



FOREST TO MI FAUCET

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Michigan.gov/ForestStewardship

More info at Michigan.gov/ForestToMiFaucet and [YouTube.com/@MichiganSAF](https://www.youtube.com/@MichiganSAF)

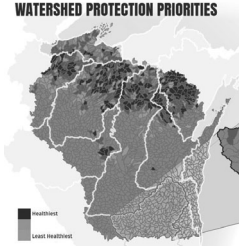
Forest to Mi Faucet: big picture ideas

- Where does our drinking water come from?
- How does land use impact water quality?
- Forests are best land use to protect drinking water
- Forest to Mi Faucet - partners and 3 main actions
- What can WE do to protect drinking water?



Wisconsin “Healthy Watersheds, High Quality Waters”

- Balance restoration and protection
- Protect the best 30% of water by 2030
 - Retain 75% forest cover
- Restore other 70% of water
 - Incredibly expensive
 - Good luck
- Pamela.Toshner@Wisconsin.gov
- DNR.Wisconsin.gov/topic/SurfaceWater/HQW.html



WATERSHED PROTECTION PRIORITIES



KEEP IT
FRESH[®]
PURE MICHIGAN[®]

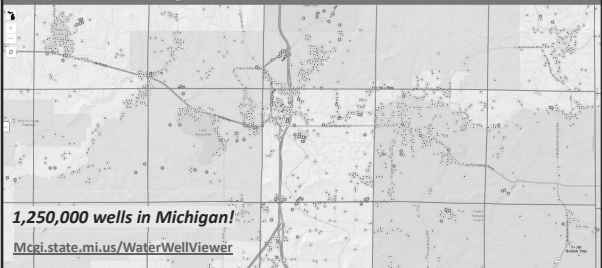
Is our freshwater infinite, free and pure?

Is Michigan taking good care of its land and water?

<p>Forests</p> <ul style="list-style-type: none"> • 20 million acres (includes 4.5 m wetlands) • 56% of our land area • Other land uses <ul style="list-style-type: none"> - 10 m acres agriculture (28%) - 2 m wetlands [non-forest] (8%) - 2 m acres urban (6%) • \$21 billion forest products industry <i>- are we taking good care of forests?</i> 	<p>Water</p> <ul style="list-style-type: none"> • 25.5 million acres <ul style="list-style-type: none"> - 24.7 m Great Lakes - 835,200 acres inland lakes • 10,889 lakes > 5 acres • 52,053 miles of rivers • 3,049 miles Great Lakes shoreline • MI has 9% of world's fresh water! • Water is a PUBLIC GOOD - \$\$\$??? • <i>are we taking good care of water?</i>
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RURAL drinking water for 2.5 million Michiganders

EGLE Water Well Viewer
Department of Environment, Great Lakes, and Energy

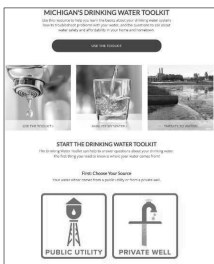


1,250,000 wells in Michigan!

Mdei.state.mi.us/WaterWellViewer

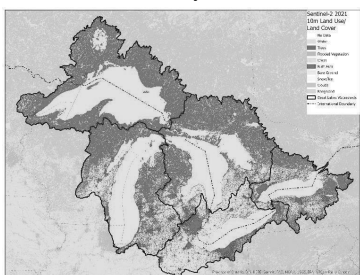
URBAN drinking water for 7.5 million Michiganders

- Groundwater Wells (1.8 million people in Michigan)
 - Kalamazoo, Lansing, Jackson, Gaylord, Cadillac ...
- RIVERS (~150k people in Michigan)
 - Ann Arbor – Huron River (128k people)
 - Adrian – Wolf Creek (20k people)
 - Flint – Flint River (*now back to GLWA*)
- Great Lakes (5.7 million people in Michigan)
 - Marquette, Traverse City, Alpena, Grand Rapids ...
 - Detroit: Great Lakes Water Authority (GLWA)
 - 3.8 million people, 112 communities, 8 counties



[MIDrinkingWater.org/find_your_public_water_type](#)

Which Great Lake do you want to drink?



Great Lakes Land Cover
Lake Superior 91% forest, 1% ag, 2% urban
Lake Huron 67% forest, 22% ag, 6% urban
Lake Michigan 49% forest, 32% ag, 10% urban
Lake Ontario 49% forest, 34% ag, 12% urban
Lake Erie 19% forest, 61% ag, 18% urban

Map produced by John Esch (EGLE) Esch@Michigan.gov on 8/25/22.

Source: EPA 2022 State of Great Lakes Technical Report (forest & forested wetland)

What is the Status of Each Lake?

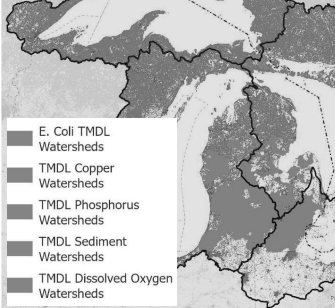
As forest cover declines, so does lake quality.

City	Municipal Water Source	EPA's Lake Status	Forest Cover in Watershed
Marquette	Lake Superior	Good	91%
Detroit	Lake Huron	Good	67%
Toronto	Lake Ontario	Fair	49%
Grand Rapids	Lake Michigan	Fair	49%
Monroe	Lake Erie	Poor	19%

Photo: [Great Lakes Now.org](https://www.greatlakesnow.org/2022/07/2022-Sources-of-harmful-algal-blooms-forecast-lake-erie) (2022/07/2022-Sources-of-harmful-algal-blooms-forecast-lake-erie)

State of the Great Lakes 2022 Report, EPA & Canada

As forest cover declines, pollution increases.



“Total Maximum Daily Load”
Maximum amount of pollution allowed by Clean Water Act.

[Michigan.gov/TMDL](https://www.Michigan.gov/TMDL)

Excludes TMDLs for PCBs & mercury (cover most of MI, industrial source)

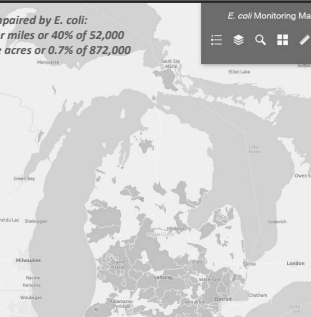
Map produced by John Esch (EGLE) Esch@Michigan.gov on 8/25/22.

Land cover correlation with E. coli TMDL

Impaired by E. coli: 20,526 river miles or 40% of 52,000, 6,000 lake acres or 0.7% of 872,000

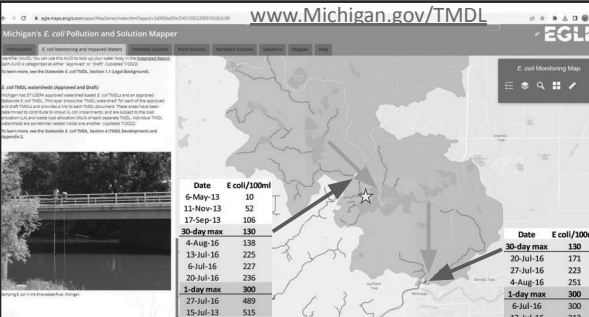
E. coli live in intestinal tract of warm-blooded animals

WCMF Watershed Variables and Characteristics	E. coli (geomean)	Agriculture (Ag) Landcover (all)	Forest Landcover (all)
Agriculture (Ag) Landcover (all)	0.56	-0.56	-0.78
Forest Landcover (all)	-0.63	-0.78	-0.38
Developed Landcover (all)	0.24	NS	0.78
Natural Riparian Buffer	-0.52	-0.80	NS
Wetland Landcover (all)	-0.18	-0.40	NS
Lost Wetland (% of original)	0.31	0.54	-0.50
Septic System Density	0.46	0.49	-0.50
Population Density	0.62	0.45	-0.62



Michigan's E. coli Pollution and Solution Mapper

www.Michigan.gov/TMDL



Date	E. coli/100ml	Date	E. coli/100ml
6-May-13	10	30-day max	190
11-Nov-13	52	6-Jul-16	171
17-Sep-13	106	20-Jul-15	251
6-Aug-15	138	4-Aug-16	251
13-Jul-16	225	1-day max	300
6-Jul-16	227	27-Jul-16	489
20-Jul-15	235	15-Jul-13	515
1-Jul-16	300	Average	222
27-Jul-16	489	Average	251

DO NOT POOPING

Combined Sewer Overflows & Concentrated Animal Feeding Operations

- In 2021, 383 CSO events and 47 billion gallons discharged
 - 38 billion gallons from retention treatment basin
 - 9 billion gallons of untreated human sewage (900/person)**
 - Detroit, Dearborn, Wayne County, Lansing
 - Daily CSO reports at Mi.gov/SewageDischarge!!
- ~25% of rural septic systems in need of repair
 - Michigan is ONLY state without a statewide sanitary code
- EGL permits 290 CAFOs as point source pollution
 - 413k cows, 717k pigs, 775k turkeys, 22m chickens
 - 4 billion gallons manure, 1.3 million tons dry manure
 - 2020 Permit: 35' riparian buffer (Farm Bureau sued)**
- MDARD
 - Averages only 8 *voluntary* spill reports a year...
 - Generally Accepted* Agricultural Management Practices

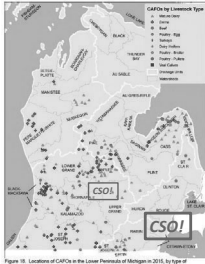
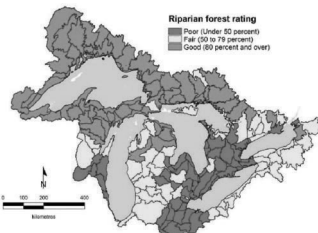


Figure 10. Location of CAFOs in the Lower Peninsula of Michigan in 2015, by type of livestock. April 2016. Data were used to generate CAFOs in the Upper Peninsula.

Forest Cover inside 30m Riparian Zone



Riparian forest rating

- Poor (Under 50 percent)
- Fair (50 to 75 percent)
- Good (80 percent and over)

- Superior – 96%
- Huron – 78%
- Michigan – 66%
- Ontario – 65%
- Erie – 35%

Source: EPA's State of the Great Lakes 2022 Technical Report

PCBs, Mercury and "Eat Safe Fish"

Impaired by PolyChlorinated Biphenyls: 52,000 river miles & 145,306 lake acres

743 water bodies impaired by mercury: 13,780 river miles & 246,482 lake acres

Michigan.gov/EatSafeFish
52,000 river miles & 498,127 lake acres





Figure 11. Fish Consumption Guidelines for Rivers in Michigan State.

100% of river miles
17% of lake acres
(Great Lakes not included)

27% of river miles
28% of lake acres
(Great Lakes not included)

100% of river miles
57% of lake acres
100% of Great Lakes

PFAS = per and polyfluoroalkyl substances




264 sites at EGLE's Michigan.gov/PFASresponse

36 water bodies with 115 fish advisories for PFAS at Michigan.gov/pfasresponse/fishandwildlife/fish

2018 "Do Not Eat" Advisory for PFAS in Deer

Does forest management contribute to pollution? Yes

Probable Source	Rivers (miles)	Lakes (acres)	Wetlands (acres)
Unknown	143,955	3,761,194	383,096
Agriculture	134,911	1,182,059	203,199
Hydromodification	88,986	696,532	4,565
Atmospheric Deposition	85,872	4,214,594	200,171
Habitat Alterations	65,749	288,233	33
Unspecified Nonpoint Source	60,618	1,130,571	2,040
Municipal Discharges of Sewage	56,626	691,354	21
Natural / Wildlife	50,728	1,172,278	288,473
Urban Stormwater Runoff	48,978	804,179	130
Silviculture (Forest Management)	40,836	170,181	
Resource Extraction	33,156	519,917	32,112
Construction	21,399	223,035	
Industrial	11,665	246,619	352
Other	9,333	875,745	888
Land Application/Waste Sites/Tanks	8,562	27,199	680
Historical Pollutants	6,230	749,910	21
Spills or Dumping	4,038	173,199	6
Recreation & Tourism (Non-Boating)	1,747	174,519	



Source: EPA 2018 National Water Quality Data at https://efdm.gov/epa/waters10/attains_nation_cy_control/causes

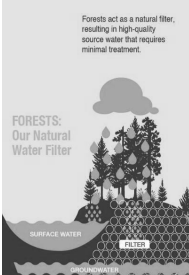
What must Michigan do to protect its land and water?

Transform our Culture

- Consumers
 - Consume less...stuff, beef, gasoline, etc.
 - Pay more for quality & less pollution
- Corporations (economy *and* ecology)
 - Forest certification & better managing
 - Right to Farm/Forest is *NOT* right to pollute
- Culture
 - Land & water are not infinite, free or ours
 - Responsibility, not just individual rights
 - PUBLIC TRUST**, not just personal property

Improve our Policy

- Local
 - Land use, zoning, protection (>30% by 2030)
 - Water users pay for better upstream land use
- State
 - Statewide septic code & separate CSOs
 - Best Man. Practices* mandatory in forest & ag
 - Invest in infrastructure (Michigan is D+)
- Federal
 - Clean Water Act should include nonpoint
 - End perverse subsidies that harm water

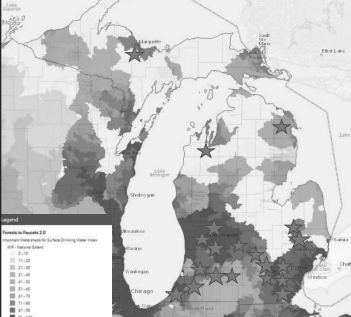


Forests act as a natural filter, resulting in high-quality source water that requires minimal treatment.

How do forests protect clean water?

- Vegetation slows water velocity (vertical & horizontal)
- Undisturbed soils and leaf layer reduce runoff & erosion
- Soil and vegetation filter pollutants
- Minimal infrastructure and impermeable surfaces
- Infrequent and small chemical spills
- Forests regulate timing and magnitude of stream flow

Graphic: Oregon Forest Resources Institute



Forests to Faucets 2.0

What forests should we protect and enhance for surface drinking water?

Connecting Forests, Water & Communities

USDA Forest Service, 2011

★ = 20 Project Partners on Forest to Mi Faucet

USDA Forest Service Funding:
\$300,000 Landscape Scale Restoration
\$755,000 Forest Stewardship Program

Forest to Mi Faucet Team

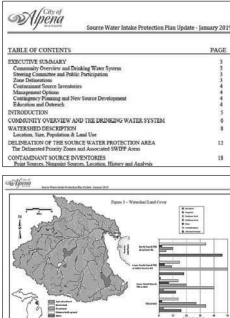


- 5 Watershed Councils**
 - Huron River Watershed Council
 - Flint River Watershed Coalition
 - Kalamazoo River Watershed Council
 - Lower Grand River Org. of Watersheds
 - River Raisin Watershed Council
- 5 Land Conservancies**
 - Legacy Land Conservancy
 - SE Michigan Land Conservancy
 - Mid Michigan Land Conservancy
 - Land Conservancy of West Michigan
 - Southwest Michigan Land Conservancy
- 3 Regional Conservation Groups**
 - Superior Watershed Partnership
 - Conservation Resource Alliance
 - Huron Pines
- 3 Conservation Districts**
 - Kent Conservation District
 - Genesee Conservation District
 - Washtenaw Conservation District
- 3 Statewide Associations**
 - Michigan Forest Association
 - Michigan Association of Timbermen
 - Michigan Prescribed Fire Council
- 1 National Nonprofit**
 - Old Growth Forest Network

Project administered by DNR Forest Stewardship Program and funded by USDA Forest Service

Municipal Water Utilities

- Establishing new partnerships with 15+ utilities
 - How can we help reduce treatment costs?
- Implement Source Water Protection Plans
 - Source water protection area
 - Pollution: point source & nonpoint (land use)
 - Management options to protect water
- Outreach & education to customers and public
 - Urban residents and rural landowners upstream
- Establish groundwork for a future payment for ecosystem service market



Three Forestry Solutions

- PROTECT important forests
 - Public ownership (38% of MI forests) for Public Trust
 - Private: conservation easements, preserves, zoning
 - 6% of Michigan forests legally restrict timber harvesting
- MANAGE all forests better
 - Logger training and forestry Best Management Practices
 - Forest certification (SFI, FSC, Tree Farm)
 - Empower landowners (plans, peers, people, programs)
- EXPAND forests in strategic places
 - Riparian buffers & agroforestry
 - Urban forests & green infrastructure
 - Afforestation (convert important land back to forest)



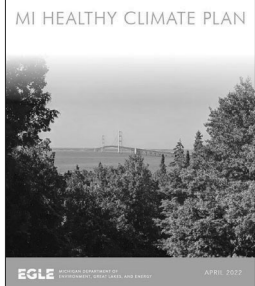

PROTECT

Watershed Councils

- How can we help water utilities?
- Protected watersheds
- Education for public
- mi-wea.org/watershed_groups.php

Land Conservancies

- Conservation easements & nature preserves
- Outreach to landowners
- HeartOfTheLakes.org




MI HEALTHY CLIMATE PLAN

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, WATER, AND ENERGY APRIL 2022

30 x 30

- **Protect 30% of land and water by 2030**
 - United Nations Convention on Biological Diversity
 - America the Beautiful
 - Michigan Healthy Climate Plan
- USGS Protected Area Database is inaccurate
 - Forest Action Plan = 6% protected from harvest
 - NOAA Marine Sanctuaries = 6% of water
- Are the 70% "unprotected" forests managed well?
- Can we improve land use and zoning laws?
- **How do we incentivize private lands?**



MANAGE WELL

Foresters

- Forest certification for better management
- Consulting Foresters – MichiganACE.org

Landowners

- 250 new [Michigan Forest Association](http://MichiganForestAssociation.org) members
- 29% of landowners use forester for timber sale (2018 National Woodland Owner Survey)

Loggers are key to improved management

- 25 new [Michigan Master Loggers](http://MichiganMasterLoggers.org) in southern LP
- Help SFI train 1,000 loggers statewide on BMPs

None of 80 Master Loggers are in southern Lower Peninsula (18% of forests; 80% of people)

Forest Certification

- Evaluating and confirming quality of forest management against standards
- Track and label forest products through supply chain to assure consumers of responsibly managed sources
- Private Certification Organizations
 - Forest Stewardship Council (4.2 million ac)
 - Sustainable Forestry Initiative (5.4 million ac)
 - American Tree Farm System (0.5 million acres)
- 30% of Michigan's forests are certified






BEST MANAGEMENT PRACTICES

Loggers Use to Protect Water and Provide Downstream Benefits


1



ROADS

Loggers design roads to minimize erosion so fish can live in clean water.


2



WETLANDS

Loggers use mats to load logs in wetlands which are nature's water filter.


3



STREAM CROSSINGS

Loggers install the right size bridge to allow fish to swim upstream.


4



SPILL

Loggers clean up spills to keep chemicals out of our drinking water.


5



BUFFER MANAGEMENT ZONES

Loggers leave lots of trees near water to keep it cool and provide food for fish.

6



RUTS

Loggers minimize ruts in soil to protect roads and keep our water clear.


Forests filter and clean our water which is essential for people, fish and wildlife. We all benefit when loggers use Best Management Practices in the forest.

ForestalorFish.org

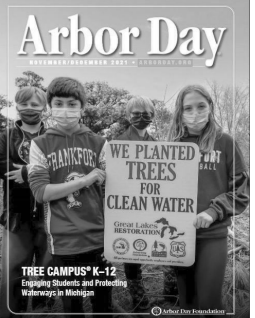
SFI Logger Training

Michigan Department of Natural Resources

MICHIGAN FORESTRY BEST MANAGEMENT PRACTICES FOR SOIL AND WATER QUALITY



DEQ



Arbor Day

NOVEMBER-DECEMBER 2022 - 115 YEARS

WE PLANTED TREES FOR CLEAN WATER

Great Lakes Region BEST WATERSHEDS

TREE CAMPUS® K-12 Engaging, Student-led and Protecting Waterways in Michigan

EXPAND

Planting Trees EMPOWERS People

Partners to plant 80,000 trees

- Rural and urban riparian areas

DNR plants 5 million trees annually

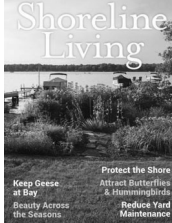
- 750,000 in Forest to Mi Faucet priority areas

Tree Planting Organizations

- ReLeaf Michigan, American Forests
- Arbor Day Foundation, One Tree Planted
- Greening of Detroit, Friends of GR Parks
- MACD.org and PlantMichiganGreen.com

Michigan Natural Shoreline Partnership

ShorelinePartnership.org



Shoreline Living


Keep Grease off Bay Beauty Across the Seasons

Protect the Shore Attract Butterflies & Hummingbirds Reduce Yard Maintenance

Native Plants

instead of seawalls or riprap

EGLE permits required!



Funding Opportunities for Landowners & Organizations

- Federal Government**
 - 2022 Inflation Reduction Act
 - \$5 billion for forests and \$22 billion for agriculture
 - 2021 Bipartisan Infrastructure Law
 - 2018 Farm Bill Sec 2503 = 10% for SWP
 - Natural Resources Conservation Service
 - Environmental Quality Incentives Program
 - Conservation Stewardship Program
 - Agricultural Conservation Easement Program
 - Farm Services Agency
 - Conservation Reserve Program
 - Emergency Forest Restoration Program
 - Forest Service
 - Landscape Scale Restoration
 - Great Lakes Restoration Initiative
 - Environmental Protection Agency
 - Great Lakes Restoration Initiative
 - Funding Integration Tool for Source Water
- State Government**
 - EGL Source Water Protection
 - EGL Section 319 Grants
 - DNR Fisheries Division
 - DNR Urban & Community
 - DNR Forest Legacy
 - MDARD Farmland Preservation
 - MDARD Western Lake Erie Basin
- Local Government**
 - Municipal Water Utilities?
 - Invest in upstream forest protection?
- Foundations and Nonprofits**
 - National Fish and Wildlife Foundation
 - Sustain our Great Lakes
 - Arbor Day Foundation
 - One Tree Planted
 - Great Lakes Impact Investment Platform

What can YOU do?


- To help protect forests?
- To help manage forests better?
- To plant more trees in urban and rural areas?
- Something else to protect drinking water?
 - Become a [Clean Water Ambassador](#)
 - Collect data with [Michigan Clean Water Corps](#)
 - [Maintain SepticSmart](#), wildflowers instead of lawn ...
 - Grow a garden, eat less meat, **better policy**, urban rain gardens ...
 - Natural shorelines, buy certified lumber, shop at local farmers markets ...



Supplemental Slides Showcasing Partners

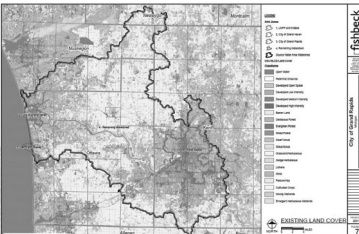
Superior Watershed Partnership

- Marquette is largest city in UP
- Dead River watershed is small SWPA within Lake Superior basin
- Tree planting & forest protection
- Update Marquette's 2003 SWP?
- Better urban zoning?



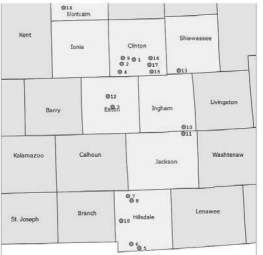
Lower Grand River Organization of Watersheds

- Grand Rapids has new 2020 SWP
- City is upstream *and* downstream
 - Water intake in Lake Michigan
- Mostly urban & agriculture
 - Urban sprawl and inadequate zoning
- Grand River degrades lake quality
 - Downstream of 200 NPDES permits
 - 6 CAFO, 10 WWTP, 2 Superfund Sites
- Tree planting in urban & rural



MidMichigan Land Conservancy

- Promoting forest management to protect water quality on 18 current easements
 - Recruiting new easements
 - Planting trees
- Managing 7 preserves for water quality benefits along the upper Grand River
 - Developing forest management plans



Kalamazoo River Watershed Council

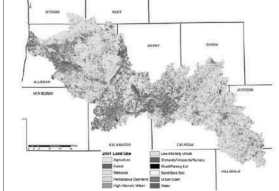
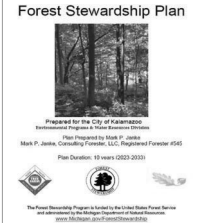


Figure 6. Land use and cover in the Kalamazoo River Watershed in 2003 based on data from the Michigan Forest Stewardship, Assessment, and Prescription (MFSAP) system.

Agriculture - 47%
Forest - 27%
Wetlands - 7%
Urban - 8%

Forest Stewardship Plan



Prepared for the City of Kalamazoo
Kalamazoo Forestry Program & Major Business Division
Plan Prepared by Mark P. Jaska
Mark P. Jaska, Consulting Forester, LLC, Registered Forester #562
Plan Duration: 10 years (2022-2031)

The Forest Stewardship Program is funded by the United States Forest Service and administered by the Michigan Department of Natural Resources.

Forest stewardship plans to improve management:


- family forest landowners
- City of Kalamazoo and City of Battle Creek

Michigan Forest Association: learning from other landowners



- 250 new members and host 6+ field days and workshops for landowners in SLP
- More information about upcoming events at www.MichiganForests.org

Huron River Watershed Council



Forests to Faucets 2.0

Important Watersheds for Surface Drinking Water Index

IMP - National Index	51-60
0-10	61-70
11-20	71-80
21-30	81-90
	91-100


Huron River watershed rated highest importance for drinking water protection

Project Activities:

- Assist Ann Arbor update its 2017 SWP
- Host townhalls for landowners
- Tree planting in Ypsilanti Township
- Develop ecosystem services priority tool

Flint River Watershed Coalition

- Earth Day 2023 in Flint
- 300 new trees along Gilkey Creek
- Students from 5 local schools
- [YouTube.com/watch?v=kchh50Zl5hM](https://www.youtube.com/watch?v=kchh50Zl5hM)



Conservation Resource Alliance

CRA featured in Michigan Radio story on NPR
[Forest to MI Faucet: Using trees to keep water sources pristine](#)



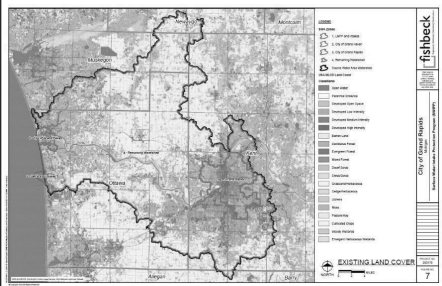
Wild-Roots
Improving the health and resilience of watersheds and natural habitats

We aim to plant 100,000 native trees and shrubs on private and permanently protected lands over five years.

RiverCare.org/Wild-Roots
packets of riparian tree seedlings available at conservation district tree sales

CRA community tree planting on May 2, 2023

How does land use impact our water quality and quantity?



fishbeck
City of Grand Rapids
Map Date: 11/2023

- Grand Rapids SWP
- Pretty map!
- No land use analysis...
 - Urban?
 - Agriculture?
 - Forest?
- No management...
- What can you do?