

Resource List

for the Conservation Master Plan

Bay Shore Blufflands State Natural Area

January 2015

Contributors:

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Supported by:
Door County Land Trust
Landscapes of Place, Town of Egg Harbor,

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Introduction:

The Bay Shore Blufflands State Natural Area covers approximately 4,200 acres located north of Sturgeon Bay in western Door County near the shoreline of Green Bay (T29N, R26E) in the Town of Egg Harbor. This resource list is intended to offer a currently complete compendium of documentation that provides relevant background on this landscape.



A resource list is not an end goal but a step toward revealing key findings. Additions and revisions to this document will be ongoing.

The data sources and data sets operate at various scales of spatial, topical, and time domains. The data and documents referenced in this document are available from the Door County Land Trust at jmilske@doorcountylandtrust.org or Landscapes of Place at dancollins@landscapesofplace.com.

Significant Maps developed under the 2014 WCMP Grant:



Bay Shore Blufflands Forested Landscape

- Door County Land Trust, Conservation Easement, or County Park
- Wetlands
- ~ Streams
- Niagara Escarpment



Bay Shore Blufflands Biological Findings 2014

- Aquatic macroinvertebrate survey
Cave-dwelling amphipod *Crangonyx* at 7 sites
- Herpetile survey
Special Concern Four-toed Salamander only finding within SNA on unprotected site. Common Mudpuppy records confirmed. Six herpetofauna species recommended as focus for monitoring; useful indicators.
- ▲ Breeding bird survey
- ▲ Migratory bird survey
More than 120 bird species noted within SNA. 13 birds are Species of Greatest Conservation Need, Special Concern, or Threatened.
- Small mammal survey
Pit traps, wildlife cameras, and trap transects
- Other surveys**
More than 190 plant species documented. Several species of Threatened and Endangered terrestrial snails in Escarpment habitat. More than 20 species of dragonflies and damselflies documented. Several bat species roosting in the SNA.

- Door County Land Trust
- Conservation Easement
- County Park
- Wetlands
- ~ Streams
- Niagara Escarpment

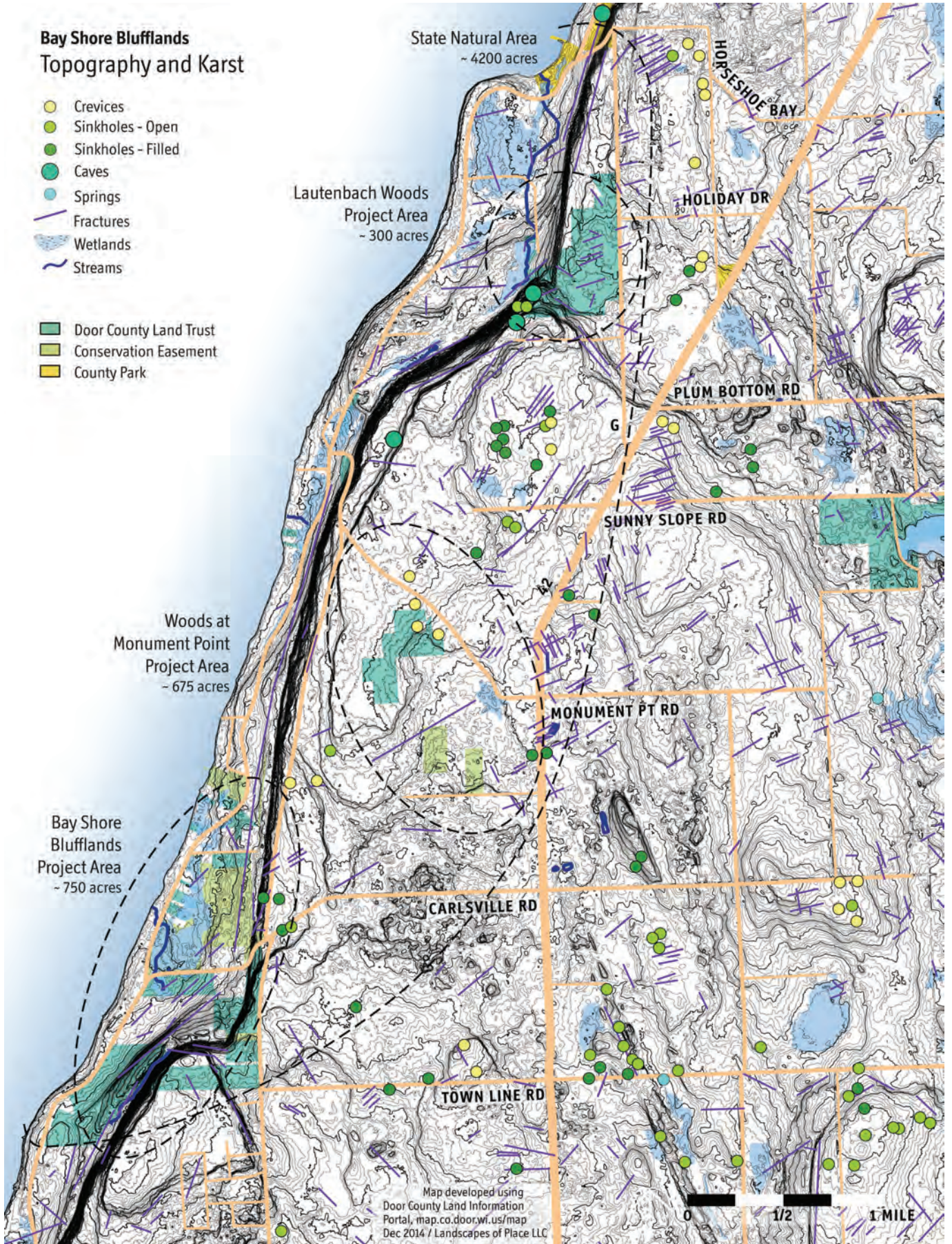


Map developed using
Door County Land Information
Portal, map.co.door.wi.us/map
Dec 2014 / Landscapes of Place LLC



Bay Shore Blufflands Topography and Karst

- Crevices
 - Sinkholes - Open
 - Sinkholes - Filled
 - Caves
 - Springs
 - Fractures
 - Wetlands
 - Streams
-
- Door County Land Trust
 - Conservation Easement
 - County Park



Bay Shore Blufflands Surface / Groundwater Connections

- Crevices
- Sinkholes - Open
- Sinkholes - Filled
- Caves
- Springs
- ▭ Wetlands
- Streams

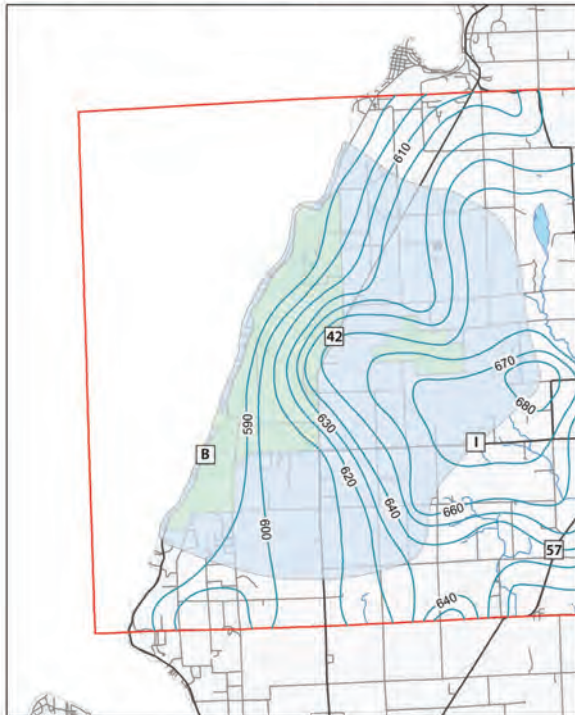
- Private Wells
- High Capacity Wells
- Groundwater Contamination Sites
- ▭ Orchard Sites
- Orchard Mixing Sites
- ▭ Gravel Pits
- Municipal Dumps

- ▭ Door County Land Trust
- ▭ Conservation Easement
- ▭ County Park



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Door County Land Information
Portal, map.co.door.wi.us/map
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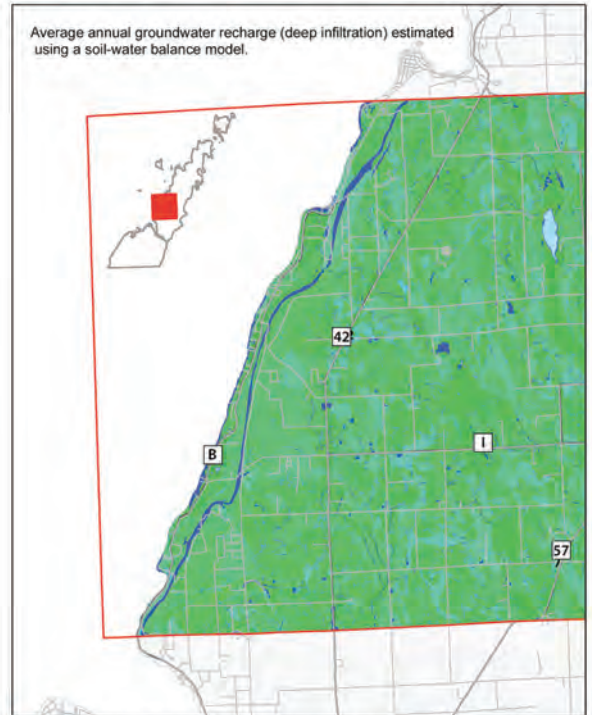
Bay Shore Blufflands
Door County, Wisconsin **Plate 1**
Water table and groundwater contributing area



— water table elevation, feet above msl
 ■ groundwater contributing area
 ■ State Natural Areas
 ■ Study Area Boundary

Scale 1:100,000
 0 1 2 Miles

Bay Shore Blufflands
Door County, Wisconsin **Plate 11**
Groundwater Recharge (WGNHS, 2008)



Average annual groundwater recharge (deep infiltration) estimated using a soil-water balance model.

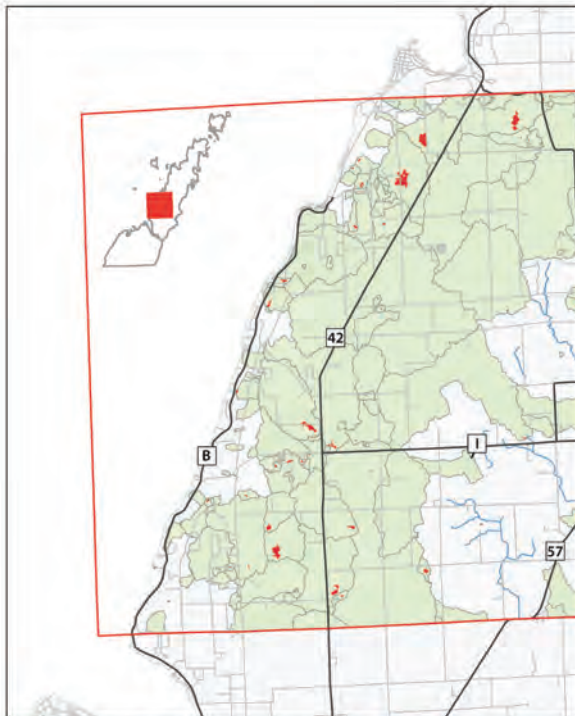
■ Study Area Boundary
 ■ Door County
 ■ Lake

Scale 1:100,000
 0 1 2 Miles

Recharge
 15 in per year
 2.5 in per year

Extension
 Wisconsin Geological and Natural History Survey
 June 2014

Bay Shore Blufflands
Door County, Wisconsin **Plate 4**
Modeled Closed Depression (WGNHS, 2014)
Derived From 10-foot DEM

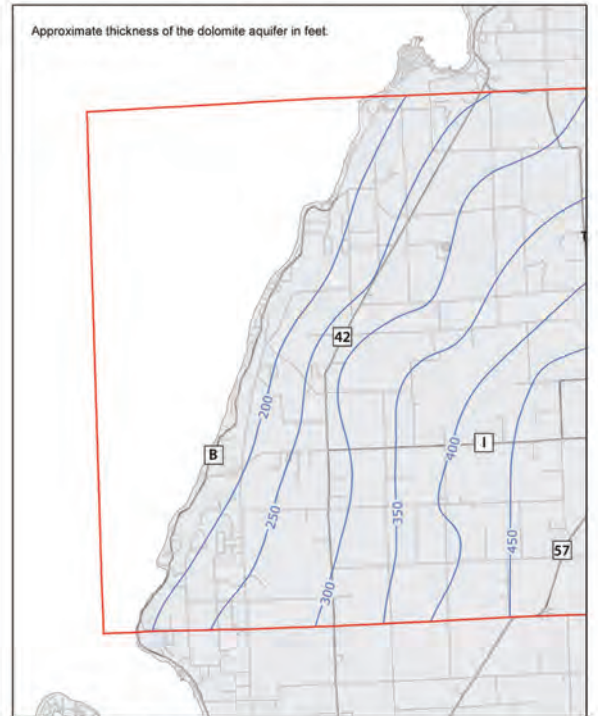


■ Study Area Boundary
 ■ Door County

Scale 1:100,000
 0 1 2 Miles

■ Closed Depressions
 ■ Contributing Areas

Bay Shore Blufflands
Door County, Wisconsin **Plate 7**
Aquifer Thickness (WGNHS, 2014)



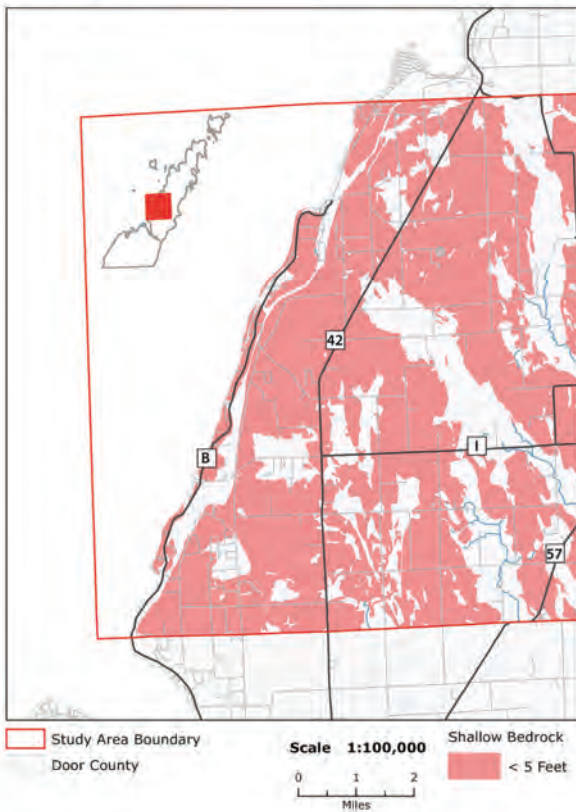
Approximate thickness of the dolomite aquifer in feet.

■ Study Area Boundary
 ■ Door County

Scale 1:100,000
 0 1 2 Miles

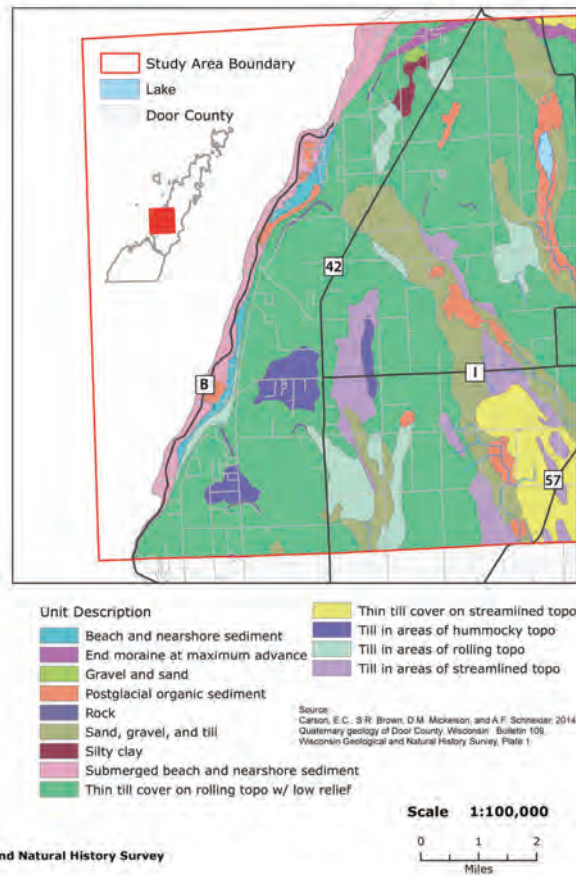
Bay Shore Blufflands
Door County, Wisconsin

Plate 12A
Shallow Bedrock (NRCS, 2014)



Bay Shore Blufflands
Door County, Wisconsin

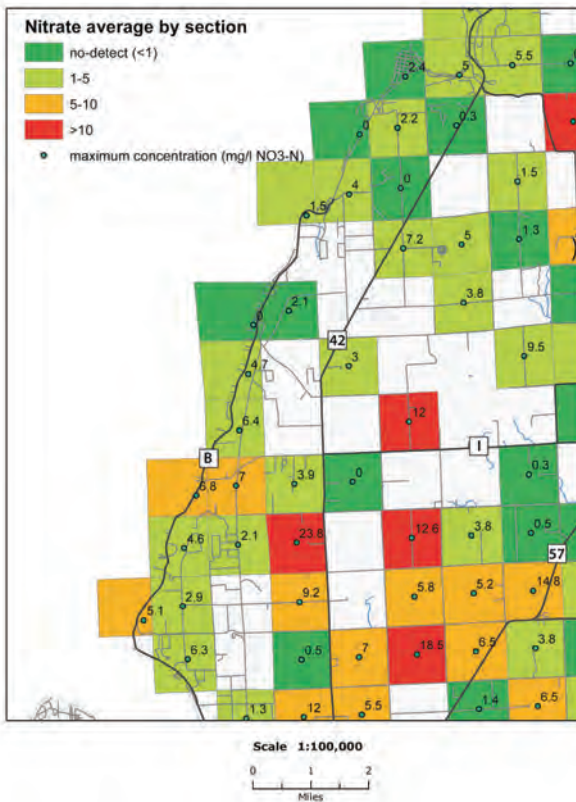
Plate 9
Surficial Geology (WGNS, 2014)



Extension
Wisconsin Geological and Natural History Survey
June 2014

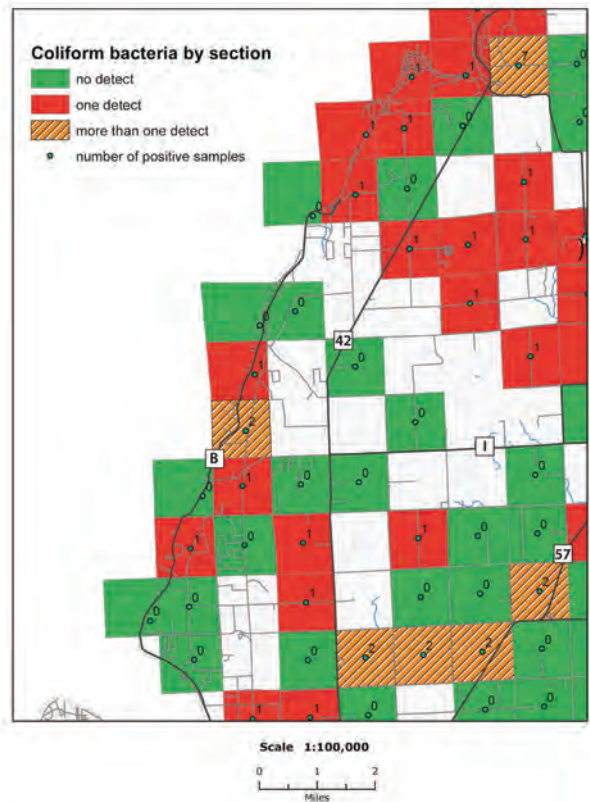
Bay Shore Blufflands
Door County, Wisconsin

Plate 13A
Groundwater Quality (UWSP, 2014)



Bay Shore Blufflands
Door County, Wisconsin

Plate 13C
Groundwater Quality (UWSP, 2014)

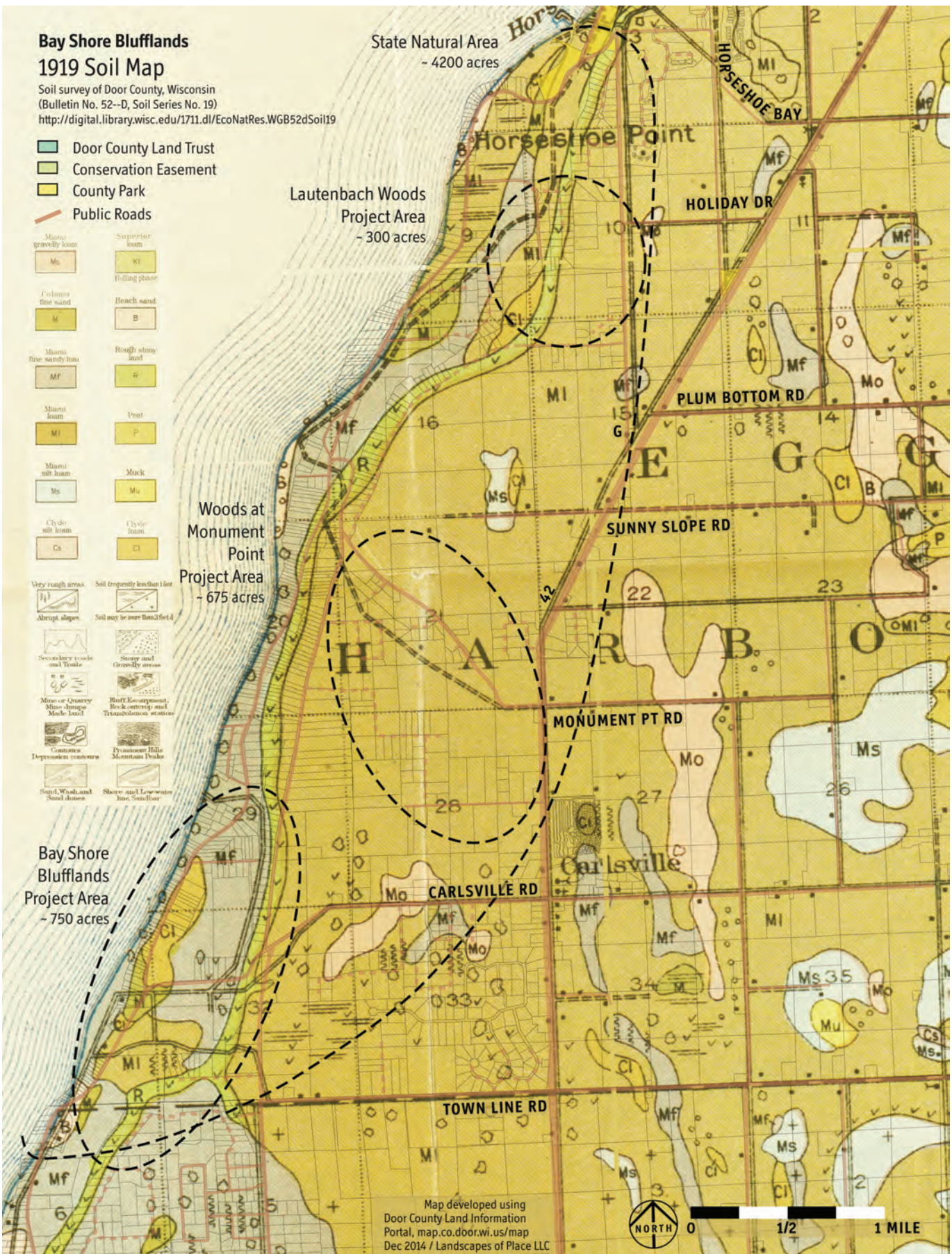


Bay Shore Blufflands 1919 Soil Map

Soil survey of Door County, Wisconsin
(Bulletin No. 52--D, Soil Series No. 19)
<http://digital.library.wisc.edu/1711.dl/EcoNatRes.WGB52dSoil19>

- Door County Land Trust
- Conservation Easement
- County Park
- Public Roads

Miami gravelly loam Mo	Superior loam Kl
Columbia fine sand M	Beach sand B
Miami fine sandy loam Mf	Rough stony loam R
Miami loam Mi	Peat P
Miami silt loam Ms	Muck Mu
Clyde silt loam Cs	Clyde loam Cl
Very rough areas Abrupt slopes	Silt deposits less than 1 in Silt may be more than 2 feet
Secondary roads and trails	Stony and gravelly areas
Mine or Quarry Muck dump Muck land	Ruff Encampment, Rock outcrop and Transportation routes
Contours	Pymont Hills Mountain Peak
Depression contours	Sand, Wash and Sand dunes
	Shore and Lowwater line, Sandbar



Map developed using
Door County Land Information
Portal, map.co.door.wi.us/map
Dec 2014 / Landscapes of Place LLC



Bay Shore Blufflands 1836 Survey Trees

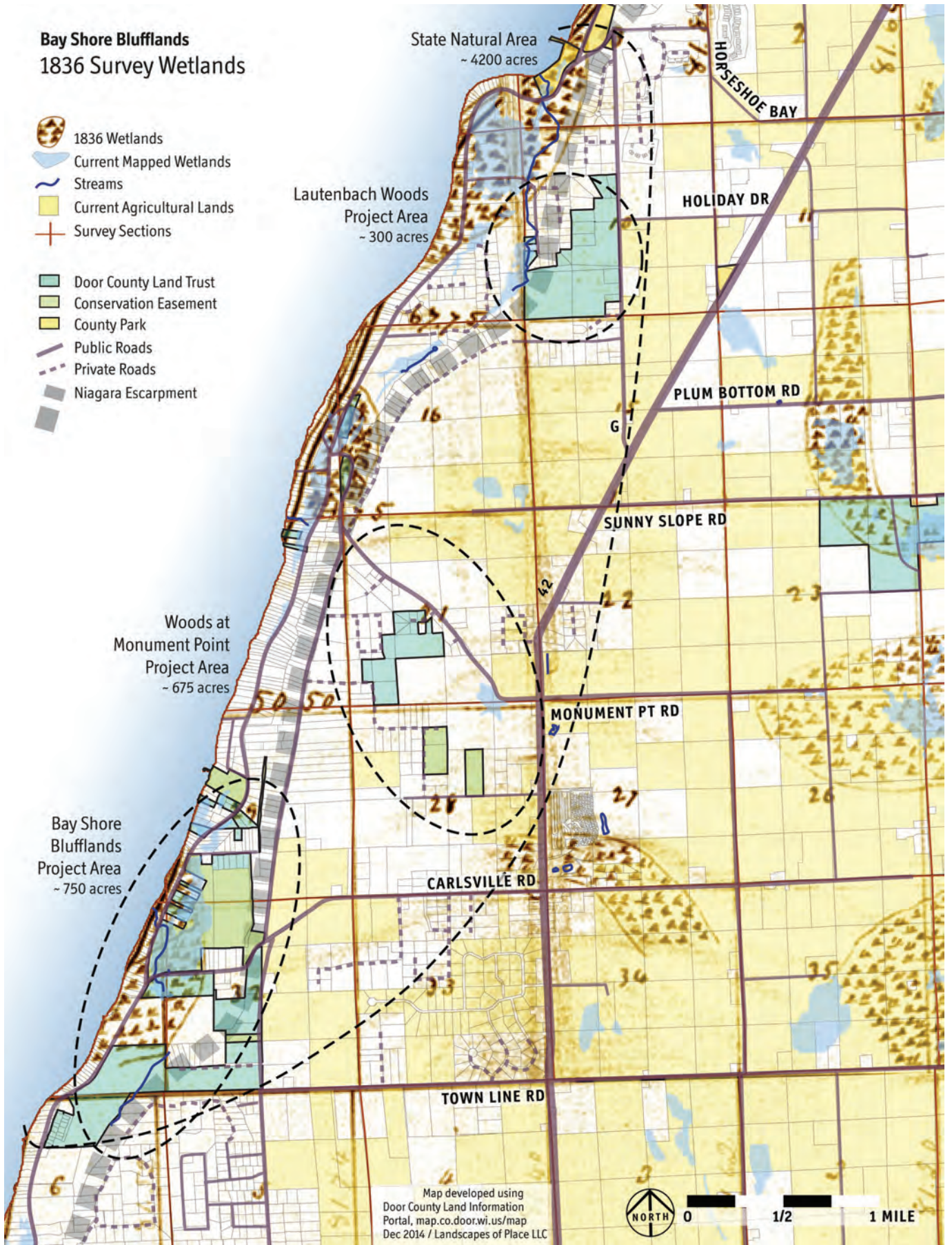
- White Pine
- Red Pine
- Pine
- Fir
- Spruce
- Hemlock
- Cedar
- Tamarack
- Birch
- Aspen
- Cottonwood
- Willow
- Elm
- White Ash
- Black Ash
- Basswood
- Maple
- Sugar Maple
- Beech
- Ironwood
- Butternut
- White Oak
- Bur Oak
- Black Oak
- Red Oak
- < 16" diameter
- >= 16" diameter
- Swamp Conifers Zone (Finley 1976)
- Door County Land Trust
- Conservation Easement
- County Park
- Public Roads
- - - Private Roads
- DCLT Preserve Trails
- Wetlands
- ~ Streams
- Niagara Escarpment



Map developed using
Door County Land Information
Portal, map.co.door.wi.us/map
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Bay Shore Blufflands 1836 Survey Wetlands

-  1836 Wetlands
-  Current Mapped Wetlands
-  Streams
-  Current Agricultural Lands
-  Survey Sections
-  Door County Land Trust
-  Conservation Easement
-  County Park
-  Public Roads
-  Private Roads
-  Niagara Escarpment

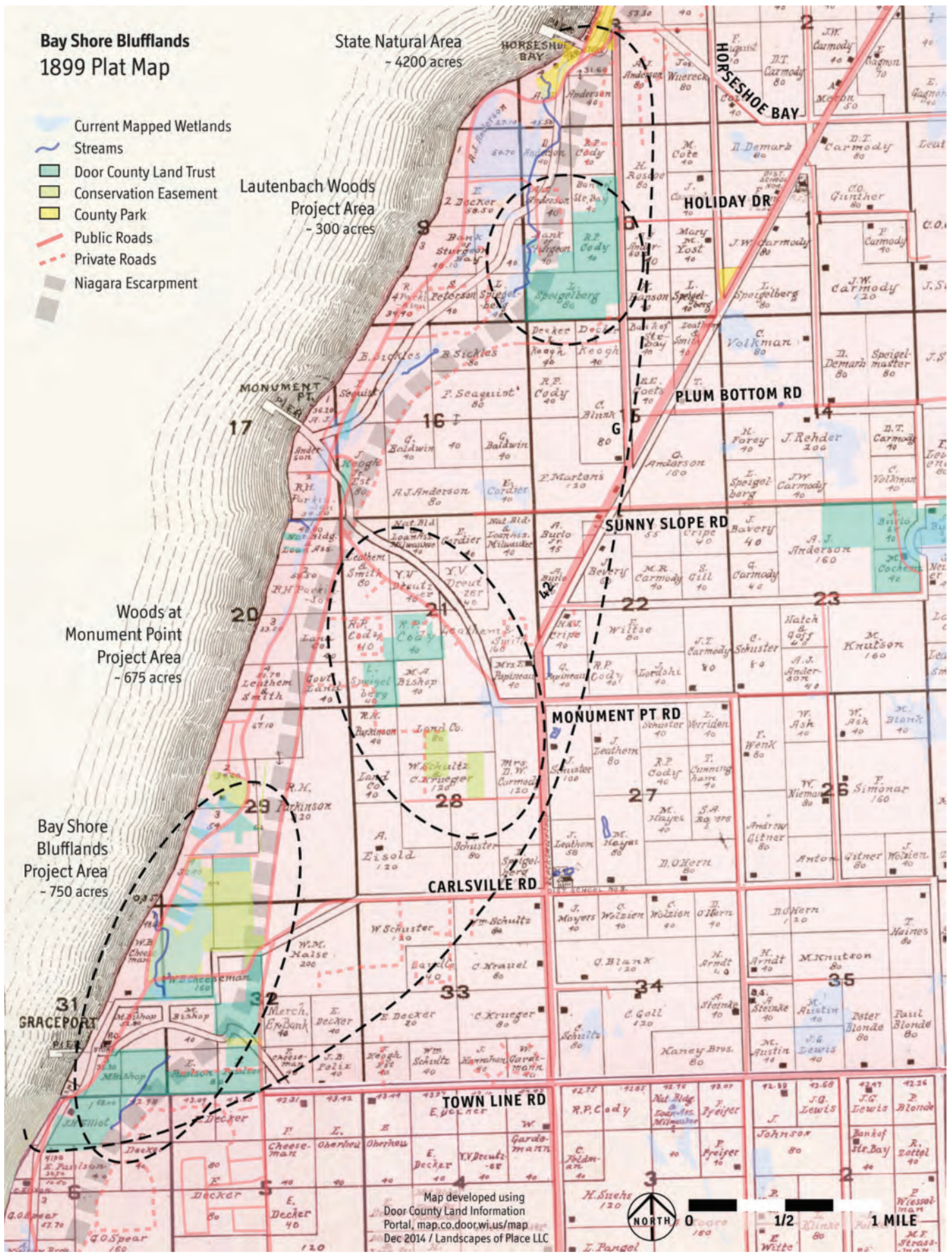


Map developed using
Door County Land Information
Portal, map.co.door.wi.us/map
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Bay Shore Blufflands 1899 Plat Map

-  Current Mapped Wetlands
-  Streams
-  Door County Land Trust
-  Conservation Easement
-  County Park
-  Public Roads
-  Private Roads
-  Niagara Escarpment



Map developed using
Door County Land Information
Portal, map.co.door.wi.us/map
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Bay Shore Blufflands
Supported Land Stewardship Work
(in part)

-  Door Stewardship Alliance (2002-present)
-  NRDA Tree Planting (2005)
-  Knowles-Nelson Stewardship (2007-2009)
-  Landowner Incentive Program (2007-2008)
-  State Wildlife Grant (2011-2013)
-  Bay Shore Property Owners 50/50 Match Program
-  Weed Management Area Forest Grant Program (2014)

-  Door County Land Trust
-  Conservation Easement
-  County Park
-  Wetlands
-  Streams
-  Public Roads
-  Private Roads
-  Niagara Escarpment

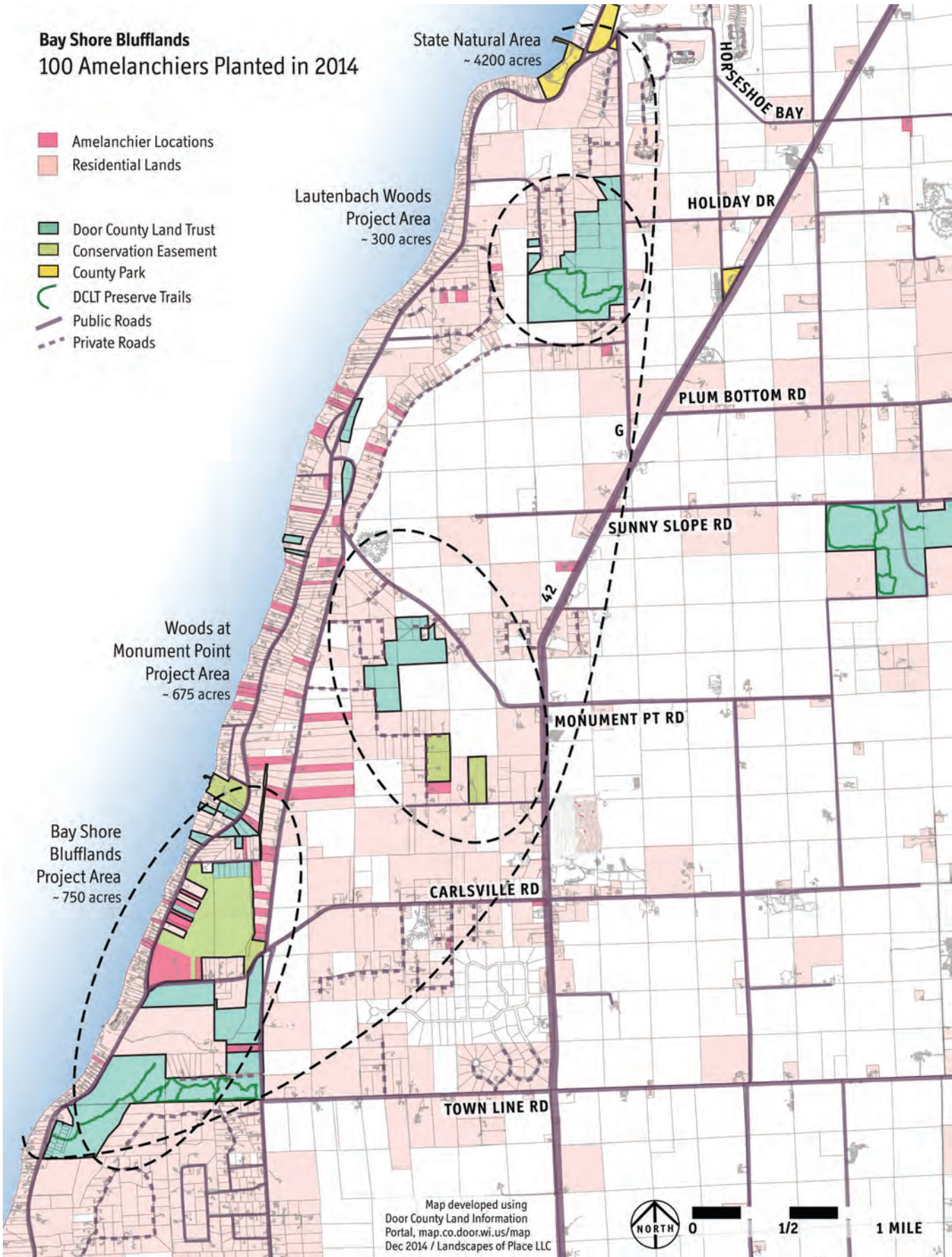


Map developed using
Door County Land Information
Portal, map.co.door.wi.us/map
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Bay Shore Blufflands
100 Amelanchiers Planted in 2014

- Amelanchier Locations
- Residential Lands
- Door County Land Trust
- Conservation Easement
- County Park
- DCLT Preserve Trails
- Public Roads
- Private Roads

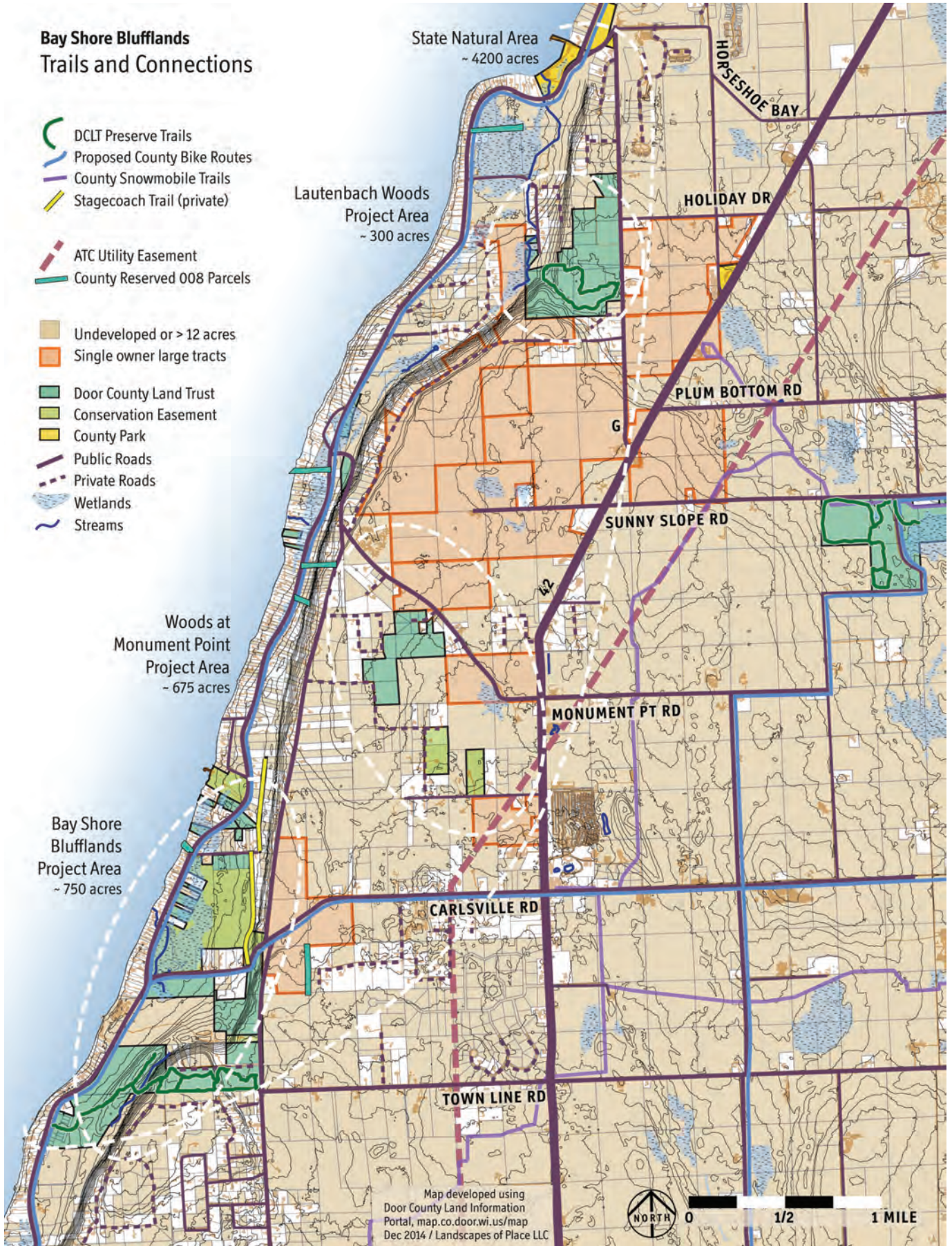


Map developed using
 Door County Land Information
 Portal, map.co.door.wi.us/map
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Bay Shore Blufflands Trails and Connections

-  DCLT Preserve Trails
-  Proposed County Bike Routes
-  County Snowmobile Trails
-  Stagecoach Trail (private)
-  ATC Utility Easement
-  County Reserved 008 Parcels
-  Undeveloped or > 12 acres
-  Single owner large tracts
-  Door County Land Trust
-  Conservation Easement
-  County Park
-  Public Roads
-  Private Roads
-  Wetlands
-  Streams



Bay Shore Blufflands Locally Owned Lands

- Owner-Occupied Fulltime (Improved, receives tax bill)
- Unimproved and Locally Owned (54235, 54209)

All parcels evaluated:

4110	acres	
664	parcels	
382	owners	

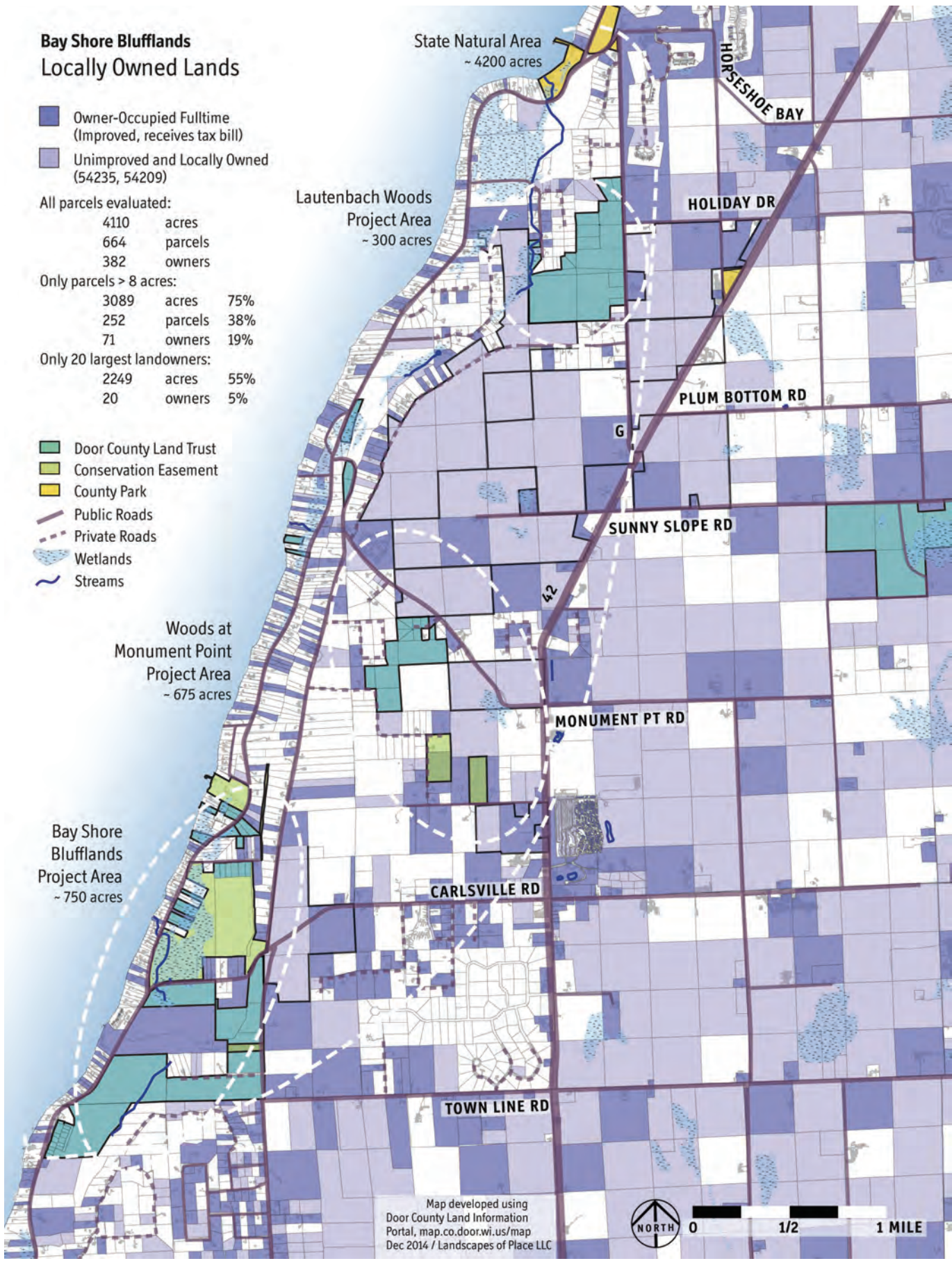
Only parcels > 8 acres:

3089	acres	75%
252	parcels	38%
71	owners	19%

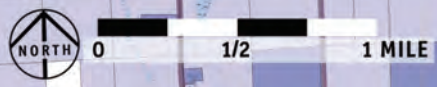
Only 20 largest landowners:

2249	acres	55%
20	owners	5%

- Door County Land Trust
- Conservation Easement
- County Park
- Public Roads
- Private Roads
- Wetlands
- Streams



Map developed using
Door County Land Information
Portal, map.co.door.wi.us/map
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Bay Shore Blufflands Working Lands

- Agriculture Land Use
- Agriculture/Forest Land Use
- Forest Land Use
- Managed Forest Law - Open
- Managed Forest Law - Closed
- Commercial Land Use
- Manufacturing Land Use

All parcels evaluated:

4110	acres	
664	parcels	
382	owners	

Only parcels > 8 acres:

3089	acres	75%
252	parcels	38%
71	owners	19%

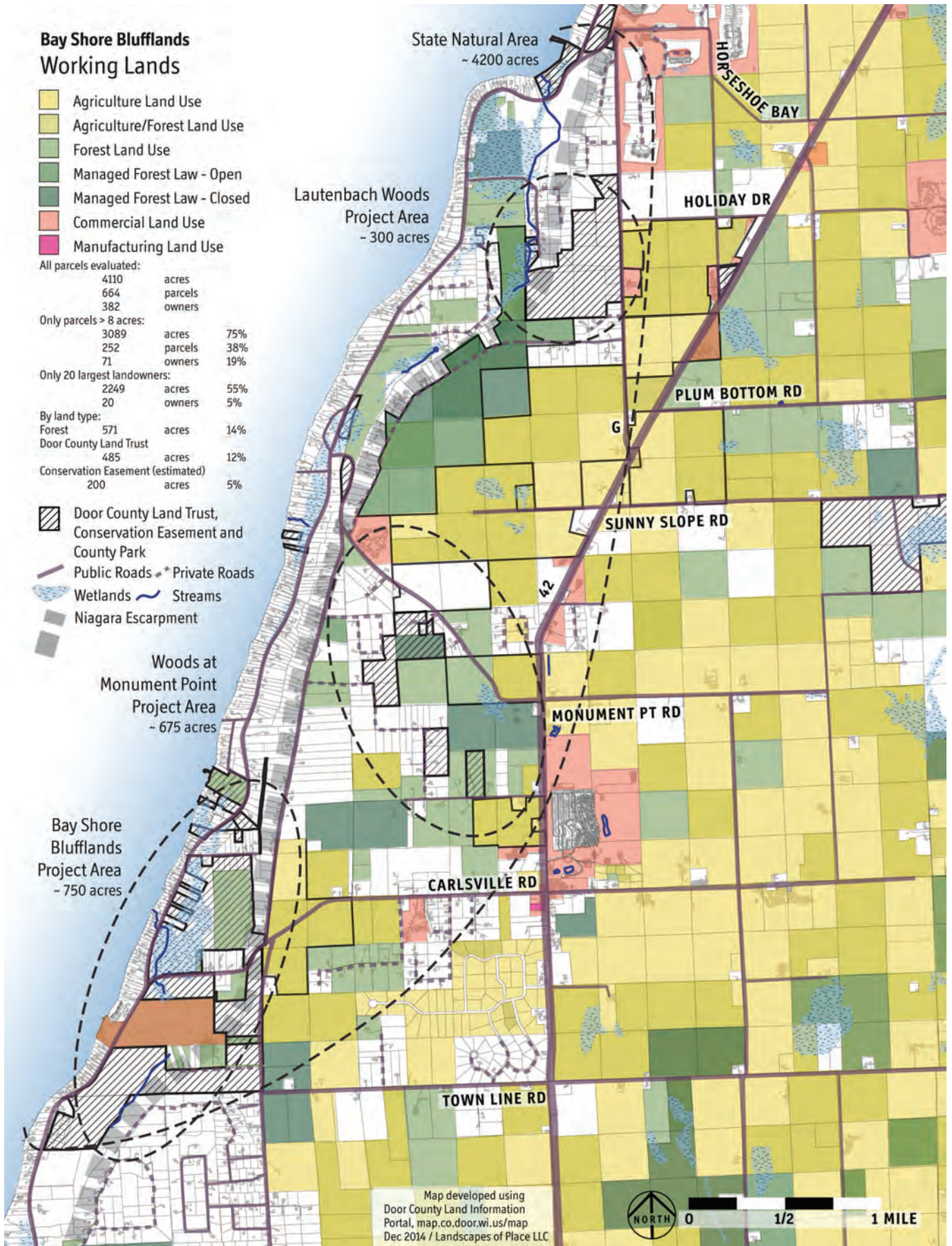
Only 20 largest landowners:

2249	acres	55%
20	owners	5%

By land type:

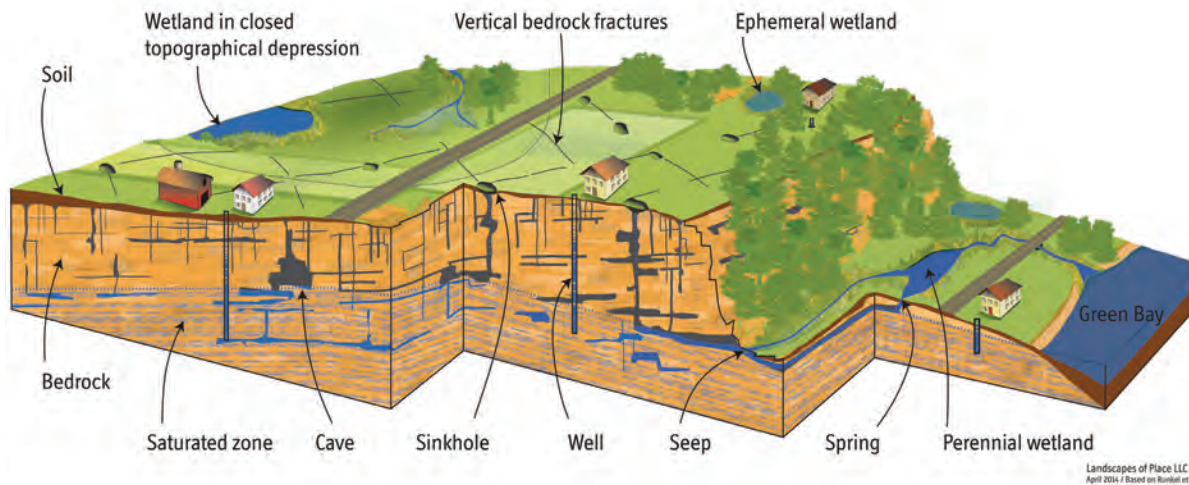
Forest	571	acres	14%
Door County Land Trust	485	acres	12%
Conservation Easement (estimated)	200	acres	5%

- Door County Land Trust, Conservation Easement and County Park
- Public Roads Private Roads
- Wetlands Streams
- Niagara Escarpment



Map developed using
Door County Land Information
Portal, map.co.door.wi.us/map
Dec 2014 / Landscapes of Place LLC





Karst Landscape often found in Door County
 (Illustration developed under the WCMP 2014 grant).

Reports and Documents:

- Aiken, Roy, editor, et al. 2003. A Guide to Significant Wildlife Habitat and Natural Areas of Door County, WI. WDNR
- Alexander, Calvin E., Jeffrey A. Green and Scott C. Alexander. 2008. Plum Bottom Closed Depression Groundwater Trace Final Report
- Anderson, Craig, et al. 2002. The Niagara Escarpment Inventory Findings 1999-2001 and Considerations for Management Wisconsin Department of Natural Resources
- Aten, Nancy 2014. Bay Shore Blufflands plant inventory, unpublished.
- Bay-Lake Regional Planning Commission. 2005 Door County Environmental Corridors, A Coastal Resource Identification Project
- Bay-Lake Regional Planning Commission. 2012 Environmental Corridors of the Bay-Lake Region, Covering Northeastern Wisconsin
- Borchardt, Mark A., Kenneth R. Bradbury, E. Calvin Alexander Jr., et al. 2011. Norovirus Outbreak Caused by a New Septic System in a Dolomite Aquifer. Ground Water 49 (1) p.85-97, NGWA.org
- Bradbury, Ken 2014. Groundwater Flow Model Construction for the Bay Shore Blufflands Project, Wisconsin Geological and Natural History Survey, University of Wisconsin-Extension
- Casper, Gary and Ryne Rutherford 2014 Bay Shore Blufflands SNA Pilot Herptile Assessment. Great Lakes Ecological Services LLC.
- Cobb, Michael and Kenneth Bradbury. 2008. Delineation of areas contributing groundwater to springs and wetlands supporting the Hine's Emerald Dragonfly, Door County, WI Wisconsin Geological and Natural History Survey, University of Wisconsin-Extension

Door County Soil and Water Conservation Department, 2008, Door County beach contamination source identification final report 2006–2007

Door County Soil and Water Conservation Department. 2000. Surface Water Inventory of Door County.

Door County Soil and Water Conservation Department. 2011. Door County Land & Water Resource Management Plan 2011-2020.

Door County. 2009. Door County Comprehensive Plan 2030

Dweller, Howard and Paul Stoelting, 1986 Wisconsin's Door Peninsula and its Geomorphology, AGS Collection, UW-Milwaukee

Erb, Kevin and Stieglitz, Ron, Editors. 2007. Final Report of the Northeast Wisconsin Karst Task Force

Grimm, Mike 2014. Migratory Bird Survey Bay Shore Blufflands Landscape Door County, WI

Grimm, Mike 2003. Site Conservation Plan for the Carlsville [Bay Shore] Bluff Site, Wisconsin Chapter of The Nature Conservancy, Sturgeon Bay.

Grimm, Mike. 2000. A land conservation plan for the Carlsville Bluffs Master's Thesis, University of Wisconsin.

Haight, Tom. 2010. Door County Land Information Modernization Plan. Door County Land Information Office

Johnson, S.B. & R. D. Stieglitz. 1990. Karst features of a glaciated dolostone peninsula, Door County, Wisconsin: *Geomorphology*, 4:437-454.

Juckem, Paul F., et al. 2012. Evaluation of Potential Sources and Transport Mechanisms of Fecal Indicator Bacteria to Beach Water, Murphy Park Beach, Door County, Wisconsin USGS

Link, Ernest, Steven Elmer and Sidney Vanderveen. 1979. Soil Survey of Door County, Wisconsin. USDA

Nekola, Jeffrey C. 2003. Terrestrial gastropod fauna of Northeastern Wisconsin and the Southern Upper Peninsula of Michigan. *American Malacological Bulletin* 18 (1/2)

Quamme, Kurtis. 2014 Quantitative Macroinvertebrate Survey of the Door County Land Trust. UW-Milwaukee.

Regnier, Paul 2014. Bay Shore Blufflands Natural Area Bird Survey Project June-July 2014. Door County Nature and Travel LLC.

Reis, Anne, Jennifer Callaghan, Delainey Loedding, Tim Vargo 2014. Small Mammal Monitoring Survey & Recommendations, Urban Ecology Center.

Schneider, Allan F. Editor. 1993. Pleistocene Geomorphology and Stratigraphy of the Door Peninsula, Wisconsin. *Midwest Friends of the Pleistocene 40th Annual Meeting*

Town of Egg Harbor. 2009. Town of Egg Harbor Door County, Wisconsin 20-Year Comprehensive Plan. BayLake Regional Planning Commission

US Environmental Protection Agency 2012. Lake Michigan Lakewide Management Plan

Walter, Mark. 2010. Niagara Escarpment Overlay Zoning Guide. Bay-Lake Regional Planning Commission.

Wisconsin Department of Natural Resources. 2011. Wisconsin's Lake Michigan Water Trail Project, Inventory and Analysis of Access Sites in Support of a Lake Michigan Water Trail

Wisconsin Department of Natural Resources. 2005 Wisconsin Wildlife Action Plan (2005-2015)

Wisconsin Department of Natural Resources. 2006. Door County Comprehensive Forest Plan

Wisconsin Department of Natural Resources. date? Wisconsin's Strategy for Wildlife Species of Greatest Conservation Need

Wisconsin Wetlands Association. 2012. Land Use and Wetlands: Zoning Opportunities to Improve Wetlands Protection

Zercher, Deanna. 2001. Hine's Emerald Dragonfly Recovery Plan, USFWS

Zipp, K., Lewis, D., Provencher, B. 2011. Does open space conservation increase neighboring development, A study applied to Door County

Collections:

Museum Collections:

Milwaukee Public Museum, Milwaukee WI

Richter Museum, University of Wisconsin Green Bay, Thomas Erdman, Curator

Neville Public Museum, Green Bay, WI

Herbaria:

University of Wisconsin-Stevens Point Freckmann Herbarium,

<http://wisplants.uwsp.edu/>

University of Wisconsin-Green Bay, Cofrin Center for Biodiversity, Herbarium,

<http://www.uwgb.edu/biodiversity/herbarium/>

University of Wisconsin Herbarium,

<http://www.botany.wisc.edu/herbarium/>

Inventory Databases / Systems:

Wisconsin Department of Natural Resources, Natural Heritage Inventory

Citizen based monitoring <http://wiatri.net/cbm/invmon/>

Herp Net <http://www.herpnet.org/>

Vert Net <http://www.vertnet.org/>

ebird <http://www.ebird.org/>

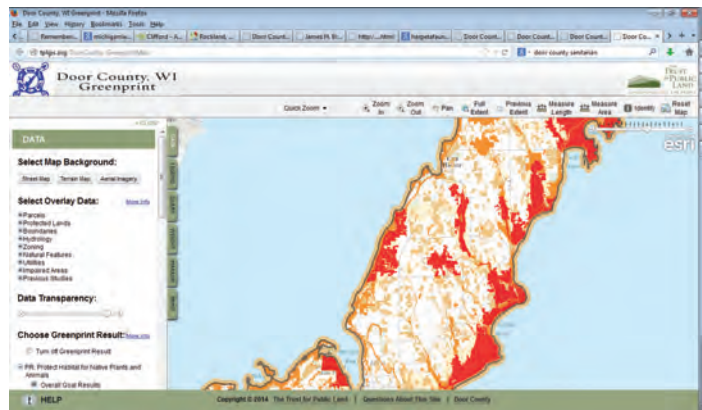
Dragonfly <http://wiatri.net/inventory/odonata/Checklist/>

Nature Observations <http://inaturalist.org/>

GIS Web-based Mapping:

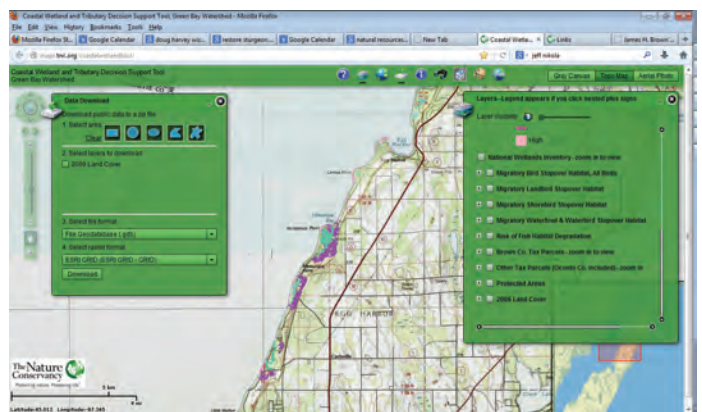
Door County Greenprint

http://tplgis.org/DoorCounty_Greenprint/



Coastal Wetlands Decision Support Tool The Nature Conservancy

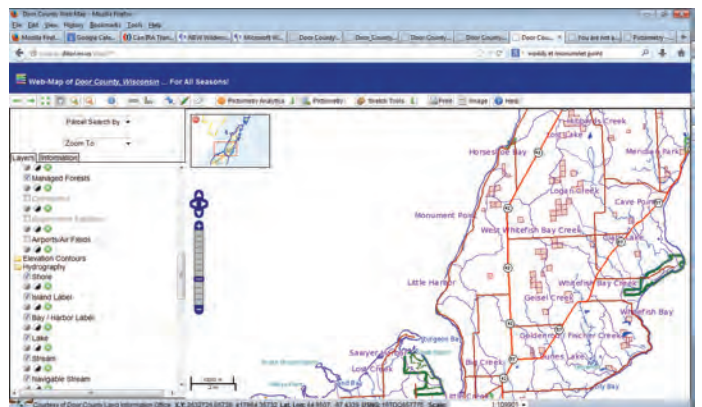
<http://maps.tnc.org/coastalwetlandtool/>



Door Count GIS – LIO

<http://map.co.door.wi.us/map/>

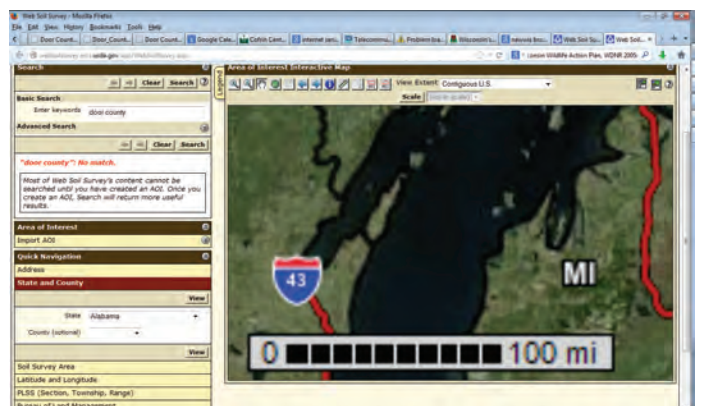
Notes: Contains layers for: watershed, forest management parcels, orchards and orchard mixing sites



USDA Natural Resources Conservation Service (NRCS) Web Soil Survey

<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

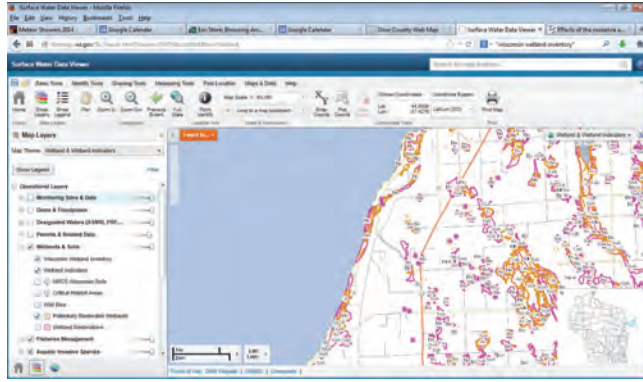
Detailed Soil Surveys



Wisconsin Wetland Inventory - WDNR

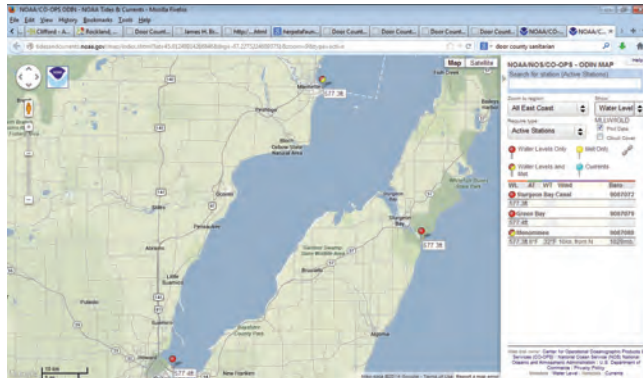
<http://dnrmaps.wi.gov/SL/Viewer.html?Viewer=SWDV&runWorkflow=Wetland>

Notes: Layers include locations of wetland / waterway alterations



NOAA; Green Bay and Lake Michigan real-time levels found at:

<http://tidesandcurrents.noaa.gov/map/index.shtml?lat=45.0&lng=-87.2&zoom=9&type=active>



Landscapes of Place Bay Shore Blufflands reference page found at:

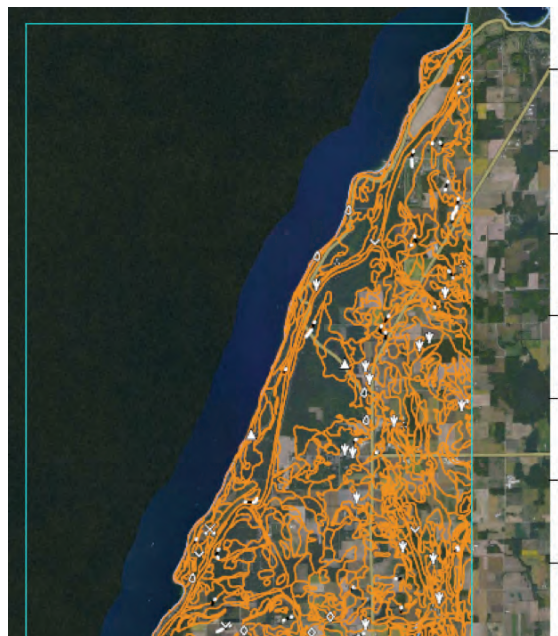
<http://www.landscapesofplace.com/bayshoreblufflands.html>



Detailed Soil Surveys and related gis located data found at:

<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

Make sure you select an AOI (Area of Interest) to activate tool sets.



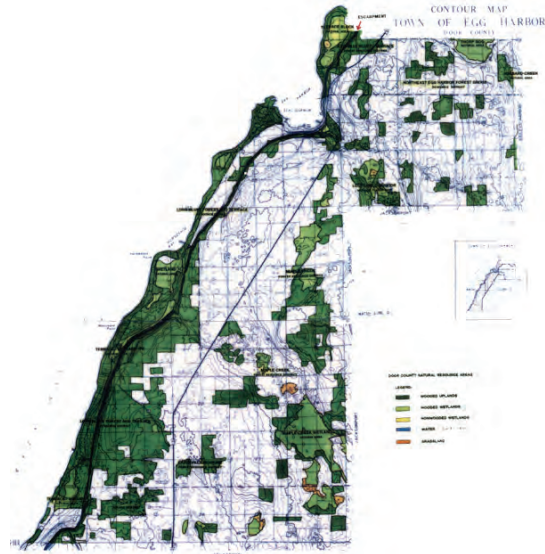
Historic Maps (noteworthy examples):

Zimmerman maps

Dr. Zimmerman, in his work for the Door County Land Use Plan, provided ideas which would be effective in ensuring that future generations would be able to enjoy the same natural surroundings that we are working to preserve today.

This resource is found at the DCEC website :

<http://www.dcec-wi.org/zimmerman/index.html>



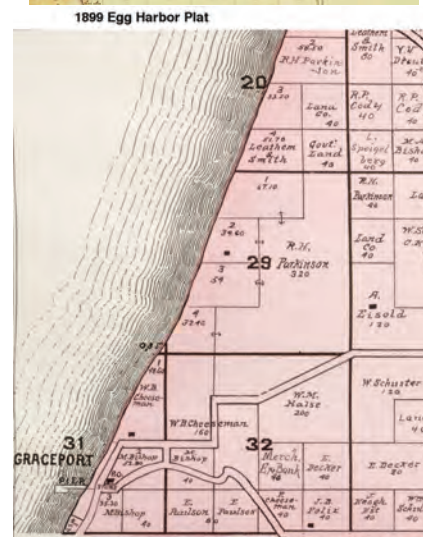
GLO Original Survey Maps and field notes for Door County (1834 – 1836). The field notes and plat maps of the public land survey of Wisconsin are a valuable resource for original land survey information, as well as for understanding Wisconsin's landscape history. Found at:

<http://digicoll.library.wisc.edu/SurveyNotes/SurveyNotesHome.html>



Plat Maps of Door County for the years of 1899, 1900, 1914 and 1923. Plat maps found at:

<http://uwdc.library.wisc.edu/collections/WI/NicoletLocHist>



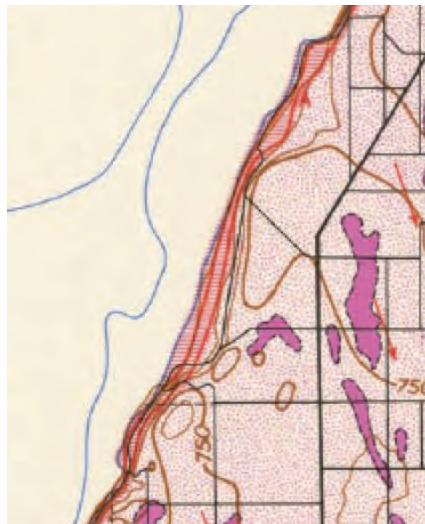
Wisconsin Historical Aerial Images 1937, 195x Aerial Photos of Wisconsin from the State Cartographers Office, and many other mapping resources found at:

<http://www.sco.wisc.edu/>



Pleistocene Geology of the Door Peninsula and many other mapping and gis resources found at the Wisconsin Geological and Natural History Survey:

<http://wgnhs.uwex.edu/pubs/m029/>



Local Grant Applications in the region:

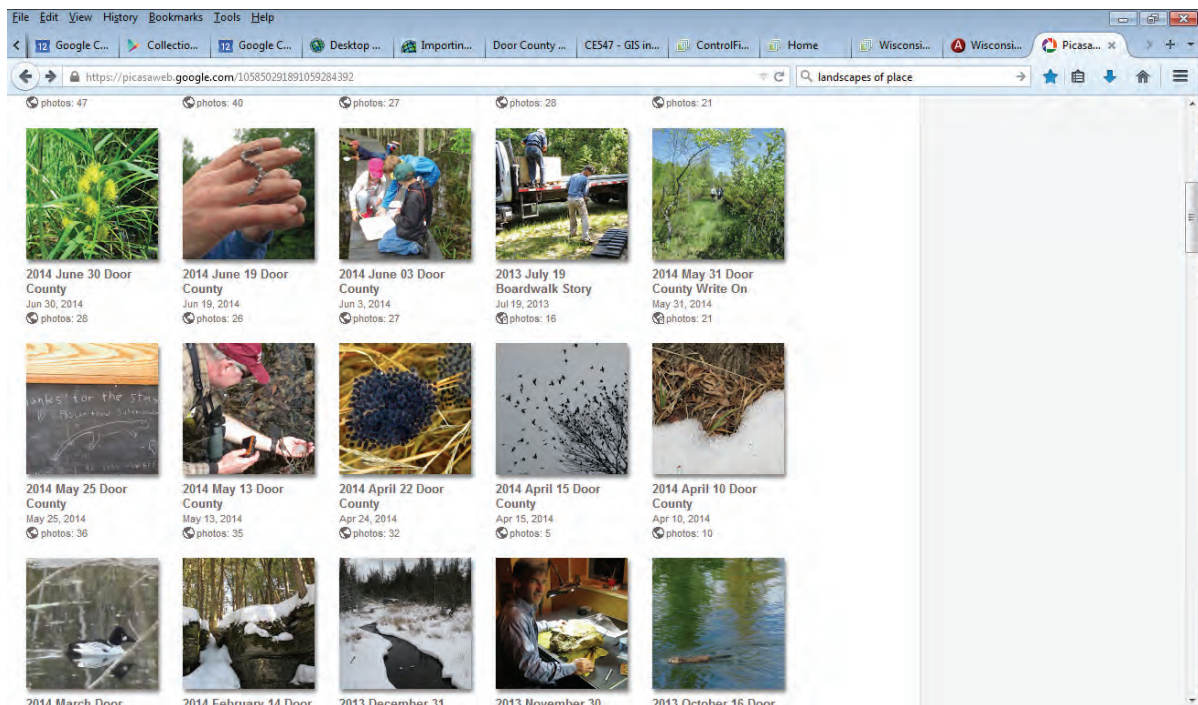
- **WDNR Landowner Incentive Program (LIP) 2007-2008 Aten and 2008-2009 DCLT**
 - **NRDA 2005 through TNC**
 - **WDNR State Wildlife Grant (SWG) 2009-2011 Aten**
 - **Knowles-Nelson Stewardship Grant 2007-2008**
 - **Great Lakes Restoration Initiative (GLRI)**
 - **Wisconsin Coastal Management Program (WCMP) planning grant 2013-2014**
 - **Weed Management Area Private Forest Grant Program (WMA-PFGP) 2013-2014**
- * totaling funds applied in the SNA not yet calculated

Grant Reports relating to local grants:

Milske, Jodi. 2006(?) Bay Shore Blufflands Final Report GLRI. Door County Land Trust
Milske, Jodi. 2007 Bay Shore Blufflands Final Report NRDA. Door County Land Trust
Milske, Jodi. 2009 Bay Shore Blufflands Final and Interim Reports LIP. Door County Land Trust
Collins, Daniel and Nancy Aten. 2009. Bay Shore Blufflands Final and Interim Report LIP.
Landscapes of Place
Collins, Daniel and Nancy Aten. 2011. Bay Shore Blufflands Final and Interim Reports SWG.
Landscapes of Place
Collins, Daniel and Nancy Aten. 2013-2014. Bay Shore Blufflands Final Report SWG.
Landscapes of Place

Photo Documentation:

<https://picasaweb.google.com/atencollins>



Partners supporting this landscape:

County of Door and Its Departments: Planning, Soil and The Nature Conservancy (TNC)
Water Conservation (SWCD), Sanitarian, etc.

Door County Land Trust (DCLT)

Town of Egg Harbor

Wisconsin Department of Natural Resources (WDNR)

Niagara Escarpment Resource Network (NERN)

US Fish and Wildlife Service (USFWS)

Bay Shore Property Owners Association (BSPOA)

Door County Invasive Species Team (DCIST)

Door Stewardship Alliance (DSA)

Door County Environmental Council (DCEC)

Door County Green Fund

Appendix A: Excerpt from the Site Conservation Plan for the Carlsville [Bay Shore] Bluff Site, Wisconsin Chapter, The Nature Conservancy, 2000:

The Bay Shore Bluff Lands cover approximately 3,250 acres located north of Sturgeon Bay in western Door County near the shoreline of Green Bay (T29N, R26E) in the Town of Egg Harbor. As this report represents general areas of concern, exact locations of boundary lines have not been designated.

GENERAL SITE DESCRIPTION:

The Bay Shore Bluff Lands extend from an area south of Carlsville Road along the western shore of the peninsula north to Horseshoe Point. The Niagara Escarpment is an important topographic feature of this natural area; karst features such as caves and sinkholes are prevalent throughout this region.

ECOLOGICAL SIGNIFICANCE:

Several groups have recognized the Bay Shore Bluff Lands (Carlsville Bluff) as a significant natural habitat in the last 20 years. In 1976, the Door County Natural Heritage Program ranked the area as an important scenic wetland and forest resource area. In this study the forest was ranked 5th among 15 Door County areas. Again in 1976, the Natural Areas Inventory of Wisconsin's Great Lakes coastline listed the Carlsville Bluff as a significant natural area. In 1977, the Wisconsin Coastal Atlas rated the area as high quality wildlife habitat. In 1981, a U.S. Fish and Wildlife conducted inventory of the Great Lakes coastal wetlands identified and classified the forested wetlands of this site. In 1988, Dr. Jim Zimmerman in his natural features inventory of Door County concluded the Carlsville forest, escarpment, and terraced wetlands were deserving of WDNR Natural Area status. A 124-acre tract of these bluff lands was recently purchased by the Door County Land Trust and was designated as a State Natural Area in 2002, (see Appendix "D" for further information). The site's natural diversity with habitat types ranging from open cliff faces to hardwood swamps to dry mesic forest supports an impressive number of rare or uncommon species. At least a dozen orchid species, a number of rare land snails, and many birds requiring large forests are found at this site. Over a hundred blooming and numerous non-blooming plant species have been counted in the recent past. As the site rests along the west exposure of the Niagara Escarpment, karst features are abundant. These features often allow rapid movement of surface water into the bedrock, which is why this site is also important for the protection of ground water resources of the region. Rare animals, invertebrates and plants have been inventoried in this area, including a large population of state threatened Ram's head orchid. Other plants worth noting are the long-spurred violet (*Viola rostrata*) and allegheny vine (*Adlumia fungosa*), both are listed as state special concern. For additional information refer to the Natural Communities Cross-Reference, Appendix "A" and Wisconsin's Natural Heritage Inventory Listing, Appendix "B".

NOTEWORTHY CULTURAL AND HISTORICAL FEATURES:

Like many of the coastal communities in the late 1800's this area was a shipping point for lumber and shingle products. Three major piers were in use between Carlsville Road at the southern end of the site and what is now Murphy Park at the northern end. By 1937 the southern and northern piers were gone. The earliest aerial photos of the site, June 1938, show a solid forest block along the shore of Green Bay from Carlsville Road to Murphy Park. The configuration of this forest coverage is generally similar to present coverage. Agricultural land use, at least row cropping and haying, appears to have always been confined to land above the bluff in the deeper clay-loam soils. However, aerial photos in 1961 show explosive growth of shoreline homes and cottages since 1938. The next aerial photos were taken in 1974 and indicate a continual increase in home building along the shore and road building activity above the bluff areas. Some of the previously tilled agricultural fields have been abandoned and "old field" succession has begun.

SITE FEATURES:

Bay Shore Bluff Lands & Woods

The Bay Shore Bluff Lands are located from Horseshoe Point south to Carlsville Road. The Bay Shore Bluff Lands' escarpment is one section of the Niagara Escarpment and is approximately 6 miles in length.

- Upland sand ridges and lowland forest swale features sustain a diversity of woodland plant species. Several forest types exist both above and below the escarpment. Many seeps are found along the base of much of the talus slopes. Along the escarpment face the type and amount of rock exposure is highly variable (Grimm 2001).
- The bluff lands and woods are mostly within the Town of Egg Harbor, with a small portion in the Town of Seavastopol. A county zoning map exists for Egg Harbor, however, zoning is not in effect. An independent Town Board using its own sub-division ordinance governs the Town. The Egg Harbor Town Board enacted a moratorium on commercial development from January 1998 to March 1999. Under the Town Plan wetlands, forests, the Niagara Escarpment and open space should be protected. The Nature Conservancy is working with the town to identify high quality natural resources in Egg Harbor.
- Land use surrounding this area is predominantly that of cropland, woodlots, idle cropland, residential lots, orchards, and recreational land under private ownership.
- Soils are shallow to deep, well drained, and nearly level to moderately steep. A sandy loam or loam subsoil overlays sandy loam or fine sandy loam till or dolostone bedrock (USDA SCS 1978).
- The area including the base of the escarpment is characterized by seeps. Across Carlsville road to the north lies springs and ponds that serve as breeding grounds for northern pike (*Esox lucius*).
- Herbaceous plants include wood betony (*Pedicularis canadensis*), American hog-peanut (*Amphicarpa bracteata*), sweet cicely (*Osmorhiza claytonii*), black snakeroot (*Sanicula marilandica*), wood anemone (*Anemone quinquefolia*), white baneberry (*Actaea pachypoda*), red baneberry (*Actaea rubra*), and zig-zag goldenrod (*Solidago flexicaulis*), Canada Mayflower (*Maianthemum canadense*), rosy twisted-stalk (*Streptopus roseus*), large-leaved aster (*Aster macrophyllus*), New Jersey tea (*Ceanothus americanus*), rattlesnake fern (*Botrychium virginianum*), wild sarsaparilla (*Aralianudicaulis*), Large-flowered trillium (*Trillium grandiflorum*), and spreading dogbane (*Apocynum androsaemifolium*), sharp-lobed hepatica (*Hepatica acutiloba*), long-spurred violet (*Viola rostrata*), bladder fern (*Cystopteris bulbifera*), common polypody (*Polypodium virginianum*), walking fern (*Camptosorus rhizophyllus*), northern fragile fern (*Cystopteris fragilis*), American bittersweet (*Celastrus scandens*), climbing fumitory (*Adlumia fungosa*), and two-leaf miterwort (*Mitella diphylla*).
- Several types of vegetation are consistent with various habitat types found here. Canopy species include hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), red pine (*Pinus resinosa*), bigtoothed aspen (*Populus grandidentata*), northern white-cedar (*Thuja occidentalis*), beech (*Fagus grandifolia*), and basswood (*Tilia americana*). Understory plants include mountain maple (*Acer spicatum*), chokecherry (*Prunus virginiana*), and ironwood (*Ostrya virginia*).
- Below the escarpment are several types of forests. A seasonally spring-fed wet forest is dominated by silver maple (*Acer saccharinum*), and green ash (*Fraxinus pennsylvanica*). Several species are present which are more common to southern regions, such as: swamp white oak (*Quercus bicolor*); American bladdernut (*Staphylea trifolia*); and great water-leaf (*Hydrophyllum appendiculatum*). Sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), red oak (*Quercus rubra*) and hemlock dominate a mesic northern hardwood forest. Another northern forest type is comprised of white cedar, white spruce (*Picea glauca*), and balsam fir (*Abies balsamea*). A wetland near Carlsville Road is fed by springs and contains open sedge, dogwood, willow shrubs, and tamarack (*Larix laricina*) (Grimm 2001).
- Terrace communities include canopy species such as white birch, white cedar, white pine, and trembling aspen (*Populus tremuloides*), large-toothed aspen, northern red oak, sugar maple, American beech, white ash (*Fraxinus americana*) and hemlock congregate on old beach ridges.

- Understory plants include chokecherry, red osier dogwood (*Cornus stolonifera*), round-leaved dogwood (*Cornus rugosa*), and balsam fir. Other species include American witch-hazel (*Hamamelis virginiana*), highbush cranberry (*Viburnum trilobum (americanum)*), beaked hazelnut (*Corylus cornuta*), eastern leatherwood (*Dirca palustris*), and russet buffalo-berry (*Shepherdia canadensis*).
- A shrub layer south of Carlsville Road contains pussy willow (*Salix discolor*), grape (*Vitis spp.*), red osier dogwood, willow (*Salix spp.*), and green ash. Herbaceous plants include spotted Joe-Pye-weed (*Eupatorium maculatum*), blue-joint grass (*Calamagrostis canadensis*), panic grass (*Panicum spp.*), monkey-flower (*Mimulus ringens*), panicled aster (*Aster simplex*), goldenrod (*Solidago spp.*), grassleaved goldenrod (*Solidago graminifolia*), and small yellow lady's-slipper (*Cypripedium calceolus var. parviflorum*) (Standish 2001).
 - Wildlife includes upland forest species with many songbirds (Zimmerman, 1989). A large number of breeding birds are known to the area, such as: American Redstart, Scarlet Tanager (*Piranga olivacea*), White-throated Sparrow (*Zonotrichia albicollis*), Great Crested Flycatcher (*Myiarchus crinitus*), Wood Thrush (*Hylocichla mustelina*), Hermit Thrush (*Catharus guttatus*), Black-throated Blue warbler (*Dendroica caerulescens*), Orchard oriole (*Icterus spurius*), Veery (*Catharus fuscescens*), Eastern Phoebe (*Sayornis phoebe*), and Eastern Wood Pewee (*Contopus virens*). Other birds include Northern or Yellow-shafted Flicker (*Colaptes auratus*), Pileated Woodpecker (*Dryocopus pileatus*), Red-bellied Woodpecker (*Melanerpes carolinus*), Yellow-bellied Sapsucker (*Sphyrapicus varius*), Northern Saw-whet Owl (*Aegolius acadicus*), Barred Owl (*Strix varia*), Great Horned Owl (*Bubo virginianus*), Whip-poor-will (*Caprimulgus vociferus*), American woodcock (*Scolopax minor*), and Common Raven (*Corvus corax*). Some hawks such as Northern Harrier, Broadwing Hawk (*Buteo platypterus*), Northern Goshawk (*Accipiter gentilis*), Cooper's Hawk (*Accipiter cooperii*), Sharp-shinned Hawk (*Accipiter striatus*), American Kestrel (*Falco sparverius*), Peregrine Falcon (*Falco peregrinus*) during migration and Red-shouldered Hawk have been found in the area (Standish 2001).
 - Land snails have been found on rock outcrops north and south of Carlsville Road and at the north end of the bluffs. Nineteen species were recorded in 1995 including 3 rare species and 1 glacial relict species (Grimm 2001). A preliminary list of snails include *Allogona profunda*, *Anguispira alternata*, *Cochlicopa lubrica*, *Columella simplex*, *Discus catkillensis*, *Euconulus fulvus*, *Gastrocopta contracta*, *Gastrocopta pentadon*, *Glyphyalina indentata*, *Hendersonia occulta*, *Mesodon thyroidus*, *Nesovitreia electrina*, *Paravitrea multidentata*, *Punctum minutissium*, *Strobilops aeneas*, *Strobilops labyrinthica*, *Vertigo bollesiana*, *Vertigo gouldii*, *Vertigo hubrichtii*, and *Zonitoides arboreus* (Standish 2001).

Spring Lane Hardwood Swamp

- The Spring Lane Hardwood Swamp covers approximately 15 acres and is located between Monument Point Road north to Horseshoe Point. The swamp was named after the road Spring Lane, which runs the length of the site. This spring fed hardwood swamp is drained by several sinkholes.
- Spring Lane Hardwood Swamp is in the Town of Egg Harbor. Land use is primarily woodlots with lesser amounts of residential, cropland, idle farmland, and orchards.
 - Soils are shallow to deep, well drained, and nearly level to moderately steep. A sandy loam or loam subsoil overlays sandy loam or fine sandy loam till or dolostone bedrock (USDA SCS 1978).
 - Vegetation within the hardwood swamp canopy is green ash, sugar maple, and swamp white oak. A common understory plant is young green ash. Herbaceous plants include northern blue flag (*Iris versicolor*), common moonseed (*Menispermum canadense*), and blue skullcap (*Scutellaria lateriflora*).
 - Upland forest near the swamp contains canopy trees such as red oak, white birch, silver maple, bitternut hickory (*Carya cordiformis*), wild black cherry (*Prunus serotina*), hemlock, large-toothed aspen, and white ash. Understory plants include eastern leatherwood, American yew (*Taxus canadensis*), American bladdernut, wild black currant (*Ribes americanum*), and silver maple. A herbaceous plant layer contains rue-anemone (*Anemonella thalictroides*), blue cohosh (*Caulophyllum thalictroides*), broad-leaf sedge (*Carex platyphylla*), allegheny vine, long-spurred

violet, trillium, and American trout-lily (*Erythronium americanum*). Near the edge of swamp vegetation varies. Virginia waterleaf (*Hydrophyllum virginianum*), great water-leaf (*Hydrophyllum appendiculatum*), springbeauty (*Claytonia virginica*), Dutchman's-breeches (*Dicentra cucullaria*), squirrel-corn (*Dicentra canadensis*), and bloodroot (*Sanguinaria canadensis*) are common species (Standish 2001).

- Wildlife includes several noteworthy bird species. Among these is the state special concern Northern Goshawk, Northern Harrier, Cooper's Hawk, Veery, Wood Thrush, and the state threatened Redshouldered Hawk. Other significant birds in the area include the Hermit Thrush and the Turkey Vulture (*Cathartes aura*) (Standish 2001).
- State threatened plant species include ram's-head lady's-slipper (*Cypripedium arietinum*) and dwarf lake iris (*Iris lacustris*). State special concern species found in this area are small yellow lady'sslipper (*Cypripedium parviflorum*), showy lady's-slipper (*Cypripedium reginae*), Hooker's orchis (*Platanthera hookeri*), long-spurred violet (*Viola rostrata*), allegheny vine (*Adlumia fungosa*), large white-flowered ground-cherry (*Leucophysalis grandiflora*), broad-leaf sedge (*Carex platyphylla*), Canadian yew (*Taxus canadensis*), and variegated horsetail (*Equisetum variegatum*).
- Other significant plant species include northern green orchid (*Platanthera hyperborea*), striped coralroot (*Corallorhiza striata*), early coralroot (*Corallorhiza trifida*), spotted coral-root (*Corallorhiza maculata*), cancer-root (*Orobanche uniflora*), great water-leaf, Hitchcock's sedge (*Carex hitchcockiana*), swamp white oak, American bladdernut, common moonseed, walking fern, and prickly-ash (*Zanthoxylum americanum*) (Standish 2001).

CONSERVATION GOALS:

- Maintain or enhance the ecological composition, structure and functions of the several core natural areas or features of the site, (e.g., the hardwood swamps below the talus, the escarpment free face and talus slopes, the semi-open wetlands at the south end of the site, and the interior mixed conifer/hardwood forests).
- Maintain the existing forest of the site and reforest abandoned agricultural land adjacent to the existing forest to increase the overall size of the forest.
- Prevent further fragmentation of existing forest by roads.
- Prevent impairment to water quality and flow regime of the springs that feed the sub-talus wetlands at this site.
- Monitor exotic aggressive species, particularly garlic mustard, and control, as necessary.

THREATS:

- Loss of forest cover for homesites and "viewsheds"; bedrock destruction for foundation and sewer construction; erosion during construction; filling of wetlands and karst features for roads, driveways and lawns; increased impervious surfaces that promote runoff of oils and salts; and increased human activity (Grimm 2001C).
- Poor logging practices could disturb karst features, especially when snow cover is unavailable to protect the ground surface (Grimm 2001C).
- Exotic plants and animals like the gypsy moth, butternut canker, and garlic mustard increase when forest interior decreases. Non-native species could thrive on human disturbed habitat with increased forest edge (Grimm 2001C).
- Deer herbivory is expected to increase as subdivisions decrease hunting lands. The forest mosaic could be compromised because of the removal of low woody and herbaceous vegetation by deer (Grimm 2001C).
- Changes in surface or shallow groundwater movement due to surface disturbance associated with development could decrease water/groundwater quality (Standish 2001).

INFORMATION NEEDS / GAPS:

- Complete plant and animal inventories
- Develop list of individuals and landowners interested in conservation activities

Resource List

for the Conservation Master Plan

Bay Shore Blufflands State Natural Area

January 2015

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