Appendix C

Educational Materials

Karner Blue Butterfly

Lycaides melissa samuelis

Background:

The Karner blue butterfly is a very rare, small, silvery blue butterfly that was listed as a federal endangered species in 1992. It is one of the best indicator species of oak-pine barren and dry sand prairie remnants. Its larvae feed exclusively on wild lupine, which is only found within these systems. The existence of this butterfly in Brooks Township is one of the primary reasons for all of the state and federal attention which has been directed towards this area by the DNR, the US Forest Service, and the Nature Conservancy.

Life History:

- Eggs are laid on lupine plants with two life cycles each year.
- Larvae feed on wild lupine and pupate after about three weeks.
- Adults can be seen in late May/early June, then again in July.
- All life stages are vulnerable to fire, which is necessary to maintain their habitat.

Threats:

- Off-road vehicle damage
- Red pine plantations
- Fire suppression
- Residential development (habitat loss & fragmentation)
- Gypsy moth spraying
- Invasive exotic weeds (e.g. spotted knapweed)

Management Techniques:

- Protect known populations of Karner blue from any disturbances
- Maintain habitat by inhibiting forest succession: prescribed burns, mowing
- Connect isolated populations by providing habitat corridors between major colonies of Karner blue butterflies

For more information on how to preserve this delicate species, contact:

The Land Conservancy of West Michigan
1345 Monroe Ave. NW Suite 324
Grand Rapids MI, 49505
Phone: (616) 451-9476
Fax: (616) 451-1874
e-mail: lcwm@naturenearby.org

A Threatened Community:
The Oak-Pine Barrens & Prairie Landscape

West Michigan is home to a unique ecosystem made up of dry sand prairies and oak-pine barrens. This community provides habitat for many different species: **9 rare plant species** and **14 rare insect species**, including the federally endangered Karner blue butterfly. The diversity of this natural habitat is the foundation of a unique larger community that has received national attention for its conservation value.

Dry Sand Prairies:

- Dry, nutrient-poor grassland dominated by little bluestem, big bluestem, and Pennsylvania sedge
- Maintained by recurrent fire, either natural or human-made
- Habitat for the Karner blue butterfly and other rare species

Oak-Pine Barrens:

- Typically found around the edges of dry sand prairies
- Similar to the dry sand prairie, but with widely scattered trees

History:

This area had continuous tracts of dry sand prairie surrounded by oak-pine barrens before the logging era. These have now been reduced to a few small remnants located on both public and private land. Most of the larger remnants have been identified, however, crucial corridor habitat exists in small isolated patches as well.

Management Techniques:

Oak-pine barrens and dry sand prairies can be protected and enhanced to support the diversity of the associated rare plant and animal species by using various techniques:

- Restore the landscape to its original condition by replanting native grasses and even possibly by removing closed canopy forest trees.
- Educate your neighbors and yourself about the rare communities and species found in your area.
- If a Karner blue butterfly is spotted on your property, protect the area from disturbance and maintain the wild lupine they depend on.

If you are committed to the preservation of this unique ecosystem on your proptery, consider available stewardship plans such as conservation easements or participating in the Forest Stewardship Program. For more information, contact:

The Land Conservancy of West Michigan
1345 Monroe Ave. NW Suite 324
Grand Rapids MI, 49505
Phone: (616) 451-9476
Fax: (616) 451-1874
E-mail: lcwm@naturenearby.org

Coastal Plain Marshes: A Unique Michigan Habitat

Description:

A coastal plain marsh is a special type of wetland found on the shores of shallow soft-water seepage lakes and ponds. What makes this habitat so unique are the rare grasses, rushes, and other plants that are only found in coastal plain marshes – here and on the Atlantic coast. In order to survive, these plants must have open, shallow shorelines that are created as the water level rises and falls each year and throughout the seasons.

The plants of the marsh are generally situated around the pond or lake in concentric rings: in the center there is open water (at least part of the year), and in the shallow water or shoreline there are annual plant species and wetland plants. Slightly further out is a moist meadow area, and in the outermost zone of this community may be a band of shrubs and trees.

Range:

At one time, Michigan may have been home to around 300,000 acres of coastal plain marsh. Less than half of that remains today, and much of it has been degraded by dredging and filling of the shoreline, development, and ORV use.

What do coastal plain marshes need to survive?

These marshes are dependent on the body of water which they surround. The water quality and the changing water levels create the conditions that are essential for the rare plants of the coastal plain marsh to reproduce and survive.

What is harmful for coastal plain marshes?

Perhaps the greatest threat to this rare natural community in Michigan is shoreline development – for both housing and agriculture.

- **Water level:** if the water levels no longer fluctuate, the unique plant species will not be able to survive. Other more common plants will invade the area, and the coastal marsh community will disappear. This is a usually a result of dredging or filling.

- **Water quality**: as with all wetlands, contamination can result from excessive use of pesticides, herbicides, fertilizers and other chemicals on surrounding lands.
- **Off-Road Vehicles**: ORV use can damage and destroy not only the rare coastal marsh plants themselves, but can also dramatically alter the natural water flow, which changes the habitat and hydrology of these areas.

What you can do:

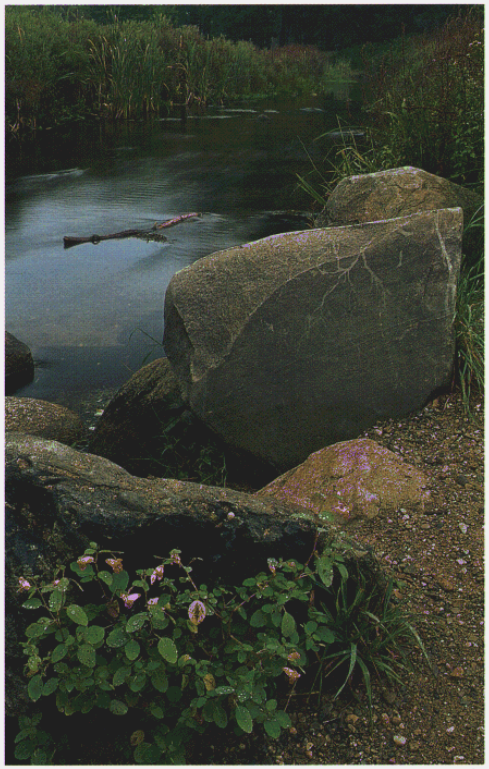
- Keep the shoreline undisturbed, and minimize impacts.
- If you want to preserve your marsh and its rare species, consider the potential benefits of a conservation easement. For more information, contact:

Land Conservancy
OF WEST MICHIGAN

The Land Conservancy of West Michigan
1345 Monroe Ave. NW Suite 324
Grand Rapids MI, 49505
Phone: (616) 451-9476
Fax: (616) 451-1874
e-mail: lcwm@naturenearby.org

What effects do humans have on the Dowagiac River Watershed hydrology?

One of the biggest effects that humans can have on hydrology is to upset the balance of water reaching the rivers and streams through groundwater. This balance is upset by increased impervious cover, which is any surface that does not allow water to infiltrate the ground. Examples include roads, parking lots, rooftops, and sidewalks. Studies indicate that even relatively small amounts of impervious surface coverage (10-15% of the total land area) can make it difficult to maintain water quality.



The groundwater flowing into the Dowagiac Creek flows into the Dowagiac River, St. Joseph River and at last reaches Lake Michigan Photo © Michael Kucinich

When impervious cover causes more rainfall to directly reach a stream or lake over the surface instead of infiltrating the ground, the result is:

- increased frequency of flooding.
- stream bank erosion as the stream widens to accommodate the additional water.
- habitat destruction as the banks erode, filling in pools and covering gravel stream beds with sediment.
- decreased groundwater recharge.
- more pollutants (oil, sediment, nutrients) entering a stream or lake.
- a 2 to 10 degree F. increase in the temperature of streams and lakes.

What can we do to preserve the hydrology of the Dowagiac River Watershed?

Encourage local governments to enact ordinances that will protect water quality when new residential, commercial, and industrial developments are built. Local ordinances can have requirements that reduce the amount of impervious cover on a site, require a certain amount of open space, retain the natural topography and natural resources such as wetlands, and require best management practices to be used when handling storm water. With the use of best management practices, a development can be planned so that the natural or pre-development hydrology of the site and watershed is maintained.

For more information on conserving hydrology

To learn more or to become involved in the Dowagiac River Watershed Project that addresses many of these issues, call the Cass County Conservation District at (616) 445-8643, ext. 3. To learn more about the Dowagiac River visit www.meandrs.org.

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Cover photo © Michael Kucinich

Hydrology

The Dowagiac River Watershed — Its Unique Hydrology

What is so special about the Dowagiac River Watershed?

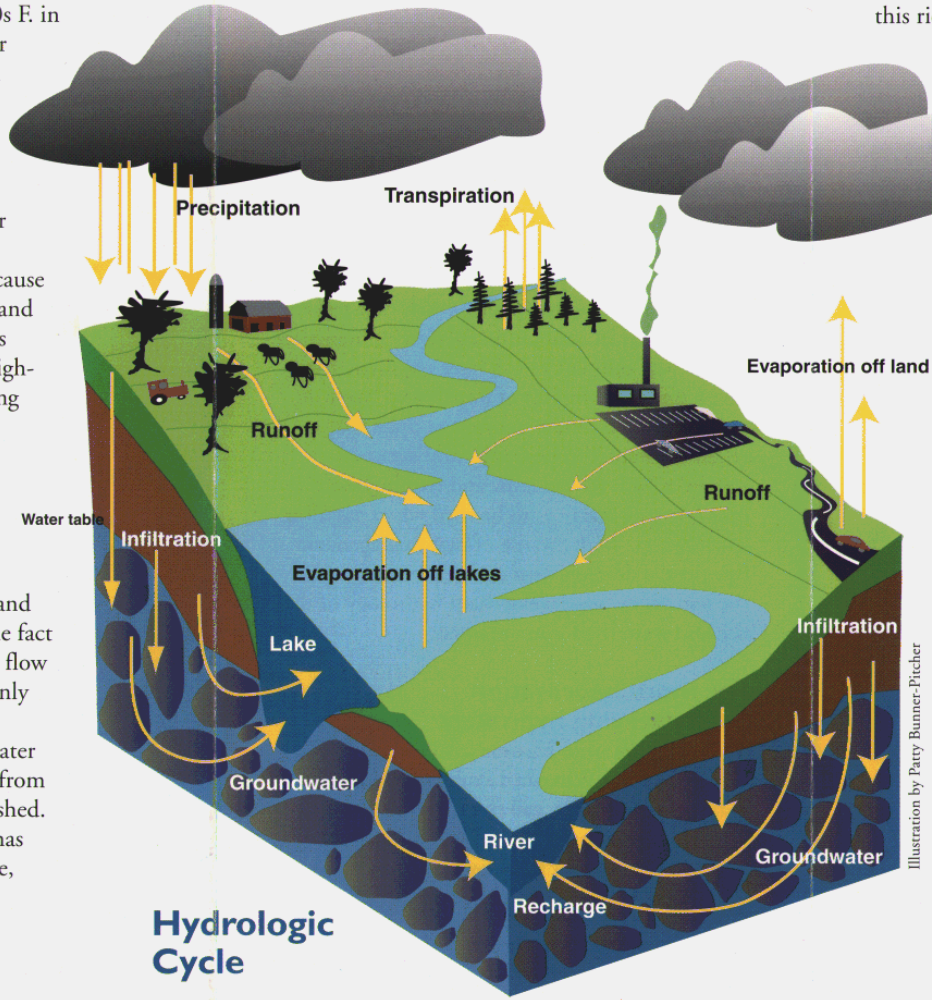
The Dowagiac River Watershed has received much attention because of two unique features of the river and its tributaries. First, the water in the Dowagiac River and many of its tributaries, exhibits a year-round cold temperature (averaging in the mid to upper 60s F. in July). Second, the Dowagiac River maintains a stable, steady flow. In comparison, many rivers and streams in southern Michigan contain warmer water and experience flashy flows after storms. Often the Dowagiac River is compared to rivers in northern Michigan such as the AuSable because of the similarities in temperature and flows. The Dowagiac River and its many tributaries are designated high-quality cold-water streams containing brown trout.

What causes the hydrology of the Dowagiac River Watershed to be unique?

Both the cold water temperature and stable flow can be attributed to the fact that 90% of the Dowagiac River's flow comes from groundwater, while only 10% is from surface water runoff.

The large amounts of groundwater discharge into the streams results from the soils and geology of the watershed. A large portion of the watershed has sandy soils that are very permeable, allowing much infiltration. The geologic feature that contributes to the groundwater discharge is the presence of what is called the Kalamazoo moraine. This moraine, a long narrow ridge left by glacial deposits, runs south of Decatur to northeast of Dowagiac and separates the Dowagiac Creek from the Dowagiac River. The head pressure created from this ridge and other areas of high elevation pushes the groundwater toward the streams and rivers and occasionally causes natural springs and wetlands.

Impervious surfaces should be minimized since they have a significant impact on many stream characteristics, including stream shape, water quality, stream temperature and biodiversity.



Hydrologic Cycle

Illustration by Patty Bunner-Pitcher

Understanding the hydrologic cycle

Water is constantly being recycled. As rain or snow falls to the earth's surface:

- some water runs off the land to rivers, lakes, streams, and oceans (surface water runoff).
- some water returns to the atmosphere by evaporation or transpiration through plants.
- some water infiltrates the soil, where it can
  - be absorbed by plant roots, or
  - continue to move down to become groundwater, or
  - move down and sideways or back up to become surface water through wells, natural springs, marshes, streams, etc.

The movement of water between the earth and the atmosphere through runoff, infiltration, evaporation, transpiration, and precipitation is continuous.

and beavers), waterfowl (ducks and geese), shorebirds (plovers and sandpipers), wading birds (herons and rails), amphibians (salamanders, frogs, and toads), and insects (dragonflies and mayflies) are examples of creatures found in wetlands.

Wetland plants stabilize soils and reduce erosion. Wetlands act as huge sponges to store water, which helps to reduce flood damage. The water then percolates back into the earth, where it helps to recharge the groundwater supply and maintain water levels in streams and rivers.

Deadman's Hollow along the Dowagiac River
Photo © Michael Kucinich

Celithemis elisa, Calico Pennant Dragonfly
Photo by William Westrate

Should I protect, enhance, or create a wetland?

Wetlands should be preserved whenever possible. Natural wetlands, which developed over thousands of years, are hard to duplicate because of their complexity. Preserving those that are not currently being drained or altered by humans is the best way to maintain existing wetland functions. Recognize, however, that wetlands are a dynamic system that will change with time.

There are a number of programs designed to protect, create, or enhance wetlands. The Natural Resources Conservation Service has a Wetland Reserve Program for wetland protection and cost-share programs for wetland creation. In southwest Michigan, the Southwest Michigan Land Conservancy will accept donations of easements and gifts of land that may provide landowners with a tax deduction.

It is never too late to protect, enhance, or create a wetland!

For more information on conserving wetlands

Contact your county Conservation District or Southwest Michigan Land Conservancy at (616) 324-1600.

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Wetlands

Wetlands should be protected whenever possible

Since European settlers arrived in America, wetlands have been filled, drained, or damaged in an effort to develop and use the land more intensely. Michigan has lost 35-50% of its presettlement wetlands by conversion to buildable land and agricultural use. These changes burden remaining wetlands with runoff and pollution from streets, yards, parking lots, agriculture, and industrial facilities.

Butorides striatus, Green-backed Heron (immature) Photo by William Westrate

What is a wetland?

Wetlands are known by various common names — swamps, bogs, sloughs, fens, and marshes. They all have water on or near the surface for all or part of the year, contain special soil types called hydric soils, and are populated by unique plants or animals.

What are some examples of wetlands?

Swamps have saturated soils that may have standing water during part of the year and are dominated by water-tolerant trees such as silver maple, cottonwood, black ash, or tamarack. Buttonbush, alder, willow, and red osier dogwood are shrub species that often grow in swamps. Types of swamps include forested floodplains, conifer swamps, and dense shrub swamps.

A **marsh** is another type of wetland covered periodically by standing or slow-moving water. Soft-stemmed plants such as cattails, sedges, and rushes dominate a marsh's nutrient-rich soil.

Wet meadows are similar to marshes in that they also contain grasslike vegetation. However, these wetlands typically have only seasonally saturated soils and little or no standing water. Blue vervain, Joe-pye weed, ironweed, red top, smooth goldenrod, and bluejoint grass are common in this type of wetland.

Bogs and fens are wetlands with a thick accumulation of organic matter called peat, but the similarities stop there. They differ in their source of water, location in the landscape, and types of plants. Bogs are rarer in southwest Michigan, usually found in kettle holes, with highly acidic soils and dependency on water from rainfall and runoff. Prairie fens are typically located on sandy hillsides along lakes, ponds, rivers, and streams, with constant sources of alkaline groundwater from seeps and springs.

Seasonal wetlands or vernal pools are shallow, temporary wetlands that can have standing water from late winter through early spring. Vernal woodland pools are typical seasonal wetlands that vary in size from a few square feet to over an acre. These wetlands are essential for migrant waterfowl and for breeding amphibians.

Why are wetlands important?

- Recreation for hunters, fishermen, bird watchers, photographers, and general nature enthusiasts.
- Assist in controlling water flow and reducing flood damage.
- Improvement in drinking water and surface water quality.
- Habitat benefits for many endangered or threatened species.

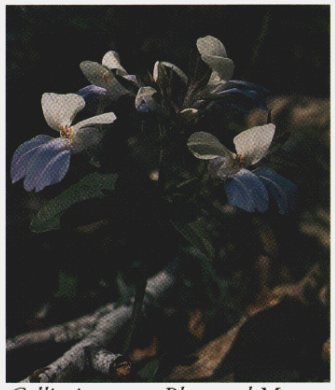
Why are wetlands important?

Some people wrongly view wetlands as wastelands, but all Michigan citizens, whether they own land or not, receive benefit from wetlands. Wetlands provide recreational opportunities for bird-watchers, hunters, hikers, photographers, canoeists, and other outdoor enthusiasts. Wetlands are among the most biologically diverse and productive landscape types, providing habitat for thousands of species of fish, insects, amphibians, reptiles, birds, and mammals. Nearly 35% of the nation's rare wildlife species are located in wetlands or are dependent on them. Mammals (muskrats, mink,

Nymphaea odorata, Fragrant Water Lily Photo by William Westrate

Early morning marsh Photo © Michael Kucinich

Floodplain forested wetlands also provide services that cannot easily be duplicated by man-made facilities. During heavy rainfall, these wetlands divert, store, and slow the flow of water to reduce flood damage downstream. Forested floodplains:

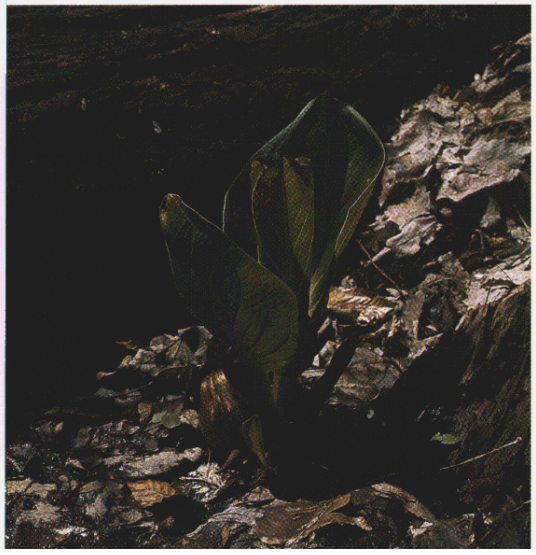


Collinsia verna, Blue-eyed Mary
Photo by William Westrate

- protect surface water quality
- aid in recharging groundwater
- act as buffers for rivers and streams to reduce erosion and sedimentation downstream, and
- improve the overall health of the watershed.

When protected, floodplain wetlands improve the quality and function of our natural systems.

Symplocarpus foetidus, Skunk Cabbage
Photo by William Westrate



Caltha palustris, Marsh Marigold Photo by Joe Ervin

What are the threats to southern floodplain forests?

Southern floodplain forests are among the lower peninsula's largest remaining natural habitats, because they are not easily farmed or logged. In recent years they have become highly desirable for home site development because of water access and scenic views.

The largest threat to our remaining forests is fragmentation, which occurs when large pieces of land are divided into smaller parcels. These smaller parcels are used for residential, commercial, and industrial activities, leaving isolated fragments of forests. These remaining small patches of forest become islands in a sea of human activity and face other threats, including over-grazing by livestock, browsing by deer, invasive exotic species, or hydrologic alterations.

For more information on conserving floodplain forests

Contact your county Conservation District or Southwest Michigan Land Conservancy at (616) 324-1600.

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Floodplain Forests

Floodplain forests improve the quality and function of our natural systems

In the early 1800s, forests covered most of Michigan's 36 million acres. Today, nearly all of Michigan's landscape has been disturbed by human activity causing the loss of more than 50% of the state's original forest.

Trillium grandiflorum, Large-flowered Trillium Photo by Joe Ervin

What type of forests do we find in southwest Michigan?

Floodplain forests, hardwood swamps, and moist hardwood forests are the dominant forest types in southwest Michigan. The most common forest type in southwest Michigan is the southern floodplain forest, found next to rivers and creeks along flat and seasonally wet areas.

Michigan's southern floodplain forests support silver and red maple, red ash, and cottonwood, with components of red oak, swamp white oak, black willow, black ash, butternut, tulip tree, and black walnut also occurring. Several southern trees reach their northern ranges in these forests, such as paw paw, Kentucky coffee tree, honey locust, red mulberry, and sycamore.

What is found in a southern floodplain forest?

Songbirds that inhabit these forests include the red-eyed vireo, northern oriole, indigo bunting, gray catbird, and eastern wood pewee. Other species include the wood duck, black duck, great blue heron, woodcock, deer, wild turkey, woodpecker, salamander, frog, snake, coyote, fox, beaver, and rabbit. Rare and unique species include the red-shouldered hawk, Indiana bat, smallmouth salamander, spotted turtle, Blanchard's cricket frog, cerulean warbler, and yellow-throated warbler.

Common plants found in floodplain forests include wild geranium, cinnamon fern, buttercup, violet, spring beauty, jewelweed, skunk cabbage, marsh marigold, and jack-in-the-pulpit. Rare plants include prairie trillium, cup plant, snow trillium, and black cottonwood.

How can I protect the remaining southern forested floodplains in southwest Michigan?

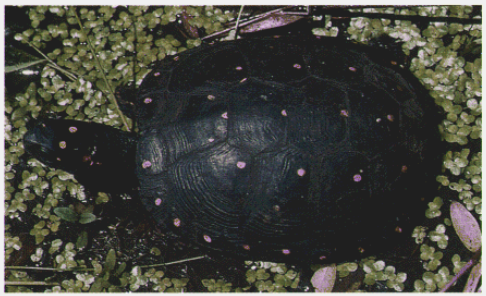
- Contact your county Conservation District representative to learn more about managing southern floodplain forests.
- Consider protecting these forests with a conservation easement through the Southwest Michigan Land Conservancy or through the Natural Resources Conservation Service Wetland Reserve Program.
- Consider re-creating and adding forested buffers or wetlands along waterways on your property.

Terrapene c. carolina, Eastern Box Turtle
Photo by William Westrate

Dowagiac Woods Photo © Michael Kucinich

Why are southern floodplain forests important?

Floodplain forests are a transitional habitat between the river or stream and upland and serve as a wildlife corridor between habitats. Nutrients are exchanged in these wetlands, with floodwater depositing silt and nutrients and the upland contributing leaf litter and runoff. The fluctuating water levels and nutrient-rich soils make these wetlands highly diverse and excellent habitat for aquatic and terrestrial wildlife.



Clemmys guttata, Spotted Turtle
Photo by William Westrate

What are coastal plain marshes?

Coastal plain marshes occur in relatively narrow bands around softwater ponds and depressions having gradually sloping shores and warm water temperatures. Soils range from sandy to muck and are very acidic.

Annual and seasonal water level fluctuations are what make coastal plain marshes unique. Many of the characteristic plant species are annuals, plants that live only for one growing season. They are adapted to the periodic natural draw-down of water levels, which exposes bare soils for germination.

Shallow water or recently emerged shore, due to draw-down, contains coastal plain marsh species like the purple spike rush and tooth-cup. More than 40 threatened or endangered plant species are associated with coastal plain marshes

Thomas Fen on Cook Lake Photo © Michael Kucinich

in Michigan. Cross-leaved milkwort, meadow beauty, tall beak rush, umbrella grass, and Hall's bulrush are just a few of the rare plants in this unique habitat.

These marshes are very rare in Michigan and are considered by many conservation organizations to be critically threatened. Most records indicate the majority of coastal plain marshes are in the western Lower Peninsula.

What are bogs?

Bogs are composed of saturated peat soils that are low in nutrients and very acidic. Bogs originate in a shallow lake as a floating mat of sedges that becomes colonized by sphagnum moss. As the mat gradually thickens and stabilizes, it is invaded by shrubs and trees. Over time, the bog mat expands until no open water is visible. This transformation from open water to forest is very slow and can take thousands of years.

The peat is typically covered by a low-growing carpet of sphagnum moss. Low nighttime temperatures in bogs (often 30 degrees cooler than the surrounding uplands) are ideal for sphagnum moss, which acts as an insulator for the roots of other plants. Plants typically found in bogs include sedges and shrubs such as bog rosemary, Labrador tea, bog laurel, lowbush blueberry, and leatherleaf.

Carnivorous plants like pitcher plants and sundew are common in bogs. Bogs are also home to turtles, frogs, salamanders, and snakes. The spotted turtle and the red-bellied snake are two of the rarer finds in a bog, and they are protected by the State of Michigan.

For more information on conserving fens and bogs

Contact your county Conservation District or Southwest Michigan Land Conservancy at (616) 324-1600.

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Cover photo © Michael Kucinich

Fens, Marshes, and Bogs

Fens, marshes, and bogs need protection

These three specialized wetland systems are considered rare and a high priority for preservation in southern Michigan. They might even be considered "extreme" wetlands, because they occur only under specific conditions related to their source of water and location in the landscape.

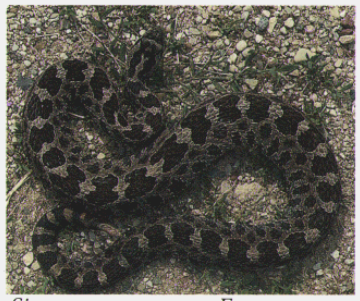
What are prairie fens?

Prairie fens are peat-covered wetlands that are often springy when walked upon. These fens are fed by a constant flow of mineral-rich groundwater that seeps to the surface and flows through and over the accumulated peat. The groundwater, rich in both calcium and magnesium, contributes to the alkaline soil condition. Historically, dry upland communities such as mixed oak savannas were subject to fire, which also burned into the adjacent prairie fens. Plants found in fens are adapted to alkaline soils, periodic fire, and a constant flow of cool groundwater.

Calopogon tuberosus, Grass-pink Orchid
Photo by William Westrate

Why protect these "extreme" wetlands?

- The "extreme" wetland systems are particularly important because they occur only under specific circumstances.
- They are not the type of wetland that can be created, and restoration can be challenging.
- The variety of plants and animals that occupy these systems is unique and specialized.



Sistrurus c. catenatus, Eastern Massassauga
Photo by William Westrate

Typical plants in a prairie fen are big bluestem, Indiangrass, tamarack, shrubby cinquefoil, bog birch, poison-sumac, and many species of sedges and rushes. The extremely alkaline soils limit the variety of plants found in fens, but alkaline-tolerant plants like grass-of-Parnassus, Kalm's lobelia, round-leaved sundew, and pitcher plant may be found. Prairie fens also harbor a number of rare plant species, including Indian plantain, white ladies'-slipper, common valerian, prairie dropseed, and rosinweed.

A number of animals make their homes in or around fens. The Mitchell's satyr butterfly, a federally endangered species, is one of the more special finds in the fens of southwest Michigan. Other common finds are dragonflies, water snakes, and turtles.

There are 85 known prairie fens in Michigan, totaling about 2,000 acres. Although prairie fens are not considered to be globally imperiled, they are often found only in very small, isolated pockets, and good quality sites can be very difficult to find. In the southern Lower Peninsula of Michigan, prairie fens occur primarily in areas with a lot of topographic relief.

Parnassia glauca, Grass-of-Parnassus
Photo by Emma Bickham Pitcher

A look at the Dowagiac River Watershed in the past

A scene along Dowigiac Creek
Photo © Michael Kucinich

Historically, oak savanna and oak hickory forests dominated the sandy uplands of the watershed and beech-sugar maple forests covered the drier soils. There were also a few large pockets of tall grass prairie in the more fire prone areas. The lowland areas were dominated by forested floodplains and other types of wetlands.

As settlers moved into the area, the uplands were quickly converted into agricultural fields. The wetland forests in the northern part of the watershed were eventually cleared and drained so farmers could utilize the rich organic soils.

The drainage of agricultural lands was accomplished with the installation of private drains and the channelization of the Dowagiac River in the early 1900's. The Dowagiac River was channelized from the headwaters in Van Buren County to just north of the Niles dam. This lowered the water table as expected, but also destroyed several natural springs and lakes along the river. The channelization also disconnected the river from its floodplain, made the banks unstable and destroyed stream and riparian habitats.

Did you know?

The City of Dowagiac lies in the deepest part of an ancient lake bed that extended from Grand Rapids to South Bend. This lake was formed by retreating glacial ice.

Rana catesbeiana, Bull Frog
Photo by William Westrate

Almost all of the Native Americans living in Cass County at the time of white settlement were the Potawatomies. They hunted, fished, trapped and cultivated crops in the watershed and other parts of southwest Michigan. The Potawatomies still have an active role in the Dowagiac River Watershed today.

In 1873, Michigan's first fish hatchery was located along the Dowagiac River just north of Sumnerville at the present day Crystal Springs Methodist Camp.

For more information about the Dowagiac River Watershed

River habitat restoration efforts are being coordinated by Partnership for MEANDRS. Watershed planning efforts are being coordinated by the Dowagiac River Watershed Project. For more information contact the Cass County Conservation District at (616) 445-8643 ext. 3. For general information on the watershed, visit www.meandrs.org.

This brochure is funded by a grant from the Michigan Department of Environmental Quality, Surface Water Quality Division. All programs and materials of the Cass County Conservation District are open to all without regard to race, national origin, sex, handicap, age or religion.

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Dowagiac River Watershed

Dowagiac River Watershed Facts

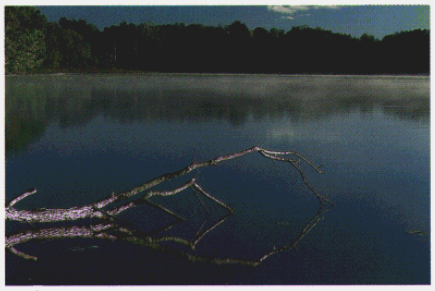
Where is the Dowagiac River Watershed?

The Dowagiac River Watershed is located in southwest Michigan with headwaters in southern Van Buren County. The river then flows through northwest Cass County and enters the St. Joseph River near Niles in Berrien County. The watershed drains about 287 square miles or 181,347 acres. The major tributaries to the Dowagiac River are the Dowagiac Creek, Pokagon Creek, Peavine Creek, McKinzie Creek, Silver Creek, and Lake of the Woods Drain.

Russ Forest along Dowagiac Creek Photo © Michael Kucinich

Are there lakes in the watershed?

Several — in fact, there are 23 lakes larger than 10 acres. Lakes are an important part of the Dowagiac River Watershed. Magician Lake, Indian Lake, Lake of the Woods, Lake LaGrange, Twin Lakes, and Bunker Lake are a few of the many lakes in the watershed.



Lake LaGrange Photo © Michael Kucinich

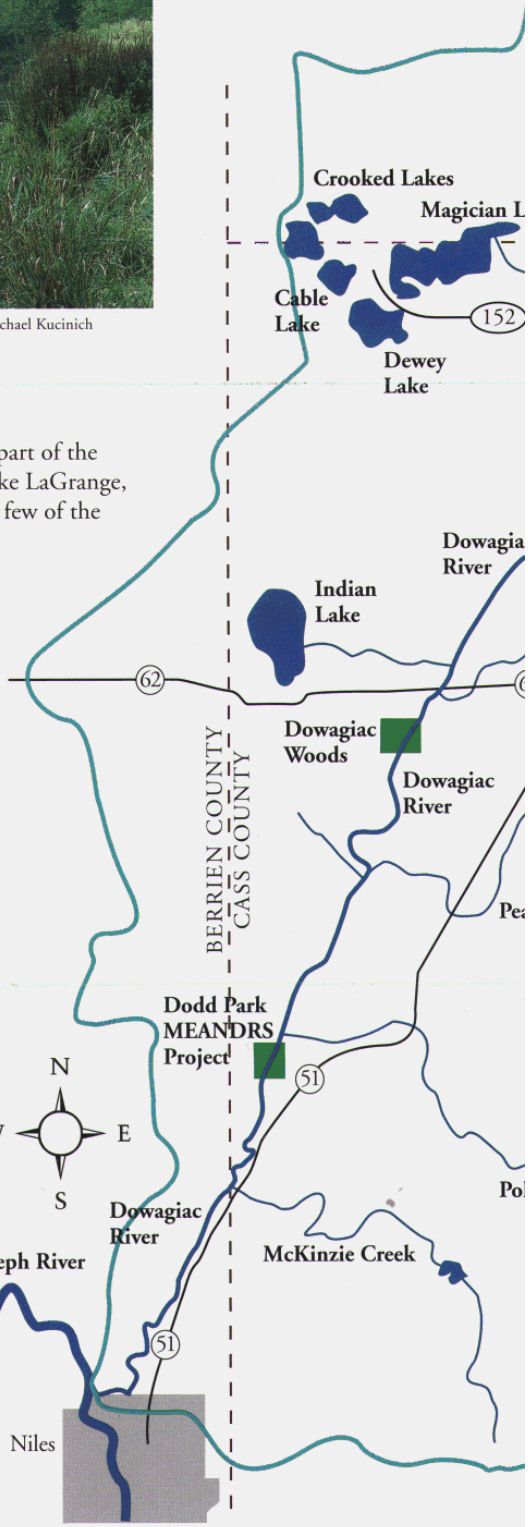
Who has jurisdiction over the land that affects the River and its tributaries?

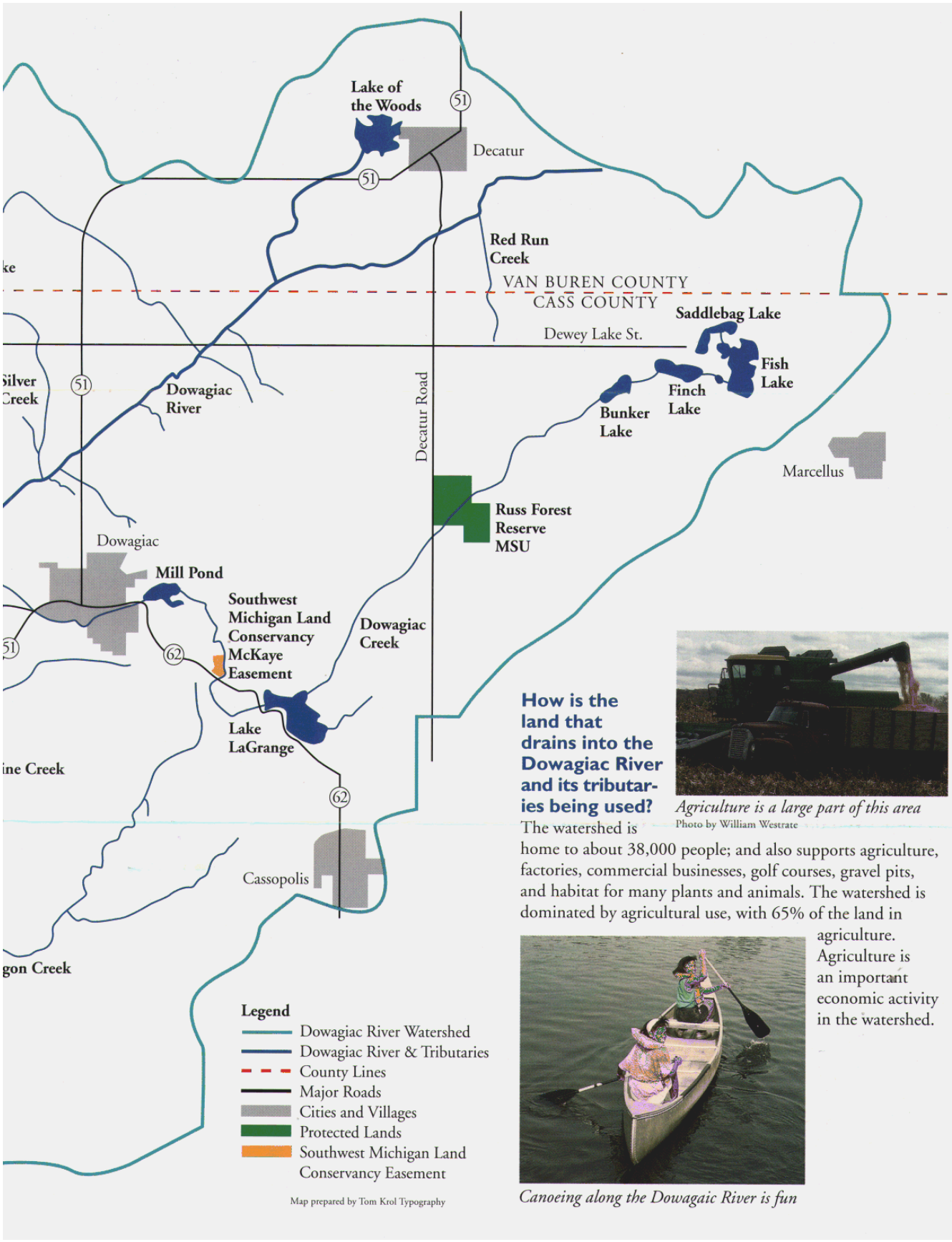
As you can see from the map, the watershed crosses political boundaries of townships and counties. The watershed encompasses all or part of 20 municipalities in Cass, Berrien and Van Buren counties, and include the cities of Dowagiac and Niles, the villages of Cassopolis and Decatur and 16 townships.

Why is the water in the Dowagiac River and its tributaries so cold, even on the hottest days of summer?

The river and its tributaries maintain a year round cool temperature because they are "spring fed." Because of the pervious, sandy soils in the watershed, the river and its tributaries get almost 90% of their flow from groundwater and only 10% from surface run-off. These unique characteristics maintain steady year round flows and high quality cold water temperatures. The shade provided by trees on the banks of the river also help to keep the water cool.

Trout fishing is very good in the cool waters of the Dowagiac River
Photo by Joe Ervin





Agriculture is a large part of this area
Photo by William Westrate

How is the land that drains into the Dowagiac River and its tributaries being used?

The watershed is home to about 38,000 people; and also supports agriculture, factories, commercial businesses, golf courses, gravel pits, and habitat for many plants and animals. The watershed is dominated by agricultural use, with 65% of the land in agriculture. Agriculture is an important economic activity in the watershed.

Canoeing along the Dowagaic River is fun

The Dowagiac River: a gem in southwest Michigan

The Dowagiac River Watershed is unique

The Dowagiac River is a hidden treasure in Michigan, being one of the most heavily groundwater-fed rivers of its size in the state. This unique hydrology supports a cold water fishery that has the potential to rank among the finest trout rivers in the Midwest.

Today the watershed is dominated by agriculture with only a few upland forests and small isolated prairies remaining. However, the lowlands, particularly those along the Dowagiac River and its tributaries, still have a rich array of natural communities. Large tracts of forested floodplain are still found along the main branch of the Dowagiac River. These wet forests harbor a rich variety of wildlife such as wood ducks, tree frogs, salamanders, song birds, wild turkey, spotted turtle, red tailed hawks, and much more.

Salmo trutta, Brown Trout Photo by Tom Krol

The watershed contains pockets of unique wet prairies, grasslands and wetlands that provide habitat for many species of plants, wild flowers, insects, animals and song birds. Prairie fens found in the watershed are home to many rare plants as well as the endangered Mitchell's satyr butterfly.

Asclepias incarnata, Swamp Milk Weed Photo by William Westrate

What is a watershed?

The next time it rains, watch the water run off your roof, your driveway, and down the street. Some of the water soaks into the soil to become groundwater, which slowly replenishes streams, lakes and wetlands. Some runs overland to the nearest stream, lake or wetland. Add up all of the land that drains into the same waterway and you have a watershed. A watershed crosses political boundaries connecting several communities by water.

Our shared responsibility

Each and every person who lives, works and plays in the boundaries of the Dowagiac River Watershed has an integral part in determining its future. The Dowagiac River Watershed is unique and valuable. It is our responsibility to protect and preserve the special features in the watershed. There are many things that we can do to help...

- Attend township and city planning and board meetings — important decisions regarding the use of the land are made at these meetings. How we develop land in the watershed will have a great impact on water quality and natural resources.
- Encourage and support development that is planned and takes into consideration the protection of community character, open space and natural resources.

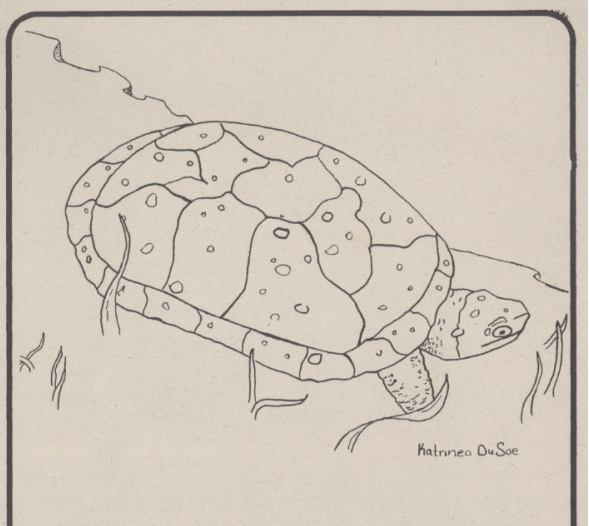
MEANDRS project at Dodd Park Photo © Michael Kucinich

Frank McKaye (shown), and his wife Mildred, placed a conservation easement on their property in Cass County that will permanently prohibit division of their land and protect the natural features of the land forever. Photo by SWMLC

- Dispose of household hazardous wastes properly — call the county MSU extension office for details. Cass: (616) 445-8661, Van Buren: (616) 657-7745.
- Consider placing a conservation easement on your property to protect it forever. Call the Southwest Michigan Land Conservancy for options (616) 324-1600.
- If you are a riparian owner, consider leaving a natural area at least 50 feet wide along streams, ditches, lakes and wetlands. This vegetation will filter and control run-off, provide habitat for wildlife and keep water temperatures cool.
- Be sure to maintain your septic system. Inspect sludge levels every 6 months and pump the tank every 1 to 3 years, depending on your household use.
- Only use fertilizers and pesticides if needed. Have your soil tested to see what kind of fertilizer, if any, is most appropriate. (Call your county conservation district for details).

Marbled Salamander by Dan Ostyn, grade 12. This amphibian is a state threatened species. It is black with silvery crossbands. It is found in the Berrien County portion of the watershed.

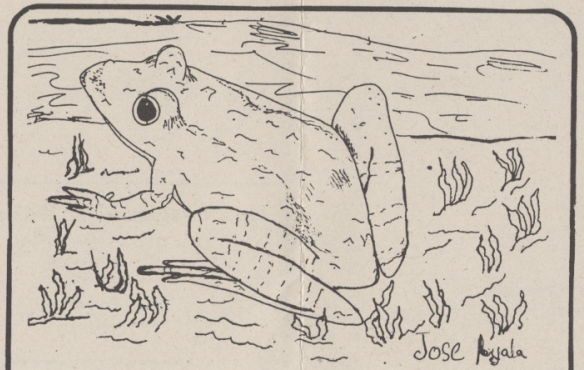
Prairie Trillium by Corey Skorupa, grade 12. This state threatened flower is rarely seen in Michigan but grows frequently in the watershed in Berrien County. Its small upright petals are a maroon color.



Spotted Turtle by Katrinea DuSoe, grade 12. This reptile is listed as special concern in Michigan. It is black with yellow spots. It lives in grassy marshes in the watershed.

COLOR THESE SPECIAL PLANTS AND ANIMALS OF THE DOWAGIAC RIVER WATERSHED

Prairie Vole by Suzanne Sommer, grade 12. This small, mouse-like, state threatened mammal has not been seen in Cass County for 30 years. Most animals that become extinct in an area do so due to a loss of habitat.



Blanchard's Cricket Frog by Jose Ayala, grade 8. This rare amphibian is listed as special concern in Michigan. This small, rough-skinned frog is greenish-brown with hazy, dark stripes on its thigh. It likes sunny, grassy, shallow ponds.

Small Whorled Pogonia by Emily Westendorp, grade 8. It is federally threatened and state endangered. This flower has small white petals enclosed in light green sepals. It is found in the Berrien County portion of the watershed.

Celebrating the 30th Anniversary of Earth Day
April 22, 2000

Watershed Facts

✓A watershed is a drainage basin or area of land that drains into a common marsh, stream, river, lake or groundwater.

✓The Dowagiac River Watershed is 287 square miles in size and encompasses all or part of 16 townships, two cities and two villages.

✓The headwaters of the Dowagiac River are in southern VanBuren County, the river flows through northwestern Cass County, and it joins the St. Joseph River in Berrien County.

✓The Dowagiac River System exhibits cold year-round temperatures and stable year-round flows which make it unique and the only of this caliber in southern Michigan.

✓The Dowagiac River has the potential to rank among the finest trout rivers in the Midwest.

✓The Dowagiac River Watershed contains sensitive animal and plant remnants representative of pre-settlement prairies, wetlands, and forests.

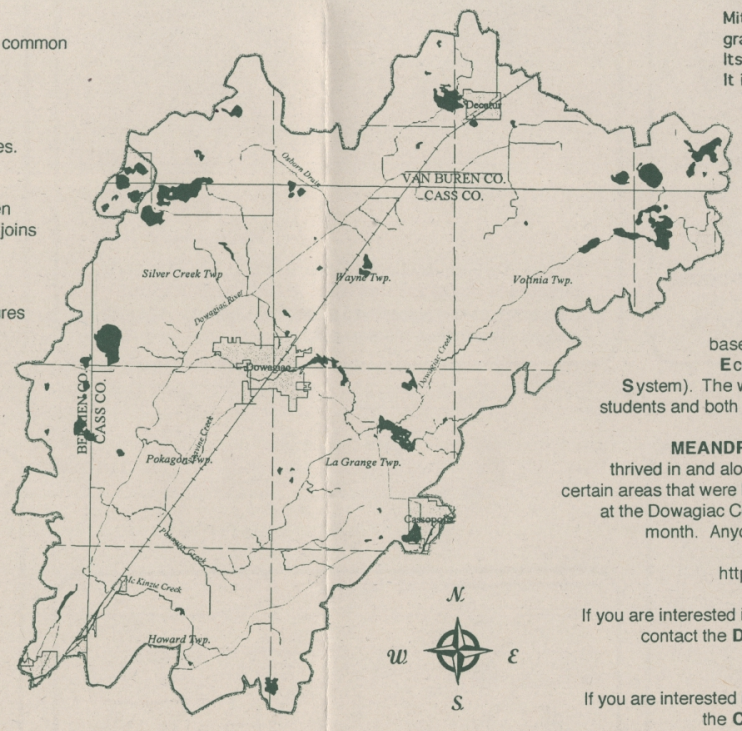
✓The Dowagiac River Watershed is worth protecting. It supplies us with groundwater for drinking; lakes, rivers and streams for recreation; farmland and beautiful natural areas.

✓Our actions throughout the entire watershed will affect the quality and quantity of water in the river and the groundwater.

✓Invasive plants and animals threaten our watershed. Purple Loosestrife, a tall, purplish pink flower is so aggressive that it will crowd out all native plants including cat tails. The zebra mussel is also found here in our inland lakes. These accidentally introduced species have no competition and contribute to a loss of diversity and health in our ecosystem.

✓With the help of Michigan State University, the Dowagiac Union High School biology classes have been participating in "The Purple Loosestrife Project" by raising beetles that will biologically control the loosestrife without harming other plants.

The Dowagiac River Watershed



The Dowagiac River Watershed

- Watershed Boundary
- Urbanized Area
- River/Drain
- Primary Highway
- Railway

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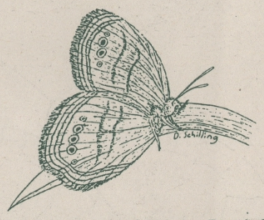
Miles
Southwestern Michigan Commission - Jan. 98



Mitchell's Satyr *(Neonympha mitchelli)* by Derek Schilling, grade 8. This butterfly is state and federally endangered. Its color is tan with black dots surrounded by yellow halos. It is found in wetlands in the watershed.

About the Placemat

This student-made, educational placemat is a partnership project between the **Dowagiac Education Association** and the citizen based organization, Partnership for **MEANDRS** (**M**eeting the **E**cological and **A**gricultural **N**eeds within the **D**owagiac **R**iver **S**ystem). The watershed facts were researched by Central Middle School students and both middle and high school art students drew the illustrations.

MEANDRS' focus is to restore the coldwater ecosystems that once thrived in and along the river by reconnecting old meanders and "restoring" certain areas that were historically dredged and straightened. **MEANDRS** meets at the Dowagiac Conservation Club at 7:30pm on the second Tuesday of the month. Anyone interested is invited to attend. Check out MEANDRS' homepage to learn more. http://members.tripod.com/Agusbear/MEANDRS/Index.html

If you are interested in sharing your knowledge of the watershed with students, contact the **Dowagiac Union Schools** and talk to a science teacher. (616) 782-4400

If you are interested in helping to protect surface water or groundwater, contact the **Cass County Conservation District.** (616) 445-8643

If you own land with natural areas and are interested in protecting or preserving its character, contact the **Southwest Michigan Land Conservancy.** (616) 324-1600

The **Dowagiac Education Association** and **MEANDRS** would like to thank all those who made this placemat project possible including the restaurants who voluntarily supported us with its distribution.

Color the special plants and animals on the reverse side.

East Fork Area

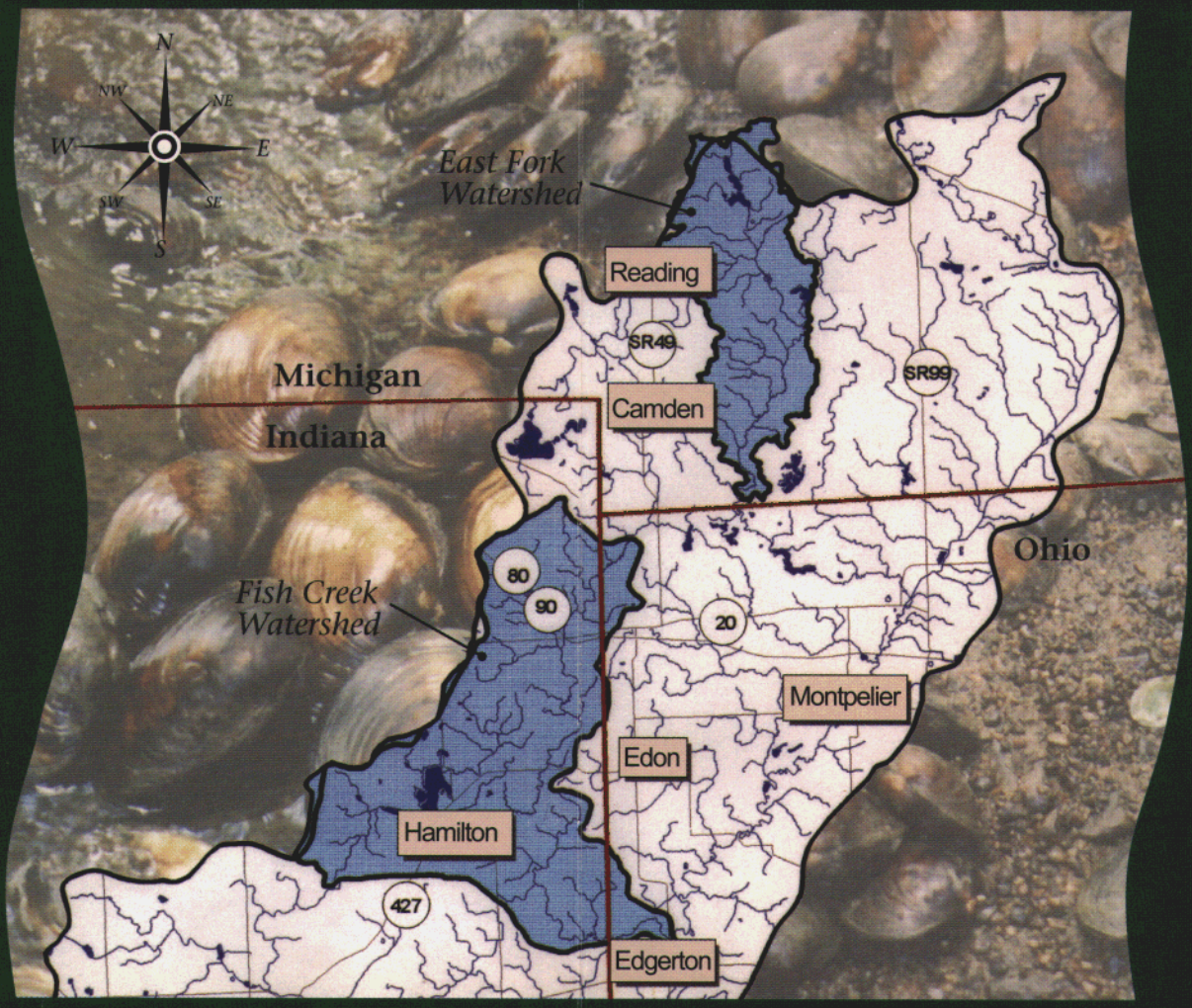
System: The East Fork of the West Branch of the St. Joseph River is very similar to Fish Creek in that it contains a great diversity of fresh water mussels, 15 species, including the federally endangered Cubshell. The East Fork drains approximately 35,000 acres of agricultural land located in Hillsdale County, Michigan.

Stressors: Although the water quality of the East Fork is very good as indicated by the mussels that live there, keeping it clean is the challenge. Sediments and nutrients slowly degrade the habitat and water quality, thus disrupting life cycles of the aquatic organisms. Hydrology alterations change the flow characteristics of the creek, thus destabilizing stream banks and natural flows during dry periods.

Sources of Stress: The sources of stress to the East Fork system are similar to those of Fish Creek and are all derived from use of natural resources within the watershed. The following are, in order of priority, the sources of stress to the quality of East Fork: nonpoint source pollution (soil erosion from exposed agricultural fields, stream bank erosion, livestock operations, and urban land uses); disrupted riparian corridor (the conversion of the forested riparian corridor to cropland); and stream channel dredging, excessive groundwater removal/inadequate ground water recharge.

Strategies: A local Advisory Group is guiding the project and helping to develop strategies. One strategy being used is reforestation of the land along the East Fork to buffer the creek. Additionally The Nature Conservancy is also working with area farmers to fence livestock from sensitive areas along the creek and its tributaries.

Measuring Success: We monitor land use changes such as adoption of conservation tillage and progress of the reforestation of the floodplain. The biological community, including insects, fish and mussels of the creek, is monitored on an annual basis to determine the effectiveness of the project.



Upper St. Joseph River Project Map

Since 1992, The Nature Conservancy has operated a Fish Creek Project office. The Upper St. Joseph River project is a natural expansion of the Nature Conservancy's work in this region. The project area includes Fish Creek and the St. Joseph River upstream from Fish Creek. Recent surveys have identified the East Fork of the West Branch of the St. Joseph River as having a mussel community with near equal quality to Fish Creek. The total project area of the St. Joseph River is more than 350,000 acres. Initially, The Nature Conservancy will focus on Fish Creek and the East Fork of the West Branch reducing the project area to 105,000 acres.

UPPER ST. JOSEPH RIVER NEWS

The Nature Conservancy
1220 North 200 West, Ste G * Angola, Indiana 46703 * (219) 665-9141

The Nature Conservancy
INDIANA CHAPTER
Saving the Last Great Places

July 2000

Since 1992, The Nature Conservancy has operated a Fish Creek Project office in Angola, Indiana. In 1999 we expanded our area of work to include the Upper St. Joseph River Watershed. The project area includes Fish Creek and the St. Joseph River upstream from Fish Creek. Recent surveys have identified the East Fork of the West Branch of the St. Joseph River as having a fish and mussel community with near equal quality to Fish Creek. The total project area of the St. Joseph River is more than 350,000 acres. Initially, The Nature Conservancy will focus on Fish Creek and the East Fork of the West Branch reducing the project area to 105,000 acres.

Upper St. Joseph River Map

The Fish Creek Watershed is approximately 70,000 acres in Steuben and DeKalb counties in Indiana and Williams county in Ohio

The East Fork Watershed is approximately 35,000 acres in Hillsdale County, Michigan

Joe Draper - Field Representative

Joe is the new field representative for the Upper St. Joseph River watershed project and will be replacing Angie O'Neill. He is a recent graduate from Michigan State University with a degree in Agronomy and Soil Sciences and a minor in agri-business management. He has a working knowledge of farming practices and equipment and is excited about working with all of you. Joe is a resident of the area and lives just outside the east fork watershed. He is from Hillsdale County, Michigan, where he helps with the family farm near Osseo. He will be working with area landowners to develop land management practices to stabilize the St. Joseph River watershed. Joe is anxious to meet with all of you and help in any way that he can.