



MICHIGAN

What Do Trump's Attacks On Science Mean For Michigan?

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TL/DR:

Michiganders Believe In Climate Change - And They Want Their Leaders To Act

- [65% of Michiganders](#) believe in climate change, and [57% of the state's residents](#) are worried about climate change.
- [59% of Michiganders](#) believe both the President and Congress should do more to address climate change. [55% of Michiganders](#) believe their Governor and local officials should do more.
- [Click here to jump to more research below](#)

Trump's Climate Denial Is Harmful To Michiganders' Health:

- Michigan [currently experiences](#) extreme heat rarely – but it's [projected to jump](#) to 15 extreme heat days by 2050.
 - In 2018, Michigan [recorded](#) 4,784 emergency department visits for heat-related illnesses. Currently, [more than 270,000](#) Michiganders are especially vulnerable to extreme heat.
- In 2019, seventeen counties in Michigan received an F grade for ozone pollution, and Detroit was [ranked](#) the 10th worst city in America for particle pollution.
- Trump's anti-science attitude led him to block action to make polluters pay for cleaning up toxic chemicals that have been [found](#) in water supplies [across the state](#). These chemicals, called PFAS are [linked](#) to kidney and testicular cancer, hypertension and other diseases.
- [Click here to jump to more research below](#)

Trump's Climate Denial Puts The Safety Of Michiganders At Risk:

- Michigan is at risk from climate-related flooding:
 - Scientists have [linked](#) an increase in heavy downpours to climate change.
 - Cycles of drought and flooding have turned the Great Lakes into the “[erratic high seas of the Midwest](#).” Last year, high water levels damaged property along the lakeshore and [flooded tourist hot spots](#). This year, the Army Corps of Engineers [predicts](#) it will get worse.
 - Currently, 340,000 people are [at risk](#) of flooding in Michigan.
 - In the last decade, Michigan [witnessed](#) three severe flooding events that caused a total of at least \$12 billion in damages and 5 deaths.
- Michigan is at risk from climate-related wildfire and droughts:
 - [Studies show](#) climate change is increasing the severity, frequency, and extent of wildfires.
 - Climate change is [already affecting](#) global patterns of drought, and such trends are expected to continue, with longer and more intense droughts [predicted](#).
 - From 2009 through 2016, Michigan [witnessed](#) two drought events that caused a total of 45.9 billion in damages and 176 deaths.
- Michigan military bases are at risk from extreme weather events:
 - Michigan's Selfridge Air National Guard Base (ANGB) is [impacted](#) by current and potential future wildfires.
- [Click here to jump to more research below](#)

Trump's Climate Denial Hurts Michigan's Economy:

- Climate change will [cost](#) Michigan \$5,178,650,000 a year by the year 2100.
- In 2017, agriculture [generated](#) over \$104.7 billion in gross state product and employing 805,000 workers, or 17% of Michigan's workforce.
 - Climate change is [projected](#) to cause a 1.58% loss in crop yields in Michigan, including a 19% loss in grains.
- The costs of dealing with rising water levels on the Great Lakes is already impacting Michigan Cities.
 - [South Haven](#) recently spent \$16 million on damages along the Lake Michigan Coastline and nearly had to cancel its July 4th fireworks in 2019 due to beach erosion.
 - Governor Whitmer [announced](#) a plan to devote \$40 million in next year's budget to help cities cover damages related to climate change.

- High water on the Great Lakes has flooded beaches and marinas, [impacting tourism](#).
- Outdoor recreation in Michigan [supports](#) 232,000 jobs and \$26.6 billion in consumer spending.
 - Recreational fishing is a [\\$3 billion industry](#) in the Great Lakes, plus an [additional](#) \$1 billion in commercial fishing, and an Enbridge oil pipeline project [threatens](#) to destroy it.
- In the past decade, Michigan has [experienced](#) 16 climate-related disasters responsible for a total of \$79 billion in damages.
- Since Trump assumed office, Michigan has [experienced](#) 6 climate-related disasters responsible for a total of \$19 billion in damages.
- Trump's clean cars rollback will [cost](#) Michiganders over \$745 million per year.
- [Click here to jump to more research below](#)

Trump's Climate Denial Is Especially Harmful To People Of Color In Michigan:

- Seventeen counties in Michigan received an F grade for ozone pollution, most of which are disproportionately Black.
 - Ozone has been [linked](#) to asthma, and Black children are [four times](#) more likely to be admitted to the hospital and [ten times](#) more likely to die from asthma.
- The [most polluted](#) ZIP code in Michigan, 48217, is 81% Black.
 - Four of the five most polluting refineries in Michigan are within five miles of this ZIP code.
- Environmental racism has deep roots in Michigan, where the water crisis in Flint sparked many Americans' awareness of the issue.
 - Six years on, 15 percent of Flint's lead pipes [have still not](#) been replaced.
 - Some communities in Flint still [do not have](#) access to clean water.
 - Nearly 30,000 children [were exposed](#) to toxic lead.
 - Neurological damage to the children of Flint is [overwhelming](#) the city's public school system, where the rate of children who qualify for special needs instruction has doubled in recent years.
 - The lead crisis goes beyond Flint – 13 water systems across Michigan recently [tested positive](#) for lead, and the [rate of lead exposure](#) among children rose 28% in Detroit in 2016.
- Michigan tribes have led the [fight to shut down](#) the Enbridge Line 5 pipeline which has spilled at least 29 times and over 1 million tons of oil into the Great Lakes.

- [Click here to jump to more research below](#)

Michigan Has An Opportunity To Build A Strong Green Economy:

- In 2019, there were [more jobs](#) in renewable electricity generation than in fossil fuels.
- In 2019, Michigan was [ranked](#) 5th for clean energy employment, with 125,365 jobs, and 2nd for clean energy jobs in [rural areas](#), with 24,954 jobs.
- In 2019, Michigan was home to over 3,800 jobs in the [solar industry](#) and 4,001 to 5,000 direct jobs in the [wind industry](#).
- [Click here to jump to more research below](#)

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HERE'S WHAT'S HAPPENING:

A [majority](#) of Michiganders both believe in climate change and want their elected officials at all levels to do more to address the issue. President Trump's climate denial is harmful to Michigan's health, safety, and economy – and is particularly harmful to communities of color.

Currently, [more than 270,000](#) Michiganders are especially vulnerable to extreme heat and in 2019, heat-related illnesses [resulted](#) in 4,784 emergency room visits across the state. In 2019, seventeen Counties in Michigan [received](#) an F grade for ozone pollution, and Detroit was [ranked](#) the 10th worst city in America for particle pollution.

In addition to extreme heat and air pollution concerns, Michigan faces serious issues with access to clean water. Trump's anti-science attitude led him to block action to make polluters pay for cleaning up toxic chemicals that have been [found](#) in water supplies [across the state](#). PFAS chemicals are [linked](#) to kidney and testicular cancer, hypertension and other diseases.

Alongside health factors, Trump's Climate Denial places the safety of Michiganders at risk. Currently, 340,000 people are [at risk](#) of inland flooding in Michigan and over the past decade, Michigan [witnessed](#) three severe flooding events that caused a total of at least \$12 billion in damages and 5 deaths. In addition to floods, Michigan is at risk from climate-related drought and wildfire. From 2009 through 2016, Michigan [witnessed](#) two drought events that caused a total of 45.9 billion in damages and 176 deaths, and Michigan's Selfridge Air National Guard Base (ANGB) is [impacted](#) by current and potential future wildfires.

Trump's climate change denial harms Michigan's economy. Climate change is estimated to [cost](#) Michigan \$5,178,650,000 a year by the year 2100. Climate change will also harm the state's [agriculture](#) and [outdoor recreation](#) industries.

In the past decade, Michigan has [experienced](#) 16 climate-related disasters responsible for a total of \$79 billion in damages, and since Trump assumed office, Michigan has [experienced](#) 6 climate-related disasters responsible for a total of \$19 billion in damages. Trump's climate policies harm upon the state's economy can be evidenced with his administration's clean cars rollback , which will [cost](#) Michiganders over \$745 million per year.

Trump's Climate Denial is especially harmful to people of color in Michigan, who [continue to fight](#) for clean, lead-free water and against [air pollution](#) from [pipelines](#), manufacturing facilities, fossil fuel refineries.

Despite Trump's climate change denial, Michigan has an opportunity to build a strong green economy. The state was [ranked](#) 5th for clean energy employment in 2019, with the

sector providing 125,365 jobs, and 2nd for clean energy jobs in [rural areas](#), with the sector providing 24,954 jobs. In 2019, there were [more jobs](#) in renewable energy than there were in the state's fossil fuel sector. In 2019, Michigan was home to over 3,800 jobs in the [solar industry](#) and 4,001 to 5,000 direct jobs in the [wind industry](#).

RESEARCH:

MICHIGANDERS WANT CLIMATE ACTION

65 Percent Of Michiganders Believe In Climate Change. According to public opinion survey estimates modeled by the Yale Program on Climate Change Communication and the George Mason Center for Climate Change Communication, 65% of Michiganders agree that global warming is happening. [[Yale Program on Climate Change Communication, 9/17/2019](#)]

57 Percent Of Michiganders Are Worried About Climate Change. According to public opinion survey estimates modeled by the Yale Program on Climate Change Communication and the George Mason Center for Climate Change Communication, 57% of Michiganders are worried about global warming. [[Yale Program on Climate Change Communication, 9/17/2019](#)]

59 Percent Of Michiganders Believe The President Should Do More To Address Climate Change. According to public opinion survey estimates modeled by the Yale Program on Climate Change Communication and the George Mason Center for Climate Change Communication, 59% of Michiganders believe the President should do more to address global warming. [[Yale Program on Climate Change Communication, 9/17/2019](#)]

60 Percent Of Michiganders Believe That Congress Should Do More To Address Global Warming. According to public opinion survey estimates modeled by the Yale Program on Climate Change Communication and the George Mason Center for Climate Change Communication, 60% of Michiganders believe that Congress should do more to address global warming. [[Yale Program on Climate Change Communication, 9/17/2019](#)]

57 Percent Of Michiganders Believe That Their Governor Should Do More To Address Global Warming. According to public opinion survey estimates modeled by the Yale Program on Climate Change Communication and the George Mason Center for Climate Change Communication, 57% of Michiganders believe that their Governor should do more to address global warming. [[Yale Program on Climate Change Communication, 9/17/2019](#)]

55 Percent Of Michiganders Believe That Their Local Officials Should Do More To Address Global Warming. According to public opinion survey estimates modeled by the Yale Program on Climate Change Communication and the George Mason Center for Climate Change Communication, 55% of Michiganders believe that their local officials should do

more to address global warming. [[Yale Program on Climate Change Communication, 9/17/2019](#)]

TRUMP'S CLIMATE DENIAL IS HARMFUL TO MICHIGANDERS' HEALTH

EXTREME HEAT DAYS

Currently, Michigan Rarely Experiences Extreme Heat Days. According to States At Risk, "Currently, Michigan rarely experiences days when heat exceeds dangerous levels." [[StatesAtRisk.Org, Accessed 4/29/2020](#)]

By 2050, The Number Of Extreme Heat Days Michigan Experiences Annually Is Projected To Jump To 15. According to States At Risk, Michigan is expected to see nearly 15 days of extreme heat per year by 2050, a five-fold increase. [[StatesAtRisk.Org, Accessed 4/29/2020](#)]

HEAT RELATED ILLNESSES

In 2016, There Were 4,784 Hospital Emergency Department Visits For Heat-Related Illnesses In Michigan. According to data collected by the Michigan Department of Health and Human Services, "There were a total of 4,784 hospital emergency department (ED) visits in Michigan with self reported dehydration (3494, 73.0%), sun-associated complaints (870, 18.2%), and/or heat associated complaints (451, 9.4%) between April 1, 2016 and August 31, 2016. (Figures 1 & 4)" [Michigan Department of Health and Human Services, [2016](#)]

A University Of Michigan Study Projects Emergency Department Visits Due To Extreme Heat Are Likely To Increase From To 7,800 Per Year By 2070. According to a University of Michigan Public Health Center blog post: "Emergency department visits are expected to increase from 1,200 to 7,800, and hospitalizations from 28 to 185." [University of Michigan, [8/7/2019](#)]

A University Of Michigan Study Projects Deaths From Extreme Heat Are Likely To Increase From 33 Deaths Annually To 240 By 2070. According to a University of Michigan Public Health Center blog post: "A University of Michigan study projects deaths and emergency department visits caused by weather events during the time period 2041 to 2070 compared to a historical period of 1971 to 2000. Deaths from extreme heat are likely to

increase from 33 deaths annually to 240 in the projected time period, the researchers report." [University of Michigan, [8/7/2019](#)]

The Detroit Metropolitan Area Could Experience 760 Excess Deaths On Dangerously Hot Days Each Year By The 2040s. According to the Natural Resources Defense Council: "In Michigan, the risks of heat-related illnesses and deaths will grow as climate change fuels more intense, frequent, and longer heat waves.³⁹ For example, from 1975 to 2010, the Detroit metropolitan area experienced an average of approximately 65 excess deaths per year on dangerously hot summer days. If we continue on our current trajectory of global carbon emissions, the Detroit metropolitan area could experience an annual average of 760 excess deaths on dangerously hot days by the 2040s." [NRDC, [6/29/2017](#)]

Vulnerable Populations

Currently, More Than 270,000 Michiganders Are Especially Vulnerable To Extreme Heat. According to States At Risk, there are 270,000 people who are particularly vulnerable to extreme heat – those under 6 years old, above 65 years old, or living in extreme poverty – in Michigan. [[StatesAtRisk.Org](#), Accessed 4/29/2020]

ISSUES WITH ACCESS TO CLEAN AIR

Ozone Levels

Seventeen Michigan Counties Received F Grades for Ozone Pollution In 2019. According to the American Lung Association's annual State of the Air report in 2019, Allegan, Benzie, Berrien, Cass, Clinton, Genesee, Kalamazoo, Kent, Macomb, Muskegon, Oakland, Ottawa, Schoolcraft, St. Clair, Washtenaw, and Wayne counties all received a grade of F grade for having high ozone days. [[American Lung Association State of the Air Report Card: Michigan, 2020](#)]

Asthma and Allergy Foundation: "Ozone Triggers Asthma." According to the Asthma and Allergy Foundation of America, "Ozone, a gas, is one of the most common air pollutants. Ozone contributes to what we typically experience as "smog" or haze. It is most common in cities where there are more cars. It is also more common in the summer when there is more sunlight and low winds. Ozone triggers asthma because it is very irritating to the lungs and airways. It is well known that ozone concentration is directly related to asthma attacks. It has also caused the need for more doses of asthma drugs and emergency treatment for asthma. Ozone can reduce lung function. Ozone can make it more difficult for you to breathe deeply." [[Asthma and Allergy Foundation of America, October 2015](#)]

Particle Pollution

Detroit Metropolitan Area Was Ranked 10th Worst City In America For Particle Pollution In 2019. According to the American Lung Association's 2020 State of the Air report, Detroit ranks as the 10th worst metropolitan area in the US for year-round particle pollution. [[American Lung Association State of the Air Report, 2020](#)]

ISSUES WITH ACCESS TO CLEAN WATER

PFAS Contamination Has Been Found Across Michigan

FREEP Headline: PFAS Contamination Is Michigan's Biggest Environmental Crisis In 40 Years. [[Detroit Free Press, 4/26/2019](#)]

Michigan May Have More Than 11,000 Sites Contaminated With PFAS. In April of 2019, the Detroit Free Press reported with the headline: "PFAS contamination is Michigan's biggest environmental crisis in 40 years." According to the article: The U.S. Environmental Protection Agency's health advisory level in drinking water for two of the most common PFAS compounds, known as PFOS and PFOA, is 70 parts per trillion. The levels in Wynn-Stelt's drinking water tested as high as 76,000 parts per trillion. Michigan may have more than 11,000 sites contaminated with these once-common chemicals, now linked to cancer and a host of other ailments. Regulators have identified 46 sites statewide with levels above the EPA's health limit in groundwater." [[Detroit Free Press, 4/26/2019](#)]

"Study: Michigan Has Most PFAS Contaminated Sites In United States." On May 6, 2019, UpNorthLive published an article with the headline "Study: Michigan has most PFAS contaminated sites in United States." According to the article: "As of March 2019, per- and polyfluoroalkyl substances (PFAS) have been found in at least 610 locations in 43 states, that's according to a recent study done by the Environmental Working Group (EWG). A recent update to an interactive map by the EWG and Social Science Environmental Health Research Institute shows publicly-known pollution from PFAS chemicals nationwide. These include public water systems, military bases, military and civilian airports, industrial plants, dumps and firefighter training sites." [[UpNorthLive, 5/6/2019](#)]

Health Risks

Per- And Polyfluoroalkyl Substances, Known As PFAS, Are Prevalent Man-Made Chemicals That Do Not Break Down And Accumulate Over Time In The Environment And Human Body. According to the EPA, "Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that includes PFOA, PFOS, GenX, and many other chemicals. PFAS have been manufactured and used in a variety of industries around the globe, including in the United States since the 1940s. PFOA and PFOS have been the most extensively produced and studied of these chemicals. Both chemicals are very persistent in the environment and in the human body – meaning they don't break down and they can accumulate over time. There is evidence that exposure to PFAS can lead to adverse human health effects."

[EPA.gov, accessed [3/8/19](#)]

- **PFAS Are Known As "Forever Chemicals" Because They Do Not Break Down.** According to The Washington Post, "Because PFAS do not break down in the environment, they have become known as 'forever chemicals.'" [[Washington Post, 2/14/19](#)]

PFAS Can Be Found In Food Packaging, Commercial Household Products, Factories, Drinking Water, And Living Organisms. According to the EPA, "PFAS can be found in: - Food

packaged in PFAS-containing materials, processed with equipment that used PFAS, or grown in PFAS-contaminated soil or water. - Commercial household products, including stain- and water-repellent fabrics, nonstick products (e.g., Teflon), polishes, waxes, paints, cleaning products, and fire-fighting foams (a major source of groundwater contamination at airports and military bases where firefighting training occurs). - Workplace, including production facilities or industries (e.g., chrome plating, electronics manufacturing or oil recovery) that use PFAS. - Drinking water, typically localized and associated with a specific facility (e.g., manufacturer, landfill, wastewater treatment plant, firefighter training facility). - Living organisms, including fish, animals and humans, where PFAS have the ability to build up and persist over time." [EPA.gov, accessed [3/8/19](#)]

PFAS Can Cause Reproductive, Developmental, And Immunological Effects, As Well As Tumors, Increased Cholesterol Levels, Low Infant Birth Weight, And Thyroid Hormone Disruption. According to the EPA, "PFAS are found in a wide range of consumer products that people use daily such as cookware, pizza boxes and stain repellants. Most people have been exposed to PFAS. Certain PFAS can accumulate and stay in the human body for long periods of time. There is evidence that exposure to PFAS can lead to adverse health outcomes in humans. The most-studied PFAS chemicals are PFOA and PFOS. Studies indicate that PFOA and PFOS can cause reproductive and developmental, liver and kidney, and immunological effects in laboratory animals. Both chemicals have caused tumors in animals. The most consistent findings are increased cholesterol levels among exposed populations, with more limited findings related to: low infant birth weights, effects on the immune system, cancer (for PFOA), and thyroid hormone disruption (for PFOS)." [EPA.gov, accessed [3/8/19](#)]

Local Incidents

November 2018: A Lake County Well Was Taken Offline Due To PFAS Contamination. According to the Lake County Star, "As a precautionary measure, the detected well was taken offline upon receiving these results. A follow-up resampling of this well will be scheduled and performed by Dec. 1." [Lake County Star, [11/7/18](#)]

October 2018: Michigan DEQ Sent A Violation Notice To The US Air Force Over PFOS Discharge From Wurtsmith Air Force Base Violating Michigan PFAS Law. In October of 2018, the Michigan Department of Environmental Quality sent a letter to a US Air Force official, which began by saying: "The Michigan Department of Environmental Quality (MDEQ), Water Resources Division (WRD), has determined that the USAF-Wurtsmith AFB is in violation of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.3101 et seq.; the administrative rules promulgated thereunder being 2006 AACR R 323.2101 et seq., as amended; and SRD No. MIU990034, which was signed on April 15, 2016. A review of groundwater data from compliance monitoring wells located in the area of Clark's Marsh document PFOS levels far exceeding the 12 nanograms per liter (ng/l) PFOS water quality standard at the groundwater surface water interface (GSI). Failure to meet water quality standards for discharges of venting groundwater is a violation of Section 3109(a) and

other sections of Part 31; excerpt is below. The MDEQ has also determined that the discharge of venting groundwater is not in compliance with Part 201, Environmental Remediation, of the NREPA." [[Michigan Department of Environmental Quality Violation Notice No. VN-008900, 10/19/2018](#)]

September 2018: PFAS Levels At Battle Creek Air National Guard Base Were Over 1,000 Times The EPA Advisory Benchmark. According to MLive, "Upton held a sheet with testing results showing that groundwater is contaminated with PFOS and PFOA at 76,000 parts per trillion at the base. The testing numbers do not include the sum of all PFAS compounds that likely were found during Air National Guard sampling at the site." [MLive, [09/06/18](#)]

- **Battle Creek Air National Guard Base Used Firefighting Foam Containing PFAS For More Than 40 Years.** According to the Battle Creek Enquirer, "It is the firefighting foam that has Battle Creek identified as an area to be tested. The Air National Guard base in Battle Creek used AFFF, a firefighting foam that contains PFAS, for more than 40 years before transitioning to a more environmentally friendly foam at the end of 2016." [Battle Creek Enquirer, [08/01/18](#)]
- **EPA: PFAS Health Advisory Benchmark Is 70 Parts Per Trillion.** According to the U.S. Environmental Protection Agency, "To provide Americans, including the most sensitive populations, with a margin of protection from a life-time of exposure to PFOA and PFOS from drinking water, EPA established the health advisory levels at 70 parts per trillion. When both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS should be compared with the 70 parts per trillion health advisory level. This health advisory level offers a margin of protection for all Americans throughout their life from adverse health effects resulting from exposure to PFOA and PFOS in drinking water." [U.S. Environmental Protection Agency, [11/2016](#), 2]
- **September 2018: Rep. Upton Claimed PFAS The Testing Results From Battle Creek Air National Guard Base Were Held Up In Pentagon Bureaucracy.** According to MLive, "Upton pressed Department of Defense Deputy Assistant Secretary Maureen Sullivan on why testing results at the Battle Creek Air National Guard Base were held up in Pentagon bureaucracy for months when the state of Michigan was able to respond to high levels of PFAS found in the city of Parchment water this summer in a matter of days." [MLive, [09/06/18](#)]

December 2018: Discharge Of PFAS Contaminated Water Was 3,428 Times The EPA Advisory Benchmark 25 Miles From Battle Creek. According to the Associated Press, "The highest recorded discharge level was 240,000-ppt of PFAS from Bronson Plating to the Bronson wastewater plant, which is about 25 miles south of Battle Creek. The plant discharges into Swan Creek, which connects to the St. Joseph River and Lake Michigan." [Associated Press, [12/02/18](#)]

Summer 2018: PFAS Contamination Was Found At The Wash King Superfund Site. According to the Lake County Star, "The latest twist in the Wash King history took place beginning the summer of 2018, when the site tested positive for PFAS contamination, an issue which MDEQ officials are currently addressing." [Lake County Star, [05/01/19](#)]

- **1982: The Wash King Site Put On The EPA's National Priorities List With Perchloroethylene Levels 11 Times Michigan Cleanup Standard.** According to the Lake County Star, "The now vacant site encompassed the former Wash King Laundry coin-operated facility (1962-1991) and four lagoons, located approximately 500 feet west of the former building which were used to discharge wastes. The wastes were directed to the lagoons from a water storage tank located beneath the laundromat through underground piping, which was later determined to have leaks. Since 1982, the contaminated area became a Superfund site and was put on a National Priorities List, authorizing the U.S. Environmental Protection Agency to respond to laundry waste contaminants which seeped into groundwater and soil. The Michigan Department of Natural Resources took this as a lead project. Superfund sites are nationally-designated environmental cleanups which are extremely expensive and complex. Over the past four decades, investigations identified groundwater and soil contamination as primarily the dry-cleaning agent perchloroethylene (PCE) as well as other chemicals. The PCE levels, of up to 1,100 ug/kg (mass of chemical in milligrams per mass of soil in kilograms) near the Wash King building, were greatly in excess of state cleanup standards (100 ug/kg)." [Lake County Star, [05/01/19](#)]
- **2018: The State Tested The Wash King Site And Found PFAS Levels Almost 8 Times The EPA Advisory Benchmark.** According to the Lake County Star, "EGLE, formerly called the Michigan Department of Environmental Quality, tested the contaminated area for PFAS last July as part of continuing cleanup work to clean up PCE contaminants. The site was suspected to have PFAS because of dry-cleaning operations which took place in the '60s and '70s. PFAS were used for more than 50 years in many products, including Teflon, waterproof clothing and footwear and laundry agents. They are chemicals which break down very slowly and are highly soluble, moving easily from groundwater to surface water. There is a possibility the chemical was used at the site for clothing stain repellent or in laundry detergent. In July, EGLE took 11 groundwater samples in the current PCE plume, and in August, two of the 11 samples had detectable levels of PFAS, each north of the former lagoons, where the groundwater flows northward. The highest concentration was 310 ppt (parts per trillion) and in total, 550 ppt. The lifetime health advisory level is 70 ppt before the chemical is considered to adversely affect health." [Lake County Star, [05/01/19](#)]
- **EPA: PFAS Health Advisory Benchmark Is 70 Parts Per Trillion.** According to the U.S. Environmental Protection Agency, "To provide Americans, including the most sensitive populations, with a margin of protection from a life-time of exposure to PFOA and PFOS from drinking water, EPA established the health advisory levels at 70 parts per trillion. When both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS should be compared with the 70 parts per trillion health advisory level. This health advisory level offers a margin of protection for all Americans throughout their life from adverse health effects resulting from exposure to PFOA and PFOS in drinking water." [U.S. Environmental Protection Agency, [11/2016](#), 2]

TRUMP'S CLIMATE DENIAL PUTS MICHIGANDERS' SAFETY AT RISK

FLOODS

Link to Climate Change

Scientists Have Linked Increases in Flooding to Climate Change. According to the National Climate Assessment, "Floods are caused or amplified by both weather- and human-related factors. Major weather factors include heavy or prolonged precipitation, snowmelt, thunderstorms, storm surges from hurricanes, and ice or debris jams [...] Increasingly, humanity is also adding to weather-related factors, as human-induced warming increases heavy downpours, causes more extensive storm surges due to sea level rise, and leads to more rapid spring snowmelt [...] The risks from future floods are significant, given expanded development in coastal areas and floodplains, unabated urbanization, land-use changes, and human-induced climate change" [National Climate Assessment, Extreme Weather, [2014](#)]

Scientists Say Climate Change Played A Hand In Deadly 2019 Midwest Floods. In March of 2019, Reuters reported: "Climate change played a hand in the deadly floods in the U.S. upper Midwest that have damaged crops and drowned livestock, scientists said on Thursday, while a Trump administration official said more homework was needed before making that link. The "bomb cyclone" that dumped rain on Nebraska, Iowa and Missouri and killed at least four people now threatens a wider region downstream of swollen rivers and smashed levees. Manmade greenhouse gases trap heat in the atmosphere, warming the oceans and making the air above them more humid, scientists said. When a storm picks up and eventually spits out that moisture, it can be devastating for people caught below. 'The atmosphere is pretty close to fully saturated, it's got all the water it can take,' said Michael Wehner, a senior scientist at the Lawrence Berkeley National Laboratory."

[\[Reuters, 3/21/2019\]](#)

Population At Risk

Currently, More Than 340,000 People Are At Risk Of Inland Flooding In Michigan. According to States At Risk, there are currently more than 340,000 people living in areas at elevated risk of inland flooding in Michigan. [[StatesAtRisk.Org, Accessed 4/29/2020](#)]

Impact On The Great Lakes

2013: Lakes Huron Reached Lowest Levels In Recorded History. In February of 2013, the Associated Press reported: "Two of the Great Lakes have hit their lowest water levels ever recorded, the U.S. Army Corps of Engineers said Tuesday, capping more than a decade of below-normal rain and snowfall and higher temperatures that boost evaporation. Measurements taken last month show Lake Huron and Lake Michigan have reached their

lowest ebb since record keeping began in 1918, and the lakes could set additional records over the next few months, the corps said. The lakes were 29 inches below their long-term average and had declined 17 inches since January 2012. The other Great Lakes - Superior, Erie and Ontario - were also well below average." [\[Associated Press, 2/6/2013\]](#)

2019: "Climate Change Is Fueling Conditions That Have Turned The Great Lakes Into The Erratic High Seas Of The Midwest." In August of 2019, E&E News reported from Grand Haven, Michigan: "Streets are flooded in 'Coast Guard City, USA,' and the maritime rescue force is responding to dangerous events not seen for decades on Lake Michigan. Boats ramming breakwalls and other objects hidden below the lake surface. People and pets nearly swept off piers by crashing waves. Swimmers fighting riptides that have drowned 30 people so far this year. Beach walkers becoming trapped between pounding surf and cliff-like dunes. Welcome to the nation's 'Third Coast,' where climate change is fueling conditions that have turned the Great Lakes into the erratic high seas of the Midwest." [\[E&E News, 8/22/2019\]](#)

U Mich Scientist Says Extreme Rains And Drought Driven By Climate Change Will Make The Great Lakes Water Levels "Very High" And "Very Low." In August of 2008, MLive reported: "Michigan may not get a break anytime soon from high lake levels wreaking havoc across the state, but when it does, the pendulum likely will swing the other way. That's according to researchers with the University of Michigan, who say climate change is behind heavy precipitation that has engorged the Great Lakes as well as water tables throughout the state. It also will be behind periods of dry weather in coming years that will result in low water levels, said Richard B. Rood, a professor in U-M's Department of Climate and Space Sciences and Engineering. He calls the change from high to low water periods of 'variability.' 'We think you're going to see it very high and there also will be times when you will see it very low,' Rood said." [\[MLive, 8/15/2019\]](#)

Great Lakes Water Levels Expected To Top 2019 Records In 2020. In January of 2020, Fox 2 Detroit reported: "With water levels in the Great Lakes breaking records in 2019, the U.S. Army Corps of Engineers is predicting levels to reach similar heights in 2020, with a chance of new records being set again. Projections that extend six months from the present-day estimate levels in every Great Lake, as well as Lake St. Clair will be well above the average levels, with Lakes Michigan and Huron appear the most likely to set record highs. Both came close to records in 2019." [\[Fox 2 Detroit, 1/8/2020\]](#)

Recent Flooding Events

2020 Flooding Events

January 2020: Southeastern Tornadoes And Northern Storms And Flooding Caused \$1.1 Billion In Damages And 10 Deaths. According to NOAA's National Centers for Environmental Information, Southeastern Tornadoes and Northern Storms and Flooding,

which hit Michigan in January 2020, caused \$1.1 billion in damages and resulted in 10 deaths. [[ncdc.noaa.gov, Accessed 4/30/2020](https://www.ncdc.noaa.gov/capabilities-and-data/monitoring-and-assessment/monitoring-and-assessment-data/annual-flood-data)]

- **Michigan Was Impacted By Storms And Severe Flooding That Caused Significant Damage Along The Shoreline Of Lake Michigan.** According to NOAA's National Centers for Environmental Information, "More than 80 tornadoes and severe storms caused damage across many southeastern states (AL, AR, GA, IL, IN, KY, LA, MS, MO, NC, OH, SC, TN, TX, VA, WI). Storms and severe flooding also impacted northern states including Michigan, Wisconsin and New York. Significant damage occurred along the shoreline of Lake Michigan to roads, the foundation of homes and to Port Milwaukee. These powerful waves were generated by high winds and a lack of seasonal ice cover." [[ncdc.noaa.gov, Accessed 4/30/2020](https://www.ncdc.noaa.gov/capabilities-and-data/monitoring-and-assessment/monitoring-and-assessment-data/annual-flood-data)]

May 2020: Record Heavy Rain Resulted In River Flooding That Mandated Evacuations In Mid-Michigan. On May 19, 2020, the Detroit Free Press reported: "Heavy rains over the last few days doused Michigan, prompting flood warnings along rivers across the state and forcing some residents to evacuate their homes and navigate water-logged roads. At least two rivers in mid-Michigan — the Tittabawassee River in Midland and the Rifle River near Sterling — had reached their major flood stage Tuesday afternoon. Moderate flooding has been observed at a handful of other rivers in mid-Michigan as well as the west and southwest portions of the state, according to the National Weather Service. Meteorologists say areas around Midland logged 3 to 4 inches of rain since Sunday. This produced a 'tremendous' amount of runoff that the National Weather Service said is causing significant rises on the river system." [[Detroit Free Press, 5/19/2020](https://www.detroitfreepress.com/news/local/michigan/record-heavy-rain-causes-major-floods-in-mid-michigan/300000501)]

Floodwaters Caused A Dam To Fail, Forcing Evacuations In Midland County. On May 19, 2020, The Weather Channel reported: "Residents in two central Michigan towns were told to evacuate immediately Tuesday evening after floodwaters caused a dam to fail. Emergency officials in Midland County, about 150 miles north of Detroit, had earlier warned residents along Wixom and Sanford lakes that the Edenville Dam was in danger of failure. They told residents to leave immediately around 6:15 p.m. EST when the dam could no longer hold back the water flowing through its flood gates. [[The Weather Channel, 5/19/2020](https://www.weatherchannel.com/weather-headlines/edenville-dam-collapse-michigan-evacuation-weather-channel)]

CNN Headline: "Thousands In Michigan Evacuate After 2 Dams Are Breached, And The Governor Warns City Could Soon Be Under '9 Feet Of Water" On May 20, 2020, CNN reported: "A rain-swollen river has breached two dams and flooded fields and streets in parts of mid-Michigan, forcing evacuation orders for thousands amid a coronavirus pandemic that's posing safety challenges Wednesday for officials trying to provide shelter. Parts of the city of Midland and surrounding areas were virtual lakes Wednesday morning, and it could get worse. Downtown in Midland, a city of about 41,000 people downstream of the dams, could eventually be 'under approximately 9 feet of water' on Wednesday, Gov. Gretchen Whitmer said the prior night." [[CNN, 5/20/2020](https://www.cnn.com/2020/05/20/us/michigan-dams-breached/index.html)]

New York Times Headline: "Dam Disaster Threatens Major Dow Chemical Complex and Superfund Project." On May 20, 2020, the New York Times reported: "Floodwaters from two breached dams in Michigan on Wednesday surged toward a sprawling Dow chemical complex and a vast Superfund toxic-cleanup site downriver, raising concerns of wider environmental fallout from the dam disaster and historic flooding. The compound, which also houses the chemical giant's world headquarters, lies on the banks of the Tittabawassee River in Midland, a city that emergency officials say could soon be under as much as nine feet of water. Kyle Bandlow, a Dow spokesman, confirmed that floodwaters had reached the site's outer boundaries and were entering ponds designed to hold runoff of water used on the site." [\[New York Times, 5/20/2020\]](#)

2019 Flooding Events

March 2019: Missouri River And North Central Flooding Caused \$10.9 Billion In Damages And Resulted In 3 Deaths. According to NOAA's National Centers for Environmental Information, flooding of the Missouri River and in the North Central U.S., which hit Michigan in March 2019, caused \$10.9 billion in damages and resulted in 3 deaths. [\[ncdc.noaa.gov, Accessed 4/30/2020\]](#)

- **Michigan Was One Of Eight States Most Effect By The Historic Midwest Flooding, Which Was One Of The Costliest U.S. Inland Flooding Events On Record.** According to NOAA's National Center for Environmental Information, "Historic Midwest flooding inundated millions of acres of agriculture, numerous cities and towns, and caused widespread damage to roads, bridges, levees, and dams. The states most affected were Nebraska, Iowa, Missouri, South Dakota, Minnesota, North Dakota, Wisconsin and Michigan. This flood was triggered by a powerful storm with heavy precipitation that intensified snow melt and flooding. [...] This historic flooding was one of the costliest U.S. inland flooding events on record." [\[ncdc.noaa.gov, Accessed 4/30/2020\]](#)

2014 Flooding Events

August 2014: Michigan And Northeast Flooding Caused \$1.1 Billion In Damages And Two Deaths. According to NOAA's National Centers for Environmental Information, flooding in Michigan and across the Northeast caused \$1.1 billion in damages and two deaths. [\[ncdc.noaa.gov, Accessed 4/30/2020\]](#)

- **Heavy Rainfall In Excess Of Five Inches Caused Significant Flooding Across Michigan, Damaging Thousands Of Automobiles, Businesses, Homes And Other Infrastructure.** According to NOAA's National Centers for Environmental Information, "Heavy rainfall in excess of 5 inches caused significant flooding in cities across Michigan damaging thousands of cars, business, homes and other infrastructure. Flooding also occurred across Maryland and New York's Long Island, as the slow-moving storm system delivered 24-hour rainfall exceeding 6 and 12 inches, respectively, creating more flood damage." [\[ncdc.noaa.gov, Accessed 4/30/2020\]](#)

WILDFIRES

Link to Climate Change

Climate Change Is Increasing The Severity, Frequency, And Extent Of Wildfires. According to a report from the EPA: "Higher temperatures and drought are likely to increase the severity, frequency, and extent of wildfires in Colorado, which could harm property, livelihoods, and human health. In 2013, the Black Forest Fire burned 14,000 acres and destroyed over 500 homes. Wildfire smoke can reduce air quality and increase medical visits for chest pains, respiratory problems, and heart problems. The size and number of western forest fires have increased substantially since 1985." [[Environmental Protection Agency, "What Climate Change Means for Colorado" August 2016](#)]

Acres Burned By Wildfire Doubled In Recent Decades Due To Climate Change. According to the 2018 National Climate Assessment Report: "Wildfire is a natural part of many ecosystems in the Southwest, facilitating germination of new seedlings and killing pests. Although many ecosystems require fire, excessive wildfire can permanently alter ecosystem integrity. Climate change has led to an increase in the area burned by wildfire in the western United States. Analyses estimate that the area burned by wildfire from 1984 to 2015 was twice what would have burned had climate change not occurred. Furthermore, the area burned from 1916 to 2003 was more closely related to climate factors than to fire suppression, local fire management, or other non-climate factors." [[National Climate Assessment, Chapter 25, 2018](#)]

Recent Wildfire Seasons

2019 Fire Season

In 2019, 1,128 Acres Of Land Were Burned Due To Wildfire In Michigan. According to the National Interagency Fire Center's 2019 report, 1,128 acres of land were burned in 361 fires across Michigan in 2019. [[National Interagency Fire Center, National Report of Wildland Fires and Acres Burned by State, 2019 Report](#)]

2018 Fire Season

In 2018, 3,786 Acres Of Land Were Burned Due To Wildfire In Michigan. According to the National Interagency Fire Center's 2018 report, 3,786 acres of land were burned in 431 fires across Michigan in 2018. [[National Interagency Fire Center, National Report of Wildland Fires and Acres Burned by State, 2018 Report](#)]

2017 Fire Season

In 2017, 736 Acres Of Land Were Burned Due To Wildfire In Michigan. According to the National Interagency Fire Center's 2017 report, 736 acres of land were burned in 270 fires across Michigan in 2017. [[National Interagency Fire Center, National Report of Wildland Fires and Acres Burned by State, 2017 Report](#)]

DROUGHT

Link to Climate Change

Scientists Have Linked Prolonged Heat Waves To Climate Change. According to the 2014 National Climate Assessment Report: "Analyses show that human-induced climate change has generally increased the probability of heat waves." [National Climate Assessment, Extreme Weather, [2014](#)]

Recent Heat Waves "Unprecedented" Since Records Began Over One Hundred Years Ago. According to the 2014 National Climate Assessment Report: "prolonged (multi-month) extreme heat has been unprecedented since the start of reliable instrumental records in 1895." [National Climate Assessment, Extreme Weather, [2014](#)]

National Climate Assessment Showed That Climate Change Is Affecting Us Now, Not Just In The Future. According to CNN, "An analysis by the environmental advocacy group the Sierra Club, released Monday, found nine instances in which Wheeler's statements about the delayed impact of climate change were directly contradicted in the National Climate Assessment, a government-sponsored climate analysis authored by scientists from 13 federal agencies that was released in November. (there is no link to this analysis because they gave it to us exclusively)" [CNN, [4/22/19](#)]

- **Higher Temperatures.** According to CNN, "Between 1901 and 2016, the global average temperatures 'have increased by 1.8 degrees Fahrenheit,' and there is no evidence that the rise in temperature has been caused by any 'natural explanation,' according to the report. 'The evidence consistently points to human activities, especially emissions of greenhouse or heat-trapping gases, as the dominant cause,' the report states." [CNN, [4/22/19](#)]
- **Hotter Years.** According to CNN, "Each decade has been the hottest on record in succession over the past 30 years. Seventeen of the 18 hottest years on record have occurred since 2001, according to the report." [CNN, [4/22/19](#)]

NASA Research Showed Human Activity Has Been Influencing Global Patterns Of Drought, With Increased Drought Occurring In Response To Greenhouse Gas Emissions. According to NASA, "Warming temperatures and changing precipitation patterns can lead to droughts, and NASA research shows that humans have been influencing global patterns of drought for nearly a century. Kate Marvel and Ben Cook, researchers at NASA's Goddard Institute for Space Studies and Columbia University in New York City, investigated humans' influence on 20th-century drought patterns using historical weather data and drought maps calculated from tree rings. They found that a data 'fingerprint' – a drying and wetting pattern predicted to occur in response to greenhouse gas emissions – was visible as far back as the early 1900s." [[climate.nasa.gov, 6/13/2019](#)]

Climate Change Is Already Affecting Global Patterns Of Drought, And Such Trends Are Expected To Continue. According to NASA, "Demonstrating that humans influenced global drought patterns in the past is an important part of understanding how we may influence them in the future, said Cook. 'Climate change is not just a future problem,' he said. 'This shows it's already affecting global patterns of drought, hydroclimate, trends, variability — it's happening now. And we expect these trends to continue, as long as we keep warming the world.'" [climate.nasa.gov, 6/13/2019]

Recent Droughts Affecting Michigan

2013 Drought Impacts

Spring – Fall 2013: Western Plains Drought And Heatwave Caused \$11.7 Billion In Damages And 53 Deaths. According to NOAA's National Centers for Environmental Information, droughts and heatwaves across the Western Plains, that impacted Michigan in the Spring and Fall of 2013, caused \$11.7 billion in damages and 53 deaths.

[[ncdc.noaa.gov](https://www.ncdc.noaa.gov), Accessed 4/30/2020]

- **Michigan Was One Of 22 States That Experienced Moderate To Extreme Drought.**

According to NOAA's National Centers for Environmental Information, "The 2013 drought slowly dissipated from the historic levels of the 2012 drought, as conditions improved across many Midwestern and Plains states. However, moderate to extreme drought did remain or expand into western states (AZ, CA, CO, IA, ID, IL, KS, MI, MN, MO, ND, NE, NM, NV, OK, OR, SD, TX, UT, WA, WI, WY). In comparison to 2011 and 2012 drought conditions the US experienced only moderate crop losses across the central agriculture states." [[ncdc.noaa.gov](https://www.ncdc.noaa.gov), Accessed 4/30/2020]

2012 Drought Impacts

2012: Nationwide Droughts And Heatwaves Caused \$34.2 Billion In Damages And 123 Deaths. According to NOAA's National Centers for Environmental Information, drought and heatwaves across the U.S. in 2012 caused \$34.2 billion in damages and 123 deaths.

[[ncdc.noaa.gov](https://www.ncdc.noaa.gov), Accessed 4/30/2020]

- **The 2012 Drought Impacted Over Half Of The U.S. And Was The Most Extensive Drought In America Since The 1930s.** According to NOAA's National Centers for Environmental Information, "The 2012 drought is the most extensive drought to affect the U.S. since the 1930s. Moderate to extreme drought conditions affected more than half the country for a majority of 2012. The following states were affected: CA, NV, ID, MT, WY, UT, CO, AZ, NM, TX, ND, SD, NE, KS, OK, AR, MO, IA, MN, IL, IN, GA. Costly drought impacts occurred across the central agriculture states resulting in widespread harvest failure for corn, sorghum and soybean crops, among others. The associated summer heatwave also caused 123 direct deaths, but an estimate of the excess mortality due to heat stress is still unknown." [[ncdc.noaa.gov](https://www.ncdc.noaa.gov), Accessed 4/30/2020]

MILITARY BASES AFFECTED BY CLIMATE CHANGE

Michigan's Selfridge Air National Guard Base (ANGB) Is Impacted By Current And Potential Future Wildfires. According to the Department of Defense, Selfridge Air National Guard Base (ANGB) in Michigan is impacted by current and potential wildfires. [[Report on Effects of a Changing Climate to the Department of Defense, January 2019](#)]

TRUMP'S CLIMATE DENIAL HURTS MICHIGAN'S ECONOMY

GDP IMPACT

Climate Change Will Cost Michigan \$5,178,650,000 A Year By The Year 2100. According to data on the impacts of climate change as part of a study published in Science Magazine, Michigan can expect to lose \$5,178,650,000 from annual GDP by the year 2100 if action isn't taken to immediately curtail carbon emissions. The study used a model that aimed to calculate the future impact on each state's gross domestic product (GDP) from events including hurricanes, storm surges, changes in agricultural yields, changing electricity demands, changes in mortality rates, changes to the labor supply, rising sea levels and rising crime rates. [[Hsiang, S., Kopp, R.E., et al. "Estimating economic damage from climate change in the United States" Science Magazine, 6/30/2017, MarketWatch, 4/30/2018](#)]

AGRICULTURAL IMPACTS

Michigan Agriculture Generates An Economic Impact Of \$104.7 Billion And Supports 805,000 Jobs. According to data published by the Michigan Department of Agriculture & Rural Development, "The food and agriculture industry contributes \$104.7 billion annually to the state's economy." Also, "Michigan's food and agriculture system is a large portion of this state's workforce. Total employment resulting from this sector is approximately 805,000, which accounts for about 17 percent of the state's employment." [[Michigan Department of Agriculture & Rural Development website accessed 6/10/2020](#)]

Climate Change Is Projected To Cause A 1.58% Loss In Crop Yields In Michigan, Including A 19% Loss In Grains. According to data on the impacts of climate change as part of a study published in Science Magazine, Michigan can expect to see a 1.58% loss in total value of agricultural crop yields by late in the century (2080-2100) if action isn't taken to immediately curtail carbon emissions. This includes a 16% gain in productivity in oil crops (palm, soybean, rapeseed and sunflower) that would be completely offset economically by a 19.08% decline in grain production. The study used a model that aimed to calculate the future impact on agricultural yields on GDP. [[Hsiang, S., Kopp, R.E., et al. "Estimating economic damage from climate change in the United States" Science Magazine, 6/30/2017 \(data files via Zenodo\)](#)]

ECONOMIC COSTS OF GREAT LAKES FLOODING

South Haven, MI Reported \$16 Million In Damages Due To Water Rising On Lake Michigan Coastline. In March of 2020, MLive reported: "Communities around the state are sharing

that concern. South Haven almost canceled its July 4 fireworks in 2019 as its beach eroded. That was just one sign to visitors to the community faced changes. Less obvious to the tourists that head to the Southwest Michigan city is how much else has changed: By early this year, city officials reported \$16 million in damages due to water rising on its Lake Michigan coastline and in the Black River, which bisects the town. And the city's fireworks already are off for 2020." [\[MLive, 3/27/2020\]](#)

Gov. Whitmer Announced A Plan To Devote \$40 Million TO Help Cities Pay For The Effects Of Climate Change. In March of 2020, MLive reported: "In late 2019, EGLE reduced its permitting time for homeowners who wanted to get ahead of the forecast and erect seawalls or add height to foundations, among other ways to try to save houses that once may have been more than 200 feet or more from the eroding shoreline. Then early this year, it led a statewide meeting of cities, townships and others threatened by high water. Days later, Gov. Gretchen Whitmer announced a plan to devote \$40 million in next year's budget to help cities pay for effects of climate change. Congress also is eyeing the high water, with members of the state's delegation touring affected areas like Bay City and South Haven." [\[MLive, 3/27/2020\]](#)

In 2019, High Water Levels Forced Closures Of Marinas, Boat Ramps, And Docks. In August of 2019, MLive reported: "Much of Veterans Memorial Park in Bay City was underwater earlier in the summer, prompting the closure of the boat launch ramp there. Launch ramps elsewhere have been closed, including in Muskegon where tow vehicles could have gone into the water with the boats, according to city officials." The article went on the point out: "Marinas are turning off electric power to boat slips due to the possibility of electric currents leaking into the water and causing electric shock drownings. Docks throughout the state are submerged. In South Haven, access to a popular park, boat launch and marina has been partially blocked due to road flooding. That has led to a reduction in parking revenue the city uses to maintain its seven beaches, said Hunter, South Haven's public works director." [\[MLive, 8/13/2019\]](#)

In 2019, Lakeshore Communities Worried About Shrinking Beaches And Waterlogged Marinas Turning Tourists Away. In June of 2019, the Lansing State Journal reported: "The Upper Peninsula community can weather the record-high Lake Superior water level, but only if the lake holds fast. 'It cannot go another inch higher,' said Kilpela Jr., who operates The Isle Royale Queen IV ferry. 'Then things get really compromised.' Kilpela is among thousands of Michiganders who had a lakeside view as the Great Lakes rose above record heights in May, according to a report the Army Corps of Engineers issued Tuesday. The rising waters have washed out roads, inched over boat slips, covered beaches and flooded properties. Some residents of Michigan's coastal communities worry their tourism-based economies will suffer if visitors turn away from their shrinking beaches and waterlogged marinas." [\[Lansing State Journal, 6/6/2019\]](#)

TOURISM & OUTDOOR RECREATION IMPACTS

Outdoor Recreation In Michigan Supports 232,000 Jobs And \$26.6 Billion In Consumer Spending. According to data collected by the Outdoor Industry Association, outdoor recreation in Michigan supports 232,000 direct jobs and generates \$7.5 billion in wages and salaries. Outdoor recreation generates \$26.6 billion in consumer spending for the state, which brings in \$2.1 billion in state and local tax revenue. [[Outdoor Industry Association accessed 6/9/2020](#)]

Great Lakes Fishing Economy

NOAA: Commercial Fishing Contributes More Than \$1 Billion To The Great Lakes Economy. According to the National Oceanographic and Atmospheric Administration's Great Lakes Environmental Research Laboratory: "Commercial and sport fisheries are important industries in the Great Lakes region. Commercial fishing began in about 1820 and has increased ever since. About 65 million pounds of fish per year are harvested from the lakes, contributing more than \$1 billion to the Great Lakes economy. Primary commercial catches include whitefish, smelt, walleye, and perch, while sport anglers prefer salmon, steelhead, walleye, lake trout, perch and bass. The commercial fishery in the region has been declining however, due to over-fishing, pollution, habitat destruction, and introduction of invasive species." [[NOAA Great Lakes Environmental Research Laboratory website accessed 10/12/2017](#)]

NOAA: Sport Fishing Contributes More Than \$4 Billion To The Great Lakes Economy. According to the National Oceanographic and Atmospheric Administration's Great Lakes Environmental Research Laboratory: "Sport fishery is a huge tourist attraction, which helps to build the economy of the Great Lakes region. Sport fishery contributes \$4 billion to the economy. Sport fishery has also been responsible for the unintended introduction of some invasive species. Exotic fish such as salmon were purposely introduced to help boost the sport fishing industry." [[NOAA Great Lakes Environmental Research Laboratory website accessed 10/12/2017](#)]

Water Level Fluctuation Threatens Fishing Economy

2013: Lakes Huron Reached Lowest Levels In Recorded History. In February of 2013, the Associated Press reported: "Two of the Great Lakes have hit their lowest water levels ever recorded, the U.S. Army Corps of Engineers said Tuesday, capping more than a decade of below-normal rain and snowfall and higher temperatures that boost evaporation. Measurements taken last month show Lake Huron and Lake Michigan have reached their lowest ebb since record keeping began in 1918, and the lakes could set additional records over the next few months, the corps said. The lakes were 29 inches below their long-term average and had declined 17 inches since January 2012. The other Great Lakes - Superior, Erie and Ontario - were also well below average." [[Associated Press, 2/6/2013](#)]

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Winter Recreation

EPA: Shortened Winters Could Harm Local Economies That Depend On Recreational Activities Like Ice Fishing And Snowmobiling. According to a fact sheet from the Environmental Protection Agency, "Warmer winters are likely to shorten the season for recreational activities like ice fishing, snowmobiling, snowboarding, and skiing, which could harm the local economies that depend on them. Small lakes are freezing later and thawing earlier than a century ago, which shortens the season for ice fishing and ice skating. Since the early 1970s, winter ice coverage in the Great Lakes has decreased by 63 percent. Warmer temperatures are likely to shorten the season when the ground is covered by snow, and thereby shorten the season for activities that take place on snow. Nevertheless, annual snowfall has increased in much of the Great Lakes region, which could benefit winter recreation at certain times and locations." [[EPA, "What Climate Change Means For Michigan," August 2016](#)]

SPENDING ON DISASTERS

In The Past Decade, Michigan Has Experienced 16 Climate-Related Disasters Responsible For Over 79 Billion Dollars' Worth Of Damages And 264 Deaths. According to NOAA's National Centers for Environmental Information, Michigan experienced 16 climate-related disasters that were responsible for over a billion dollars' worth of damages each, with a combined total of \$79.3 billion. 264 deaths were attributed to these events. These 16 disasters that occurred between 2009 and 2019 include 10 severe storms, 2 winter storms, 2 droughts, and 2 flooding events. [[ndcd.noaa.gov, Accessed 4/30/2020](#)]

Since Trump Assumed The Office Of The Presidency, Michigan Has Experienced 6 Climate-Related Disasters Responsible For Over 19 Billion Dollars' Worth Of Damages And 24 Deaths. According to NOAA's National Centers for Environmental Information, since President Trump assumed office in 2017, Michigan has experienced 6 climate-related disasters responsible for over a billion dollars' worth of damages each with a combined total of \$19.1 billion. 24 deaths were attributed to these events. [[ndcd.noaa.gov, Accessed 4/30/2020](#)]

THE COST OF TRUMP CLIMATE POLICIES

Trump's Clean Cars Rollback Will Cost Michiganders Over \$745 Million Per Year. In March of 2019, the Center for American Progress analyzed the costs of some of Donald Trump's regulatory changes. For Trump's rollback of clean cars standards, they combined data from M.J. Bradley and Associates' analysis of the net cost for American families of freezing fuel economy targets at model-year 2020 along with data from the Energy Information Agency's oil price forecasts as well as the American Community Survey. The analysis found that Trump's rollback of clean cars standards will cost Michiganders \$745,100,000 per year. [[Center for American Progress, 3/27/2019](#)]

TRUMP'S CLIMATE DENIAL IS ESPECIALLY HARMFUL TO PEOPLE OF COLOR IN MICHIGAN

EXTREME HEAT IMPACTS ON COMMUNITIES OF COLOR

Study Shows Michigan People Of Color Experienced 37% Increase In Risk Of Hospitalization For Some Conditions On Hot Days, But White People Experiences No Increased Risk. "A study of Ingham, Washtenaw, and Wayne counties found that heatwave days increased the odds of hospitalization for kidney disease by 37 percent among people of color from 2000 to 2009. In contrast, there was no increase in hospitalization odds among white people." [NRDC, [1/2019](#); International Journal of Biometeorology [10/30/2016](#)]

Study Analyzed The Impact Of Racist Exclusionary Housing Practices And Found Neighborhoods In Formerly Redlined Areas Are Subject To Hotter Temperatures. "While a growing body of evidence describes the intra-urban variation of temperatures due to characteristics of the built environment, few have asked why we observe a pattern of historically-marginalized communities living in the hottest areas. Here we have presented results from an analysis of 108 US cities that aimed to examine the role of historic 'redlining' policies in mediating exposure to intra-urban heat. We found that in nearly all cases, those neighborhoods located in formerly redlined areas—that remain predominantly lower income and communities of color—are at present hotter than their non-redlined counterparts. Although the extent of differences in temperatures varies by region, the preponderance of evidence establishes that those experiencing the greatest exposure to present and potentially future extreme heat are living in neighborhoods with the least social and ecosystem services historically." [[Hoffman, J.S.; Shandas, V.; Pendleton, N. The Effects of Historical Housing Policies on Resident Exposure to Intra-Urban Heat: A Study of 108 US Urban Areas. Climate 2020](#)]

CDC: African-Americans Had Higher Death Rates From Heat Related Illness. According to the CDC, "During 1999–2005, a total of 3,981 heat-related deaths were reported, resulting in approximately 569 heat-related deaths per year in the United States. Older adults and young children are particularly susceptible to heat-related illnesses and are at high risk for heat-related mortality. Black or African American males had a higher crude rate for heat-related deaths than any other race, across all age groups." [CDC, Preparedness and Response for Public Health Disasters, accessed [6/24/15](#)]

National Climate Assessment: Climate Change Would Amplify Existing Health Threats In Communities Of Color. According to the 2014 National Climate Assessment, "Climate change will, absent other changes, amplify some of the existing health threats the nation now faces. Certain people and communities are especially vulnerable, including children, the elderly, the sick, the poor, and some communities of color." [National Climate Assessment, [2014](#)]

- **National Climate Assessment: Minorities Would Be More Vulnerable To Impacts Of Devastating Heat Waves Caused By Climate Change.** According to the 2014 National Climate Assessment, "Vulnerability to heat waves is not evenly distributed throughout urban areas; outdoor versus indoor air temperatures, air quality, baseline health, and access to air conditioning are all dependent on socioeconomic factors. Socioeconomic factors that tend to increase vulnerability to such hazards include race and ethnicity (being a minority), age (the elderly and children), gender (female), socioeconomic status (low income, status, or poverty), and education (low educational attainment). The condition of human settlements (type of housing and construction, infrastructure, and access to lifelines) and the built environment are also important determinants of socioeconomic vulnerability, especially given the fact that these characteristics influence potential economic losses, injuries, and mortality." [National Climate Assessment, [2014](#)]

AIR POLLUTION

Seventeen Michigan Counties Received F Grades for Ozone Pollution In 2019. According to the American Lung Association's annual State of the Air report in 2019, Allegan, Benzie, Berrien, Cass, Clinton, Genesee, Kalamazoo, Kent, Macomb, Muskegon, Oakland, Ottawa, Schoolcraft, St. Clair, Washtenaw, and Wayne counties all received a grade of F grade for having high ozone days. [American Lung Association State of the Air Report Card: Michigan, [2020](#)]

- **Asthma and Allergy Foundation: "Ozone Triggers Asthma."** According to the Asthma and Allergy Foundation of America, "Ozone, a gas, is one of the most common air pollutants. Ozone contributes to what we typically experience as "smog" or haze. It is most common in cities where there are more cars. It is also more common in the summer when there is more sunlight and low winds. Ozone triggers asthma because it is very irritating to the lungs and airways. It is well known that ozone concentration is directly related to asthma attacks. It has also caused the need for more doses of asthma drugs and emergency treatment for asthma. Ozone can reduce lung function. Ozone can make it more difficult for you to breathe deeply." [[Asthma and Allergy Foundation of America, October 2015](#)]
- **African American Children Were Four Times More Likely To Be Admitted To The Hospital And Ten Times More Likely To Die From Asthma.** According to the Department of Health and Human Services, "In 2015, African American children had a death rate ten times that of non-Hispanic white children. Black children are 4 times more likely to be admitted to the hospital for asthma, as compared to non-Hispanic white children. [Department of Health and Human Services, Accessed [9/7/18](#)]

Detroit Metropolitan Area Was Ranked 10th Worst City In America For Particle Pollution In 2019. According to the American Lung Association's 2020 State of the Air report, Detroit ranks as the 10th worst metropolitan area in the US for year-round particle pollution. [American Lung Association State of the Air Report, [2020](#)]

Headline: "Hispanics And Blacks Create Less Air Pollution Than Whites, But Breathe More Of It, Study Finds." [[CNN, 3/13/2019](#)]

- **Study: Blacks And Hispanic Are Exposed To 56% And 63% More Particulate Air Pollution (PM2.5) Than Is Caused By Their Consumption, While Non-Hispanic Whites Are Exposed To Less Pollution Than They Cause.** According to a study published in the Proceedings of the National Academy of Sciences, "Fine particulate matter (PM2.5) air pollution exposure is the largest environmental health risk factor in the United States. Here, we link PM2.5 exposure to the human activities responsible for PM2.5 pollution. We use these results to explore "pollution inequity": the difference between the environmental health damage caused by a racial–ethnic group and the damage that group experiences. We show that, in the United States, PM2.5 exposure is disproportionately caused by consumption of goods and services mainly by the non-Hispanic white majority, but disproportionately inhaled by black and Hispanic minorities. On average, non-Hispanic whites experience a "pollution advantage": They experience ~17% less air pollution exposure than is caused by their consumption. Blacks and Hispanics on average bear a "pollution burden" of 56% and 63% excess exposure, respectively, relative to the exposure caused by their consumption. The total disparity is caused as much by how much people consume as by how much pollution they breathe. Differences in the types of goods and services consumed by each group are less important. PM2.5 exposures declined ~50% during 2002–2015 for all three racial–ethnic groups, but pollution inequity has remained high." [[Tessum, Christopher W. et al., "Inequity in consumption of goods and services adds to racial–ethnic disparities in air pollution exposure." Proceedings of the National Academy of Sciences Mar 2019, 116 \(13\) 6001-6006](#)]

Marathon Oil Refinery Created Most Polluted ZIP Code In Michigan Where 81 Percent Of Residents Are Black. According to a January 2020 profile in the Guardian, "Growing up in southwest Detroit, Vince Martin thought it was normal for the sky to be orange. When he was three years old, his family moved from Cuba to one of the black areas of town. At the time, discriminatory housing practices segregated the city. His Afro-Cuban family settled in the 48217 district, now Michigan's most polluted zip code, where 71% of the population is black and air pollution makes the sky look like it's on fire. Specifically, the Martins moved to Boynton, a working-class neighborhood. The town sits next door to a Marathon oil refinery and its sprawling industrial campus." [The Guardian, [1/9/2020](#)]

Four Of Michigan's Top Five Emitters Are Located Within A 5 Mile Radius Of The 48217 Zip Code. "Four of the state's top emitters of particulate matter sulfur dioxide and nitrous oxides, which can, respectively, cause respiratory issues, and create acid rain are located within a five-mile radius of Boynton. The situation in the 48217 is by far the worst out of all the areas in Detroit, but environmental problems pervade the entire city. And in Detroit, the blackest major city in the United States, those problems fall disproportionately on poor

communities and communities of color. De-population, white flight and the implosion of the city's manufacturing industry have left behind vulnerable communities. These communities are now struggling, and fighting to survive." [The Guardian, [1/9/2020](#)]

NAACP Report "In Detroit, 2,402 Black Children Have Asthma Attacks Due To Natural Gas Pollution Per Year And Miss 1,751 Days Of School As A Result." In 2017, a report from the NAACP showed that "in Detroit, 2,402 black children have asthma attacks due to natural gas pollution per year and miss 1,751 days of school as a result. Across Michigan, the report showed, 40% of the population in counties that have a refinery are black." [The Guardian, [1/9/2020](#); NAACP, [11/2017](#)]

American Lung Association: "Poorer People And Some Racial And Ethnic Groups Are Among Those Who Often Face Higher Exposure To Pollutants And Who May Experience Greater Responses To Such Pollution." According to the American Lung Association, "The burden of air pollution is not evenly shared. Poorer people and some racial and ethnic groups are among those who often face higher exposure to pollutants and who may experience greater responses to such pollution. Many studies have explored the differences in harm from air pollution to racial or ethnic groups and people who are in a low socioeconomic position, have less education or live nearer to major sources, including a workshop the American Lung Association held in 2001 that focused on urban air pollution and health inequities." [[American Lung Association 2/12/2020](#)]

American Lung Association: "People Of Color Also May Be More Likely To Live In Counties With Higher Levels Of Pollution." According to the American Lung Association, "People of color also may be more likely to live in counties with higher levels of pollution. Non-Hispanic Blacks and Hispanics were more likely to live in counties that had worse problems with particle pollution, researchers found in a 2011 analysis. Non-Hispanic Blacks were also more likely to live in counties with worse ozone pollution. Income groups, by contrast, differed little in these exposures. However, since few rural counties have monitors, the primarily older, non-Hispanic white residents of those counties lack information about the air quality in their communities." [[American Lung Association 2/12/2020](#)]

American Lung Association: Communities Of Color "Experienced Higher Risks Of Harm, Including Premature Death, From Exposure To Air Pollution." According to the American Lung Association's State of the Air report: "Studies have found that Hispanics, Asians, American Indians/Alaska Natives and especially African Americans experienced higher risks of harm, including premature death, from exposure to air pollution. Approximately 74 million people of color live in counties that received at least one failing grade for ozone and/or particle pollution. Over 14 million people of color live in counties that received failing grades on all three measures." [[American Lung Association, State of the Air 2020](#)]

LEAD CONTAMINATION

Flint, Michigan

Neurological Damage Resulting From Flint's Water Crisis Is "Threatening To Overwhelm The Education System." According to a November 2019 feature in the New York Times, "Five years after Michigan switched Flint's water supply to the contaminated Flint River from Lake Huron, the city's lead crisis has migrated from its homes to its schools, where neurological and behavioral problems — real or feared — among students are threatening to overwhelm the education system. The contamination of this long-struggling city's water exposed nearly 30,000 schoolchildren to a neurotoxin known to have detrimental effects on children's developing brains and nervous systems. Requests for special education or behavioral interventions began rising four years ago, when the water contamination became public, bolstering a class-action lawsuit that demanded more resources for Flint's children." [New York Times, [11/6/2019](#)]

- **Since 2014, Nearly 30,000 Children Have Been Exposed To Toxic Lead From Municipal Water Sources.** According to a November 2019 feature in the New York Times, "The contamination of this long-struggling city's water exposed nearly 30,000 schoolchildren to a neurotoxin known to have detrimental effects on children's developing brains and nervous systems. "[New York Times, [11/6/2019](#)]
- **The Percentage Of Students Who Qualify For Special Ed Has Doubled Since The Beginning Of The Crisis.** According to a November 2019 feature in the New York Times, "The percentage of the city's students who qualify for special education services has nearly doubled, to 28 percent, from 15 percent the year the lead crisis began, and the city's screening center has received more than 1,300 referrals since December 2018. The results: About 70 percent of the students evaluated have required school accommodations for issues like attention deficit hyperactivity disorder, also known as A.D.H.D.; dyslexia; or mild intellectual impairment, said Katherine Burrell, the associate director of the center. "We have a school district where all that's left are damaged kids who are being exposed to other damaged kids, and it's causing more damage," said Stephanie Pascal, who has taught in Flint for 23 years." [New York Times, [11/6/2019](#)]
- **No Way To Prove The Changes Are The Result Of Lead—But There Are Plenty Of Systematic Injustices To Choose From.** "Medical experts say there is no way to prove that the lead has caused new disabilities. Pediatricians here caution against overdiagnosing children as irreparably brain damaged, if only to avoid stigmatizing an entire city. The State Department of Education, in battling the class-action lawsuit filed by the American Civil Liberties Union of Michigan and the New Jersey-based Education Law Center, enlisted an expert who testified that the real public health crisis was not the lead-contaminated water but the paranoia of parents, students and teachers exposed to it. But Dr. Burrell said that proving the cause of the students' problems was not the point. Many of the problems uncovered by the lead testing could certainly have existed before." [New York Times, [11/6/2019](#)]

Since 2014, At Least 12 People Have Died From the Water Crisis In Flint. According to an April 2020 article by the investigative team at ClickOn Detroit commemorating the sixth

anniversary of the switch in water sources that began the flint water crisis: "It was April 2014 when the city moved from using water from the Detroit Water and Sewerage Department to water from the Flint River. After this change, lead leached from pipes into the water. That change resulted in 12,000 children being exposed to dangerous levels of lead, and at least 12 people dying." [ClickOn Detroit, [4/24/20](#)]

Fifteen Percent Of The Pipes In Flint Have Yet To Be Replaced, Water Is Still Not Safe In All Communities. According to an April 2020 article by the investigative team at ClickOn Detroit commemorating the sixth anniversary of the switch in water sources that began the flint water crisis: "While years have passed and tests show the water quality in most areas is now acceptable to drink, many people are scared to drink it. The city has inspected more than 25,000 service lines and has replaced 85 percent of the pipes." [ClickOn Detroit, [4/24/20](#)]

Michigan Faces A Lead Crisis That Goes Beyond Flint

Thirteen Michigan Water Systems Failed To Meet Lead Standards In 2018. In February of 2019, MLive reported: "Thirteen Michigan water systems failed to meet federal standards for lead in drinking water in the last half of 2018, and seven of those systems had lead levels at least twice as high as the state will allow starting in 2025. Data requested by MLive-The Flint Journal from the Michigan Department of Environmental Quality shows water systems above that action limit in the most recent Lead and Copper Rule testing are located throughout the state and are both large and small -- one serving less than 100 homes and others providing water to cities as large as Hamtramck and Benton Harbor."

[[MLive, 2/15/2019](#)]

Lead Exposure In Detroit's Young Children Rose 28% 2015-2016. According to the Guardian, "Traces of lead contamination in young Detroit children rose by 28% in 2016 over the year prior, and not just because of increased testing, said Lyke Thompson, director of the Center for Urban Studies at Wayne State University. Experts point to lead in dust, paint, and soil as understudied culprits. In 2019, 500 "hydration stations" had to be installed in Detroit's public schools so students could access water free of lead, copper and other contaminants." [The Guardian, [1/9/2020](#)]

LINE 5 PIPELINE

Democratic Gov. Whitmer Launched An Investigation Over Community Concerns Against Enbridge's Line 5 Pipeline, A 60-Year-Old Oil Pipeline Running Along The Bottom Of The Great Lakes. Michigan officials demanded an extensive set of records Monday from Enbridge Inc. in an investigation of the company's oil pipeline that runs beneath a channel linking two of the Great Lakes. In a letter to the Canadian company, the state Department of Natural Resources requested documents dating back to 1953, when two 20-inch pipelines were placed across the bottom of the Straits of Mackinac. They are part of Line 5, which carries crude oil and natural gas liquids used in propane from Superior,

Wisconsin, to Sarnia, Ontario. The straits connect Lakes Huron and Michigan. [Detroit Free Press, [1/14/20](#)]

Enbridge Line 5 Runs Through The Area With The Highest Population Of Native Americans In Michigan. According to a Dartmouth blog post, "The Line 5 pipelines, which connect at the upper and lower Michigan Peninsulas, were commissioned in 1953, making Line 5 almost 65 years old. The Upper Michigan peninsula houses Mackinac county and the greatest population of Native Americans in Michigan. Fifteen federally recognized Indian tribes, as well as businesses and local governments, have spoken out to protect the Great Lakes and seek the deconstruction of Line 5; however, the Governor of Michigan, Rick Snyder, acts otherwise. Not only has Snyder refused to decommission line 5, but he also refuses to shut down the flow of oil and petroleum running through line 5. The rusty pipelines and rusty politicians share commonalities with the decrepit pipes and corrupt government that delivered contaminated water to the city of Flint, Michigan which is 57% African American and 40% poor." [Dartmouth, [accessed 6/13/20](#)]

University Of Michigan Study: Enbridge's Line 5 Is "The Worst Possible Place For A Spill" In The Great Lakes Region. In a 2015 article, the Huffington Post cites a report from University of Michigan researchers saying the Enbridge Line 5 pipeline is in "the worst possible place" for a spill in the Great Lakes region. [Huffington Post, [5/22/2015](#)]

Detroit Public TV Released A Documentary On Line 5 Pipeline. [Detroit Public TV, accessed [6/12/20](#)]

MICHIGAN HAS AN OPPORTUNITY TO BUILD A STRONG GREEN ECONOMY

MICHIGAN'S GREEN ECONOMY

Michigan Was Ranked 5th Among The Top 10 States For Clean Energy Employment In 2019. According to the 2020 Clean Jobs America Report by E2, Michigan was 5th in clean energy employment in 2019, with the clean energy sector providing 125,365 jobs. [[Clean Jobs America Report, E2, 2020](#)]

Michigan Ranked Second For Clean Energy Jobs In Rural Areas, With The Sector Employing 24,954 Workers In 2019. According to the 2020 Clean Jobs America Report by E2, Michigan ranked second among the states in for clean energy jobs in rural areas. In 2019, the sector employed 24,954 workers. [[Clean Jobs America Report, E2, 2020](#)]

In 2019, Michigan Had 10,202 Jobs In Renewable Energy, Compared To 7,389 Jobs In Fossil Fuels. According to National Association of State Energy Officials, in Michigan in 2019 there were 5,419 jobs in electricity generation from solar, 4,783 jobs in electricity generation from wind, adding up to 10,202 jobs in renewable electricity generation, compared to 3,714 jobs in electricity generation from coal, were 3,598 jobs in electricity generation from natural gas, and 77 jobs in electricity generation from oil and other fossil fuels, adding up a total of 7,389 jobs in electricity generation from all fossil fuel sources. [[National Association of State Energy Officials, U.S. Energy and Employment Report 2019](#)]

SOLAR

2019: Michigan Was Home To 3,876 Jobs In The Solar Industry. According to The Solar Foundation, in 2019 there were 3,876 solar jobs in Michigan and the state was ranked eighteenth in the nation for solar jobs. [[The Solar Foundation, Solar Jobs Census 2019: Michigan](#), Accessed 4/29/2020]

2019: There Were 254 Solar Companies In Michigan. According to The Solar Foundation, in 2019 there were 254 total solar companies in Michigan. [[The Solar Foundation, Solar Jobs Census 2019: Michigan](#), Accessed 4/29/2020]

2019: 29,698 Equivalent Homes Were Powered By Solar In Michigan. According to The Solar Foundation, in 2019 the number of equivalent homes powered by solar in Michigan stood at 29,698. [[The Solar Foundation, Solar Jobs Census 2019: Michigan](#), Accessed 4/29/2020]

WIND

2019: Michigan Was Home To 4,001 To 5,000 Direct Jobs In The Wind Industry. According to American Wind Energy Association, in 2019 the wind industry supplied 4,001 to 5,000 direct jobs in Michigan. [[American Wind Energy Association, State Fact Sheet: Wind Energy In Michigan, April 2020](#)]

2019: There Were 27 Wind Energy Manufacturing Facilities In Michigan. According to American Wind Energy Association, in 2019 there were 27 active manufacturing facilities in Michigan. [[American Wind Energy Association, State Fact Sheet: Wind Energy In Michigan, April 2020](#)]

2019: There Were 1,165 Wind Turbines In Michigan. According to American Wind Energy Association, in 2019 Michigan was home to 1,165 wind turbines. [[American Wind Energy Association, State Fact Sheet: Wind Energy In Michigan, April 2020](#)]

2019: The Equivalent Number Of Homes Powered By Wind In Michigan Was 533,300. According to American Wind Energy Association, the equivalent number of homes powered by wind in Michigan in 2019 was 533,300. [[American Wind Energy Association, State Fact Sheet: Wind Energy In Michigan, April 2020](#)]