NEW BUFFALO AREA SCHOOLS NATURE STUDY TRAIL SYSTEM

New Buffalo, Berrien County, Michigan – August 27, 2016

PREPARED BY TREKKMODE AKA PAT FISHER

(NST)

PRELIMINARY

@TREKKMODE® nature study trails®
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MAP LEGEND

- Boardwalk
- Bench
- NBAS Properties
- Privately Owned
- Bridge
- Stream
- Wetland

- A Nature Study Loop (1.6 mi)
- B Bison Nature Tail (0.4 mi)
- C Marsh & Creek Study Trail (0.6 mi)
- D Dune Forest Study Trail (0.2 mi)
- E Wetland Study Tail (0.6 mi)
- F Turtle Pond Connector (0.1 mi)
- G Proposed PM Greenway (10 k)
- H Harbor Country Hike & Bike Trail
- J ADA Trail (0.3)
- Q Other Trails
- 0.6 Trail Mileage

Trail Difficulty Rating

- Easy
- Moderate
- Difficult

RECREATION SYMBOLS

- Amplitheater
- Bicycle trail
- Bicycle rack
- CampPinee pit
- XC ski trail
- Drinking water
- Geocache
- Hiking trail
- Interpretive exhibit
- Litter receptical
- Parking
- Picnic area
- Point of interest
- Restrooms
- Road crossing
- Scenic view
- Self guided tour
- Study area
- Trailhead
- Trailhead info
- ADA accessible
- CC course

NOTE: The east woods are extremely wet late winter through early summer. Boardwalks are a planned addition to the trails. They are *not* in place yet. Dress appropriately.

TRAILHEAD LAT / LON
GPS: 41.782233,-86.757151

200 ft
100 m

North

Lake Michigan's Wetlands

Michigan Department of Natural Resources

Wetlands are characterized by the presence of water that saturates the soil or covers the land for most or all of the year. This leads to the development of plant and animal communities that are adapted to these conditions and which differ from those in purely aquatic (lakes, rivers) or dry land environments.

HISTORY

Fifteen thousand years ago the last great ice age was coming to an end in Michigan. As the glaciers melted, they left behind a changed landscape. Water was everywhere. New river channels cut through the sands and gravels and drained into broad lowlands, flowing finally into lake basins carved by the glaciers. Massive chunks of ice became kettle lakes, while winds sculpted coastal dunes of shifting sand.

Slowly drainage patterns stabilized, and lake levels fell. Forests returned on the higher ground, while vast grassy marshes spread across the former lakebeds and coastal lowlands. Over time, the shallower kettle lakes filled with plant debris, becoming bogs. Perhaps a third or more of the state was covered by wetland habitats. These new habitats filled with wildlife in great abundance, including mastodons, caribou, and bear sized giant beavers. These species soon disappeared, to be replaced by more familiar creatures.

A succession of American Indian cultures in Michigan made efficient use of wetlands. Open waters of lakes and rivers served as transportation corridors, while swamps and marshes produced wild game and food plants. These Native Americans understood the value of wet places. Then, about 200 years ago, an invasion of Europeans arrived, bringing with them the view that the wilderness was an enemy, to be subdued and conquered. Wetlands, in particular, were considered mysterious and forbidding places-wastelands to be drained or filled at the earliest opportunity. The prevailing attitude, reinforced by acts of Congress and State government, led to the destruction of millions of acres of wetlands.

This "reclaim the wetlands" attitude continued to the middle of this century, when nearly three-quarters of the original wetland area in our state (estimated at over 11 million acres) had been destroyed. Michigan's abundant freshwater resources, a gift of our glacial past, have too often been squandered and wasted. Only in recent years have we begun to realize the essential role that wetlands play in nature, and the human economy.

But despite new laws and the efforts of government and private conservation groups, the destruction of wetlands continues, though on a reduced scale.

FOR YOUR SAFETY

In case of Emergency call: 9-1-1
To report a crime call: 1-800-525-5555
Hours are Sunrise to Sunset
Bring Insect Repellent and Sunscreen
Hats or Bandanas provide Sun and Tick protection
Hiking Boots provide the best protection
Michigan State Law prohibits Alcohol, Drugs and Tobacco products on public school properties
Pets must be on short leash
No Camping or Ground Fires
No Glass Bottles, Hunting or Fireworks
These are foot trails only!
Stay on the trails
Please do not litter or disturb plants and animals!

New Buffalo Area Schools
NBAS Nature Study Trails
Outdoor Classrooms… Let Nature Speak for Herself

MAJOR WETLAND TYPES

Wetlands are a blending of lands and water in varying quantities, and many different types have been identified by biologists. The three major types are **marsh**, **swamp**, and **bog**. These can be defined more specifically:

Marshes have standing water from less than an inch to several feet deep. The amount of water can fluctuate seasonally or from year to year. Marshes might generally be called "flooded grasslands." They are dominated by soft stemmed emergent plants such as cattails, grasses, sedges, rushes, arrowhead, pickerel weed, and smartweed. In deeper water are found lily pads and submerged plants such as elodea, milfoil, and pondweed. Marshes are critical for many fish species that live and/or breed there. Marshes offer primary breeding and feeding habitat for water birds (ducks, geese, herons, cranes, rails) and song birds like the marsh wren and yellow warbler, as well as numerous frog species, reptiles (turtles, water snakes), and mammals such as muskrats, beaver, and otter. In Michigan, marshes are found at the edge of some rivers and lakes, in lowlands and depressions, and in swales between sand dunes.

Swamps can best be described as flooded woodlands or shrublands. Unlike marshes, they are dominated by woody plants. The soil is usually waterlogged throughout the growing season, though some swamp soils may become dry during the hot summer months. In Michigan, trees and shrubs found in swamps include red and silver maple, cedar, balsam, willow, alder, black ash, elm, and dogwood. Swamps occur most often along streams or on floodplains, in flat uplands, or shallow lake basins. Numerous wildflower species are found in swamp habitats, including the cardinal flower and yellow ladyslipper. Characteristic of the many swamp living animals are wood frogs, gray treefrogs, salamanders, barred owls, waterthrushes, prothonotary warblers, water shrews, and raccoons.

Bogs occur where accumulations of decaying vegetation form mats that eventually cover and then fill in old ponds or kettle lakes. In some bogs, open water may be surrounded by floating vegetation, while other bogs are totally grown over and consist of spongy, waterlogged peaty soil covered by sphagnum moss. Bog soils are usually highly acidic, and oxygen and nutrient deficient. Acid tolerant plants found in or around bogs include woody plants such as labrador tea, poison sumac, tamarack, and black spruce. Many species of orchids prefer bog habitats, as do insect eating sundews and pitcher plants. Bogs shelter many rare animal species, including the spotted turtle and southern bog lemming.

The bogs most people are familiar with are these acidic bogs. There is, however, a distinctly different type of bog called a **fen**. Its higher alkalinity and productivity is the result of water passing through calcareous deposits. Fens typically have high plant diversity due to higher nutrient levels; many plants are prairie plants such as prairie white fringed orchid, sweet grass, the bluestems, and blazing star. Unusual animals of fens include the eastern massasauga rattlesnake and rare butterflies such as Mitchell's satyr and the powesheik skipper.

Vernal Ponds are small bodies of standing water that form in the spring from meltwater and are often dry by mid summer. While not usually considered in official definitions of wetlands, vernal ponds are very important in the life cycles of many wildlife species. In particular, many species of amphibians (frogs and salamanders) depend on these temporary ponds for breeding sites. This allows the vulnerable aquatic larvae (e.g. tadpoles) to mature in a place free of fish predators.

WHY ARE WETLANDS IMPORTANT?

Because they occur where the dry land meets the water, wetlands play a critical role in the management of our water based resources.

Acre for acre, wetlands produce more wildlife and plants than any other Michigan habitat type. Wetland species also comprise a critically important segment of these species. For example, Michigan boasts about 2300 native plant species; 50 percent of these are wetland species and over 25 percent of the wetland species are threatened or endangered. More than 40 percent of the 575 vertebrate (with a backbone) wildlife species in Michigan live in or utilize wetlands. This includes 10 to 15 of the 66 mammals, 180 of the 370 birds, 22 of the 28 reptiles, and all of the 23 amphibians.

HERE ARE A FEW OTHER THINGS THAT WETLANDS DO:

- reduce flooding by absorbing runoff from rain and melting snow and slowly releasing excess water into rivers and lakes - a one acre swamp when flooded to a depth of one foot contains 330,000 gallons of water
- filter pollutants from surface runoff, trapping fertilizers, pesticides, sediments, and other contaminants and helping to break some of them down into less harmful substances, improving water clarity and quality
- help recharge groundwater supplies when connected to underground aquifers
- contribute to natural nutrient and water cycles, and produce vital atmospheric gases, including oxygen
- provide commercial or recreational value to our human economy, by producing plants, game birds (ducks, geese) and fur bearing mammals - many fish are directly connected to wetlands, requiring shallow water areas for breeding, feeding and escaping from predators
- when wetlands occur adjacent to the Great Lakes, inland lakes or streams, they serve as nutrient traps that then enrich the larger body of water of which they are part. [1]

NATIVE PLANTS AND ANIMALS TO WATCH FOR:

Rusty Crayfish	Cut-leaved Toothwort	Wild Lily-of-the-valley
Damselfly	False Solomon's Seal	Riverbank Grape
Green Darner Dragonfly	Field Horsetail	Virginia Creeper
Red Admiral Butterfly	White Trillium	Reed-broadleaf Cattail
Eastern Box Turtle	Herb Robert	Wood Sedge
Eastern Gray Treefrog	Hispid Buttercup	Beech
Northern Spring Peeper	Indian Pipe	Black Cherry
Painted Turtle	Jack-in-the-pulpit	Paw Paw
Western Chorus Frog	Lowbush Blueberry	Cottonwood
Black Squirrel	Maple-leaved Viburnum	Red Maple
Chipmunk	Marsh Marigold	Bur Oak
Red Fox	Mayapple	Hickory
Striped Skunk	Jewelweed	Musclewood
White-tailed Deer	Round-lobed Hepatica	Shining Sumac
Bald Eagle	Rue Anemone	Sassafrass
Barred Owl	Skunk Cabbage	Tuliptree
Great Blue Heron	Striped Wintergreen	White Ash
Pileated Woodpecker	Squaw-root (bear corn)	White Pine
Red Tailed Hawk	Swamp Milkweed	Witch-hazel
Hummingbird	Tall Scouring Rush	White Birch
Wild Turkey	Trout Lily	Haircap Moss
Wild Red Raspberry	White Baneberry	Oyster Mushroom
Wintergreen	White Lettuce (lion's foot)	Rainbow Bracket
Nodding Bellwort	Wild Geranium	Christmas Fern

OUR TRAILS

Our nearly five miles of Interpretive Trails, and our Nature Study Areas, contain pristine examples of forested backdune and interdunal pond habitats. Depending on the trails you visit, you will discover native flora and fauna living in harmony with glacial ravines and valleys, streams, wet meadows, emergent marshes, interdunal ponds, forested dunes or a wet flatwoods filled with hummocks, vernal pools and rivulets. We call them "Habitats for Wildlife," biodiversity at its finest!

The trails are maintained by students & staff, volunteers, and most of the structures have been added by local scouts earning their Eagle Rank. The exception is the Friendship Circle Pavilion, a joint effort between our PTO, GRBI and many volunteers, which provides us with shelter, an outdoor classroom and an awesome nature trail starting point.

The **Nature Study Loop (1.6mi)** is a series of rural, semi-primitive and primitive trails. This moderately difficult nature walk connects you with trails that pass through our Nature Study Areas and onto community greenways. The wetland trails are teaming with spring wildflowers, but are extremely wet late winter through early summer, so dress your feet appropriately.

The **Bison Nature Trail (0.4mi)**, our easiest trail, is located behind the school playgrounds with over 40 varieties of trees, shrubs and vines indentified. This self-guided nature tour includes several scenic viewpoints and benches along the way. The trail earned Ed Hatton, Jr. his Eagle Scout rank. Most of the trail structures have survived over 20 years of our Michigan weather. [2] *Due to the age of this trail, some of the flora associated with the markers have changed.*

Our **Nature Study Areas (1.2mi)** have trails with varying degrees of difficulty and pass through hardwood forests, pine groves and flatwoods; along marshes, vernal pools, rivulets and creeks. The unfinished Marsh & Creek Trail will be physically demanding but brimming with nature.

HOLBROOK CREEK (also know as Lighthouse Creek)

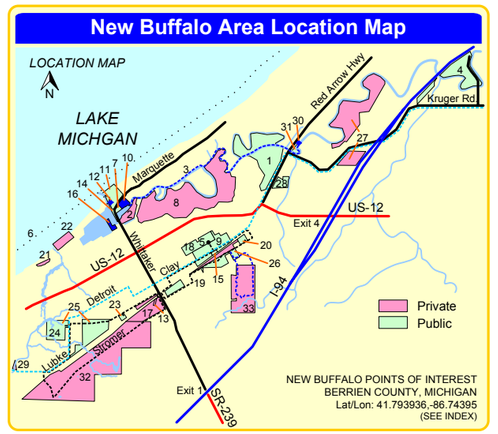
All of our trails lie in the Holbrook Creek Watershed. Holbrook (also known as Lighthouse Creek) is located within the coastal dunes of Lake Michigan and currently drains directly into Lake Michigan. Its channel is composed of sand and clay and has no gravel or larger particles except near Lake Michigan. [3] Its wide valley and creek located just behind the school, the connecting ravines and streams, and our flatwoods located east of Lubke Road were created as Proglacial Lake Baroda drained over the adjacent Lake Border Moraine some 14,000 years ago. [4]

A longtime resident shared with us that the creek, and one of the original New Buffalo Township schoolhouses, was named after Festus A. Holbrook. An original settler, his homestead was located at the headwaters of Holbrook Creek. [5]

REFERENCES

1. DNR - Wetlands - State of Michigan, Michigan.gov, 2013
2. The Bison Nature trail, New Buffalo Elementary School, 1992, Edward J. Hatton, Jr., May 28, 1992
3. Lighthouse Creek Flooding Evaluation, Christopher B. Burke Engineering, Ltd., June 2010
4. Correspondence with Kevin Kincare, USGS, 2014
5. History of Berrien and Van Buren Counties, Franklin Ellis, 1880

New Buffalo Area Location Map



New Buffalo Area Points of Interest

1. Galien River County Park (Berrien)
2. Merganser Point Preserve (SWMLC)
3. Galien River Marsh Water Trail (COL)
4. Glassman Park – Greenspace
5. Harbor Country Hike and Bike Trail Hub
6. Lake Michigan Water Trail (LMWT)
7. Lions Pavilion Park
8. Louis J. Sima Great Lakes Marsh (COL)
9. New Buffalo Area Schools – Middle/Senior High
10. New Buffalo Boat Launch (MDNR,11-11)
11. New Buffalo Lakefront Park and Beach
12. New Buffalo Kayak Launch
13. New Buffalo Railroad Museum
14. New Buffalo Riverfront Park
15. New Buffalo Skate Park
16. New Buffalo Transient Dock Facilities
17. Old Roundhouse Historic Property (Private)
18. Oselka Park
19. Pere Marquette Railside Greenway Trail
20. Sari Asher Memorial Dog Park
21. Schultz Park (Sunset Shores Homeowners Association)
22. Sunset Shores Beach (Homeowners Association)
23. Turtle Pond Nature Preserve
24. New Buffalo Area Schools – Elementary
25. New Buffalo Area Schools – Nature Study Trails
26. Moraine Ridge Nature Preserve
27. New Buffalo Rod & Gun Club (Private)
28. New Buffalo Township Memorial Park
29. Oak Hill Springs Park (Homeowners Association)
30. Red Arrow Highway Boat Launch (MDNR,11-3)
31. Red Arrow Highway Fishing Access (MDNR)
32. Stromer Woods (Private)
33. Nokmes Creek Natural Area (Private)

PLANT LIST INDEX [2]

(Eagle Scout Project)
1992

1. Maple Viburnum
2. Witch Hazel
3. American Beech
4. Bitternut Hickory
5. American Hornbeam
6. Red Cedar
7. Big Tooth Aspen
8. Slippery Elm
9. Scarlet Hawthorn
10. Staghorn Sumac
11. Sugar Maple
12. Red Mulberry
13. Pin Oak
14. Basswood
15. White Oak
16. Quaking Aspen
17. Sassafras
18. Multiflora Rose
19. Black Willow
20. Shining Sumac
21. Panicled Dogwood
22. Flowering Dogwood
23. Red Oak
24. Butternut
25. Spicebush
26. Cottonwood
27. Dune Grape
28. White Pine
29. Black Cherry
30. Pin Cherry
31. Blackberry
32. Speckled Alder
33. Meadow Willow
34. Red Oiser Dogwood
35. Domestic Apple
36. Tulip Tree
37. Poison Ivy
38. Virginia Creeper
39. Smooth Juneberry
40. Paw Paw
41. White Spruce
42. White Ash
43. Red Maple

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