



Michigan **SCHOOL Forest Guide**

GROWING a SCHOOL Forest
FIRST Edition 2018

MICHIGAN SCHOOL Forest Guide

Something For Everyone!

RECREATIONAL THERAPY
SCIENCE
DENDROLOGY PHYSICAL FITNESS
ART LANGUAGE ARTS
BIOLOGY HISTORY AGROFORESTRY
SOCIAL STUDIES AGRICULTURE ECOLOGY
TECHNOLOGY
GPS ENGINEERING
POLITICAL SCIENCE

Use this Guide to Grow Your OWN School Forest

*Front Cover: White Pine Cones, Michigan's State Tree, *Pinus strobus*
Back Cover: White Pine Bark

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What is a School Forest?



Beechview Elementary School students

What is a School Forest?

A school forest is simply a forest that is owned or leased by a school. School forests can be small 1-acre woodlots in urban areas or huge 1,000-acre forests in rural areas. What makes school forests unique is their potential to help students learn and discover new things outside the four walls of a traditional classroom. Creative teachers can use a forest to help their students discover new things in any subject or class. Creative administrators can use school forests to develop their students' future job skills and maybe even fund a few school projects in the next fiscal year.

School forests are also unusual because they are often public land and managed by groups rather than individuals. Public ownership and group management complicates the already difficult task to be good stewards of natural resources. The advantages and benefits of school forests far outweigh the challenges.




History and Extent of Michigan School Forests

This guidebook was inspired when a fire officer for the Department of Natural Resources (DNR) found a 1954 Michigan State University Extension (MSUE) publication called "School Forests: Their Educational Use" in his father's basement, a retired DNR forester. That old MSUE bulletin tells the story of Negaunee Schools in Marquette County pioneering the first school forest in Michigan in 1925. Michigan State University held a conference in 1929 about the educational benefits of public school forests. The State of Michigan responded to this interest and passed a law in 1931 that allowed the Department of Natural Resources to give surplus land to schools and other municipal governments. Many schools obtained school forests and by 1954 there were 650 schools owning 70,000 acres of school forests in Michigan.

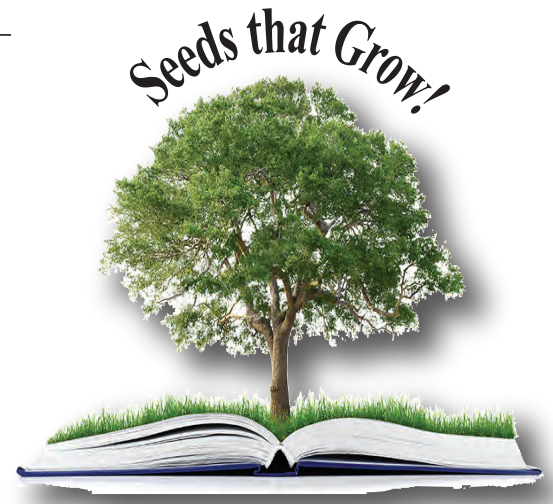
It is unknown exactly how many schools in Michigan have a school forest in 2018. The most recent tally had the total number at 230 schools, but it is estimated that hundreds more schools bought forests or were given forests by landowners other than the State of Michigan. We hope that readers will contact schools in their city or county to find other nearby schools that also have a forest.

The Need for this Guide

School forests all over Michigan share at least three common problems:

-  First, school forests are under-utilized by educators. Teaching is a difficult, high-pressure profession and it is hard to find time in the curriculum to take students outside into a forest.
-  Second, school forests are not managed well by administrators. Nobody became a principal or superintendent because he/she wanted to manage an 80-acre forest. Managing land is complex and outside the professional duties for school administrators.
-  Third, teachers and administrators are unfamiliar with the resources to help them better utilize their school forest. It can be challenging to find relevant outdoor education curricula and even the internet can't find professional foresters who work near your school.

This guide is designed to help schools address common problems and uncertainties.



Negaunee Public Schools in Michigan's Upper Peninsula (Marquette County) was the very first Michigan school to start a school forest in 1925.

Benefits of a Strong School Forest Program

Benefits to Students

- Foster a sense of pride and belonging
- Recreation and physical activity in the great outdoors
- Develop research, communication, problem solving, consensus building, and leadership skills
- Real-life, hands-on experiences in responsible citizenship and citizen science
- Explore complex environmental issues and observe relationships in nature
- Develop knowledge of natural resource conservation, management and stewardship
- Achieve shared goals with groups of people working together
- See the connection between academic studies and real-life experiences
- Connect students to people in the community
- New ways of learning including cooperative learning, active learning and service learning
- Develop care and concern for the environment and establish environmental values and ethics
- Thrive in a stimulating and familiar environment

Benefits to Teachers

- Professional development and State Continuing Education Clock Hours (SCECH)
- Model care for the environment instead of simply talking about it in class
- Infuse environmental education into curriculum
- Address state and national academic standards
- Explore creative teaching methods and techniques
- Observe students in a different context
- Potential for challenging or at-risk students to blossom in the outdoors
- Problem-solving and group learning with peers
- Networking with colleagues throughout the state
- Learn alongside their students in a new setting
- Promote interdisciplinary studies that infuse new life into common subjects
- Location for long-term environmental monitoring

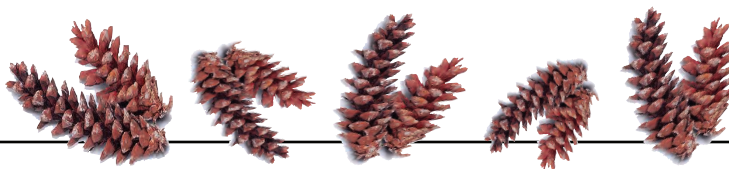
Benefits to the School District

- Enhance public relations between the school and community
- Offer space for community recreation
- Produce occasional income through timber harvests
- Showcase employment opportunities in natural resources with nearby employers
- Provide a wide range of educational offerings for students and teachers
- Limit liability with written advice and guidance from professional foresters
- Implement environmental education plans
- Leverage grant funding opportunities for outdoor education

Adapted from “How to Grow a School Forest: A Handbook for Wisconsin Educators” produced by LEAF, Wisconsin Forest Resources Education Alliance and Wisconsin Environmental Education Board.



Goals for Readers



The first goal for this guide is to inspire schools to get outside and use their forest. Forests are places of beauty and wonder for your students to discover. This guide offers ideas and resources for teachers to expand the use of their school forest for education and recreation.

The second goal for this guide is to connect schools with other schools that have forests or provide outdoor education for their students. Our list of schools with school forests is growing so please reach out to neighboring schools in your city or county to find other school forests and outdoor educators. We encourage you to network with other educators which will help you find the resources your school needs. School forests are common in Wisconsin and Minnesota so consider networking with schools in nearby states also.

The third goal for this guide is to make connections between the forestry and education communities. There are hundreds of foresters in Michigan who are available to help schools manage, protect and enjoy their school forest. Foresters provide professional guidance to school boards and administrators who may have to make decisions that are controversial in the community.

This guide is not a “Forestry 101” textbook trying to get educators to become foresters. Instead, this guide seeks to help classroom and non-traditional educators find professionals who can help them manage their forest. Foresters are a great resource for writing Forest Management Plans in order to help schools manage their complex forest ecosystem. Hopefully this guide will inspire connections between great educators and foresters to help students discover their school forest.



Suggested Activity:

Form a Student Advisory Committee

One of the best things that teachers and administrators can do is include students in the process of managing their school forest. Students have great ideas and lots of energy to get projects done. Students will also benefit the most from interacting with natural resource professionals and others in the community on school forest projects. If your school has a “forestry board” to manage the forest, start including students in the meetings and decisions. Students can also make presentations to the school board, which often has the final say in how school forests are used and managed.

Resources for Teachers and Administrators

Michigan State University Extension – www.canr.msu.edu/natural_resources

Michigan State University Forestry - www.canr.msu.edu/for

Michigan Technological University Forestry - www.mtu.edu/forest

Michigan Department of Natural Resources – www.Michigan.gov/DNREducation

Michigan Society of American Foresters - www.michigansaf.org





Michigan Connection:

West Side Christian School



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est Side Christian School in Grand Rapids is doing great things with their small school forest in an urban area.

The school's 5-acre forest is called the Brian Dyk Nature Preserve in honor of the teacher who championed the use of the forest. The school uses their small urban forest to make real-world connections to students learning.

West Side Christian is using their school forest as a tool to engage students in meaningful, hands-on, nature-based learning. Students regularly experience outdoor learning experiences by exploring the school forest. West Side has been transforming their forest, in partnership with Blandford Nature Center, to enhance how the school utilizes it as an outdoor classroom. A community-wide invasive species removal project reignited a vision to use the forest every day as outdoor classroom space for their Nature Preschool program.

Principal An Kurosu explains the value of their Nature Preschool, "Outdoor learning creates a unique way for students to explore and understand their world around them. Students get hands-on experience and expand their knowledge of what is learned in their classroom."

West Side Christian School hired Janet Staal to be their Director of Outdoor Education to develop

place-based student experiences and help teachers get their students into the woods. Janet previously worked as an outdoor educator for nearby Blandford Nature Center.

Janet met a consulting forester at the Michigan Science Teachers Association and realized that the school could use some professional advice. The school hired Jason Darling of Darling Forestry LLC to develop a Forest Stewardship Plan for the school forest. A grant from the Department of Natural Resources covered the cost to hire the forester.

Janet says, "Once the school has a forest management plan in place, we'll work to connect grade level content objectives to the needed restoration efforts of this special forested area. Imagine reading, writing, math, science, music, Bible and technology education connected to hands-on conservation efforts! Our school forest provides students an opportunity to impact the community through community-wide education and increased biodiversity. It's literally education for the future."

West Side Christian School is also including their neighbor, KEC Oakleigh public school, in the expanded use of their school forest. KEC Oakleigh is right across the playground from West Side so it is easy for both schools to access the forest for learning and recreation.

SCHOOLS Without a SCHOOL Forest



Getting in Touch With Trees at Hartwick Pines State Park

Schools Without a School Forest

Hundreds of schools in Michigan own forests, but many more schools do not have their own forest. If your school does not own a forest, you still have many opportunities to bring students outside into the woods. It is possible for schools to obtain forests from donors or the State of Michigan, but it will be far less work to simply visit nearby forests that your school does not have to own and manage.

Small is Beautiful. Are you *sure* that your school doesn't own a forest? Some schools have forgotten that they owned land that was far away from their main campus. Check with your administrators and county offices to see if your school owns land in a far-off corner of your county.

Please don't think that you need 640 or even 40 acres to have a school forest. According to the United States Forest Service definition of a forest, the minimum area of a forest is only 1 acre. Many schools might have small woodlots or natural areas on their campus that exceed 1 acre of woods. School forests do not have to be large to be useful. Small woodlots are great places for exploring and learning lots of things. The author David Haskell spent a whole year studying and discovering one square meter of forest in his book, "The Forest Unseen" so don't overlook the beauty and potential of small forests.

Visit a Forest. Michigan has forests in every city and county so there are many nearby forests your school can visit. Michigan has 8 million acres of public forest owned by local, state or the federal government. Anybody can go visit public forests, including schools. Ten Michigan State Parks have Visitor Centers that offer educational programming about forests and the animals that live in them. Find a visitor center in your area by visiting the DNR website at: www.michigan.gov/dnr and clicking on the *Places to Go* tab. Many cities and counties, even in the mostly urban southeast part of our state, have large parks that include public forests for everyone to explore. Ask nearby schools that have a forest if you can visit their school forest.

Private landowners own 12 million acres of forest in Michigan. Many of our 400,000 family forest owners and corporate landowners would love to have schools visit their forest. Do any of the students in your class have grandparents who own a forest nearby? If not, there are many ways to connect to private forest landowners near your school. The Michigan Forest Association or the Michigan Tree Farm Committee can connect you with one of their members who own forests. The Michigan Forest Products Council can connect you with forest products companies that own land near your school. Many nature centers offer educational programs in their forests.



Communication and Media Arts High School of Detroit enjoying Hawk Woods Nature Center

Ask for a Forest. If your school would like its own forest, Alumni living in your community might consider donating land to the school. Several hundred schools got their forests from the State of Michigan after the 1932 Municipal Forest Act allowed the DNR to give surplus land to nearby schools and local governments. Although possible it is not very likely schools can still obtain surplus land. This law has been updated several times and incorporated into the Natural Resources and Environmental Protection Act (Public Act 451 of 1994) and more information is available at www.Michigan.gov/LandForSale.



Suggested Activity: Visit a nearby forest. Forests are like yachts - it is often better to have friends with one than to own one yourself. Don't worry about not having your own 160-acre school forest to manage. Instead, go play in a neighbor's forest and leave when you want to (with permission).

Resources for Teachers and Administrators

Where to Go?

- The DNR offers 103 State Parks for you to explore - www.Michigan.gov/StateParks
- Michigan has 4 million acres of state forest you can visit - www.Michigan.gov/Forestry
- There are 3 million acres of National Forests in Michigan.
 - Ottawa National Forest - www.fs.usda.gov/ottawa
 - Hiawatha National Forest - www.fs.usda.gov/hiawatha
 - Huron-Manistee National Forest - www.fs.usda.gov/hmnf
- Nature Centers - https://en.wikipedia.org/wiki/List_of_nature_centers_in_Michigan
- City or County Parks
 - Call your city or county recreation department to find a nearby forest.
- Michigan Forest Association – www.MichiganForests.org
 - 400 nice grandparents that would love to have you visit (and provide cookies)
- Michigan Tree Farm System – www.TreeFarmSystem.org/Michigan
 - 900 landowners with forests certified as well-managed
- Michigan Forest Products Council – www.MichiganForest.com
 - Corporate landowners and sawmills that will provide 100,000 jobs for your students after they graduate



How to Get There?

- Wheels to Woods provides funding to pay for transportation costs for an educational field trip. Any PreK-12 school in Michigan is eligible for funds to go on a field trip to a school forest, private forest, public forest or forest products company. Wheels to Woods is administered by the Michigan Tree Farm Committee with funding from forest products companies and the US Forest Service. Application forms and more information can be found at: www.WheelsToWoods.org.

Who can help?

- Connect with other teachers trained in the outdoor education curricula described in Chapter 3
- Ask a forester to explain forest ecology or management – www.MichiganSAF.org
- Ask a logger to show you how they cut down trees – www.Timbermen.org
- Ask a Conservation District forester to host a trip – www.Michigan.gov/MIFAP



Michigan Connection:

The James and Grace Lee Boggs School



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hen schools do not have access to their own school forest, they are able to utilize local nature centers, nature preserves, state and federal land in order to go on educational field trips that get their students out and enjoying the forest.

This is especially common in southeast Michigan, where there are many urban and suburban schools who rely on these options that deviate from a school-owned forest.

Wheels to Woods (WTW) is a grant-funded program which allocates funding for schools who apply to go toward transportation costs in order to get students out and learning about Michigan's forests. The program grants up to \$350 per bus or \$1,000 per school and the program has gained popularity since it began in 2016.

Thirty-seven 6th-8th grade students from The James and Grace Lee Bogg School in Detroit received a WTW grant and were able to visit the

US Fish and Wildlife Service's Detroit River International Wildlife Refuge in April, 2018. The students had the opportunity to see a transition between a new growth and an old growth forest, and many of the students recounted enjoying discovering trees that were 300 years old. Students were able to learn the names of a variety of different tree species and were able to grasp the concept of why land management is important.

One of the teacher's goals was for her students to gain exposure to the ecosystems that they were learning about in class, and had this to say about the experience: *"For many of our students, this was a first exposure to a wildlife refuge and being out in nature all day. For some of our students, this was not new, and something they already enjoy. I could see a transformation happening over the course of the day through the building of confidence and students allowing themselves to feel the wonder and joy of nature".*

Educational Value of School Forests



Campers and counselors with Opportunities Unlimited for the Blind become a 'Tree Factory'

Out of the Classroom and Into the Woods








Ada Takacs and camper learning about leaves at Camp Optimist

The most important use of a school forest is the education and enlightenment of students. Forests provide many educational benefits to students, teachers, administrators and the community.

Creative educators can use a school forest to get students interested in any subject that is normally taught indoors in front of a computer screen or blackboard. Forests help schools accomplish several key educational objectives and offer unlimited educational opportunities for all grade levels. Every subject can be enhanced by one small plot of land - school forests offer something for every class.


School Forests Have Incredible Value. They help:

-  **Meet state education standards.** School forests help to meet diverse state-mandated education standards including science, language arts, math, social studies, environmental education and agriculture education. School forests are perfect for developing science, technology, engineering and math (STEM) curriculum.
-  **Integrate environmental education into the curriculum.** Using the environment as a theme across subject areas can increase standardized test scores, improve attendance and decrease behavior problems. Environmental education isn't another subject area, but an approach that can help students learn across the entire curriculum. School forests are valuable assets that are an extension of the classroom used to enhance learning through hands-on, experiential approaches.
-  **Connect teachers and students to place.** School forests localize education and connect students to their natural and human communities. Forests are an alternative to the standardized and nationalized approaches to education and increase the time spent outdoors by children. A "sense of place" in education is essential to help children grow up to be good stewards of the land and productive community members. Author and traditional farmer Wendell Berry once said, "If you don't know where you are, you don't know who you are."
-  **Demonstrate sustainable natural resource management.** Forests supply ecological, economic and social benefits now and for future generations. School forests provide opportunities for students to learn how to care for the land and manage our natural resources. Adults should allow students to play an integral role in the management of their school forest through developing management plans, implementing management activities and utilizing products from their forest. School forests help young people understand the relationship between their lives and nature.
-  **Strengthen school and community relationships.** School forests are an informal setting for parents, businesses and community members to become more involved in education. School forests are community resources for public recreation, educational events, demonstration sites, and leverage for grant funding to launch meaningful projects.

Adapted from "How to Grow a School Forest: A Handbook for Wisconsin Educators" produced by LEAF, Wisconsin Forest Resources Education Alliance and Wisconsin Environmental Education Board.

Suggested Activities: Incorporate outdoor education into every class

School forests can enhance every subject from science to social studies and beyond. Consider sharing lessons from the following list of state and national programs. Those with green ribbon symbols earn educators SCECHs.

	<p><u>Project Learning Tree (PLT)</u> <i>Project Learning Tree is an award-winning environmental education program that uses forests as a window to the world. PLT activities empower educators to inspire youth from preschool through Grade 12.</i></p> <p>Websites: www.plt.org or www.michiganplt.org</p> <p>Program Coordinator: Ada Takacs Michigan Department of Natural Resources Forest Resources Division takacs@michigan.gov</p>
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	<p><u>Project WILD</u> <i>Project WILD links educators and their students to local wildlife & habitat through environmental education professional development for educators from preschool through Grade 12.</i></p> <p>Websites: www.projectwild.org or www.michigan.gov/michiganprojectwild</p> <p>Program Coordinator: Natalie Elkins Michigan Department of Natural Resources/Education Specialist Marketing and Outreach Division elkins@michigan.gov</p>
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	<p><u>Salmon in the Classroom (SIC)</u> <i>Teachers and students receive fertilized salmon eggs from a DNR fish hatchery in the fall, hatch them, feed and raise the fry through spring and release the young salmon into a local river.</i></p> <p>Website: www.michigan.gov/sic</p> <p>Program Coordinator: Tracy Page Michigan Department of Natural Resources Aquatic Education Coordinator pageT3@michigan.gov</p>
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Academy of Natural Resources



Academy of Natural Resources (ANR)

The Academy of Natural Resources offers educators the opportunity to learn about Michigan's diverse natural resources, discover current trends in their management and experience activities that bring knowledge to the classroom.

Website: www.michigan.gov/anr

Program Coordinator:

Kevin Frailey
Michigan Department of Natural Resources
Education Services Manager
fraileyk@michigan.gov



Project Wet

The goal of the Project WET program is to facilitate and promote the awareness, appreciation, knowledge, and stewardship of water resources through the development and dissemination of classroom ready teaching aids and the establishment of state and internationally sponsored Project WET programs.

Website: www.gvsu.edu/wri/education/michigan-project-wet.19.htm

Program Coordinator:

Dr. Janet Vail
GVSU Annis Water Resources Institute
vailj@gvsu.edu



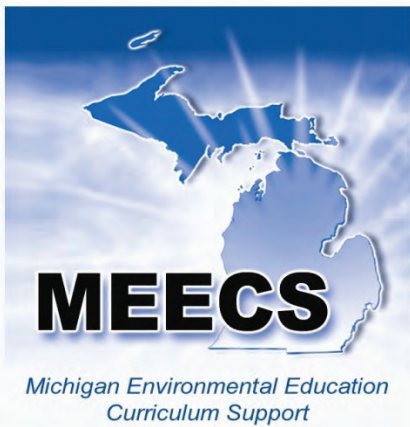
Project F.I.S.H (Friends Involved in Sportfishing Heritage)

Project FISH is an educational program for youth and families sponsored locally by schools, fishing conservation organizations, others interested in fishing and our fisheries. Our vision is to initiate and provide fishing education and fishing skills to interested adults and youth from Michigan's many diverse populations.

Website: www.projectfish.org

Program Coordinator:

Mark Stephens
mark@projectfish.org



Michigan Environmental Education Curriculum Support

The goal of MEECS is to provide students in grades 3 through 9 with an opportunity to learn more about their environment through lessons in Science and Social Studies. The MEECS curriculum consists of seven different curriculum units: Air Quality, Climate Change, Ecosystems & Biodiversity, Energy Resources, Land Use, Land and Environment, and Water Quality.

Website: www.michigan.gov/meecs

Program Coordinator:

Thomas Occhipinti

Michigan Department of Environmental Quality

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Leopold Education Project

LEP is an environmental education curriculum based on essays in Aldo Leopold's A Sand County Almanac. Targeted mainly to middle school and high school students, it can also be adapted for use with families, adults and elementary age children.

Website: www.aldoleopold.org/teach-learn/leopold-education-project/

Program Coordinators:

Gail Luera – U of M-Dearborn – grl@umich.edu

Jerry Pease – Watersmeet – jpease7667@gmail.com



MAEOE Environmental Educator Certification

Michigan Alliance for Environmental and Outdoor Education developed the premiere certification for new educators and career professionals by providing the opportunity to invigorate and align their professional objectives and set goals to improve Michigan's environmental education.

Website: www.maeoe.com/get-certified

Program Coordinator:

Cindy Fitzwilliams-Heck – eecmaeoe@gmail.com





Michigan Envirothon:

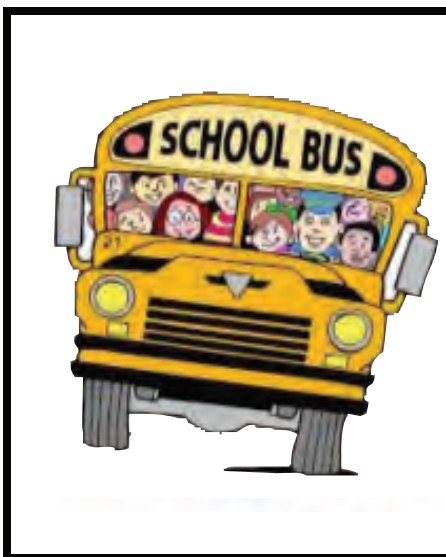
Teams of up to five students and one alternate member utilize resource materials and local resource professionals to gain a knowledge and understanding of the following natural resource subject areas: Agriculture, aquatic, ecology, energy, forestry, soils/geology, wildlife, and a current environmental issue that varies every year. The Michigan Envirothon program focuses on using the outdoors as a classroom and utilizes diverse “eco-stations” as competition testing sites.

Website: www.macd.org/ME/about-envirothon.html

Program Coordinator:

Angela Sandusky

angela.sandusky@macd.org



Wheels to Woods

Wheels to Woods provides funding to PreK-12 schools and other youth groups to pay for transportation costs for an educational field trip to a nearby forest or forest products company. Any PreK-12 school in Michigan is eligible to apply for funds. W2W reimburses actual transportation costs up to \$350 per bus and \$1,000 per school.

Website: www.wheelstowoods.org

Program Coordinator:

Mike Smalligan

Michigan Department of Natural Resources

Forest Resources Division

smalliganm@michigan.gov





Michigan Connection:

Clarkston Community Schools

Students at Clarkston Community Schools in Oakland County are doing a lot of innovative things to expand the educational use of their school forest.

Their school forest includes 26 acres owned by Clarkston Community Schools and another 4 acres owned by the township. The school forest is part of the Early Childhood Center campus and just a ten-minute walk from Renaissance High School, the alternative high school in Clarkston.

Clarkston Renaissance High School students created an outdoor learning lab for all K-12 students to use in their school forest. Suzanne Miller, science teacher at RHS, inspired the students to tackle a lot of projects to establish this outdoor lab. Students removed 2 tons of trash from the woods and started clearing invasive plants. They identified tree species and created *Who Am I?* tree identification signs. Students constructed the outdoor lab, bird houses, nesting boxes and picture frames for trail signs. The Renaissance students also made scavenger hunt activities for Early Childhood students.

Clarkston Community Schools celebrated the opening of the outdoor lab by hosting all Young Five and Early Childhood students to introduce them to the wonder of nature. A Wheels to Woods transportation grant allowed several schools in the district to attend.






The school forest has also expanded partnerships in the community. The Clarkston Farm & Garden Club paid for all K-6 teachers to get trained in Project

Learning Tree and Project Wild. Middle and high school science teachers were already trained in PLT.

Staff at the local Ace Hardware helped students design and build several projects. Geometry students made birdhouses, picture frames and tree identification signs. Art students created original artwork inspired by the forest. Music students designed and built musical instruments with pipes from Ace Hardware.

Technology students are making phone apps detailing the birds and trees in the forest for the Young Five and Early Childhood teachers. The Clarkston school forest provides educational opportunities for each grade level and class.

Clarkston Community Schools has five goals for their school forest:

-  Encourage students to become active learners and effective thinkers who are eager to create, innovate and become environmental problem solvers.
-  Develop responsible actions to improve and preserve the environment while keeping the natural setting as undisturbed as possible.
-  Facilitate RHS students taking ownership of the outdoor lab, including the building of structures and maintaining the integrity of the environment.
-  Make the outdoor area more accessible and attractive for the citizens of Clarkston who walk or jog along the trails.
-  Build a partnership between Renaissance students and the Young Five and Early Childhood students.

Recreational Value of School Forests



Students from Kalkaska Public Schools enjoy their school forest

School Forests Provide Many Recreational Opportunities

Athletics

Trails for the cross-country teams are the most common recreational use of school forests. Forests make interesting and challenging courses for recreational and competitive runners. Forests also pose unique safety risks for running. Be sure to identify or remove large roots that are tripping hazards. Coaches should also look up to watch for dead branches or other hazards overhead.

Obstacle Courses

School forests are great places to offer physical education. Phys ed instructors can work with the outdoor educators to plan and build an exciting and challenging obstacle course. This fitness resource is available all year long for students and neighbors to build a healthier school and community.

Trails

Walking trails are an ideal way to get the community to use the school forest. People of all ages and abilities enjoy the aesthetic benefits of trails in beautiful forests. Building and maintaining trails are ways to increase community involvement with the school. The school should develop and post guidelines about community use of the school forest to reduce vandalism, smoking or littering in the school forest. Signs, fences and landscaping can help direct public access and use of the school forest.

Nature Playscapes

Nature playscapes use natural elements such as water, rocks, sand, wood, plants and soil to establish play areas. Natural playscapes create safe, sustainable eco-friendly areas that shape the way students view and interact with nature. Natural features keep children engaged and help them get in touch with nature. Examples include using tree stumps as stepping stones, building slides out of hillsides, creating a sand box and constructing “streams” from rocks and logs.

Camping

School forests provide opportunities for students to discover new adventures like camping overnight in the woods. Camping helps students bond with classmates outside of the classroom and learn valuable life lessons. Camp fires provide teaching moments to discuss invasive species and not transporting insects or disease in firewood. Pay attention to the weather to ensure that students have a safe and enjoyable camping experience.

Hunting, Fishing and Birdwatching

The most common recreational use of forests in Michigan are hunting, fishing and viewing wildlife. School forests can also be used for these activities, but the school board should first establish clear policies for both students and the public. If hunting is allowed, designate who can hunt using what types of weapons. If fishing is allowed, post clear guidelines on who and when fishing is permitted. Wildlife viewing is a great way to introduce students to nature, but birds and animals are not always visible when 30 second graders are roaming through the woods. The Department of Natural Resources and many wildlife or sportsman’s groups are available to help introduce young people to hunting, fishing and wildlife conservation.

Resources for Teachers and Administrators

Nature Playscapes

Earthplay - www.earthplay.net

Earthscape - www.earthscapeplay.com

Natural Playgrounds Company - www.naturalplaygrounds.com

Grounds for Play - www.groundsforplay.com

Trails

DNR Trails – www.Michigan.gov/DNRTrails

North Country Trail Association - <https://northcountrytrail.org/trail/michigan-lower>

Hunting & Fishing

DNR Hunting and Fishing Center – www.Michigan.gov/HuntFishCenter

UP Sportsmen's Alliance - <http://upperpeninsulasportsmensalliancewebsite.com>

Michigan United Conservation Clubs – www.mucc.org

DNR Fisheries Division – www.Michigan.gov/Fishing

Trout Unlimited – www.MichiganTU.org

Camping

Becoming an Outdoors Woman – www.Michigan.gov/BOW

Recreational Equipment Incorporated – www.rei.com

Birdwatching - www.fws.gov/birds

Michigan Audubon Society - www.michiganaudubon.org

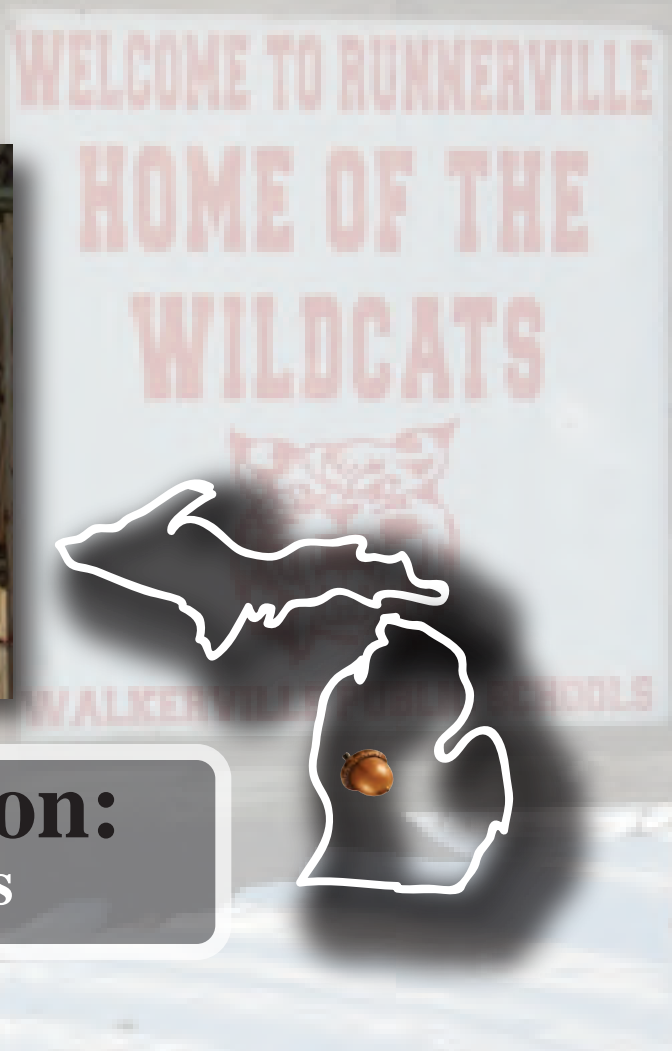


Suggested Activities:

- Build trails for community recreation
- Start a geocaching course
- Design fitness stations
- Go canoeing or kayaking
- Establish a cross-country route for runners
- Host snowshoeing or skiing trips
- Create interpretive signage

Campers and counselors with Opportunities Unlimited for the Blind enjoy a float trip on the Manistee River





Michigan Connection: Walkerville Public Schools

W

alkerville Public Schools in Oceana County calls their school forest “Runnerville” because of its extensive network of cross-country trails. The school developed a network of trails for running and walking that are used to host several cross-country meets in their school forest every year. Michelle Sweet, the Walkerville cross-country coach says, “Our school forest provides a challenging course in a beautiful location. Our students and visiting athletes love running in the Runnerville forest.”

People in the community also enjoy the recreational opportunities this school forest provides. Neighbors use the trail for exercise and enjoying nature. Some schools with very large and very rural forests allow public hunting, but the Walkerville School Forest prohibits hunting for safety reasons because the cross-country athletes run in the woods throughout most hunting seasons.

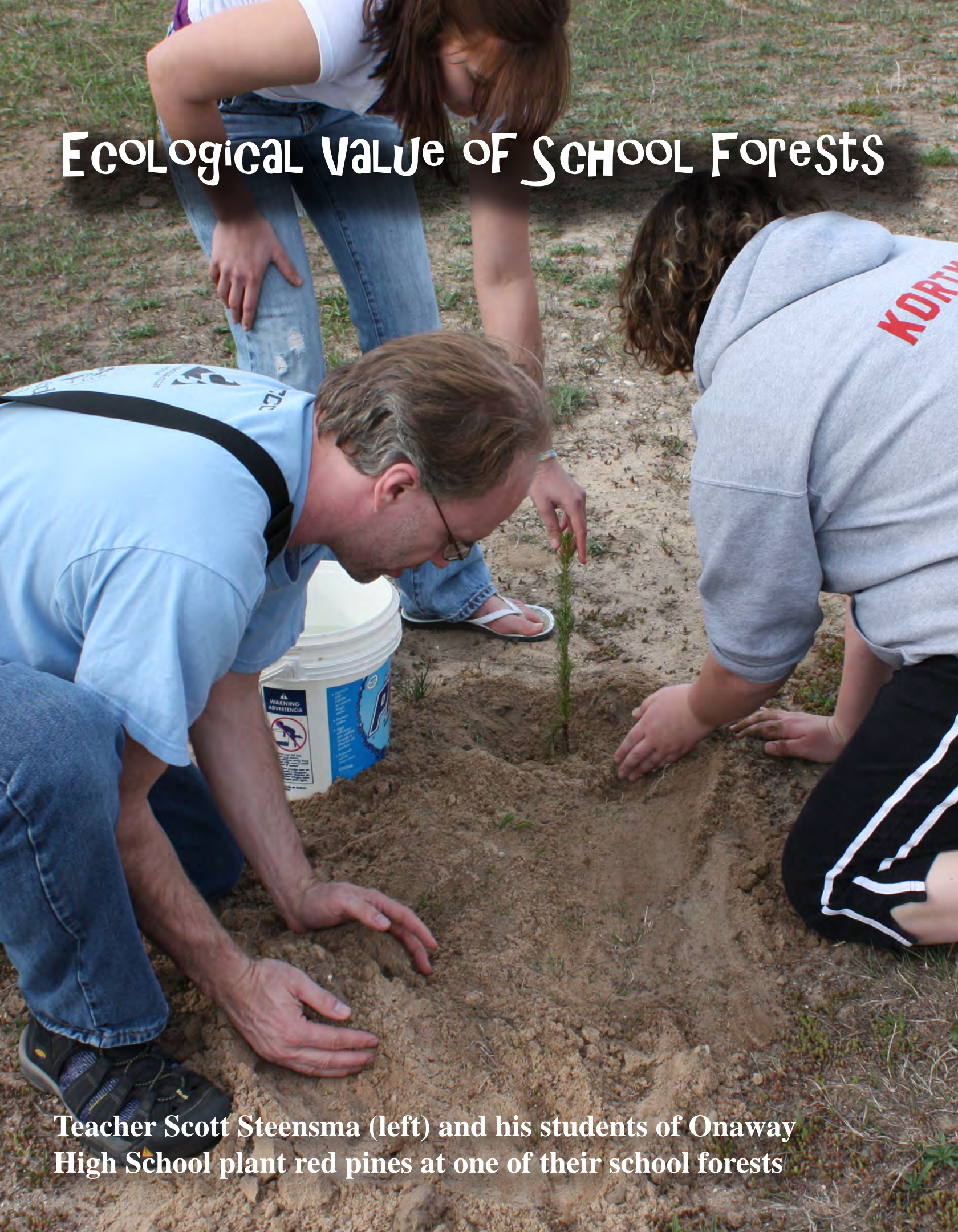
Students and teachers at Walkerville Public School use their forest for education, recreation and to showcase rural jobs in natural resources. Teachers bring their students

on field trips to the forest for science and other lessons. The school intends to start offering overnight camping trips.

School administrators are interested in using the forest to showcase careers in natural resources for their students. The school forest has two parcels that were given to the school by a private donor a few decades ago. The parcels are a few miles apart and there is a sawmill between them that makes pallets.

Superintendent, Mike Sweet (pictured above), applied to the Department of Natural Resources for a grant to develop a Forest Stewardship Plan to help them manage their school forest. The Michigan Forest Foundation also provided funds to the school to hire a professional forester to develop their plan. The consulting forester interviewed Mr. Sweet to determine the school’s forest management goals, visited the forest to measure and inventory the trees and wrote a plan to help the school expand the use of their forest. The 120-acre school forest was certified by the American Tree Farm System in 2017 for their sustainable forest management.

ECOLOGICAL VALUE OF SCHOOL FORESTS

A photograph showing a teacher and two students working together to plant a young red pine tree in a sandy, cleared area. The teacher, a man with glasses and a light blue shirt, is kneeling on the left, patting the soil around the base of the sapling. One student, a girl in a white shirt and jeans, is standing behind him, also looking down at the tree. Another student, wearing a grey hoodie with 'KORT' visible on the back, is kneeling on the right, holding the sapling steady. A white bucket with a blue label is on the ground near the teacher. The background shows a grassy field.

Teacher Scott Steensma (left) and his students of Onaway High School plant red pines at one of their school forests

Understanding Forest Ecology

When we think of a forest large groups of trees are typically the first things we imagine. But even a short hike through the woods quickly reveals that forests are home to many diverse organisms thriving, surviving and dying all around us. The forest community provides boundless opportunities for ecological research and education and no matter their size, school forests are the perfect living laboratory for students to discover.

Ecology is the study of interactions between living organisms (biotic components) and their environment (the non-living, abiotic components). Forest ecology is the study of these relationships within the forest ecosystem. Forest ecosystems are classified by the dominant tree species such as hardwoods like maple, beech, oak, or conifers like balsam, fir, and pine. Pine



plantations are considered a simple ecosystem, with one species of plant. Other types of forest ecosystems are more complex because of the variety of mixed species such as beech/maple. Forest ecosystems that are more complex are more resistant to disturbance from storms, flooding, fire, diseases or insects. Diverse forest ecosystems are able to endure the impact from one of these occurrences. They can bounce back more easily from disasters. Likewise, forests that are less diverse can be annihilated from a single disturbance. After devastation however, a forest ecosystem can restructure and revive itself often improved in health, vigor, and productivity. Think of the natural recovery of the western Cascade Range after the 1980 eruption of Mt. St. Helen's in Oregon and the ecosystem's response over time. An ecological come-back story!

Characteristics and Processes of Forest Ecosystems

School forests provide students with the ultimate introduction to ecology starting with learning how forest life establishes within its niche or physical location within the forest. Characteristics of forest ecosystems include stratification, or layers within a forest from the life living on the forest floor, to the understory and up to the canopy. Zonation is the areas that certain trees, shrubs and plants prefer to grow. Cedars, for example are among many tree species that 'like their feet wet' so they prefer riparian areas along streams or lakes or other wetland landscapes with a shallow water table for their roots to access easily. Other trees like Jack pine prefer higher and dryer areas of forestland. Resource professionals have sorted Michigan's Boreal (Taiga) forest biome into five general categories listed here in bold. The most common forest type is the **upland hardwoods** of maple, oak, hickory and paper birch. **Upland conifers** include pines, balsam fir, and white spruce. **Swamp conifers** are tamarack, black spruce, and white cedar. **Swamp hardwoods** are elms, ash, cottonwood, and balm-of Gilead. **Aspen** consists of quaking aspen and bigtooth aspen.

The processes of forest ecosystems include succession, energy flow, material cycling and competition. Succession is a slow, organized process that occurs as trees are dying and being replaced with other species. Sometimes new tree species enter over time and the forest ecosystem changes. The climax stage of succession consists of the mature, oldest trees. Energy flow refers to the producers or green plants capturing sunlight and combining it with water and nutrients from the soil and carbon dioxide in the air. Forest animals are the consumers and survive on the producers for energy. Material cycling contributes to the energy flow as animals and plants die and break down, the decomposers like fungi and bacteria help recycle the material back to other forest life. The fight for space, water, and the best nutrient-rich soils is constant and both plants and animals compete for the resources they need to survive.

The Synergy of Disturbance



Named for Pan, the ancient mythical Greek god of nature, *Panarchy* is the theory of forest growth, decline and renewal. In his book, *The Upside of Down: Catastrophe, Creativity, and the Renewal of Civilization*, Canadian author and ecologist, Thomas Homer-Dixon interprets the 20-year old theory, “*Panarchy is a conceptual framework to account for the dual, and seemingly contradictory characteristics of all complex systems – stability and change. Put simply, the catastrophe of collapse allows for the birth of something new. The cycle of growth, collapse, reorganization and rebirth allows the forest to adapt over the long term to a constantly changing environment.*”

Natural and human activities can alter the balance of forest ecosystems and impact overall forest health negatively or positively. Invasive species infestations, wildfires, or flooding will influence carbon storage and biodiversity and these events are often interlinked. For example, wildfires can weaken a forest’s natural defenses, destroy vegetation and enable invasive species to take hold, however species like Michigan’s native Jack pine require fire as an environmental trigger that opens its tight, serotinous cone in order to release its seed. Additionally, rising forest temperatures caused by climate change will negatively impact some species of plants and animals but provide opportunities for other forest organisms to grow and thrive. Additional human impacts on forests stem from climate change, acid rain, human development, fragmentation (the Swiss cheese effect caused by the breaking up of large continuous tracts of forestland) and other land use changes such as the conversion of forest to farmland influence the ecological, commercial and aesthetic value of forests.

Suggested Activities:

There are many conservation practices that students can undertake which support healthy forest ecosystems. Try any of the ideas below to inspire and engage your students.

Plant trees! Trees are masters at storing carbon. As with other green plants, trees use photosynthesis and convert carbon dioxide (CO₂) into sugar, cellulose and other carbon-containing carbohydrates used for food and growth. The rate at which trees can sequester carbon depends on age, species and climate. Considering that half of the weight of dried wood is carbon, trees in a forest hold a lot of carbon. Planting trees can serve as a geoengineering technique to help remove CO₂ from the atmosphere and will help afforestation efforts.

Carbon markets are designed to reduce greenhouse gasses (GHG) through the trading of carbon emission allowances encouraging countries and companies to limit their carbon dioxide (CO₂) emissions. Have students research and report on carbon markets and become familiar with the trading process.

Enhance forest habitat for wildlife through brush piles and bird houses. Brush piles are easy to construct after a harvest through gathering logs and sticks and piling them up for small animals to utilize. Bat or bird house designs are found readily on the internet and play a critical role for these types of beneficial wildlife.

Study water quality. Macroinvertebrates are biological indicators of the health of a waterbody. Have students participate in local water quality studies to research the correlation of water quality to forest health.

Resources for Teachers:

- Share lessons from the Michigan Environmental Education Curriculum Support (MEECS): www.michigan.gov/meecs
- Purchase trees and shrubs through your county conservation district: www.macd.org
- Carbon market information: www.fs.fed.us/managing-land/sc/carbon
- Learn fire terminology: www.fs.fed.us/nwacfire/home/terminology.html
- Conservation practice instruction for dozens of resource management techniques: <https://efotg.sc.egov.usda.gov/>





Michigan Connection: Onaway Area Schools

Onaway Area Community Schools supports the ecological value of all four of their school forests through a variety of beneficial conservation practices, studies and research projects all led by the student body.

Onaway ACS is a small public school system located in Presque Isle County in the northern lower peninsula with an enrollment of 618 K-12 students. Onaway has 178 acres of school forestland with each of the four parcels ranging from 20 to 78 acres. All parcels lie between five and twelve miles of the school's main campus.

For years the school forests have been managed by professional foresters and used in parts of the secondary curriculum. Several meetings between students, teachers, foresters and community members led to a vision of the forests as a place to provide educational opportunities in an outdoor classroom setting. A Forest Stewardship Plan was completed in Fall 2015 with assistance from a consulting forester. The Presque Isle Conservation District is assisting in recertification through the American Tree Farm. Funding was provided through a Forest Stewardship Outreach and Education Grant from the Michigan Department of Natural Resources, Forest Resources Division.

Onaway's Forest Stewardship Plan includes educational, recreational, economic and management goals for the next twenty years.

Ecological studies include the students planting trees in accordance to their management plan as well as managing and monitoring invasive Tatarian honeysuckle in two units in cooperation with Huron Pines and Michigan DNR. Students also participate in stream studies to correlate healthy aquatic ecosystems to healthy forests. Macroinvertebrates are collected and identified to determine water quality of local creeks. Plans are proceeding for community walking trails, benches, signage, and an outdoor classroom.

Onaway's Forest Stewardship Plan can be seen as a lesson plan that strengthens ties between the classroom and the community for years to come.



ECONOMIC VALUE OF SCHOOL FORESTS

A woman and a man are standing in a forest, measuring a large tree trunk. The woman, on the left, is wearing a black jacket with an orange safety vest and is holding a measuring tape. The man, on the right, is wearing a light blue hoodie and is also holding the measuring tape. They are both looking at the tree trunk. The background is a dense forest with many trees.

Forester Kaytlyn Brinkman (left) of Martell Forestry in Gaylord demonstrates how to chart volume and value of a school forest

Economics and Forestry



Most people own their forest so they can see wildlife, appreciate beauty, enjoy nature and have their own place for recreation. Landowners usually list economic factors like making money from timber sales or saving on heating costs with firewood much lower on their list of reasons for owning a forest. However, all landowners, including schools, should be aware of the economic potential of their land. School forests provide two major economic opportunities for schools - showcasing potential jobs for students and generating occasional income for the school.



Jobs

School forests are laboratories for students to explore a wide variety of jobs. Michigan's forest products industry is a \$21 billion sector that creates 100,000 jobs. Hunting, fishing and other forms of recreation in forests provide thousands of additional jobs and billions more for Michigan's economy. Forests create jobs for students in skilled trades and for college graduates. Forests provide jobs for students in rural areas and urban cities throughout Michigan. There are 282 primary mills in Michigan that turn logs into products like lumber and paper. There are hundreds more secondary mills in Michigan that use lumber and paper to make other products like cabinets, furniture, pallets and boxes. Forest products industries provide 5 percent of all manufacturing jobs in Michigan and 33 percent of the manufacturing jobs in the Upper Peninsula.

The following lists are common jobs associated with forests and forest products:

Skilled Trades Jobs

These jobs do not require a college degree, although some community colleges may offer classes and training related to these jobs. These jobs provide on-the-job training for high school graduates to learn how to do the job and increase their skills.

Logger: A logger is the person who cuts down trees. Technology is rapidly changing the logging profession and making it safer. Many loggers now use harvesters or processors. These are large, expensive and extremely complex machines that are operated more like playing a video game than like swinging an axe.

Skidder: The skidder is the person who hauls trees from the woods to a "landing" where they are loaded onto a truck. The equipment used could be a "skidder" that drags long logs behind the machine or a "forwarder" that stacks short logs onto a trailer to take to the landing.

Trucker: Truckers load the logs onto trucks and deliver them or equipment to sawmills or papermills.

Firefighter: Wildland firefighters fight wildfires to protect people and buildings. Firefighters also conduct "prescribed burns" which are controlled fires to manage forests and grasslands.

Equipment Operator: These people build roads and trails in the forest to allow access for forest management and recreation. They also build bridges, install culverts or operate bulldozers to help control fires.

Mechanic: Mechanics maintain and repair the expensive and complex logging equipment.

Welder: Welders build or repair logging equipment.

Sawmill Worker: These people work in sawmills or other forest products companies to turn logs into forest products. A 'sawyer' is another common term for this position.

Cabinet Maker: These people use lumber and forest products like fiberboard to build cabinets for kitchens and countertops.

Furniture Maker: These use lumber and forest products like fiberboard to build office and home Furniture.



College Degree Jobs



There are also many jobs in the forest that require a specialized two or four-year degree:

Forester: Foresters manage and protect forests by measuring trees and administering forest management activities. Michigan State University and Michigan Technological University offer Bachelor of Science in forestry degrees.

Forest Technician: Technicians administer timber sales and other activities that are usually planned by foresters. Some technicians also fight forest fires. Gogebic Community College has a two-year forest technician program.

Wildlife Biologist: Wildlife biologists manage the habitat and population of game and non-game species. Nine universities in Michigan offer wildlife biology degrees including Central Michigan, Eastern Michigan, Ferris, Grand Valley, Lake Superior, Northern Michigan, Michigan State, Michigan Tech and University of Michigan.

Wildlife Technician: Wildlife technicians collect data and help wildlife biologists manage wildlife. Gogebic Community College offers a two-year Associates degree in wildlife.

Surveyor: Surveyors identify the property corners and property lines for legally defined parcels of land. Ferris State and Michigan Tech offer college degrees for surveyors.

GIS Analyst: A Geographic Information System (GIS) analyst maps many attributes of the forest. There are more than 50 colleges and universities in Michigan that offer GIS programs and degrees.

Naturalist/Interpreter: Naturalists or Interpreters are educators who work in parks to communicate information on natural resources, history or environmental issues. These positions are often seasonal jobs, but there are year-round opportunities which require a four-year degree.



Interpreter, Maureen Stine (right) implements a forest ecology hike for visitors at the 550-acre non-industrial forestland of the Headlands International Dark Sky Park in Emmet County.



Forestry Income

Schools with larger forests (usually at least 20 acres) can generate income from timber sales or other economic activities in their school forest. Selling trees for lumber or paper is the most common way that landowners generate income from their forest. However, some landowners also earn money by selling non-timber forest products like mushrooms and berries or leasing land for hunting and other recreational activities. For schools that obtained their land from the State through the Municipal Forest Act, the law states that “the use of the land for forestry is the highest priority objective of the land and use of the land for recreational activities shall not interfere with its use for forestry.”

Some schools with large forests have earned significant income from harvesting timber on their school forest. For example, Burt Township Schools in Grand Marais is a small school of 30 students with a large 1,326-acre forest. The school hired a consulting forester to develop a Forest Stewardship Plan for their school forest and to administer timber harvests every few years according to their plan. Burt Township Schools earned \$276,451 from 14 timber sales spanning 15 years. Most schools do not have forests this large, but many schools have potential to earn some income from conducting occasional timber sales.

How to Conduct a Timber Sale

Timber harvests are ecologically and economically complex so it is good practice for schools to have a forest management plan and to work with a professional forester. School forests are also public resources managed by a group (school board or forestry board) so it is even more important to get professional advice from foresters and have a written plan in place that describes why and what a school might cut down and sell trees from the school forest before they do a timber harvest.

A well-planned timber sale should have both economic benefits for the school and ecological benefits for the school forest. A forest management plan helps the school determine what trees to sell, and more importantly, what trees to keep so that the timber harvest improves the school forest for the future. All timber harvests are a little messy in the near-term, but they can help the school achieve desired future conditions in their forest (a safer, healthier forest). Timber sales should be conducted to accomplish the school’s specific goals for the forest, whether those are removing hazardous trees, increasing access for recreation, removing diseased trees, improving wildlife habitat, modifying the species composition, improving crop trees for future harvest or just generating income.



Timber sales are a long and complicated process so it is a good investment to hire a consulting forester to help the school administer a timber sale. A consulting forester will help the school decide what trees to sell and market the sale to multiple buyers to get the best price for the trees. A forester will also ensure that the loggers follow Best Management Practices to protect soil and water resources in the school forest. Consulting foresters provide customized timber sale contracts which are often more detailed than the contracts provided by timber buyers. Consulting foresters may charge hourly rates, set fees, or a percentage of the sale price for their services in administering a timber sale.

Most timber sales in Michigan are either a ‘lump sum’ sale where the buyer pays in full for the marked trees before the harvest begins or a ‘mill tally’ sale where the buyer pays an agreed price for a unit of wood (cords, board feet, tons, etc.) when it is cut and delivered to the sawmill. Most “selection harvests” in hardwoods forests (oak, maple, beech, cherry, etc.) are sold in a lump sum sale. If the school is thinning a pine plantation or clearcutting an aspen stand, those types of large volume harvests are often sold in a mill tally sale. Mill tally sales require a higher level of trust and usually some extra oversight.

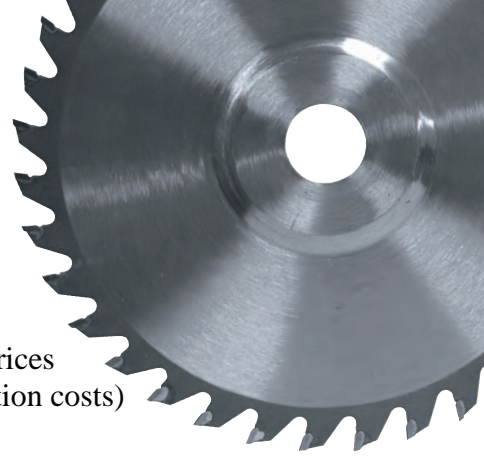
The school must have a clearly written contract that describes exactly what will occur and when it will occur during the timber sale. The seasonal timing of the harvest is important to protect soil and to reduce the potential to spread diseases like oak wilt. It is the landowner’s responsibility to know the location of their property corners and property lines so investing in a survey conducted by a licensed land surveyor is always a good idea.

Suggested Activities:

1. Explore forest products companies listed at www.Michigan.gov/Wood
2. Measure the merchantable volume of a tree with a Biltmore stick
3. Explore timber prices listed at www.Michigan.gov/Timber
4. Calculate the value of a single tree by measuring volume and finding current prices
5. Visit a local forest products company (Wheels to Woods may cover transportation costs)
6. Invite a portable sawmill operator to the school forest to mill a log into boards
7. Calculate the cost of the lumber in a typical Michigan house
8. Invite a forester or logger to visit your classroom to explain their job
9. Call a local real estate company to find out how much forest land is worth in your county
10. Research the title of the school forest and how much it is worth today and when the school acquired the forest

Resources for Administrators and Teachers

- Michigan Forest Products Council – www.MichiganForest.com
- Michigan Association of Timbermen – www.Timbermen.org
- Michigan Association of Consulting Foresters – www.ACF-Foresters.org
- Great Lakes Timber Professionals Association – www.GLTPA.org
- Forestry Field Studies: A Manual for Science Teachers



ENTRANCE GRAND MARAIS SCHOOL FOREST X-COUNTRY SKI TRAIL

Michigan Connections: Burt Township Public Schools



Burt Township Public Schools in Grand Marais is one of the smallest schools in the state with twenty-eight K-12 students enrolled in 2017, yet it has one of the largest school forests in Michigan. Burt Township obtained their 1,326-acre school forest from the State of Michigan after the passage of the 1932 Municipal Forest Act which allowed the state to give forests to schools and other municipal owners. Several schools in the Upper Peninsula also own and manage large forests including North Dickinson's 1009-acre school forest near Felch and Forest Park's 2,037-acre school forest in Crystal Falls.

Burt Township has been working with professional foresters for decades to help manage their large school forest and to generate income for their school. The school developed their first Forest Stewardship Plan in 1992. The school is now working with Grossman Forestry in Newberry to update their Forest Stewardship Plan and to manage their forest for educational, recreational and economic goals.

Grossman Forestry also helped the school forest to

become certified for their sustainable forest management through the American Tree Farm System.

Like most schools, Burt Township uses their forest most frequently for educational field trips for their students, community recreation like cross-country skiing in the winter, and mountain biking in the summer. However, owning a large forest creates opportunities to manage a forest for economic benefits. Foresters recommend harvesting timber occasionally to manage forest health issues, improve wildlife habitat and modify the forest composition. Timber harvests can also generate significant income for landowners with forests larger than twenty acres. Burt Township School has actively managed their school forest with about 14 timber harvests between 1993 and 2009. The school earned \$276,000 in gross revenue from these timber harvests. According to Jerry Grossman, the school's forester, *"We were able to get good prices for the timber sales in the Burt Township School Forest because our consulting forestry company obtained multiple bids from area loggers for each timber harvest."*

Forest Management Plans



Forester Perry Smeltzer (left) reviews a forest management plan with Presque Isle County landowners and forester Bethany Lyons (center)

Forest Management Plans

Taking good care of your school forest can be a complicated and confusing task. One way to get help is to work with a professional forester to develop a forest management plan. A forest management plan is a document that describes your school forest and suggests ways to improve the forest over the next ten to twenty years.

Most school forests are publicly owned and managed by a group of people at the school (forestry board, school board, science teachers, etc.). A forest management plan developed by a forester provides transparent guidance to decision makers to inform and support the school's forest management decisions. Professional advice, in writing, from a forester helps school board members and staff document their good decisions about the stewardship of the school forest. Local citizens sometimes oppose the use and management of school forests, so a plan that is developed with input from many stakeholders can bring a community together and minimize disagreements.

All forest management plans have four basic components. The first component involves an outline or list of the school's goals for the forest. Goals are determined by each landowner's unique values – what is important to you? Goals are also constrained by biology and economics – what is realistic to accomplish? Common goals for school forests include providing a unique place to discover and learn about nature, protecting the biological diversity of the forest, maintaining a safe space for recreation and even generating income for the school from commercial timber harvests. Landowners sometimes have a hard time describing their goals. Having a conversation with your forester while walking through the forest can help to clarify your goals and learn about your forest. Administrators should seek input from students, staff and board members to identify goals for the school forest.

Presque Isle County Conservation District Forester, Brittany Vanderwall (left) and Consulting Forester, Keith Martell (right) on a forestry site visit with Onaway Public Schools














The second component of a forest management plan is a description of the natural resources in your woods. What you have today will influence what you can accomplish in the future. Foresters evaluate and describe many parts of your forest. Natural resources described in a plan include soil, water, wetlands, fire, trees and shrubs, wildlife habitat, insects, diseases, invasive plants, recreation, aesthetics, climate adaptation, special sites and threatened or endangered species. Ask your forester if students can participate in the evaluation and inventory of their school forest.

The third component of a forest management plan is recommended forest management activities. There are many things that you can do to improve your school forest and accomplish your goals. Schools may want to remove hazard trees to improve safety, build trails for recreation or thin their woods to remove poor quality trees. Foresters are familiar with traditional forest management practices that modify the composition of trees in the woods for specific purposes – activities like planting trees and cutting down trees. If timber harvests are applicable to your school forest, they may only happen once every decade; therefore, it is important to get professional advice to ensure that harvests are done properly to improve your forest. Foresters are less familiar with education and curricula so you may want to ask your forester to include advice in the plan from outdoor educators at nearby nature centers.

The fourth component of a plan is opportunities to participate in other programs that require a forest management plan. Michigan landowners with a forest management plan can enroll in programs to lower their property taxes, obtain financial assistance to implement their plan or certify their excellent forest stewardship. Schools typically do not pay property taxes on their school forest and are not eligible for common financial assistance programs. However, schools can “certify” their school forest with the American Tree Farm System (Tree Farm) or the Forest Stewardship Council (FSC). Tree Farm and FSC are private organizations that define “standards of sustainability” and reward landowners who comply with these standards of good forest management. It may be a good idea to certify your school forest, a public resource, to show your community that you are taking good care of it according to internationally recognized standards of good forestry. There is no cost to schools or other landowners to enroll or stay in the American Tree Farm System, which has been helping people take good care of their forests since 1941.

The most important part of your forest management plan is implementing it. After your forester completes the plan, invite him or her to explain the plan to the school board and go for a walk in the woods with interested teachers and staff. Ask many questions about any confusing parts and for help with putting the plan into action.

Suggested Activities:

-  List some goals for your school forest
-  List all the trees and animals that you have seen in your forest
-  List any insects or diseases that you have in your school forest
-  List some activities you can do to improve your forest
-  If you haven't already, start a school forest board including students, staff and parents
-  Meet with the school board and administrators to talk about managing the school forest
-  Explore www.TreeFarmSystem.org to learn about forest certification
-  Research the Earth Summit in Brazil, 1990 to learn about the history of forest certification
-  Apply to the DNR for a grant to develop a Forest Stewardship Plan
-  Call a few local foresters to determine availability to develop a plan for your school forest
-  Walk in the woods with a forester to determine if you will hire her/him to develop a plan



Resources for Administrators and Teachers

- The Michigan Department of Natural Resources, with funding from the US Forest Service, provides grants to schools to hire a forester to develop a Forest Stewardship Plan. Grants are between \$1,500 and \$3,000 depending on the size of the school forest. Matching funds are not required but the grant may not cover all the costs to hire a forester to develop a Forest Stewardship Plan. The DNR reviews applications all year long and can pay either the school or the forester when the Forest Stewardship Plan is complete. Email Mike Smalligan, DNR Forest Stewardship Coordinator, at smalliganm@michigan.gov for the application form. More information and a list of 170 private sector foresters who develop Forest Stewardship Plans are available at www.michigan.gov/foreststewardship.
- The Michigan Forest Foundation also provides grants up to \$1,000 to schools to hire a forester to develop a forest management plan for a school forest. These funds can be used together with the DNR grant. More information is available at www.michiganforests.org.
- The Natural Resources Conservation Service provides funding to landowners to hire a forester to develop a forest management plan. Public schools are not usually eligible for funding from the NRCS. Staff at local NRCS offices are available for providing technical advice to schools.



Elementary students from Detroit Public Schools use their binoculars to ‘focus-in’ on nature!

Michigan Connection:

North Dickinson County School



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he North Dickinson County School has owned and operated a school forest for 85 years, stemming from the original purchase of its first 40 acres of forestland from the Kimberly Iron Company in 1930 for \$1.00. The school's first forest management plan was written in 1932 and has a birch bark cover, still on display in the school. Several additional forested parcels were added over the years and now the school currently owns just over 1,000 acres of forestland.

Students at North Dickinson County School have been planting trees on their land since the early 1940's. Back in the 1950's, there were two cabins used by students and staff for overnight field trips and outings that included hunting for small game. The school has a decades-long history of actively managing their forest with commercial timber harvests to accomplish multiple objectives. These include heating their entire school building using a wood-fueled boiler with wood harvested from their school forest.

Until recently the North Dickinson County School's most current forest management plan was written in 1970 by two foresters working for the Michigan Department of Natural Resources.

The school established a Forestry Commission to oversee the use and management of the school forest. The Commission recognized their need for an updated forest management plan and contacted several local consulting foresters to request bids to develop a comprehensive Forest Stewardship Plan (FSP) in 2015.

The Michigan Department of Natural Resources's Forest Stewardship Program provided a grant to pay for part of the planning costs. The Dickinson County Chapter of UP Whitetails and the Louisiana Pacific Foundation (LP) provided matching funds to cover the remainder. LP is an American Company that manufactures engineered wood products in nearby Sagola, Michigan.

The 2015 Forest Stewardship Plan includes state-of-the-art maps, comprehensive inventory data and useful recommendations for the school. Darrell Oman, the school's Director of Support Services says, *"Our school forest is living proof of what is possible over a long period of time when people work together for a common good. Our FSP will help us manage our school forest for students to enjoy for another 85 years."*

A group of elementary school students are in a forest, exploring the ground under large logs. One student in the foreground is kneeling and looking into a small container. Other students are standing nearby, some looking at the logs. The ground is covered in fallen leaves and moss.

Legal and Practical Aspects of School Forests

Students from Boyce Elementary in Ionia discover life under logs

Legal and Practical Aspects of School Forests



Landowners are sometimes overwhelmed with the practical and legal complexities of owning a forest. This is especially true for school administrators who have been hired to operate a school, not manage a forest. However, there are many available resources, including books, websites and professionals like surveyors, foresters, arborists and attorneys. This chapter is an overview of some of the common legal and practical aspects related to school forests.

Safety

Safety is the most important practical and legal matter for your school forest. Do everything possible to keep students, staff and the public safe while they are in the school forest. Common hazards include tripping hazards, falling objects and irritable plants. Take a walk through your school forest to identify rough trails or large tree roots that may be a tripping hazard. Look up, frequently, to find broken or dead branches that may soon fall. Look for trees that are rotten at their base and may blow over in the next wind storm. Schools should hire arborists certified by the International Society of Arboriculture to remove overhead limbs and hazardous trees. Restrict access to areas with a lot of poison ivy or brambles. Poison ivy can grow on the ground or climb up tree trunks, so be careful when wrapping your arms around trees for a hug or measurement. Schools should train staff in first-aid and maintain first aid kits and signage to locate safety equipment. Schools should also schedule regular safety meetings, inspections and safety plan reviews.

Liability

Administrators should review their insurance and liability policies to see how school forests and field trips off the main campus are covered. It may be necessary to have parents sign liability waivers for certain activities in the school forest. Insurance and liability policies may also determine if high-risk activities like hunting, trapping or other shooting sports will be allowed or prohibited on school forests.

Land Survey

Schools should know the location of their property corners and boundary lines. It is important to know this prior to posting any signs or conducting forest management activities. If the school is going to restrict access to the forest, it must know where its property is located. Harvesting your neighbor's trees when conducting a timber sale gets messy in a hurry. The only professionals who can legally identify or set property corners and mark boundary lines are licensed land surveyors. Foresters sometimes mark the boundaries of harvest units, but only land surveyors can identify your property corners and property lines.


Land Deed and Title Search

How a school obtained their land may influence what it can and can't do with their forest. Therefore, it is essential to locate and read the deed, title or land abstract. The deed provides a legal description of the area of the owned land. The title describes land use restrictions and requirements, previous owners and what the land was used for. School forests may come with land use requirements or restrictions regarding the use and sale of the school forest.

Municipal Forest Act

Hundreds of schools (and other public entities) obtained their forest through the Municipal Forest Act of 1932. This law, now updated as Part 527 of Public Act 451 of 1994, allows counties, townships, cities, villages and school districts to obtain surplus forest land from the Department of Natural Resources. Land acquired from the DNR can be used for forestry and recreational activities. Forestry is the highest priority for the land and recreation may not interfere with its use for forestry. The law does not mention educational use of municipal forests. The DNR can inspect municipal forests for compliance with the law.





The Municipal Forest Act recommends that the school board appoint a forestry commission to manage the school forest. The forestry commission must report annually to the school board about any income or expenses and other forest management activities. Funds from the school forest must be accounted for in a separate forest fund, but the school may do as it pleases with revenue placed in its general fund. The law does not mention including students on the forestry commission, but it would be a very good idea to do so. School boards do not have to appoint a forestry commission if they want to be directly responsible for the school forest.

Mesick Public Schools in Wexford County has an active Forestry Commission that could be a model for other schools. Vanderbilt Public Schools in Otsego County is a school that is including students in its forest management decisions.

If schools obtained their forest from the DNR and the Municipal Forest Act, they can't sell their school forest without permission from the DNR. School forests that are considered "prime" can't be sold and must be reverted to the DNR if the school wants to dispose of the land. Prime forests are 121 or more acres, within a boundary managed by the DNR or provide access to public body of water. If a school forest is not prime, the school may obtain permission to sell the land, but half the proceeds go to the Michigan Department of Treasury.

Schools may still today obtain surplus forest land from the Department of Natural Resources. If your school has questions about the Municipal Forest Act or the availability of surplus forest land, contact Matt Fry, the DNR Forest Land Use Specialist, at 517-284-5862 or FryM1@michigan.gov.

Public Access

School administrators should check their deeds and other policies to determine if their school forests are open or closed to the public. Schools generally can determine and post rules to govern how the public may use the school forest. It is important to identify the school activities that occur in the school forest and when those activities occur. Does the school use the forest during or after school hours? Is the forest used more in the fall, winter or spring? The school should identify how community members are currently using the land. Will rule changes or a forest management activity provoke a negative response from the community? The forestry commission, with school board review, should determine what regulations will promote safety, education, forestry and recreation while minimizing undesired activities on the property.

Rules may be different if the school forest is not part of the main school campus. For example, rural school forests might be open to students or the public for hunting while school forests attached to the main campus would never allow weapons near school buildings.

Timber Sale Contracts

The sale of standing timber is one of the most complex transactions a landowner undertakes. Most landowners do not know what trees to sell, what they are worth or how to harvest them. Professional foresters are essential resources to help schools navigate the complex timber sale process. Foresters will help the school determine which trees to sell, obtain the best price for those trees and hire qualified logging professionals to cut them down. All timber sales should be described in a detailed timber sale contract that protects the interests of both the seller (landowner) and the buyer (logger). Foresters who develop Forest Stewardship Plans are also available to administer timber sales and negotiate contracts that ensure quality work to improve the school forest. Good contracts also describe how disputes are settled and require a performance bond to ensure the woods are left in good shape when the sale is over.



Threatened and Endangered Species

State and federal laws protect species, and the habitat of species, that are threatened or endangered. Endangered species are in danger of extinction throughout all or a significant part of their range. Threatened species are likely to become endangered within the foreseeable future throughout all or a significant portion of their range. These laws make it illegal to “take” or kill the protected species or harm its habitat.

There are 26 federally listed species in Michigan. The US Fish and Wildlife Service maintains this list at www.fws.gov/midwest/endangered/lists/michigan-spp.html. There are several hundred species of plants and animals that are protected by Michigan law. These species are listed by the Michigan Natural Features Inventory at www.mnfi.anr.msu.edu. If your school develops a Forest Stewardship Plan, the DNR will provide information about threatened and endangered species to your forester to include in your plan. Your forester will give advice on how to manage the forest to protect the habitat of threatened or endangered species. Threatened and endangered species provide a great opportunity to educate students about the importance of critical habitat and how one species affects the entire ecosystem.

Miscellaneous Forestry Laws

There are several other laws that pertain to forests in Michigan. State and federal laws require that all pesticides are used, stored and disposed of in accordance with its label. The Clean Water Act requires states to establish Forestry Best Management Practices for Soil and Water Quality. These “BMPs”, available at www.Michigan.gov/Forestry, include practices that minimize soil disturbance and keep pollutants out of water. The National Historic Preservation Act requires landowners to protect archeological sites. Forest Stewardship Plans include information about historic sites. Michigan has a Right to Forest Act that protects landowners from nuisance complaints and establishes guidelines for aesthetics of common forest management practices. Overall, there are relatively few laws pertaining to forestry and most landowners in Michigan find it easy to comply with local, state and federal laws.



Covenant Christian School in the Pigeon River State Forest

Resources for Teachers and Administrators

- Owning and Managing Forests: A guide to legal, financial and practical matters. Thom McEvoy, Island Press, 2005.
- How to find a forester – www.Michigan.gov/ForestStewardship
- How to find an arborist for hazard trees - www.isa-arbor.com
- How to find a surveyor - www.misps.org
- How to find a logger – www.Timbermen.org
- Timber Sale Contracts – Michigan State University Extension
- Threatened or Endangered Species - www.mnfi.anr.msu.edu
- Archeological Sites - State Historic Preservation Office or the State Archeologist
- Pesticides Questions – Michigan Department of Agriculture and Rural Development – www.michigan.gov/mdard



Michigan Connection:

DeWitt Public Schools



Public land management can be controversial. Administrators at one school in southern Michigan learned this lesson when they decided to sell a number of trees in their school forest. This effort was quickly criticized by members of the community.

Approximately half of DeWitt Public Schools 113-acre campus is forested. The school forest has three separate woodlots that are used for education, athletics and community recreation. In the winter of 2012, school administrators decided to sell trees in their 62-acre school forest. The main objectives of the timber sale were to promote public safety and to generate income for the school by harvesting large, biologically mature trees. School administrators obtained professional advice by hiring a consulting forester to administer the timber sale.

The forester marked 231 trees in the three woodlots available in the school forest. The sale was advertised, a high bid was obtained and a contract was negotiated with a local sawmill that bought the trees for \$52,500. The forester selected large trees for harvest because they were at their peak financial value and some of the old trees were already starting to decay. That is where the controversy started.

Local community members walked the trails and saw paint marks on many of their favorite trees. They were especially concerned about the cutting of many of the large, old trees in the 15-acre woodlot designated as the “DeWitt Nature Center” located in the middle of the campus.

Many community members and retired teachers expressed their opposition which led to the formation of the “Friends of the DeWitt Nature Center.” This group was formed to allow concerns to be voiced to the school about the timber sale. School officials listened with open ears and decided to modify the timber harvest. The local sawmill that had already purchased the trees was very gracious and agreed to revise the signed contract to reduce the number of trees for harvest. Loggers cut down 140 trees, primarily in the other two woodlots, in the winter of 2013, and spared 90 of the largest trees in the DeWitt Nature Center.

As a result, DeWitt Public Schools and the Friends group worked together to develop a Forest Stewardship Plan to help jointly manage the DeWitt Nature Center. This helped guide decisions regarding the management of the forest and continues today.

APPENDIX/RESOURCES

EDUCATION:

Michigan Department of Natural Resources: www.michigan.gov/dnr
Wheels to Woods: www.wheelstowoods.org
Michigan Project Learning Tree: www.michiganplt.org
Michigan Tree Farm Program: www.treefarmssystem.org
Michigan Project WILD (Wildlife in Learning Development): www.michigan.gov/michiganprojectwild
Michigan Environmental Education Curriculum Support (MEECS): www.michigan.deq/meecs
Michigan Alliance for Environmental and Outdoor Education (MAEOE): www.maeoe.com
Michigan Green Schools: www.michiangreenschools.us
Project FISH (Friends Involved in Sportfishing Heritage): www.projectfish.org
Project WET (Water Education for Teachers): www.projectwet.org
North American Association for Environmental Education (naaee): <https://naaee.org>
Leopold Education Project: www.aldoleopold.org
World Forestry Center: www.worldforestry.org

SCIENCE:

American Forest Foundation: www.forestfoundation.org
Society of American Foresters: www.eforester.org
Michigan Association of Conservation Districts: www.macd.org
Michigan Natural Features Inventory: <http://mnfi.anr.msu.edu>
Michigan Chapter of the Soil and Water Conservation Service: www.miglswcs.org
Michigan Environmental Council: www.environmentalcouncil.org
Michigan Land Use Institute: www.mlui.org
US Forest Service: <https://www.fs.fed.us>
Web Soil Survey: <https://websoilsurvey.sc.egov.usda.gov>
Association for Fish and Wildlife Agencies (AFWA): www.fishwildlife.org
USDA NRCS, Field Office Technical Guide: <https://efotg.sc.egov.usda.gov>

BOOKS:

America at Work: Forestry. Jane Drake and Ann Love, Kids Can Press Ltd, 1998
Deep Roots: How Trees Sustain Our Planet. Nikki Tate, Orca Book Publishers, 2016
Forestry Field Studies: A Manual for Science Teachers. Glenn David and Donald Dickmann, NSTA Press, 2009
Future Foresters Coloring and Activity Book. Eva Bailey, Hannah Morrison and Julie Woodward, Society of American Foresters, 2016
Michigan Forest Communities: A Field Guide and Reference. Don Dickmann, MSU Extension, 2004
Owning and Managing Forests: A Guide to Legal, Financial, and Practical Matters. Thom McEvoy, Island Press, Revised, 2005
Sustainable Forestry Initiative Activity Book. Free pdf at www.sfiprogram.org/files/pdf/activity
Take a Tree Walk. Jane Kirkland, Stillwater Publishing, 2001

SOCIAL MEDIA/APPS:

Facebook



@michigandnr
@MiNatureDNR
@ProjectLearningTree
@ProjectWILDGuide
@michigantreefarmssystem
@MichiganProject LearningTree

Instagram



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@mistateparks
@naturalmichigan
@michigan_history_center

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@naturalinquirer



inaturalist
Leafsnap
TreeBook
VTree
What Knot to Do
Ready Jet Go

NATURE CAT
AllTrails
Geocaching
Audubon Bird Guide
Audubon Owls Guide
MI-MAST

EXPLORE MICHIGAN
Michigan Wildflowers
MISIN
ebird
Outdoor Family Fun with Plum

GRANTS:

GreenWorks! Project Learning Tree: www.plt.org/resources

Wheels to Woods: www.wheelstowoods.org

MAEOE EEC Grants: www.maeoe.com/maeoeegrants

NAI Region 4 Interpretive Project Grant: www.nairegion4weebly.com

Captain Planet Foundation: www.captainplanetfoundation.org/grants

EPA, EE Grants: www.epa.gov/education/environmental-education-ee-grants

National Environmental Education Foundation: www.neefusa.org/grants

Melinda Gray Ardia Environmental Foundation: www.mgaef.org/grants

Patagonia Environmental Grants: www.patagonia.com/grant-guidelines

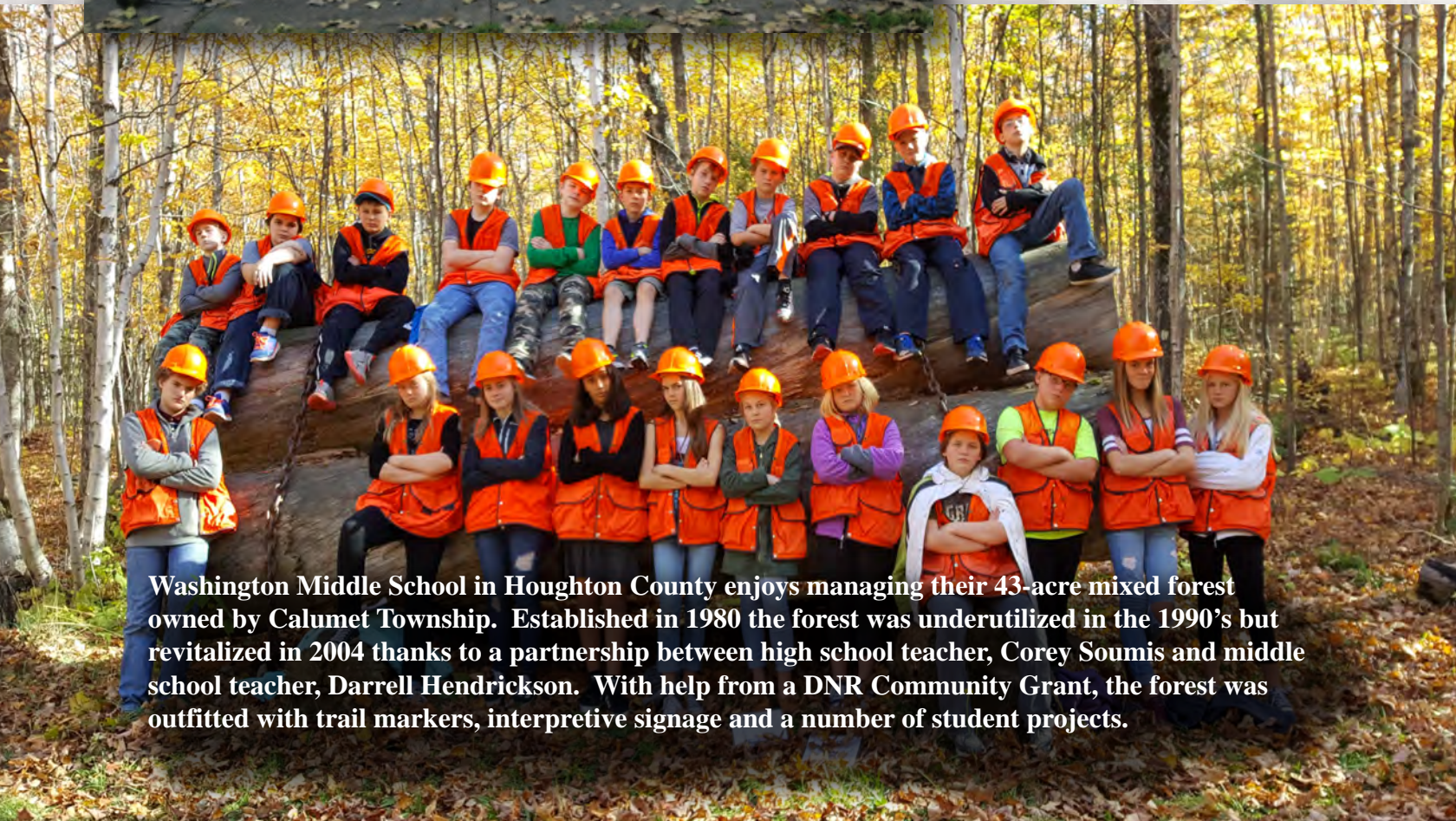
Adventitious Roots

Vanderbilt Area Schools in Otsego County has a 110-acre school forest and partnered with the MDNR, Huron Pines and Huron Pines AmeriCorps to develop a Forest Stewardship Plan.

In the fall of 2017 a trail was established in the school forest to enable accessibility for students and community members. Students have recently formed a committee to organize plans for an outdoor classroom.



In the fall of 2015, Frost Middle School in Livonia became the first landowner in Wayne County to develop a Forest Stewardship Plan for their 12-acre school forest. The Forest Stewardship Program was celebrating its 25th anniversary in 2015, and Wayne County was the only remaining county in Michigan that did not have a Forest Stewardship Plan since the program started in 1990.



Washington Middle School in Houghton County enjoys managing their 43-acre mixed forest owned by Calumet Township. Established in 1980 the forest was underutilized in the 1990's but revitalized in 2004 thanks to a partnership between high school teacher, Corey Soumis and middle school teacher, Darrell Hendrickson. With help from a DNR Community Grant, the forest was outfitted with trail markers, interpretive signage and a number of student projects.

Michigan SCHOOL Forest Guide

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Maureen Stine, Natureology
Angel Squalls, City of Detroit

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