plover	Upland Sandpiper
	Short-billed Dowitcher	Solitary Sandpiper	Caspian Tern
	Forster's Tern	Hudsonian Godwit	Barn Owl
	Black Tern	Marbled Godwit	Acadian Flycatcher
	Willow Flycatcher	American Woodcock	Least Flycatcher
	Wood Thrush	Black-billed Cuckoo	Veery
	Brown Thrasher	Yellow-billed Cuckoo	Loggerhead Shrike
	Dickcissel	Short-eared Owl	Black-throated Blue Warbler
	Field Sparrow	Red-headed Woodpecker	Canada Warbler
	Vesper Sparrow	Bell's Vireo	Western Meadowlark
	Henslow's Sparrow	Blue-winged Warbler	
Bobolink	Grasshopper Sparrow		
Eastern Meadowlark	Rusty Blackbird		
Herptiles	Blanding's Turtle	Eastern Massasauga Rattlesnake	Pickerel Frog
	Butler's Garter Snake	Queen Snake	Four-toed Salamander
	Mudpuppy		
Fishes	Striped Shiner	Lake Sturgeon	Least Darter
		Greater Redhorse	Redfin Shiner
			Lake Chubsucker
			Longear Sunfish
			Banded Killifish
		American Eel	

Ecological Priority habitat-species opportunities within the *Southern Lake Michigan Coastal Ecological Landscape*:

Community Group	Natural Communities that are Major Opportunities in the Southern Lake Michigan Coastal Ecological Landscape	Species of Greatest Conservation Need determined to be high priority based on their Community-Landscape combination scores	
Grassland	Wet-Mesic Prairie	<p><i>Birds (11)</i> Blue-winged Teal Northern Harrier Marbled Godwit Buff-breasted Sandpiper Short-eared Owl Willow Flycatcher Bell's Vireo Field Sparrow Henslow's Sparrow Bobolink Eastern Meadowlark</p>	<p><i>Herptiles (3)</i> Blanding's Turtle Butler's Garter Snake Eastern Massasauga Rattlesnake</p> <p><i>Mammals (1)</i> Franklin's Ground Squirrel</p>
Aquatic	Lake Michigan	<p><i>Birds (1)</i> Horned Grebe</p> <p><i>Fish (2)</i> Lake Sturgeon Greater Redhorse</p>	<p><i>Herptiles (1)</i> Mudpuppy</p>
	Warmwater streams	<p><i>Birds (1)</i> Solitary Sandpiper</p> <p><i>Fish (1)</i> Greater Redhorse</p>	<p><i>Herptiles (2)</i> Blanding's Turtle Queen Snake</p>

Appendix B:

Recognized Natural Communities – Wisconsin Natural Heritage Inventory (NHI)

(See <http://dnr.wi.gov/org/land/er/communities/> for updated descriptions)

Prepared by Eric Epstein, Emmet Judziewicz and Elizabeth Spencer

Alder Thicket

These wetlands are dominated by thick growths of tall shrubs, especially speckled alder (*Alnus incana*). Among the common herbaceous species are Canada bluejoint grass (*Calamagrostis canadensis*), orange jewelweed (*Impatiens capensis*), several asters (*Aster lanceolatus*, *A. puniceus*, and *A. umbellatus*), boneset (*Eupatorium perfoliatum*), rough bedstraw (*Galium asprellum*), marsh fern (*Thelypteris palustris*), arrow-leaved tearthumb (*Polygonum sagittatum*), and sensitive fern (*Onoclea sensibilis*). This type is common and widespread in northern and central Wisconsin, but also occurs in the southern part of the state.

Algific Talus Slope

This rare community of southwestern Wisconsin's Driftless Area consists of steep slopes of fractured limestone (dolomite) rock that retains ice and emits cold air throughout the growing season. The cold microhabitats enable the persistence of northern species and "periglacial relicts" such as northern monkshood (*Aconitum noveboracense*) and rare terrestrial snails. The woody overstory is often sparse, with scattered small black ash (*Fraxinus nigra*) and white birch (*Betula papyrifera*). Mountain maple (*Acer spicatum*), a northern shrub, may be frequent and extensive beds of bulblet fern (*Cystopteris bulbifera*) and mosses are characteristic.

Alkaline Clay Bluff (now called Clay Seepage Bluff)

Alvar

This rare community consists of areas of thin discontinuous soil overlying horizontal beds of limestone or dolomite in the vicinity of Great Lakes shorelines. They are characterized by relatively low tree cover and a distinctive biota which includes elements of rock pavement, prairie, savanna and boreal forest communities. Among these are regional endemics, some very rare. This community type is much more common and better-developed in Michigan and Ontario than in Wisconsin. Small coniferous and deciduous trees (cedar, fir, pine, oak, aspen, birch) are scattered among an assemblage of species that can include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indian-grass (*Sorghastrum nutans*), and wood lily (*Lilium philadelphicum*), as well as shoreline plants such as silverweed (*Potentilla anserina*) and dwarf lake iris (*Iris lacustris*).

Bedrock Glade

These are xeric, sparsely vegetated non-vertical bedrock exposures with very thin, often discontinuous soils. The rock types vary from quartzite (Baraboo Hills, McCaslin Mountain), to basalt (lower St. Croix River valley), to granite (northeastern Wisconsin). The flora can include prairie, savanna, or barrens components, some at their northern range limits. Trees and shrubs

are sparse and may include pines, oaks, and cherries. Xerophytic pteridophytes such as rusty woodsia (*Woodsia ilvensis*) and rock spikemoss (*Selaginella rupestris*) are characteristic, as are lichens and mosses.

Bedrock Shore

Wave-splashed bedrock shoreline ledges are best developed on sandstone in the Apostle Islands of Lake Superior. Stunted trees of white cedar (*Thuja occidentalis*), white birch (*Betula papyrifera*), showy mountain-ash (*Sorbus decora*) and green alder (*Alnus crispa*) are often present in crevices. Common herbs are ticklegrass (*Agrostis hyemalis*), fireweed (*Epilobium angustifolium*), and Canada goldenrod (*Solidago canadensis*), but the flora often includes unusual plants such as bird's-eye primrose (*Primula mistassinica*), brook lobelia (*Lobelia kalmii*), and three-toothed cinquefoil (*Potentilla tridentata*).

Black Spruce Swamp (A split from Curtis' Northern Wet Forest)

An acidic conifer swamp forest characterized by a relatively closed canopy of black spruce (*Picea mariana*) and an open understory in which Labrador-tea (*Ledum groenlandicum*) and sphagnum mosses (*Sphagnum* spp.) are often prominent, along with three-leaved false Solomon's-seal (*Smilacina trifolia*), creeping snowberry (*Gaultheria procumbens*), and three-seeded sedge (*Carex trisperma*). The herbaceous understory is otherwise relatively depauperate. This community is closely related to Open Bogs and Muskegs, and sometimes referred to as Forested Bogs outside of Wisconsin.

Bog Relict

These boggy, acidic, weakly minerotrophic peatlands occur south of the Tension Zone within a matrix of "southern" vegetation. Bog relicts are isolated from the more extensive, better-developed and much more widespread stands of this community found in the northern part of the state. Acidophiles present can include sphagnum mosses (*Sphagnum* spp), sedges (e.g., few seeded sedge, *Carex oligosperma*), ericaceous shrubs, and insectivorous herbs. Tamarack (*Larix laricina*) is usually the most common tree and poison-sumac (*Toxicodendron vernix*) is often formidably abundant in the understory, especially in the moat (or "lagg") at the upland/wetland interface. Examples in southeastern Wisconsin are all somewhat alkaline and may resemble "shrub-fen" communities described in other states.

Boreal Forest

In Wisconsin, mature stands of this forest community are dominated by white spruce (*Picea glauca*) and balsam-fir (*Abies balsamea*), often mixed with white birch (*Betula papyrifera*), white cedar (*Thuja occidentalis*), white pine (*Pinus strobus*), balsam-poplar (*Populus balsamifera*) and quaking aspen (*Populus tremuloides*). Mountain-ash (*Sorbus* spp.) may also be present. Common understory herbs are large-leaved aster (*Aster macrophyllus*), bluebead lily (*Clintonia borealis*), Canada mayflower (*Maianthemum canadense*), wild sarsaparilla (*Aralia nudicaulis*), and bunchberry (*Cornus canadensis*). Most Wisconsin stands are associated with the Great Lakes, especially the clay plain of Lake Superior, and the eastern side of the northern Door Peninsula on Lake Michigan. Of potential interest from the perspectives of vegetation classification and restoration, white pine had the highest importance value of any

tree in the Lake Superior region, as recorded during the original land survey of the mid-1800s.

Boreal Rich Fen

Neutral to alkaline cold open peatlands of northern Wisconsin through which carbonate-rich groundwater percolates. Sphagnum mosses are absent or of relatively minor importance, as calciphilic species (especially the "brown" mosses) predominate. Dominant/characteristic plants include woolly sedge (*Carex lasiocarpa*), twig rush (*Cladium mariscoides*), beaked bladderwort (*Utricularia cornuta*), rushes (*Juncus* spp.), and Hudson Bay cotton-grass (*Scirpus hudsonianus*). Shrubby phases also occur, with bog birch (*Betula pumila*), sage willow (*Salix candida*), and speckled alder (*Alnus incana*) present in significant amounts.

Bracken Grassland

These are open upland areas, in northern Wisconsin on sandy soils, dominated by bracken fern (*Pteridium aquilinum*), Penn sedge (*Carex pensylvanica*), Kalm's bromegrass (*Bromus kalmii*), and Canada bluegrass (*Poa compressa*). There may be a high cover of low shrubs such as blueberries (*Vaccinium angustifolium* and *V. myrtilloides*), sweet fern (*Comptonia peregrina*), prairie willow (*Salix humilis*), and hazelnuts (*Corylus* spp.). Other common herbs include poverty oat-grass (*Danthonia spicata*), Lindley's aster (*Aster ciliolatus*), gray goldenrod (*Solidago nemoralis*), and common strawberry (*Fragaria virginiana*). Exotics are often frequent. There is disagreement on whether bracken grassland should be considered a "natural community" in Wisconsin and elsewhere in the Upper Great Lakes region.

Calcareous Fen

An open wetland found in southern Wisconsin, often underlain by a calcareous substrate, through which carbonate-rich groundwater percolates. The flora is typically diverse, with many calciphiles. Common species are several sedges (*Carex sterilis* and *C. lanuginosa*), marsh fern (*Thelypteris palustris*), shrubby cinquefoil (*Potentilla fruticosa*), shrubby St. John's-wort (*Hypericum kalmianum*), Ohio goldenrod (*Solidago ohioensis*), grass-of-parnassus (*Parnassia glauca*), twig-rush (*Cladium mariscoides*), brook lobelia (*Lobelia kalmii*), boneset (*Eupatorium perfoliatum*), swamp thistle (*Cirsium muticum*), and asters (*Aster* spp.). Some fens have significant prairie or sedge meadow components, and intergrade with those communities.

Cedar Glade

Dry sandstone, quartzite or dolomite exposures vegetated with dense thickets of red cedar (*Juniperus virginiana*). Red maple (*Acer rubrum*), Paper birch (*Betula papyrifera*) and black and bur oaks (*Quercus velutina* and *Q. macrocarpa*) may also be present. This community is usually if not always the result of fire suppression on dry prairies, and in pre-settlement times it may have occurred only where extensive cliffs served as firebreaks. Common herbs include bluestem and grama grasses (*Andropogon* spp. and *Bouteloua* spp.), prickly-pear cactus (*Opuntia compressa*), flowering spurge (*Euphorbia corollata*), stiff sandwort (*Arenaria stricta*) and gray goldenrod (*Solidago nemoralis*).

Central Poor Fen

These open, acidic, low nutrient peatlands occur within the Central Sand Plains of Wisconsin. Central poor fens are floristically depauperate and generally sedge dominated, (*Carex oligosperma*, *C. lasiocarpa*, and *C. utriculata*) Bluejoint grass (*Calamagrostis canadensis*) is a frequent associate and may co-dominate in some stands. Sphagnum spp. carpets are common but typically lack pronounced hummocks and hollows. Shrubs are present but not dominant, Hard-hack (*Spiraea tomentosa*) is the most consistent in presence, and cover of ericads is generally low. Other characteristic associates include wool grass (*Scirpus cyperinus*), cotton-grasses (*Eriophorum* spp.), swamp-candles (*Lysimachia terrestris*) and Kalm's St. John's-wort (*Hypericum kalmianum*). This community often intergrades with Tamarack (poor) Swamp. Disturbance of this community through mowing may significantly alter community composition, as recolonization by at least some of the vascular plants is very slow. Many plants characteristic of poor fen communities farther north are rare or absent in these central sands peatlands.

Central Sands Pine-Oak Forest

This forest community is associated with the Central Sands ecoregion on dry to dry-mesic sites with acid sandy soils. The dominants are white and red pines (*Pinus strobus* and *P. resinosa*), oaks (*Quercus alba*, *Q. rubra*, and *Q. velutina*), and on dry-mesic sites, red maple (*Acer rubrum*). The understory is typically depauperate consisting primarily of huckleberry (*Gaylussacia baccata*), early blueberry (*Vaccinium angustifolium*), bracken fern (*Pteridium aquilinum*), wood anemone (*Anemone quinquefolia*) and Penn sedge (*Carex pensylvanica*). Jack pine (*Pinus banksiana*) is sometimes co-dominant on the driest sites (jack pine - black / Hills oak dominated stands maybe split out in the future).

Coastal Fen (now called Shore Fen)

Coastal Plain Marsh

Sandy to peaty-mucky lakeshores, pondshores, depressions, and ditches in and around the bed of extinct glacial Lake Wisconsin may harbor assemblages of wetland species including some which are significantly disjunct from their main ranges on the Atlantic Coastal Plain. There is often a well-developed concentric zonation of vegetation. Frequent members of this community are sedges in the genera *Cyperus*, *Eleocharis*, *Fimbristylis*, *Hemicarpha*, *Rhynchospora* and *Scirpus*; rushes (*Juncus* spp.); milkworts (*Polygala cruciata* and *P. sanguinea*), toothcup (*Rotala ramosior*), meadow-beauty (*Rhexia virginica*), grass-leaved goldenrod (*Euthamia graminifolia*), hardhack (*Spiraea tomentosa*), lance-leaved violet (*Viola lanceolata*), and yellow-eyed grass (*Xyris torta*).

Clay Seepage Bluff (formerly called Alkaline Clay Bluff)

Steep, clay bluffs occur along some stretches of the Great Lakes shorelines and less commonly inland on streams draining into Lake Superior and Lake Michigan. Vegetative cover ranges from forested with pines (*Pinus resinosa* and *P. strobus*), white cedar (*Thuja occidentalis*) and white birch (*Betula papyrifera*), to bare clay with only a few herbs present. Buffaloberry (*Shepherdia canadensis*) is a characteristic shrub, but more typically, alders (*Alnus incana* and *A. crispa*), as well as herbs such as Canada goldenrod (*Solidago canadensis*) and pearly everlasting (*Anaphalis margaritacea*) are dominant. Both native and exotic pioneers such as

fireweed (*Epilobium angustifolium*) and Canada thistle (*Cirsium arvense*) are common, especially on unstable sites. But it is the semi-stabilized “weeping” bluffs that are of the greatest biological interest. Golden sedge (*Carex aurea*), orchids and calciphilic fen species may colonize such sites, which can be local repositories of rare or otherwise noteworthy species.

Dry Cliff (Exposed Cliff of Curtis’ community classification)

These dry vertical bedrock exposures occur on many different rock types, which may influence species composition. Scattered pines, oaks, or shrubs often occur. However, the most characteristic plants are often the ferns, common polypody (*Polypodium vulgare*) and rusty woodsia (*Woodsia ilvensis*), along with herbs such as columbine (*Aquilegia canadensis*), harebell (*Campanula rotundifolia*), pale corydalis (*Corydalis sempervirens*), juneberry (*Amelanchier* spp.), bush-honeysuckle (*Diervilla lonicera*), and rock spikemoss (*Selaginella rupestris*).

Dry Prairie

This grassland community occurs on dry, often loess-derived soils, usually on steep south or west facing slopes or at the summits of river bluffs with sandstone or dolomite near the surface. Short to medium-sized prairie grasses: little bluestem (*Schizachyrium scoparium*), side-oats grama (*Bouteloua curtipendula*), hairy grama (*B. hirsuta*), and prairie dropseed (*Sporobolus heterolepis*), are the dominants in this community. Common shrubs and forbs include lead plant (*Amorpha canescens*), silky aster (*Aster sericeus*), flowering spurge (*Euphorbia corollata*), purple prairie-clover (*Petalostemum purpureum*), cylindrical blazing-star (*Liatris cylindracea*), and gray goldenrod (*Solidago nemoralis*). Stands on gravelly knolls in the Kettle Moraine region of southeastern Wisconsin and along the St. Croix River on the Minnesota - Wisconsin border may warrant recognition, at least at the subtype level.

Dry-Mesic Prairie

This grassland community occurs on slightly less droughty sites than Dry Prairie and has many of the same grasses, but taller species such as big bluestem (*Andropogon gerardii*) and Indian-grass (*Sorghastrum nutans*) dominate. Needle grass (*Stipa spartea*) may also be present. The herb component is more diverse than in Dry Prairies, including many species that occur in both Dry and Mesic Prairies.

Emergent Aquatic

These open, marsh, lake, riverine and estuarine communities with permanent standing water are dominated by robust emergent macrophytes, in pure stands of single species or in various mixtures. Dominants include cattails (*Typha* spp.), bulrushes (particularly *Scirpus acutus*, *S. fluviatilis*, and *S. validus*), bur-reeds (*Sparganium* spp.), giant reed (*Phragmites australis*), pickerel-weed (*Pontederia cordata*), water-plantains (*Alisma* spp.), arrowheads (*Sagittaria* spp.), and the larger species of spikerush such as (*Eleocharis smallii*).

Emergent Aquatic - Wild Rice

This open community is an emergent macrophyte type, with wild rice (*Zizania aquatica* or *Z.*

palustris) as the dominant species. The substrate usually consists of poorly-consolidated, semi-organic sediments. Water fertility is low to moderate, and a slow current is present. Wild rice beds have great cultural significance to native peoples, and are important wildlife habitats.

Ephemeral Pond

These ponds are depressions with impeded drainage (usually in forest landscapes), that hold water for a period of time following snowmelt but typically dry out by mid-summer. Common aquatic plants of these habitats include yellow water crowfoot (*Ranunculus flabellaris*), mermaid weed (*Proserpinaca palustris*), Canada bluejoint grass (*Calamagrostis canadensis*), floating manna grass (*Glyceria septentrionalis*), spotted cowbane (*Cicuta maculata*), smartweeds (*Polygonum* spp.), orange jewelweed (*Impatiens capensis*), and sedges. Ephemeral ponds provide critical breeding habitat for certain invertebrates, as well as for many amphibians such as frogs and salamanders.

Felsenmeer

This rare open primary community consists of steep slopes of quartzite or other metamorphic rock boulders (.25 - 1 meters in diameter) formed by periglacial frost and ice-wedging, and characterized by cool, moist air drainage at or near their base. The vegetation is fairly sparse but may be structurally variable. Lichens especially (*Lasallia*) are the dominant cover on the boulders. Scattered soil pockets may occur and support scattered white and red pines (*Pinus strobus* and *P. resinosa*) often in association with mossy beds of common polypody (*Polypodium virginianum*) or marginal shield fern (*Dryopteris marginalis*). The slope base in the zone of cool air drainage is typically shrub dominated, and may include a number of species somewhat disjunct from their more northern ranges, such as squashberry (*Viburnum edule*), Canada gooseberry (*Ribes oxycanthoides*). Other frequently occurring shrub or small tree species are Labrador-tea (*Ledum groenlandicum*), mountain maple (*Acer spicatum*), mountain ash (*Sorbus* spp.) and red-berried elder (*Sambucus pubens*). The vine, purple clematis (*Clematis occidentalis*) and tree, balsam fir (*Abies balsamea*) may also be present. This community type has been incompletely surveyed and occurrences should be carefully examined for rare bryophytes, lichens and terrestrial snails.

Floodplain Forest (replaces in part the **Southern Wet** and **Southern Wet-Mesic Forests** of Curtis)

This is a lowland hardwood forest community that occurs along large rivers, usually stream order 3 or higher, that flood periodically. The best-development occurs along large rivers in southern Wisconsin, but this community is also found in the north. Canopy dominants may include silver maple (*Acer saccharinum*), river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica*), hackberry (*Celtis occidentalis*), swamp white oak (*Quercus bicolor*), and cottonwood (*Populus deltoides*). Northern stands are often species poor, but balsam-poplar (*Populus balsamifera*), bur oak (*Quercus macrocarpa*), and box elder (*Acer negundo*) may replace some of the missing "southern" trees. Buttonbush (*Cephalanthus occidentalis*) is a locally dominant shrub and may form dense thickets on the margins of oxbow lakes, sloughs and ponds within the forest. Nettles (*Laportea canadensis* and *Urtica dioica*), sedges, ostrich

fern (*Matteuccia struthiopteris*) and gray-headed coneflower (*Rudbeckia laciniata*) are important understory herbs, and lianas such as Virginia creepers (*Parthenocissus* spp.), grapes (*Vitis* spp.), Canada moonseed (*Menispermum canadense*), and poison-ivy (*Toxicodendron radicans*) are often common. Among the striking and characteristic herbs of this community are cardinal flower (*Lobelia cardinalis*) and green dragon (*Arisaema dracontium*).

Forested Ridge and Swale (now called Great Lakes Ridge and Swale)

Forested Seep

These are shaded seepage areas with active spring discharges in (usually) hardwood forests that may host a number of uncommon to rare species. The overstory dominant is frequently black ash (*Fraxinus nigra*), but yellow birch (*Betula allegheniensis*), American elm (*Ulmus americana*) and many other tree species may be present including conifers such as hemlock (*Tsuga canadensis*) or white pine (*Pinus strobus*). Understory species include skunk cabbage (*Symplocarpus foetidus*), water-pennywort (*Hydrocotyle americana*), marsh blue violet (*Viola cucullata*), swamp saxifrage (*Saxifraga pennsylvanica*), golden saxifrage (*Chrysosplenium americanum*), golden ragwort (*Senecio aureus*), silvery spleenwort (*Athyrium thelypteroides*) and the rare sedges (*Carex scabrata* and *C. prasina*). Most documented occurrences are in the Driftless Area, or locally along major rivers flanked by steep bluffs.

Great Lakes Alkaline Rockshore

These creviced, wave-splashed, nearly horizontal dolomite ledges are restricted geographically to shoreline exposures along Lake Michigan on the northern Door Peninsula. Depending on lake levels, large expanses of this habitat may be either inundated or exposed during a given year. Common members of this community are the shrubs ninebark (*Physocarpus opulifolius*), shrubby cinquefoil (*Potentilla fruticosa*), and the herbs silverweed (*Potentilla anserina*), goldenrods (especially *Solidago hispida*), brook lobelia (*Lobelia kalmii*), gentians (*Gentiana* spp.), grasses-of-Parnassus (*Parnassia* spp.), Indian paint-brush (*Castilleja coccinea*), low calamint (*Calamintha arkansana*) and many other calciphiles. Plants endemic to the Great Lakes shores are significant components of some stands.

Great Lakes Barrens

In Wisconsin, this variant of pine savanna is known from only one sandy site on Lake Superior. The dominant trees in this open stand are wind- and fire-deformed trees, red pines (*Pinus resinosa*) with white pine (*P. strobus*) also present. The understory consists of dense growths of lichens with scattered thickets of common juniper (*Juniperus communis*), early blueberry (*Vaccinium angustifolium*) and huckleberry (*Gaylussacia baccata*). Other common plants are hairgrass (*Deschampsia flexuosa*), ticklegrass (*Agrostis hyemalis*), false-heather (*Hudsonia tomentosa*), and bearberry (*Arctostaphylos uva-ursi*).

Great Lakes Beach

This beach community usually occurs in association with active dune systems. The beaches of the Great Lakes are extremely dynamic features, strongly influenced by water level changes and storm events. They support a suite of very specialized organisms, although unprotected

shorelines may be entirely unvegetated. The plant species found in this community include (along Lake Michigan) seaside spurge (*Euphorbia polygonifolia*) and American sea-rocket (*Cakile edentula*).

Great Lakes Dune (formerly called Lake Dune)

The dominant plant in these semi-stabilized, open dunes along Great Lakes shorelines is usually the sand-binding marram grass (*Ammophila breviligulata*). Frequent associates are common juniper (*Juniperus communis*), Canada wild-rye (*Elymus canadensis*), false-heather (*Hudsonia tomentosa*), beach-pea (*Lathyrus japonicus*), beach wormwood (*Artemisia campestris*), sand cherry (*Prunus pumila*), and various willows (*Salix* spp.). Two plants endemic to the Great Lakes region, pitcher's thistle (*Cirsium pitcheri*) and Lake Huron tansy (*Tanacetum huronense*; possibly now extirpated in Wisconsin), occur in this community along Lake Michigan.

Great Lakes Ridge and Swale (Formerly **Forested Ridge and Swale**)

This is a complex of semi- to fully-stabilized, often forested beach / dune ridges alternating with wet open to forested swales, found on the shores of the Great Lakes but best-developed along Lake Michigan. Both parallel the coast and offer exceptionally complex and diverse habitats for wetland, upland, and Great Lakes shoreline plants. Ridges may support assemblages similar to boreal, northern mesic or northern dry-mesic forests. Water depth is a controlling factor in the swales, and the vegetation may run the gamut from open (emergent marsh, fen, or sedge meadow), shrub (bog birch, alder), or forested wetlands (often white cedar, black ash are prominent in these).

Hardwood Swamp (this is a split from Curtis' **Northern Wet-Mesic Forest**)

These are northern deciduous forested wetlands that occur along lakes or streams, or in insular basins in poorly drained morainal landscapes. The dominant tree species is black ash (*Fraxinus nigra*), but in some stands red maple (*Acer rubrum*), yellow birch (*Betula allegheniensis*), and (formerly) American elm (*Ulmus americana*) are also important. The tall shrub speckled alder (*Alnus incana*) may be locally common. The herbaceous flora is often diverse and may include many of the same species found in Alder Thickets. Typical species are marsh-marigold (*Caltha palustris*), swamp raspberry (*Rubus pubescens*), skullcap (*Scutellaria galericulata*), orange jewelweed (*Impatiens capensis*), and many sedges (*Carex* spp.). Soils may be mucks or mucky sands.

Hemlock Relict

These are isolated hemlock (*Tsuga canadensis*) stands occurring in deep, moist ravines or on cool, north or east facing slopes in southwestern Wisconsin. Associated trees include white pine (*Pinus strobus*), and yellow birch (*Betula allegheniensis*). The groundlayer includes herbaceous species with northern affinities such as shining clubmoss (*Lycopodium lucidulum*), bluebead lily (*Clintonia borealis*), Canada mayflower (*Maianthemum canadense*), and woodferns (*Dryopteris* spp). Cambrian sandstone cliffs are usually nearby and often prominent.

Interdunal Wetland

Wind-created hollows that intersect the water table within active dune fields along the Great Lakes. These may be colonized by wetland plants, including habitat specialists that are of high conservation significance. Common members of this wetland community on Lake Superior are twig-rush (*Cladium mariscoides*), species of rushes (especially *Juncus balticus*), pipewort (*Eriocaulon septangulare*), the sedge (*Carex viridula*), ladies-tress orchids (*Spiranthes* sp.) and bladderworts (*Utricularia cornuta* and *U. resupinata*).

Inland Beach

The beaches of inland lakes that experience enough water level fluctuation to prevent the development of a stable shoreline forest or other community may, instead support a specialized biota adapted to sandy or gravelly littoral habitats. The shorelines of such lakes (usually seepage lakes) may be subject to fluctuations of as much as several meters over a few years or decades. The alternation of high and low periods maintains populations of the beach specialists over time, including some rare species of unusual geographic affinity such as the Atlantic Coastal Plain of the eastern United States.

Lake Dune (see Great Lakes Dune)

Mesic Cedar Forest

This is a rare upland forest community of mesic sites in northern Wisconsin, characterized by white cedar (*Thuja occidentalis*) and various associates including hemlock (*Tsuga canadensis*), white spruce (*Abies balsamea*), yellow birch (*Betula alleghanensis*), and white pine (*Pinus strobus*). The herb layer may contain Canada mayflower (*Maianthemum canadense*), twinflower (*Linnaea borealis*), clubmosses (*Lycopodium* spp.), and others. More information is needed on this community type.

Mesic Floodplain Terrace

These are deciduous forests developed on alluvial terraces along rich, infrequently flooding (or flooding only for a very short period) rivers draining into Lake Superior. The dominant trees are usually sugar maple (*Acer saccharum*), basswood (*Tilia americana*), and sometimes ashes (*Fraxinus* spp.). There is a diverse spring ephemeral flora (which in Wisconsin includes many southern species at their northern range limits), but by late spring, these may be overtopped by dense stands of ostrich fern (*Matteuccia struthiopteris*) and wood-nettle (*Laportea canadensis*).

Mesic Prairie

This grassland community occurs on rich, moist, well-drained sites. The dominant plant is the tall grass, big bluestem (*Andropogon gerardii*). The grasses little bluestem (*Andropogon scoparius*), Indian grass (*Sorghastrum nutans*), porcupine grass (*Stipa spartea*), prairie dropseed (*Sporobolus heterolepis*), and tall switchgrass (*Panicum virgatum*) are also frequent. The forb layer is diverse in the number, size, and physiognomy of the species. Common taxa

include the prairie docks (*Silphium* spp.), lead plant (*Amorpha canescens*), heath and smooth asters (*Aster ericoides* and *A. laevis*), sand coreopsis (*Coreopsis palmata*), prairie sunflower (*Helianthus laetiflorus*), rattlesnake-master (*Eryngium yuccifolium*), flowering spurge (*Euphorbia corollata*), beebalm (*Monarda fistulosa*), prairie coneflower (*Ratibida pinnata*), and spiderwort (*Tradescantia ohioensis*).

Moist Cliff (Shaded Cliff of the Curtis community classification)

This "micro-community" occurs on shaded (by trees or the cliff itself because of aspect), moist to seeping mossy, vertical exposures of various rock types, most commonly sandstone and dolomite. Common species are columbine (*Aquilegia canadensis*), the fragile ferns (*Cystopteris bulbifera* and *C. fragilis*), wood ferns (*Dryopteris* spp.), rattlesnake-root (*Prenanthes alba*), and wild sarsaparilla (*Aralia nudicaulis*). The rare flora of these cliffs vary markedly in different parts of the state; Driftless Area cliffs might have northern monkshood (*Aconitum noveboracense*), those on Lake Superior, butterwort (*Pinguicula vulgaris*), or those in Door County, green spleenwort (*Asplenium viride*).

Moist Sandy Meadow (formerly called Sand Meadow)

This type is included primarily as a placeholder for anomalous herb-dominated assemblages on moist sandy soils in central Wisconsin. Available descriptive information is very limited at this time. Stand size is generally small, seldom, if ever, exceeding more than a few acres. The flora consists of a mixture of plant species typically found in wet prairie, sedge meadow, coastal plain marsh, and pine or oak barrens communities. No one group of associates is clearly dominant. Past human disturbance is evident in some occurrences but native species are prevalent.

Due to a high water table, stands are subject to periodic inundation for short periods of time in the spring and following heavy rain events. This dynamic appears to be at least partially responsible for maintaining the type, but periodic fire, mowing, and browsing may also be important factors.

Muskeg

Muskegs are cold, acidic, sparsely wooded northern peatlands with **composition** similar to the Open Bogs (*Sphagnum* spp. mosses, *Carex* spp., and ericaceous shrubs), but with scattered stunted trees of black spruce (*Picea mariana*) and tamarack (*Larix laricina*). Plant diversity is typically low, but the community is important for a number of boreal bird and butterfly species, some of which are quite specialized and not found in other communities.

Northern Dry Forest

This forest community occurs on nutrient-poor sites with excessively drained sandy or rocky soils. The primary historic disturbance regime was catastrophic fire at intervals of decades to approximately a century. Dominant trees of mature stands include jack and red pines (*Pinus banksiana* and *P. resinosa*) and/or Hill's oak (*Quercus ellipsoidalis*). Large acreages of this forest type were cut and burned during the catastrophic logging of the late 19th and early 20th century. Much of this land was then colonized by white birch (*Betula papyrifera*) and/or

quaking aspen (*Populus tremuloides*), or converted to pine plantations starting in the 1920s. Common understory shrubs are hazelnuts (*Corylus* spp.), early blueberry (*Vaccinium angustifolium*) and brambles (*Rubus* spp.); common herbs include bracken fern (*Pteridium aquilinum*), starflower (*Trientalis borealis*), barren-strawberry (*Waldsteinia fragarioides*), cow-wheat (*Melampyrum lineare*), trailing arbutus (*Epigaea repens*), and members of the shinleaf family (*Chimaphila umbellata*, *Pyrola* spp.). Vast acreages of open "barrens" were also planted to pine, or naturally succeeded to densely stocked "dry" forests.

Northern Dry-Mesic Forest

In this forest community, mature stands are dominated by white and red pines (*Pinus strobus* and *P. resinosa*), sometimes mixed with red oak (*Quercus rubra*) and red maple (*Acer rubrum*). Common understory shrubs are hazelnuts (*Corylus* spp.), blueberries (*Vaccinium angustifolium* and *V. myrtilloides*), wintergreen (*Gaultheria procumbens*), partridge-berry (*Mitchella repens*); among the dominant herbs are wild sarsaparilla (*Aralia nudicaulis*), Canada mayflower (*Maianthemum canadense*), and cow-wheat (*Melampyrum lineare*). Stands usually occur on sandy loams, sands or sometimes rocky soils.

Northern Mesic Forest

This forest complex covered the largest acreage of any Wisconsin vegetation type prior to European settlement. Sugar maple (*Acer saccharum*) is dominant or co-dominant in most stands, while hemlock (*Tsuga canadensis*) was the second most important species, sometimes occurring in nearly pure stands with white pine (*Pinus strobus*). Beech (*Fagus grandifolia*) can be a co-dominant with sugar maple in the counties near Lake Michigan. Other important tree species were yellow birch (*Betula allegheniensis*), basswood (*Tilia americana*), and white ash (*Fraxinus americana*). The groundlayer varies from sparse and species poor (especially in hemlock stands) with woodferns (especially *Dryopteris intermedia*), bluebead lily (*Clintonia borealis*), clubmosses (*Lycopodium* spp.), and Canada mayflower (*Maianthemum canadense*) prevalent, to lush and species-rich with fine spring ephemeral displays. After old-growth stands were cut, trees such as quaking and bigtoothed aspens (*Populus tremuloides* and *P. grandidentata*), white birch (*Betula papyrifera*), and red maple (*Acer rubrum*) became and still are important in many second-growth Northern Mesic Forests. Several distinct associations within this complex warrant recognition as communities, and draft abstracts of these are currently undergoing review.

Northern Sedge Meadow

This open wetland community is dominated by sedges and grasses. There are several common subtypes: Tussock meadows, dominated by tussock sedge (*Carex stricta*) and Canada bluejoint grass (*Calamagrostis canadensis*); Broad-leaved sedge meadows, dominated by the robust sedges (*Carex lacustris* and/or *C. utriculata*); and Wire-leaved sedge meadows, dominated by such species as woolly sedge (*Carex lasiocarpa*) and few-seeded sedge (*C. oligosperma*). Frequent associates include marsh bluegrass (*Poa palustris*), manna grasses (*Glyceria* spp.), panicked aster (*Aster lanceolatus*), joy-pye-weed (*Eupatorium maculatum*), and the bulrushes (*Scirpus atrovirens* and *S. cyperinus*).

Northern Wet Forest (revised from Curtis, with **Black Spruce** and **Tamarack Swamps** split out)

These weakly minerotrophic conifer swamps, located in the North, are dominated by black spruce (*Picea mariana*) and tamarack (*Larix laricina*). Jack pine (*Pinus banksiana*) may be a significant canopy component in certain parts of the range of this community complex. Understories are composed mostly of sphagnum (*Sphagnum* spp.) mosses and ericaceous shrubs such as leatherleaf (*Chamaedaphne calyculata*), Labrador-tea (*Ledum groenlandicum*), and small cranberry (*Vaccinium oxycoccos*) and sedges such as (*Carex trisperma* and *C. paupercula*). The Natural Heritage Inventory has split out two entities, identified (but not strictly defined) by the two dominant species (see **Black Spruce Swamp** and **Tamarack Swamp**).

Northern Wet-Mesic Forest (revised from Curtis, with **Northern Hardwood Swamp** split out)

This forested minerotrophic wetland is dominated by white cedar (*Thuja occidentalis*), and occurs on rich, neutral to alkaline substrates. Balsam fir (*Abies balsamea*), black ash (*Fraxinus nigra*), and spruces (*Picea glauca* and *P. mariana*) are among the many potential canopy associates. The understory is rich in sedges (such as *Carex disperma* and *C. trisperma*), orchids (e.g., *Platanthera obtusata* and *Listera cordata*), and wildflowers such as goldthread (*Coptis trifolia*), fringed polygala (*Polygala pauciflora*), and naked miterwort (*Mitella nuda*), and trailing sub-shrubs such as twinflower (*Linnaea borealis*) and creeping snowberry (*Gaultheria hispida*). A number of rare plants occur more frequently in the cedar swamps than in any other habitat.

Oak Barrens

Black oak (*Quercus velutina*) is the dominant tree in this fire-adapted savanna community of xeric sites, but other oaks may also be present. Common understory species are lead plant (*Amorpha canescens*), black-eyed susan (*Rudbeckia hirta*), round-headed bush clover (*Lespedeza capitata*), goat's rue (*Tephrosia virginiana*), june grass (*Koeleria cristata*), little bluestem (*Schizachyrium scoparium*), flowering spurge (*Euphorbia corollata*), frostweed (*Helianthemum canadense*), false Solomon's-seals (*Smilacina racemosa* and *S. stellata*), spiderwort (*Tradescantia ohioensis*), and lupine (*Lupinus perennis*). Distribution of this community is mostly in southwestern, central and west central Wisconsin.

Oak Opening

As defined by Curtis, this is an oak-dominated savanna community in which there is less than 50% tree canopy. Historically, oak openings occurred on wet-mesic to dry sites. The few extant remnants are mostly on drier sites, with the mesic and wet-mesic openings almost totally destroyed by conversion to agricultural or residential uses, and by the encroachment of other woody plants due to fire suppression. Bur, white, and black oaks (*Quercus macrocarpa*, *Q. alba* and *Q. velutina*) are dominant in mature stands as large, open-grown trees with distinctive limb architecture. Shagbark hickory (*Carya ovata*) is sometimes present. American hazelnut (*Corylus americana*) is a common shrub, and while the herb layer is similar to those found in oak forests and prairies, with many of the same grasses and forbs present, there are some plants and animals that reach their optimal abundance in the "openings".

Oak Woodland

This “forest” community is structurally intermediate between Oak Openings and Southern Dry Forest. The tree canopy cover is high, but frequent low-intensity fires and possibly (in pre-settlement times) browsing by herbivores such as elk, bison, and deer kept the understory relatively free of shrubs and saplings. Much additional information is needed but it appears that at least some plants (certain legumes, grasses, and composites among them) reached their highest abundance here.

Open Bog

These non-forested bogs are acidic, low nutrient, northern Wisconsin peatlands dominated by *Sphagnum* spp. mosses that occur in deep layers, often with pronounced hummocks and hollows. Also present are a few narrow-leaved sedge species such as (*Carex oligosperma* and *C. pauciflora*), cotton-grasses (*Eriophorum* spp.), and ericaceous shrubs, especially bog laurel (*Kalmia polifolia*), leatherleaf (*Chamaedaphne calyculata*), and small cranberry (*Vaccinium oxycoccus*). Plant diversity is very low but includes characteristic and distinctive specialists. Trees are absent or achieve very low cover values as this community is closely related to and intergrades with Muskeg. When this community occurs in southern Wisconsin, it is often referred to as a **Bog Relict**.

Patterned Peatland

Very rare in Wisconsin, this wetland type can be characterized as a herb- and shrub-dominated minerotrophic peatland with alternating moss and sedge-dominated peat ridges (strings) and saturated and inundated hollows (flarks). These are oriented parallel to the contours of a slope and perpendicular to the flow of groundwater. Within a patterned peatland the peat “landforms” differ significantly in nutrient availability and pH. The flora may be quite diverse and includes many sedges of bogs and fens, along with ericads, sundews, orchids, arrow-grasses (*Triglochin* spp.), and calciphilic shrubs such as bog birch (*Betula pumila*) and shrubby cinquefoil (*Potentilla fruticosa*).

Pine Barrens

This savanna community is characterized by scattered jack pines (*Pinus banksiana*), or less commonly red pines (*P. resinosa*), sometimes mixed with scrubby Hill's and bur oaks (*Quercus ellipsoidalis* and *Q. macrocarpa*), interspersed with openings in which shrubs such as hazelnuts, (*Corylus* spp.) and prairie willow (*Salix humilis*) and herbs dominate. The flora often contains species characteristic of "heaths" such as blueberries (*Vaccinium angustifolium* and *V. myrtilloides*), bearberry (*Arctostaphylos uva-ursi*), American hazelnut (*Corylus americana*), sweet fern (*Comptonia peregrina*), and sand cherry (*Prunus pennsylvanica*). Also present are dry sand prairie species such as june grass (*Koeleria macrantha*), little bluestem (*Schizachyrium scoparium*), silky and sky-blue asters (*Aster sericeus* and *A. azureus*), lupine (*Lupinus perennis*), blazing-stars (*Liatris aspera* and *L. cylindracea*), and western sunflower (*Helianthus occidentalis*). Pines may be infrequent, even absent, in some stands in northern Wisconsin and elsewhere because of past logging, altered fire regimes, and an absence of seed source.

Pine Relict

These isolated stands of white pine (*Pinus strobus*) and red pine (*P. resinosa*) or, less commonly,

jack pine (*P. banksiana*), that occur on sandstone outcrops or in thin soils over sandstone in the Driftless Area of southwestern Wisconsin, have historically been referred to as relicts. The understories often contain species with northern affinities such as blueberries (*Vaccinium* spp.), huckleberry (*Gaylussacia baccata*), wintergreen (*Gaultheria procumbens*), pipsissewa (*Chimaphila umbellata*), and partridge-berry (*Mitchella repens*), sometimes mixed with herbs typically found in southern Wisconsin's oak forests and prairies.

Poor Fen

This acidic, weakly minerotrophic peatland type is similar to the Open Bog, but can be differentiated by higher pH, nutrient availability, and floristics. Sphagnum (*Sphagnum* spp.) mosses are common but don't typically occur in deep layers with pronounced hummocks. Floristic diversity is higher than in the Open Bog and may include white beak-rush (*Rhynchospora alba*), pitcher-plant (*Sarracenia purpurea*), sundews (*Drosera* spp.), pod grass (*Scheuchzeria palustris*), and the pink-flowered orchids (*Calopogon tuberosus*, *Pogonia ophioglossoides* and *Arethusa bulbosa*). Common sedges are (*Carex oligosperma*, *C. limosa*, *C. lasiocarpa*, *C. chordorrhiza*), and cotton-grasses (*Eriophorum* spp.).

Sand Barrens

Sand Barrens are herbaceous upland communities that develop on unstable or semi-stabilized alluvial sands along major rivers such the Mississippi and Wisconsin. They are partly or perhaps wholly anthropogenic in origin, occurring on sites historically disturbed by plowing or very heavy grazing. Unvegetated "blow-outs" are characteristic features. Barrens, Dry Prairie and Sand Prairie species such as false-heather (*Hudsonia tomentosa*), bearberry (*Arctostaphylos uva-ursi*), sedges (*Cyperus filiculmis* and *C. schweinitzii*), sand cress (*Arabis lyrata*), three-awn grasses (*Aristida* spp.), rock spikemoss (*Selaginella rupestris*), and the earthstar fungi (*Geaster* spp.) are present in this community. Many exotics are present, and rare disturbance dependent species such as fameflower (*Talinum rugospermum*) occur in some stands.

Sand Meadow (now called Moist Sand Meadow)

Sand Prairie (or Dry Sand Prairie)

This dry grassland community is composed of little bluestem (*Schizachyrium scoparium*), junegrass (*Koeleria macrantha*), panic grass (*Panicum* spp.), and crab grass (*Digitaria cognata*). Common herbaceous species are western ragweed (*Ambrosia psilostachya*), the sedges (*Carex muhlenbergii* and *C. pensylvanica*), poverty-oat grass (*Danthonia spicata*), flowering spurge (*Euphorbia corollata*), frostweed (*Helianthemum canadense*), common bush-clover (*Lespedeza capitata*), false-heather (*Hudsonia tomentosa*), long-bearded hawkweed (*Hieracium longipilum*), stiff goldenrod (*Solidago rigida*), horsebalm (*Monarda punctata*), and spiderwort (*Tradescantia ohioensis*). At least some stands are Barrens remnants now lacking appreciable woody cover, though extensive stands may have occurred historically on broad level terraces along the Mississippi, Wisconsin, Black, and Chippewa Rivers.

Shore Fen (formerly called Coastal Fen)

This open peatland community occurs primarily along Great Lakes shorelines, especially near the mouths of estuarine streams. Along Lake Superior most stands are separated from the lake waters by a sand spit. The floating sedge mat is composed mostly of woolly sedge (*Carex lasiocarpa*); co-dominants are sweet gale (*Myrica gale*) and bogbean (*Menyanthes trifoliata*). The following herbs are common in this diverse, circumneutral, nutrient-rich community: twigrush (*Cladium mariscoides*), marsh horsetail (*Equisetum fluviatile*), a spikerush (*Eleocharis elliptica*), intermediate bladderwort (*Utricularia intermedia*), marsh bellflower (*Campanula aparinoides*), narrow-leaved willow-herb (*Epilobium leptophyllum*), water-parsnip (*Sium suave*), and bog willow (*Salix pedicellaris*). Coastal fens are distinguished from open bogs and poor fens (which may adjoin them in the same wetland complex) by the lack of *Sphagnum* spp. mosses, higher pH, and direct hydrologic connection to the Great Lakes. They are distinguished from rich fens by the absence of indicator species such as linear-leaved sundew (*Drosera linearis*), grass-of-parnassus (*Parnassia glauca*), false asphodel (*Tofiedia glutinosa*) and a spikerush (*Eleocharis rostellata*).

Shrub-Carr

This wetland community is dominated by tall shrubs such as red-osier dogwood (*Cornus stolonifera*), meadowsweet (*Spiraea alba*), and various willows (*Salix discolor*, *S. bebbiana*, and *S. gracilis*). Canada bluejoint grass (*Calamagrostis canadensis*) is often very common. Associates are similar to those found in Alder Thickets and tussock-type Sedge Meadows. This type is common and widespread in southern Wisconsin but also occurs in the north.

Southern Dry Forest

Oaks are the dominant species in this upland forest community of dry sites. White oak (*Quercus alba*) and black oak (*Quercus velutina*) are dominant, often with admixtures of red and bur oaks (*Q. rubra* and *Q. macrocarpa*) and black cherry (*Prunus serotina*). In the well developed shrub layer, brambles (*Rubus* spp.), gray dogwood (*Cornus racemosa*), and American hazelnut (*Corylus americana*) are common. Frequent herbaceous species are wild geranium (*Geranium maculatum*), false Solomon's-seal (*Smilacina racemosa*), hog-peanut (*Amphicarpaea bracteata*), and woodland sunflower (*Helianthus strumosus*).

Southern Dry-Mesic Forest

Red oak (*Quercus rubra*) is a common dominant tree of this upland forest community type. White oak (*Q. alba*), basswood (*Tilia americana*), sugar and red maples (*Acer saccharum* and *A. rubrum*), and white ash (*Fraxinus americana*) are also important. The herbaceous understory flora is diverse and includes many species listed under Southern Dry Forest plus jack-in-the-pulpit (*Arisaema triphyllum*), enchanter's-nightshade (*Circaea lutetiana*), large-flowered bellwort (*Uvularia grandiflora*), interrupted fern (*Osmunda claytoniana*), Lady Fern (*Athyrium Filix-femina*), tick-trefoils (*Desmodium glutinosum* and *D. nudiflorum*), and hog peanut (*Amphicarpa bracteata*). To the detriment of the oaks, mesophytic tree species are becoming increasingly important under current management practices and fire suppression policies.

Southern Hardwood Swamp (A split from Curtis' Southern Wet-Mesic Forest)

This is a deciduous forested wetland community type found in insular basins with seasonally high water tables. It is best developed in glaciated southeastern Wisconsin. The dominant trees are red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), and formerly, American elm (*Ulmus americana*). The exotic reed canary grass (*Phalaris arundinacea*) is often dominant in the understory. This Natural Heritage Inventory community partly includes the **Southern Wet-Mesic Forest** of the Curtis classification.

Southern Mesic Forest

This upland forest community occurs on rich, well-drained soils. The dominant tree species is sugar maple (*Acer saccharum*), but basswood (*Tilia americana*) and (near Lake Michigan) beech (*Fagus grandifolia*) may be co-dominant. Many other trees are found in these forests, including those of the walnut family (*Juglandaceae*). The understory is typically open (sometimes brushy with species of gooseberry (*Ribes*) if there is a past history of grazing) and supports fine spring ephemeral displays. Characteristic herbs are spring-beauty (*Claytonia virginica*), trout-lilies (*Erythronium* spp.), trilliums (*Trillium* spp.), violets (*Viola* spp.), bloodroot (*Sanguinaria canadensis*), blue cohosh (*Caulophyllum thalictroides*), mayapple (*Podophyllum peltatum*), and Virginia waterleaf (*Hydrophyllum virginianum*).

Southern Sedge Meadow

Widespread in southern Wisconsin, this open wetland community is most typically dominated by tussock sedge (*Carex stricta*) and Canada bluejoint grass (*Calamagrostis canadensis*). Common associates are water-horehound (*Lycopus uniflorus*), paniced aster (*Aster simplex*), blue flag (*Iris virginica*), Canada goldenrod (*Solidago canadensis*), spotted joe-pye-weed (*Eupatorium maculatum*), broad-leaved cat-tail (*Typha latifolia*), and swamp milkweed (*Asclepias incarnata*). Reed canary grass (*Phalaris arundinacea*) may be dominant in grazed and/or ditched stands. Ditched stands can succeed quickly to Shrub-Carr.

Submergent Aquatic

This herbaceous community of aquatic macrophytes occurs in lakes, ponds, and rivers. Submergent macrophytes often occur in deeper water than emergents, but there is considerable overlap. Dominants include various species of pondweeds (*Potamogeton* spp.) along with waterweed (*Elodea canadensis*), slender naiad (*Najas flexilis*), eel-grass (*Vallisneria americana*), and species of water-milfoil (*Myriophyllum*) and bladderworts (*Utricularia*).

Submergent Aquatic - Oligotrophic marsh (formerly called Submergent Aquatic - Oligotrophic)

This herbaceous community of distinctive highly specialized submersed, rosette-forming aquatic macrophytes occurs in clear, deep soft-water lakes in northern Wisconsin. The plants grow at depths ranging from the beach line to several meters. Species in this community include American shore-grass (*Littorella americana*), pipewort (*Eriocaulon septangulare*), yellow hedge-hyssop (*Gratiola aurea*), aquatic lobelia (*Lobelia dortmanna*), a milfoil (*Myriophyllum tenellum*), brown-fruit rush (*Juncus pelocarpus*), and quillworts (*Isoetes* spp.).

Talus Forest

This description is based on a very limited number of stands examined and should be regarded as preliminary. Talus Forest develops on a substrate of quartzite, sandstone, dolomite, rhyolite, and possibly other rock types. Canopy cover ranges from sparse to moderately dense. Tree dominance is variable, and can include white pine (*Pinus strobus*), red cedar (*Juniperus virginiana*), paper birch (*Betula papyrifera*), northern white cedar (*Thuja occidentalis*), red pine (*Pinus resinosa*) and others. Among the characteristic understory plants noted to date are the shrubs mountain maple (*Acer spicatum*), red-berried elder (*Sambucus pubens*), and bristly sarsaparilla (*Aralia hispida*). Representative herbs include common polypody (*Polypodium vulgare*), wood fern (*Dryopteris marginalis*), walking fern (*Asplenium rhizophyllum*), harebell (*Campanula rotundifolia*), columbine (*Aquilegia canadensis*), fumitory (*Adlumia fungosa*), leafcup (*Polymnia canadensis*), and pale corydalis (*Corydalis sempervirens*). Crustose lichens and various mosses sometimes reach high cover values.

Talus Forest communities often reflect the composition of forests in the surrounding landscape, but include plants and animals that are adapted to take advantage of the rock substrate, microclimatic conditions such as cold air drainage, and groundwater seepage. These habitat specialists, presumably including some of the mosses and lichens, are likely to be the species that are most restricted to such environments and of the greatest conservation concern.

Tamarack (poor) Swamp (formerly called Tamarack Swamp, this is a split from Curtis' Northern Wet Forest)

These weakly to moderately minerotrophic conifer swamps are dominated by a broken to closed canopy of tamarack (*Larix laricina*) and a frequently dense understory of speckled alder (*Alnus incana*). The understory is more diverse than in Black Spruce Swamps and may include more nutrient-demanding species such as winterberry holly (*Ilex verticillata*) and black ash (*Fraxinus nigra*). The bryophytes include many genera other than *Sphagnum*. Stands with spring seepage sometimes have marsh-marigold (*Caltha palustris*) and skunk-cabbage (*Symplocarpus foetidus*) as common understory inhabitants. These seepage stands have been separated out as a distinct type or subtype in some nearby states and provinces.

Tamarack (rich) Swamp (formerly called Tamarack Fen)

This forested wetland community type is a variant of the Tamarack Swamp, but occurs south of the Tension Zone within a matrix of "southern" vegetation types. Poison-sumac (*Toxicodendron vernix*) is often a dominant understory shrub. Successional stages and processes are not well understood but fire, windthrow, water level fluctuations, and periodic infestations of larch sawfly are among the important dynamic forces influencing this community. Groundwater seepage influences the composition of most if not all stands. Where the substrate is especially springy, skunk cabbage (*Symplocarpus foetidus*), marsh marigold (*Caltha palustris*), sedges, and a variety of mosses may carpet the forest floor. Drier, more acid stands may support an ericad and sphagnum dominated groundlayer.

Wet Prairie

This is a rather heterogeneous tall grassland community that shares characteristics of prairies, Southern Sedge Meadow, Calcareous Fen and even Emergent Aquatic communities. The Wet

Prairie's more wetland-like character can mean that sometimes very few true prairie species are present. Many of the stands assigned to this type by Curtis are currently classified as Wet-Mesic Prairies. The dominant graminoids are Canada bluejoint grass (*Calamagrostis canadensis*), cordgrass (*Spartina pectinata*), and prairie muhly (*Muhlenbergia glomerata*), plus several sedge (*Carex*) species including lake sedge (*C. lacustris*), water sedge (*C. aquatilis*), and woolly sedge (*C. lanuginosa*). Many of the herb species are shared with Wet-Mesic Prairies, but the following species are often prevalent: New England aster (*Aster novae-angliae*), swamp thistle (*Cirsium muticum*), northern bedstraw (*Galium boreale*), yellow stargrass (*Hypoxis hirsuta*), cowbane (*Oxypolis rigidior*), tall meadow-rue (*Thalictrum dasycarpum*), golden alexander (*Zizia aurea*), and mountain-mint (*Pycnanthemum virginianum*).

Wet-Mesic Prairie

This herbaceous grassland community is dominated by tall grasses including big bluestem (*Andropogon gerardii*), Canada bluejoint grass (*Calamagrostis canadensis*), cordgrass (*Spartina pectinata*), and Canada wild-rye (*Elymus canadensis*). The forb component is diverse and includes azure aster (*Aster oolentangiensis*), shooting-star (*Dodecatheon meadia*), sawtooth sunflower (*Helianthus grosseserratus*), prairie blazing-star (*Liatris pycnostachya*), prairie phlox (*Phlox pilosa*), prairie coneflower (*Ratibida pinnata*), prairie docks (*Silphium integrifolium* and *S. terebinthinaceum*), late and stiff goldenrods (*Solidago gigantea* and *S. rigida*), and culver's-root (*Veronicastrum virginicum*).

White Pine - Red Maple Swamp

This swamp community is restricted to the margins of the bed of extinct glacial Lake Wisconsin in the central part of the state. It often occurs along headwaters streams and seepages in gently sloping areas. White pine (*Pinus strobus*) and red maple (*Acer rubrum*) are the dominant trees, with other species, including yellow birch (*Betula alleghiensis*), present in lesser amounts. Common understory shrubs are speckled alder (*Alnus incana*), winterberry holly (*Ilex verticillata*), and swamp dewberry (*Rubus pubescens*); characteristic herbs include skunk cabbage (*Symplocarpus foetidus*), cinnamon fern (*Osmunda cinnamomea*), gold thread (*Coptis trifolia*), and two disjuncts from the eastern United States, bog fern (*Thelypteris simulata*) and long sedge (*Carex folliculata*). Sphagnum and other mosses are common.

Appendix C:

Wisconsin's Wildlife Action Plan (2005-2015): Priority Conservation Actions and Conservation Opportunity Areas

Superior Coastal Plain Ecological Landscape

High Priority Species of Greatest Conservation Need (SGCN) and Natural Communities

- | | | |
|-------------------------------|----------------------------|---------------------|
| ▪ Black-throated Blue Warbler | ▪ Squirrel | |
| ▪ Canada Warbler | ▪ Northern Flying Squirrel | ▪ Boreal Forest |
| ▪ Common Tern | ▪ Water Shrew | ▪ Coldwater Streams |
| ▪ Marbled Godwit | ▪ Woodland Jumping Mouse | ▪ Dry Cliff |
| ▪ Hudsonian Godwit | | ▪ Emergent Marsh |
| ▪ LeConte's Sparrow | | ▪ Great Lakes Beach |
| ▪ Piping Plover | ▪ Boreal Chorus Frog | ▪ Great Lakes Dune |
| ▪ Whimbrel | ▪ Mink Frog | ▪ Lake Superior |
| ▪ Yellow Rail | ▪ Mudpuppy | ▪ Moist Cliff |
| | | ▪ Open Bog |
| ▪ Kiyi | ▪ Old-maid Underwing | ▪ Shore Fen |
| ▪ Shortjaw Cisco | | ▪ Warmwater Streams |
| ▪ Franklin's Ground | | |

Priority Conservation Actions (CELCP-Relevant Only)

- Protect and restore harbor and river mouth shoreline and wetland habitats.
- Manage Great Lakes beach and dune habitat as part of a vegetation mosaic that includes forested ridge and swale, interdunal wetland, shrub carr, and swamp conifer forest with older age classes. Promote concentrated public access points, limited recreational activities in areas where SGCN are present (particularly during breeding seasons), protecting site hydrology, and early detection and management of invasive exotic species.
- Increase representation of near shore boreal forest by encouraging retention of white spruce, white pine, white cedar, and balsam fir, especially in older age classes, by adaptive management and selective planting.
- Preserve and maintain large expanses of sedge meadow, coastal fen and forested wetlands along the coast and manage in the context of a mosaic of community types.
- In light of climate change and lowering lake levels, monitor community-level vegetation changes in coastal fens.
- Band all Piping Plover chicks within 7-10 days of hatching.
- Install predator exclosures over Piping Plover nests to deter mammalian predation.
- Manage forested wetlands and fens as part of a vegetation mosaic that includes other open wetland communities, shrub swamp, and swamp conifer forest.
- Work with Partners to protect and manage at least three 5,000-acre grassland bird conservation areas, with 1,000-acre cores of permanent grassland, while incorporating shrub-stage component, especially along streams for shrub land and streamside species.

Conservation Opportunity Areas (CELCP-Relevant Only)

Great Lakes and their Shorelines - Global Significance

Includes the lake and embayments and migratory and winter bird concentration areas.

COA(s): Lake Superior

SGCN - Horned Grebe, Caspian Tern, Common Tern, Lake Sturgeon, Mudpuppy, Kiyi, Short-jawed Cisco, Bald Eagle.

Public Land - The lake is public water

Legacy Places - None

Important Bird Areas - Kakagon-Bad River Wetlands and Forest Corridor, Lower Chequamegon Bay, Apostle Islands, South Shore Wetlands, and Wisconsin Point.

Great Lakes Shore natural community complex including Great Lakes Beach, Great Lakes Dune, Northern Wet Forest, Northern Sedge Meadow, Open Bog, Alder Thicket, Emergent Marsh, Submergent Marsh, Emergent Marsh Wild Rice, Moist Cliff and Shore Fen.

COA(s): Coastal Headlands and Estuaries

SGCN - Boreal Chorus Frog, Four-toed Salamander, Mink Frog, Pickerel Frog, Wood Turtle, American Bittern, American Golden Plover, American Black Duck, Bald Eagle, Black Tern, Blue-winged Teal, Bobolink, Buff-breasted Sandpiper, Canvasback, Common Tern, Dunlin, Golden-winged Warbler, Hudsonian Godwit, LeConte's Sparrow, Lesser Scaup, Marbled Godwit, Northern Harrier, Olive-sided Flycatcher, Osprey, Piping Plover, Rusty Blackbird Short-billed Dowitcher, Solitary Sandpiper, Trumpeter Swan, Veery, Whimbrel, Yellow Rail, Eastern Red Bat, Franklin's Ground Squirrel, Hoary Bat, Northern Long-eared Bat, and Silver-haired Bat.

Public Land - Lost Creek Bog State Natural Area, Bark Bay State Natural Area, Port Wing Boreal Forest State Natural Area, South Shore Fishery Area.

Legacy Places - Quarry Point to Bark Point, Western Lake Superior Drowned River Mouths.

Important Bird Areas - South Shore Wetlands.

COA(s): Apostle Islands

Boreal Forest, Northern Wet Forest, Northern Wet-Mesic Forest, Northern Hardwood Swamp, Alder Thicket, Shrub Carr, Northern Sedge Meadow, Shore Fen, Northern Mesic Forest, Great Lakes Beach, Great Lakes Dune, Great Lakes Barrens, Dry Cliff, and Moist Cliff.

SGCN - Four-toed Salamander, American Golden Plover, Black-throated Blue Warbler, Canada Warbler, Least Flycatcher, Marbled Godwit, Northern Goshawk, Olive-sided Flycatcher, Rusty Blackbird, Veery, Whimbrel, Northern Flying Squirrel, and Water Shrew.

Public Land - Apostle Islands National Lakeshore (mainland unit), Big Bay State Park, Madeline Island Land Trust.

Legacy Places - Apostle Islands.

Important Bird Areas – Apostle Islands.

COA(s): Bad River

Boreal Transition Forest including Great Lakes Savanna, Boreal Forest, Northern Dry-Mesic Forest, Northern Mesic Forest, Emergent Marsh, Great Lakes Dune, Great Lakes Beach.

SGCN – Boreal Chorus Frog, Four-toed Salamander, Mink Frog, Pickerel Frog, Wood Turtle, American Bittern, American Golden Plover, American Black Duck, Bald Eagle, Black-backed Woodpecker Black Tern, Blue-winged Teal, Bobolink, Buff-breasted Sandpiper, , Canada Warbler, Canvasback, Common Tern, Dunlin, Golden-winged Warbler, Hudsonian Godwit, Least Flycatcher, LeConte’s Sparrow, Lesser Scaup, Marbled Godwit, Northern Harrier, Olive-sided Flycatcher, Osprey, Piping Plover, Rusty Blackbird Short-billed Dowitcher, Solitary Sandpiper, Trumpeter Swan, Veery, Whimbrel, Yellow Rail, and Old-maid Underwing.

Public Land – White River Wildlife Area, Copper Falls State Park, Apostle Islands National Lakeshore (Long Island unit), Iron County Forest.

Legacy Places – Bad River.

Important Bird Areas – Kakagon-Bad River Wetlands and Forest Corridor.

Boreal Forest Transition – Continental Significance

Boreal Transition Forest including Great Lakes Savanna, Boreal Forest, Northern Dry-Mesic Forest, and Northern Mesic Forest.

COA(s): Pokegama-Nemadji Wetlands, Brule Boreal Forest

SGCN –Four-toed Salamander, Black-backed Woodpecker, Canada Warbler, Olive-sided Flycatcher, Least Flycatcher, Veery, Rusty Blackbird, American Marten, Eastern Red Bat, Gray Wolf, Hoary Bat, Northern Flying Squirrel, Silver-haired Bat, Water Shrew Woodland Jumping Mouse and Old-maid Underwing.

Public Land – Brule River State Forest, Red River Streambank Area, City of Superior Municipal Forest.

Legacy Places – Bois Brule River, Wisconsin Point.

High Quality Wetland Communities – State Significance

Northern Wet Forest, Northern Wet-Mesic Forest, Northern Hardwood Swamp, Alder Thicket, Shrub Carr, Northern Sedge Meadow, and Emergent Marsh.

COA(s): Bibon Swamp, Fish Creek

SGCN –Four-toed Salamander, Wood Turtle, American Woodcock, Black-billed Cuckoo, Blue-winged Teal, Canada Warbler, Golden-winged Warbler, Least Flycatcher, Olive-sided Flycatcher, Rusty Blackbird, Veery, Mink Frog, Northern Flying Squirrel, and Water Shrew.

Public Land – Bibon Swamp State Natural Area, White River Fishery Area.

Legacy Places – White River.

Important Bird Areas – Bibon Swamp, Lower Chequamegon Bay.

Diverse Aquatic Communities - State Significance

Coldwater streams.

COA(s): White and Bad Rivers, St. Louis Estuary

SGCN -Least Darter, Four-toed Salamander, Wood Turtle, Mink Frog, Water Shrew and Calico Crayfish.

Public Land - White River Fishery Area.

Legacy Places - White River.

Extensive Grassland Communities - State Significance

Surrogate Grasslands.

COA: Lake Superior Grasslands

SGCN -American Bittern, American Golden Plover, American Woodcock, Black-billed Cuckoo, Bobolink, Brown Thrasher, Buff-breasted Sandpiper, Dunlin, Eastern Meadowlark, Field Sparrow, Golden-winged Warbler, Hudsonian Godwit, LeConte's Sparrow, Northern Harrier, Sharp-tailed Grouse, Short-eared Owl, Upland Sandpiper, Western Meadowlark, Yellow-billed Cuckoo, Franklin's Ground Squirrel, Northern Flying Squirrel, Water Shrew, Woodland Jumping Mouse and Red-disked Alpine.

Public Land - Small portion of the Brule River State Forest.

Legacy Places - Highway 2 Grasslands.

Northern Lake Michigan Ecological Landscape

High Priority Species of Greatest Conservation Need (SGCN) and Natural Communities

- Caspian Tern
- Common Tern
- Eastern Meadowlark
- Forster's Tern
- Great Egret
- Horned Grebe
- Olive-sided Flycatcher
- Piping Plover
- Snowy Egret
- Upland Sandpiper
- Whimbrel
- Lake Sturgeon
- Shoal Chub
- Mudpuppy
- Black Striate
- Boreal Top
- Bright Glyph (snail)
- Cherrystone Drop
- Hine's Emerald Dragonfly
- Iowa Pleistocene Vertigo
- Lake Huron Locust
- Midwest Pleistocene Vertigo
- Mystery Vertigo
- Phyllira Tiger Moth
- Sculpted Glyph
- Swamp Metalmark
- White-lip Dagger
- Boreal Rich Fen
- Boreal Forest
- Emergent Marsh
- Floodplain Forest
- Great Lakes Alkaline Rockshore
- Great Lakes Beach
- Great Lakes Dune
- Great Lakes Ridge & Swale
- Lake Michigan
- Northern Sedge Meadow
- Northern Wet-mesic Forest
- Warmwater Rivers

Priority Conservation Actions (CELCP-Relevant Only)

- Protect and restore harbor and river mouth shoreline and wetland habitats.
- Manage forested ridge and swale and boreal rich fen areas as part of a vegetation mosaic that includes other open wetland communities, shrub swamp, and swamp conifer forest by promoting older age classes, protecting site hydrology, and early detection and management of invasive exotic species.
- Increase near shore representation of boreal forest by encouraging retention of white spruce, white pine, white cedar, and balsam fir, especially in older age classes, by adaptive management and selective planting.
- Manage Great Lakes beach and dune habitat as part of a vegetation mosaic that includes forested ridge and swale, interdunal wetland, shrub carr, and swamp conifer forest with older age classes. Promote concentrated public access points, limited recreational activities in areas where SGCN are present (particularly during breeding seasons), protecting site hydrology, and early detection and management of invasive exotic species.
- Preserve habitat on the Niagara Escarpment and protect ecologically significant areas currently occupied by SGCN from conversion to other land uses.
- Protect and manage water bodies containing Hine's Emerald Dragonfly, monitor populations and conduct basic life history research.
- Maintain long-term wetland productivity on state properties by mimicking natural hydrologic regimes and using adaptive management techniques.
- Initiate wetland renovation projects to enhance Forster's Tern habitat.
- Utilize artificial nest platforms to maintain Forster's Tern populations.
- Keep open aspect to west shore wetlands and sedge meadows by using prescribed fire, fluctuating water levels where appropriate, and tree shearing and harvest.

Conservation Opportunity Areas (CELCP-Relevant Only)

Great Lakes and their Shorelines - Global Significance

Lake Michigan including embayments and Migratory/Winter Bird Habitat

COA(s): Lake Michigan including embayments such as Rowley's Bay and Moonlight Bay.

SGCN - Horned Grebe, Caspian Tern, Common Tern, Lake Sturgeon, Banded Killifish, Mudpuppy, Bald Eagle, Greater Redhorse

Public Land - The lake is public water

Legacy Places - None.

Important Bird Areas - None.

Northern Door County natural community complexes including Great Lakes Beach, Great Lakes Alkaline Rockshore, Great Lakes Dune, Boreal Rich Fen, Floodplain Forest, Northern Sedge Meadow, Northern Wet Forest, Northern Wet-mesic Forest, Boreal Forest, Great Lakes Ridge & Swale, and Northern Hardwood Swamp. These sites also include portions of the Niagara Escarpment including Dry Cliff, Moist Cliff and bedrock communities.

Wisconsin Coastal and Estuarine Land Conservation Plan

COA(s): Rock Island, Detroit Harbor, Big and Little Marsh, Coffey Swamp, Jackson Harbor, Chambers Island, Gardner Marsh, Potawatomi State Park, Bayshore Blufflands, White Cliff Fen and Forest, Thorp Pond, Baileys Harbor to Peninsula, Kangaroo Lake, Hibbard Creek, Logan Creek, Whitefish Dunes to Sturgeon Bay, Ellison Bluff, Door Bluff County Park, Mink River to Europe Bay, Boyer's Bluff Green Bay West Shores

SGCN – Blanding's Turtle, Four-toed Salamander, Mink Frog, Pickerel Frog, Wood Turtle, American Bittern, American Woodcock, Black-billed Cuckoo, Black Tern, Black-throated Blue Warbler, Blue-winged Teal, Bobolink, Brown Thrasher, Canada Warbler, Caspian Tern, Common Tern, Dunlin, Forster's Tern, Hudsonian Godwit, Least Flycatcher, Marbled Godwit, Northern Goshawk, Northern Harrier, Olive-sided Flycatcher, Rusty Blackbird, Solitary Sandpiper, Snowy Egret, Veery, Whimbrel, Willow Flycatcher, Wood Thrush, Yellow Rail, Eastern Red Bat, Hoary Bat, Northern Flying Squirrel, Northern Long-eared Bat, Silver-haired Bat, Water Shrew, Woodland Jumping Mouse, Lake Huron Locust, Bright Glyph (snail), Hine's Emerald Dragonfly, Swamp Metalmark, Phyllira Tiger Moth, Two-spotted Skipper, Sculptured Glyph, Cherrystone Drop, White-tip Dagger, Black Striate, Midwest Pleistocene Vertigo, Iowa Pleistocene Vertigo, Mystery Vertigo, and Boreal Top.

Public Land – Baileys Harbor Boreal Forest State Natural Area, Bloch Oxbow State Natural Area, Gardner Swamp Wildlife Area, Green Bay West Shores Wildlife Area, Mud Lake Wildlife Area, Newport State Park, Peninsula State Park, Potawatomi State Park, Rock Island State Park, Seagull Bar Wildlife Area, Whitefish Dunes State Park, TNC Mink River Preserve, UW-Green Bay Toft Point, The Ridges Sanctuary, Small Scattered State Natural Areas, Door County Land Trust Preserves, Door County Parks.

Legacy Places – Northern Door County, Green Bay West Shore Wetlands, Oconto Marsh, Peshtigo Harbor, and Seagull Bar and Niagara Escarpment.

Important Bird Areas – Whitefish Dunes - Shivering Sands, Toft Point - Ridges - Mud Lake, and Mink River Estuary - Newport State Park, Green Bay West Shore Wetlands, Lower Peshtigo River, and Seagull Bar.

High Quality Wetlands – State Significance

Boreal Rich Fen, Northern Wet-mesic Forest, Northern Wet Forest, Northern Sedge Meadow, Shrub-Carr, and Emergent Marsh.

COA(s): Lake Noquebay

SGCN – Blanding's Turtle, Four-toed Salamander, Mink Frog, Pickerel Frog, Wood Turtle, American Bittern, American Woodcock, Bald Eagle, Black-billed Cuckoo, Black Tern, Blue-winged Teal, Canada Warbler, Northern Harrier, Osprey, Rusty Blackbird, Veery, Willow Flycatcher, Yellow Rail, Eastern Red Bat, Hoary Bat, Northern Long-eared Bat, Silver-haired Bat, Water Shrew, and Woodland Jumping Mouse and Two-spotted Skipper.

Public Land – Lake Noquebay Wildlife Area.

Legacy Places – Noquebay Conifer Swamp.

Central Lake Michigan Ecological Landscape

High Priority Species of Greatest Conservation Need (SGCN) and Natural Communities

- Caspian Tern
- Common Tern
- Forster's Tern
- Great Egret
- Horned Grebe
- Peregrine Falcon
- Mudpuppy
- Banded Killifish
- Lake Sturgeon
- Shoal Chub
- Phyllira Tiger Moth
- Land Snails
- Alvar
- Floodplain Forest
- Great Lakes Beach
- Great Lakes Dune
- Great Lakes Ridge and Swale
- Moist Cliff
- Lake Michigan
- Northern Hardwood Swamp
- Warmwater Rivers

Priority Conservation Actions (CELCP-Relevant Only)

- Protect and restore harbor and river mouth shoreline and wetland habitats.
- Manage Great Lakes beach and dune habitat as part of a vegetation mosaic that includes forested ridge and swale, interdunal wetland, shrub-carr, and swamp conifer forest with older age classes. Promote concentrated public access points, limited recreational activities in areas where SGCN are present (particularly during breeding seasons), protecting site hydrology, and early detection and management of invasive exotic species.
- In the Niagara Escarpment Conservation Opportunity Area, encourage public and private landowners to maintain natural forest cover, protect areas where surface waters drain into natural fissures, minimize pesticide infiltration, and maintain partially open sinkholes that serve as bat hibernacula.
- Preserve habitat on the Niagara Escarpment and protect ecologically significant areas currently occupied by SGCN from conversion to other land uses.
- Protect Wisconsin's only large alvar (Red Banks) by minimizing impacts from quarrying, road construction, and housing development through acquisition of fee title, development rights, transfer of development rights, and zoning.
- Manage alvars by thinning densely vegetated areas and removing aggressive exotic shrubs.
- Maintain and connect large blocks of older floodplain forest to provide habitat for the large number of SGCN that use this habitat while addressing the regeneration difficulties associated with dense stands of reed canary grass.
- Initiate wetland renovation projects for Forster's Tern and use artificial nest platforms to maintain existing Forster's Tern populations.
- Maintain long-term wetland productivity on public properties by mimicking natural hydrologic regimes within an adaptive management framework.
- Protect large insular hardwood swamps from hydrological changes and fragmentation due to road and housing development.

Conservation Opportunity Areas (CELCP-Relevant Only)

Great Lakes and their Shorelines - Global Significance

Lake Michigan including embayments and Migratory/Winter Bird Habitat.

COA(s): Lake Michigan

Wisconsin Coastal and Estuarine Land Conservation Plan

SGCN - Horned Grebe, Caspian Tern, Common Tern, Lake Sturgeon, Banded Killifish, Mudpuppy, Bald Eagle, Greater Redhorse

Public Land - The lake is public water

Legacy Places - None

Important Bird Areas - Ozaukee Bight Lakeshore Migration Corridor, Harrington Beach Lakeshore Migration Corridor, and Cleveland Lakeshore Migration Corridor.

Lake Michigan Shore Features - including Great Lakes Beach, Great Lakes Dune, Interdunal Wetland, Great Lakes Ridge and Swale, and Emergent Marsh.

COA(s): Green Bay West Shores; Point Beach and Woodland Dunes; Kohler-Andrae

SGCN - Blanding's Turtle, Four-toed Salamander, Mink Frog, Pickerel Frog, Wood Turtle, American Bittern, American Golden Plover, American Woodcock, Bald Eagle, Black-billed Cuckoo, Blue-winged Teal, Bobolink, Brown Thrasher, Common Tern, Dunlin, Great Egret, Forster's Tern, Hudsonian Godwit, Least Flycatcher, Marbled Godwit, Northern Harrier, Rusty Blackbird, Short-billed Dowitcher, Solitary Sandpiper, Snowy Egret, Veery, Whimbrel, Willow Flycatcher, Wood Thrush, Yellow Rail, Eastern Red Bat, Hoary Bat, Northern Flying Squirrel, Northern Long-eared Bat, Silver-haired Bat, Water Shrew, Woodland Jumping Mouse, Two-spotted Skipper, and Phyllira Tiger Moth.

Public Land - Point Beach State Forest, Kohler-Andrae State Park, Green Bay West Shores Wildlife Area, Barkhausen County Resource Area, Woodland Dunes Nature Preserve and State Natural Area.

Legacy Places - Fisher Creek, Kohler-Andrae Dunes, Point Beach and Dunes, West Shore Green Bay Wetlands.

Important Bird Areas - Woodland Dunes Nature Preserve, Point Beach State Forest, and Green Bay West Shore Wetlands.

Niagara Escarpment - Global Significance

Dry Cliff, Moist Cliff, Alvar and Bedrock Glade communities.

COA(s): Greenleaf Escarpment; Red Banks Escarpment; Red Banks Alvar

SGCN - Sculptured Glyph, Cherrystone Drop, White-tip Dagger, Black Striate, Midwest Pleistocene Vertigo, Iowa Pleistocene Vertigo, Mystery Vertigo, Boreal Top.

Public Land - Red Banks Alvar State Natural Area, High Cliff State Park, Stockbridge Ledge State Natural Area, Brown County Parks, Calumet County Parks, Baird Creek Parkway, Heritage Hill State Park, Scattered Wildlife Areas.

Legacy Places - Niagara Escarpment.

High Quality Wetlands - State Significance

Northern Hardwood Swamp, Floodplain Forest, Northern Sedge Meadow, Shrub Carr, and Emergent Marsh

COA(s): Hardwood Swamps; Kellner Lake; Holland Red Maple Swamp

SGCN - Four-toed Salamander, American Woodcock, Least Flycatcher, and Veery.

Public Land - Buzz Besadny Fish and Wildlife Area, Holland Wildlife Area.

Legacy Places - Insular Black Ash Swamps

Southern Lake Michigan Ecological Landscape

High Priority Species of Greatest Conservation Need (SGCN) and Natural Communities

- Horned Grebe
- Peregrine Falcon
- Mudpuppy
- Striped Shiner
- Beetle (*Colaspis suggona*)
- Broad-winged Skipper
- Leafhoppers (*Paraphilaenus parrallelus*, *Destria crocea*, *Memnonia panzeri*, *Aphelonema simplex*)
- Liatris Borer Moth
- Mulberry-wing
- Red-tailed Leafhopper
- Silphium Borer Moth
- Two-spotted Skipper
- Lake Michigan
- Wet-mesic Prairie

Priority Conservation Actions (CELCP-Relevant Only)

- Preserve and manage all wet-mesic prairie sites, restore degraded sites (emphasizing restoration of hydrology), and manage the sites in a matrix of surrogate grasslands and other shrub and savanna habitats for area-sensitive species
- Protect and restore harbor and river mouth shoreline and wetland habitats.
- Conserve habitat for the striped shiner by protecting refuges in the Milwaukee River watershed, and through protection and restoration of natural habitat in the Milwaukee River.
- Improve habitat and water quality conditions in the Milwaukee River basin by controlling non-point pollution.

Conservation Opportunity Areas (CELCP-Relevant Only)

Great Lakes and their Shorelines - Global Significance

Fisheries and Migratory/Winter Bird Habitat.

COA(s): Lake Michigan including embayments and migratory and wintering bird locations.

SGCN - Greater Redhorse, Lake Sturgeon, Mudpuppy, Horned Grebe.

Legacy Places - Lake Michigan.

Lakeshore natural community complexes, including Great Lakes Beach, Great Lakes Dune, Southern Sedge Meadow, Calcareous Fen, Wet-mesic Prairie, Wet Prairie, and Shrub-carr

COA(s): Chiwaukee Prairie

SGCN - Blanding's Turtle, Bobolink, Eastern Meadowlark, Field Sparrow, Henslow's Sparrow, Short-eared Owl, Willow Flycatcher, Franklin's Ground Squirrel, Red-tailed Leafhopper, Silphium Borer Moth, Liatris Borer Moth, Mulberry-wing, Broad-winged Skipper, Two-spotted Skipper, Colapsis Leaf Beetle, and three SGCN leafhoppers.

Wisconsin Coastal and Estuarine Land Conservation Plan

Public Land - Chiwaukee Prairie State Natural Area

Legacy Places - Chiwaukee Prairie

Medium-sized Rivers and Streams - Upper Midwest/Regional Significance

Milwaukee River (main branches) is mid-sized Warmwater River, including riparian communities.

COA(s): Milwaukee River

SGCN - Greater Redhorse, Striped Shiner, Butler's Garter Snake, Least Darter, Blanding's Turtle, Rusty Blackbird, Solitary Sandpiper, Ellipse, and Slippershell Mussel.

Public Land - Milwaukee County Parks.

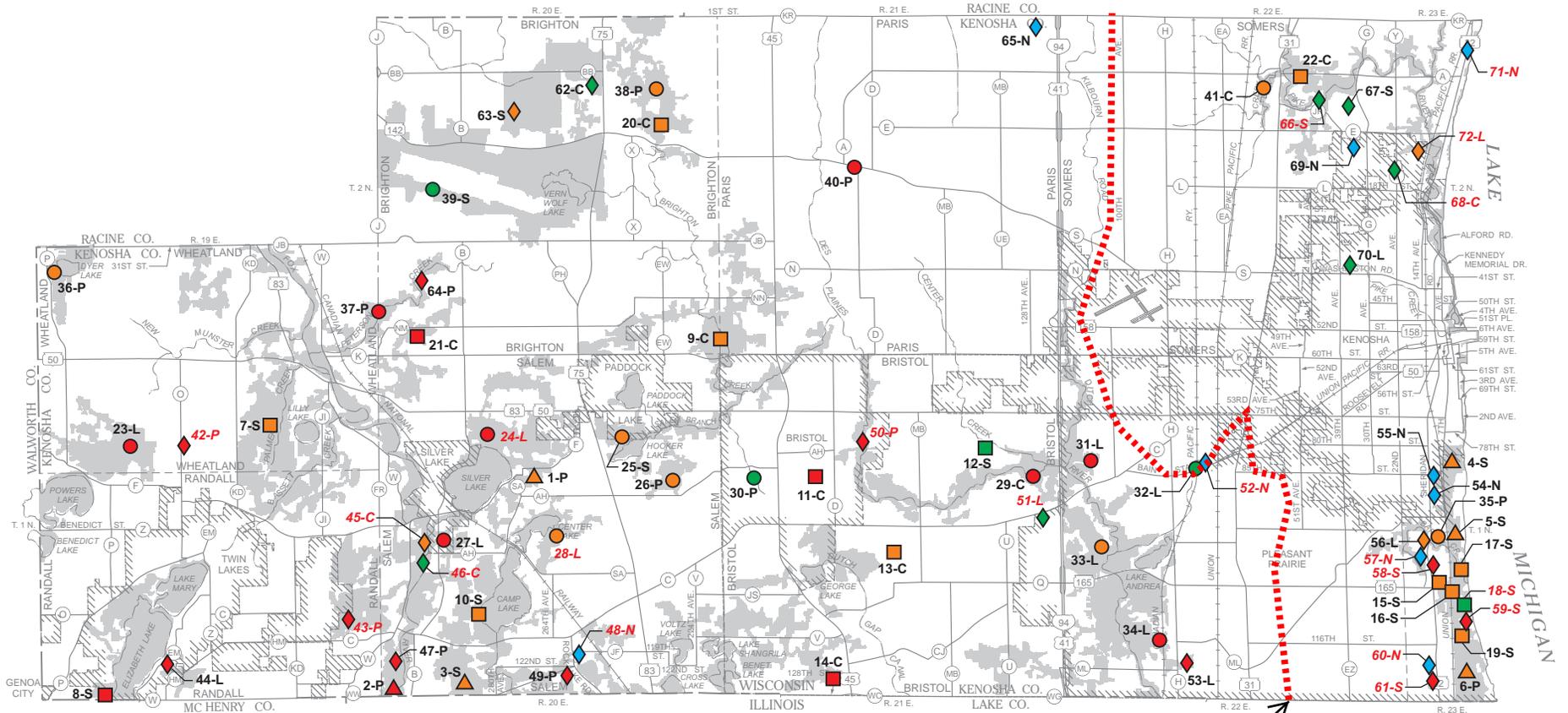
Appendix D:

Southeastern Wisconsin Regional Planning Commission, Plan Recommendations for
Natural Areas and Critical Species Habitats

Maps follow for:

Kenosha County
Milwaukee County
Ozaukee County
Racine County

PLAN RECOMMENDATIONS FOR NATURAL AREAS AND CRITICAL SPECIES HABITATS IN KENOSHA COUNTY



Great Lakes Watershed Boundary

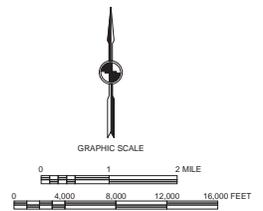
CURRENT STATUS AND PLAN RECOMMENDATION	NA-1 SITE	NA-2 SITE	NA-3 SITE	CRITICAL SPECIES HABITAT
ENTIRELY UNDER PROTECTIVE OWNERSHIP/ PROTECTIVE OWNERSHIP TO BE RETAINED	(NONE)	■	●	◆
PARTIALLY UNDER PROTECTIVE OWNERSHIP/ REMAINDER OF SITE TO BE ACQUIRED	▲	■	●	◆
NOT UNDER PROTECTIVE OWNERSHIP/ ENTIRE SITE TO BE ACQUIRED	▲	■	●	◆
NOT UNDER PROTECTIVE OWNERSHIP/ TO BE PRESERVED TO EXTENT PRACTICABLE WITHOUT PROTECTIVE OWNERSHIP	(NONE)	(NONE)	(NONE)	◆

RECOMMENDED OWNERSHIP KEY:
 S-STATE GOVERNMENT
 C-COUNTY GOVERNMENT
 L-LOCAL GOVERNMENT
 P-PRIVATE CONSERVANCY ORGANIZATION
 N-NO PROTECTIVE OWNERSHIP RECOMMENDED

27-SITE REFERENCE NUMBER
(SEE TABLE 37)

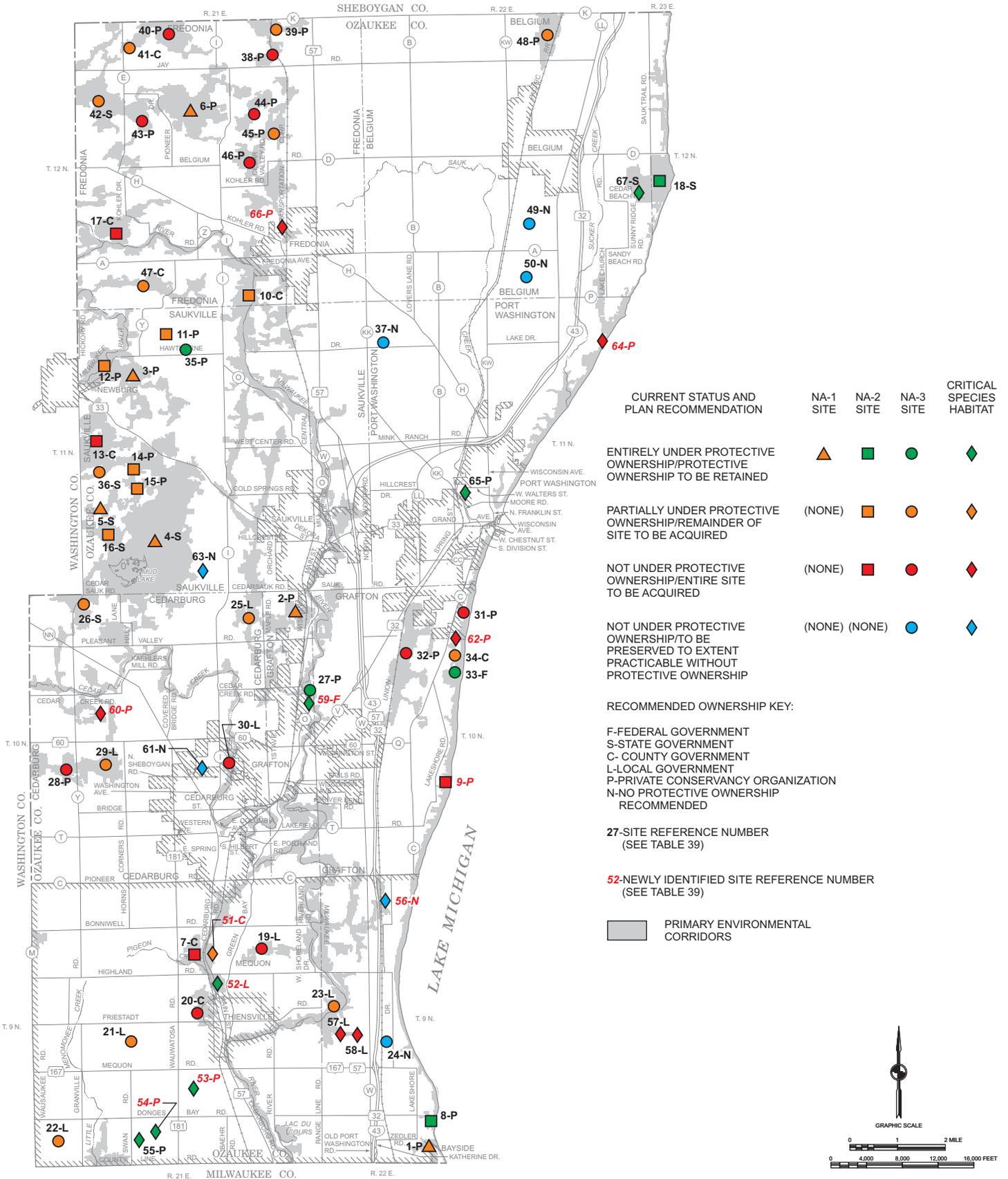
28-NEWLY IDENTIFIED SITE REFERENCE NUMBER
(SEE TABLE 37)

■ PRIMARY ENVIRONMENTAL CORRIDORS



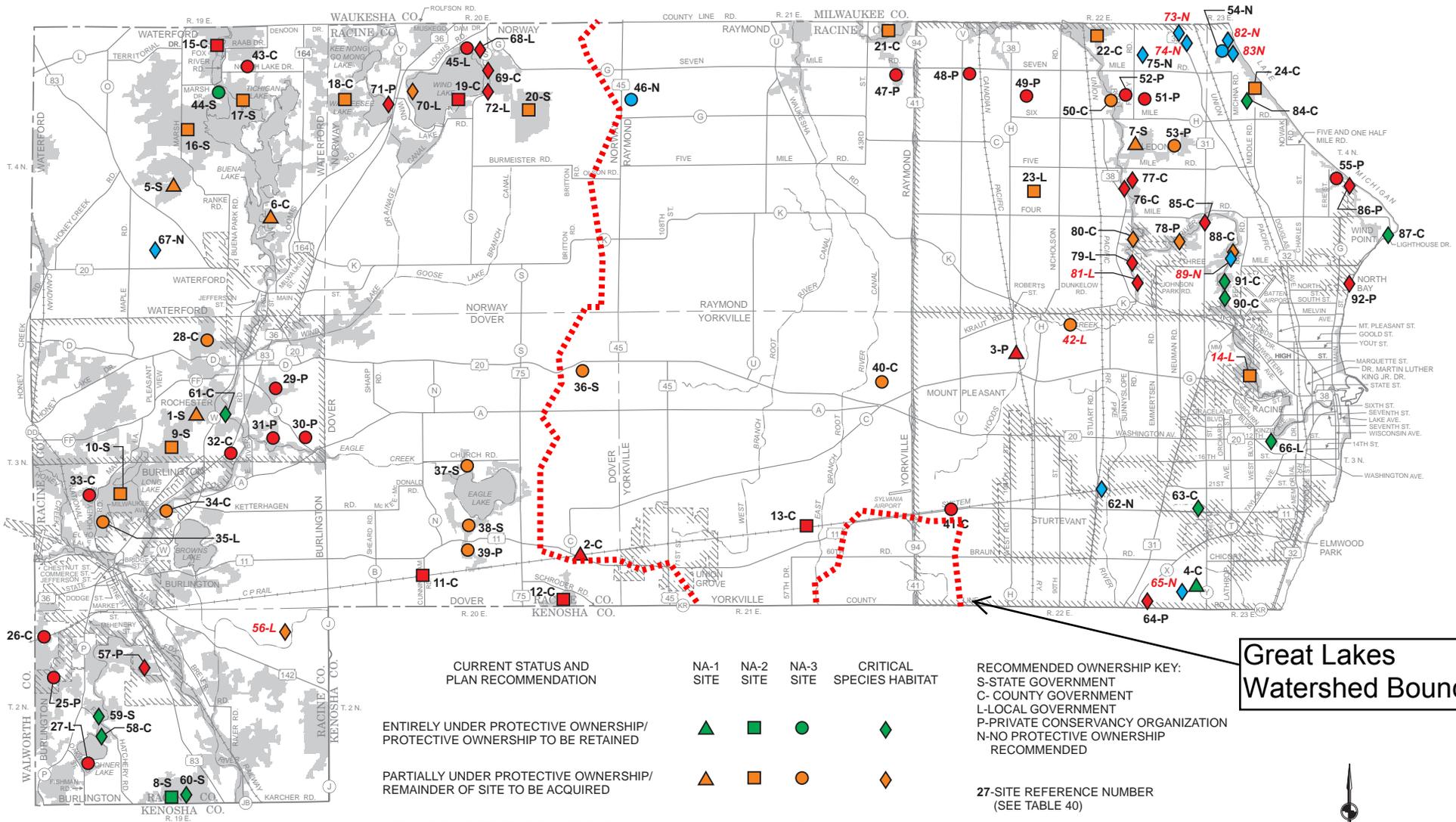
Source: SEWRPC.

PLAN RECOMMENDATIONS FOR NATURAL AREAS AND CRITICAL SPECIES HABITATS IN OZAUKEE COUNTY



Source: SEWRPC.

PLAN RECOMMENDATIONS FOR NATURAL AREAS AND CRITICAL SPECIES HABITATS IN RACINE COUNTY



CURRENT STATUS AND PLAN RECOMMENDATION

- ENTIRELY UNDER PROTECTIVE OWNERSHIP/
PROTECTIVE OWNERSHIP TO BE RETAINED
- PARTIALLY UNDER PROTECTIVE OWNERSHIP/
REMAINDER OF SITE TO BE ACQUIRED
- NOT UNDER PROTECTIVE OWNERSHIP/
ENTIRE SITE TO BE ACQUIRED
- NOT UNDER PROTECTIVE OWNERSHIP/
TO BE PRESERVED TO EXTENT PRACTICABLE
WITHOUT PROTECTIVE OWNERSHIP

- | NA-1 SITE | NA-2 SITE | NA-3 SITE | CRITICAL SPECIES HABITAT |
|-----------|-----------|-----------|--------------------------|
| ▲ | ■ | ● | ◆ |
| ▲ | ■ | ● | ◆ |
| ▲ | ■ | ● | ◆ |
| (NONE) | (NONE) | ● | ◆ |

- RECOMMENDED OWNERSHIP KEY:
- S-STATE GOVERNMENT
 - C-COUNTY GOVERNMENT
 - L-LOCAL GOVERNMENT
 - P-PRIVATE CONSERVANCY ORGANIZATION
 - N-NO PROTECTIVE OWNERSHIP RECOMMENDED

- 27-SITE REFERENCE NUMBER (SEE TABLE 40)
- 28-NEWLY IDENTIFIED SITE REFERENCE NUMBER (SEE TABLE 40)

- PRIMARY ENVIRONMENTAL CORRIDORS

Great Lakes Watershed Boundary



Source: SEWRPC.

Appendix E:

National criteria for projects and project areas.

- Protects important coastal and estuarine areas that have significant conservation, recreation, ecological, historical, or aesthetic values, or that are threatened by conversion from their natural or recreational state to other uses;
- Gives priority to lands which can be effectively managed and protected and that have significant ecological value;
- Directly advances the goals, objectives, or implementation of the state's coastal management plan or program, NERR management plans approved under the CZMA, national objectives of the CZMA, or a regional or state watershed protection plan involving coastal states with approved coastal management plans; and
- Is consistent with the state's approved coastal management program.

Appendix F:
List of advisory committee members.

Kate Angel	WCMP
Karen Bassler	Gathering Waters Conservancy
Owen Boyle	DNR, Bureau of Endangered Resources
Karen Danielsen	Great Lakes Indian Fish and Wildlife Commission
Tom Duffus	The Conservation Fund
Mike Friis	WCMP
David Hart	University of Wisconsin Sea Grant Institute
Christina Iserning	DNR, Bureau of Endangered Resources
Jim Jackley	DNR, Bureau of Facilities and Lands
Meg Kelly	The Conservation Fund
Ted Koehler	U.S. Fish and Wildlife Service
Duane Lahti	DNR (NOR)
Jason Laumann	Northwest Regional Planning Commission
Larry MacDonald	WCMC/City of Bayfield
Heidi Nelson	DNR, Bureau of Endangered Resources
Douglas Oitzinger	WCMC/City of Marinette
John Pohlman	DNR, Bureau of Facilities and Lands
Don Reed	Southeastern Wisconsin Regional Planning Commission
Patrick Robinson	University of Wisconsin-Extension
Bill Schuster	WCMC/Door County
Scott Thompson	The Nature Conservancy
Mark Walter	Bay-Lake Regional Planning Commission
Adrian Wencka, Jr.	Southeastern Wisconsin Regional Planning Commission