CLIMATE CHANGE PREPARDENESS PLAN

NOVEMBER 1, 2024

CITY OF MOUNT PLEASANT

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Executive Summary and Plan Objectives:

The City of Mt. Pleasant's Climate Change Preparedness Plan is a strategic framework designed to strengthen our community's resilience against climate-related risks, promote sustainability, and ensure a safe, healthy environment for all residents. Recognizing the urgent need for action, this plan outlines comprehensive strategies to address vulnerabilities associated with climate change impacts, including extreme weather events, flooding, increased temperatures, and other hazards.

In 2024, the City partnered with Central Michigan University (CMU) to provide information on vulnerabilities related to climate change. This was done from a framework of addressing health, safety, and welfare of our community stakeholders. Through this Climate Change Preparedness Plan, the City of Mt. Pleasant is committed to building a safer, more resilient community that can thrive in the face of environmental change. Our efforts will help protect residents, preserve our natural and built environments, and support a sustainable future for generations to come.

As the global climate continues to evolve, the City of Mt. Pleasant recognizes the imperative to proactively address the potential impacts of climate change on our community. This Climate Change Preparedness Plan outlines our commitment to enhancing resilience, safeguarding our residents, and fortifying our infrastructure in the face of evolving environmental challenges. The primary objectives of this preparedness plan are to identify, prioritize, and implement adaptive strategies that mitigate the impacts of climate change. By engaging our community, enhancing infrastructure resilience, and fostering a culture of preparedness, we aim to create a sustainable and climate change ready future for Mt. Pleasant.

The plan provides the gathered information on area vulnerabilities and attempts to address these vulnerabilities through a broad range of strategies and tactics aimed at building infrastructure that can withstand climate change impacts and mitigate the City's impact on future climate change. The plan also provides for an implementation and monitoring schedule for the City's actions related to this effort.

Why a Climate Change Preparedness Plan?

The City conducted surveying as part of the development of the Climate Change Preparedness Plan. The survey responses were clear in the community's desire and need for local government to become involved. 67% of respondents indicated a belief that local government must play a role in addressing climate change. Concerns expressed in the survey include those around public health, environmental health, and infrastructure; all areas that local government bares some responsibility to improve. Lastly, concerns expressed in the survey indicate a desire to ensure that the City's infrastructure be able to withstand climate impacts to protect community health and the businesses that are key to maintaining a thriving economy.

Key Findings on Area Vulnerabilities:

Mt. Pleasant Vulnerability

Introduction:

Data and projections of climate vulnerability in Mt. Pleasant were gathered from a presentation given by students from Central Michigan University using information from official state and federal sources. Although it is difficult to narrow the scope of climate change research to just one small city, like Mt. Pleasant, there are certain trends observed from scientific and government research that show what the larger regional impacts are. Another important point to note is that Mt. Pleasant is already being impacted by climate change in several ways, while others have yet to occur.

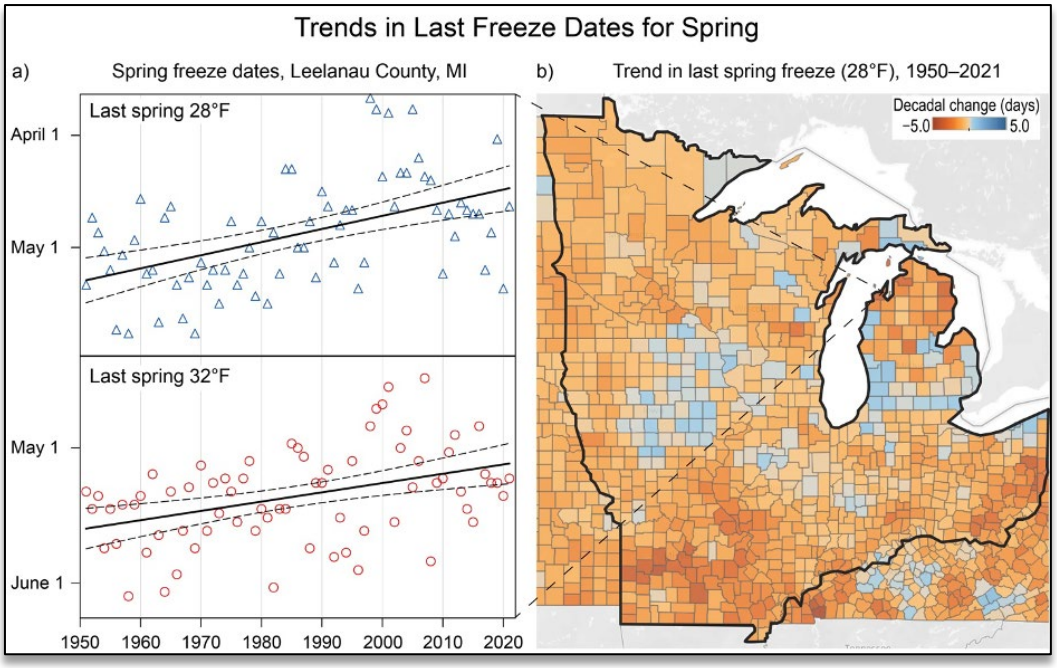
As suggested in the vulnerability presentation, it helps to categorize climate hazards around recognizable themes. In Mt. Pleasant, these categories include heat, drought, flood, and storm. Most hazards fit well into these themes. Here are examples of the categorized hazards that have a possibility of occurring in Mt. Pleasant and the surrounding area.

Heat Examples: - Heat waves - Urban heat islands - Water eutrophication - Algal blooms	Drought Examples: - Wildfires - Wind erosion - Water scarcity - Subsidence
Flood Examples: - River flooding - Flash floods - Surface flooding - Erosion	Storm Examples: - Severe thunderstorms - Severe winter storms - Influences on tornados

These categories, with their own themes, are not mutually exclusive hazards; they can interact with each other to create new issues or make existing ones worse. They also have the potential to exacerbate socio-economic and other issues that Mt. Pleasant experiences. Additionally, there are unknown vulnerabilities that could arise because of the lack of available scientific research; however, Mt. Pleasant may be better equipped to handle them if we are already addressing the known vulnerabilities. It is important to note that for some of these vulnerabilities and hazards, these are the worst-case scenarios, but because of climate change, they have an increased likelihood of happening.

Heat Vulnerability:

Heat is a major effect of climate change in the Midwest. According to the Environmental Protection Agency, the state has already warmed 2 to 3°F in the last century and is expected to get warmer. In Mt. Pleasant and the surrounding area, the vulnerability ranges from low to high, but overall temperatures will be hotter year-round. Atmospheric temperatures have a great influence on a wide variety of local and global vulnerabilities. Warmer temperatures are already being experienced in Mt. Pleasant and the Midwest as a whole. Global heat related vulnerabilities can also have an impact on the movement of people, goods, and resources that Mt. Pleasant relies on and enjoys. A lack of tree cover, green space, and permeable surfaces in urban areas can drastically increase the temperature in cities; this is known as the Urban Heat Island Effect. Daytime temperatures in cities can be 1°F to 7°F hotter than surrounding areas, with highly developed cities seeing temperature increases up to 20°F.



Public Health – Heat:

- Heat waves will become more common, leading to heat-related illnesses
    - Heat waves are two or more consecutive days over 90°F
    - Hazardous for everyone, especially children, elderly people, low-income households, and homeless people
- Urban Heat Island Effect in Mt. Pleasant is rated as high vulnerability
    - Stresses power grid with increased energy demand
- Hot temperatures can exacerbate existing health complications in people
- Increased ground-level ozone levels
- Expands habitat for disease carrying pests
    - Mosquitos and ticks

Environmental Health – Heat:

- Altered seasons
    - Less snow and more rain during winter
    - Less snowpack going into spring and earlier last freeze dates
    - Longer summers with longer growing seasons
- Native plant and animal populations stressed from unusually hot temperatures
- Invasive species replacing native species that cannot live in warmer environments
    - Loss of native biodiversity, weakening the different ecosystems
- Increased likelihood of water pollution
    - Hot temperatures increase eutrophication, which adds nutrients to water
    - This process can create harmful algal blooms and excessive plant growth depriving the whole water ecosystem of oxygen

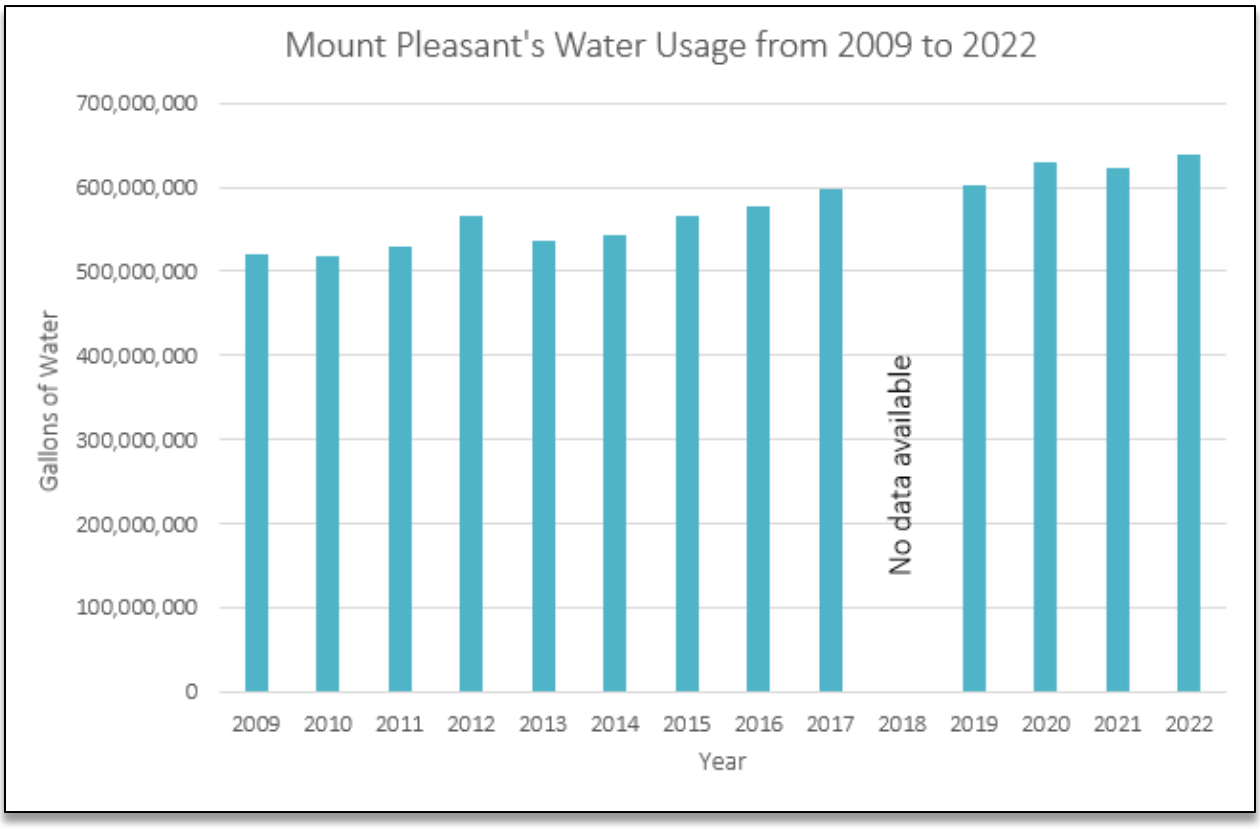
Economic Health – Heat:

- Extreme heat can make certain outdoor activities undesirable, harming businesses
    - Less snow in winter shortens time for outdoor winter recreation
- Increases water use on farms for both crops and livestock
- Healthcare expenditures may increase from heat-illnesses
    - Higher energy demand leading to increase in utility costs

Drought Vulnerability:

Droughts can generally be defined as a deficiency of precipitation over an extended period that is usually combined with hot temperatures. From 1990 to 2023, droughts have not been a detectable issue in Mt. Pleasant according to the National Weather Service and overall precipitation in the whole state is likely to increase during the next century. This, however, does not mean that droughts are assured to not happen. Heat, water usage, and the uncertainty in predicting weather patterns can all combine to make droughts much worse if they do happen. There is an overall upward trend in Mt. Pleasant's water usage since 2009, which can cause issues if a drought were to impact the water supply. If conditions are right, droughts may still happen in Mt. Pleasant and have harmful effects on many things.

Due to Michigan's abundance of freshwater, severe drought impacts in Mt. Pleasant may not be seen for several years with proper management. However, we still need to prepare for a world that is experiencing water scarcity and water stress.



Public Health – Drought:

- Decreased water quantity and quality
    - Hazardous when combined with extreme heat
- Increased risk of wildfires that can endanger people
- Increased particulate matter causing air pollution

Environmental Health – Drought:

- Less water available for plants
- Wind erosion on exposed soil
    - Damages soil health
- Increased risk of wildfires from dry conditions
- Increased reliance on bottled water that can put plastic in the environment
- Long-term drought eventually leads to subsidence when groundwater is depleted
    - This is when the ground lowers in elevation from a lack of groundwater holding it up

Economic Health – Drought:

- Increased use of groundwater for agricultural purposes
    - Lowers the water table
    - Groundwater in shallow aquifers can take months to recharge, but deeper aquifers may take years or centuries to recharge
- Increased risk of wildfires that can damage property
- Increased reliance on bottled water
    - Low-income and homeless people may not be able to afford constant water purchasing

Flood Vulnerability:

Extreme precipitation leading to flooding is something that all of Michigan will experience more often. As recently as 2017, Mt. Pleasant saw firsthand the effects of a massive flooding event. Improper zoning of buildings in flood plain areas, combined with poor management of dams and storm drains, increases the likelihood of emergency flooding situations when excessive rain occurs.

Widespread flooding can be expected in residences, parks, and golf courses along the Chippewa River in Northern and Western Mt. Pleasant. Minor to moderate flooding can occur along low-lying areas like Island and Nelson Park and other areas adjacent to the river. For river flooding in these low-lying areas of Mt. Pleasant to happen, the flood stage must be 8ft. Anything above 10ft will flood the northern industrial zone that is near residential areas and would require 20ft of water to flood the nearest residential area. The nearest gage height presented from the class was 3.87ft, but this changes daily. To put this into perspective, the 2017 flood had a crest of 14.77ft, which was the second highest since 1968. The northern industrial area is located directly near the 100-year flood zone of the Chippewa River and has structures that are mostly within 20ft of the 100-year flood elevation with one structure at 744.39ft in elevation which is below the lowest flood elevation. This could be a serious issue if the river has a 100-year flood event. Coyne Oil is near this flood zone and is only 700ft from the nearest residential area.

Within the city, impervious surfaces can make flooding worse and overload the storm sewer system during periods of extreme precipitation. They do not allow water to go back into the ground and just pool up in low-lying areas or flood into the drain, eventually making its way to the Chippewa River. Most storm drains and sewers in Mt. Pleasant have a low-risk rating for flooding. However, there is a concentration of storm sewers with a high or extreme-risk rating for flooding in downtown Mt. Pleasant and the surrounding subdivisions.

Public Health – Flooding:

- High and fast-moving flood water can be hazardous for people and even lead to drowning
- Water can carry contaminants like E. coli and dangerous chemicals
    - E. coli is already a known contaminant in the Chippewa River and is the reason for two closures at Deerfield Park in 2016
- Flooding of homes and buildings can lead to mold and leave behind hazardous chemicals and debris once water recedes

Environmental Health – Flooding:

- Extreme flooding can damage river ecosystems and the ecosystems just along them
- Spread contaminants throughout the environment
- Increased erosion of riverbanks
    - Changes area and flow of river over time
    - Carries sediment which is harmful downstream
- Disruption to plants and animals
    - Potential to spread invasive species

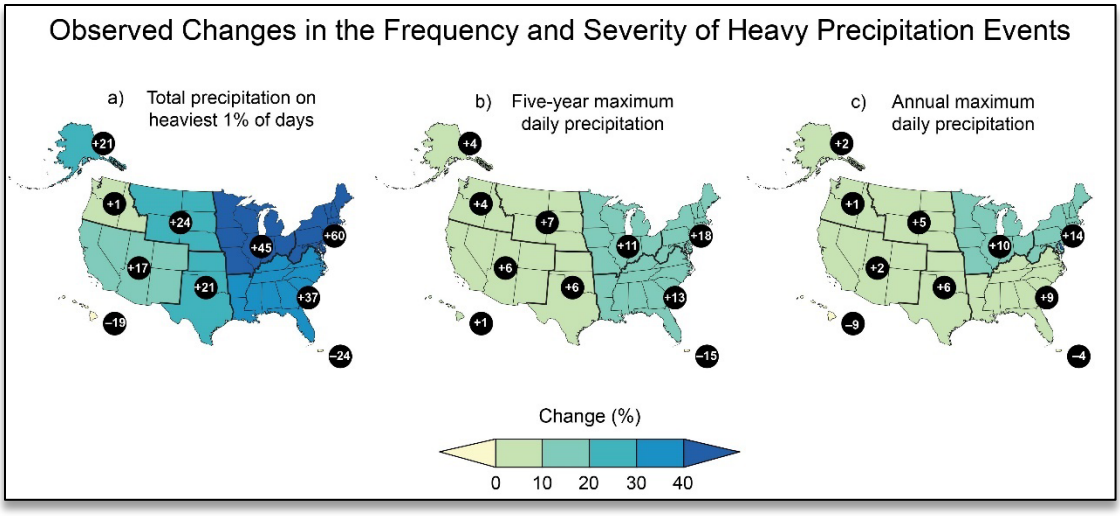
Economic Health – Flooding:

- Direct cost of damages
    - Includes cost of clean up
- Crop damage
- Restricting travel from road and bridge closures
- Business closures in flooded areas
- Increased use of emergency services

Storm Vulnerability:

Climate predictions show that extreme weather in Michigan will increase throughout the century. Along with extreme heat, the great concern in the Midwest is intense precipitation. This means there will be more storms with heavy rain that can create hazards or exacerbate existing ones.

The Midwest can expect a 45% increase in total precipitation on the heaviest 1% of days, an 11% increase in 5-year maximum daily precipitation, and a 10% increase in annual maximum daily precipitation. Precipitation is not only rain, but it can also include snow, sleet, freezing rain, or hail. The severity of these storms is likely to increase, bringing issues associated with wind and lightning strikes.



Public Health – Storms:

- Severe thunderstorms can bring heavy precipitation, fast wind, and lighting strikes
    - Power outages
    - Flooding can come from severe storms
    - Lighting strikes in dry areas can cause fires
    - Wind carrying fast moving objects through the air
    - Electrical damage causing hazardous conditions
- Increased moisture in atmosphere can create severe snowstorms despite less snow overall in winter
    - Power outages
    - Hazardous road conditions
- Scientific uncertainty around how climate change impacts frequency and severity of tornado patterns
    - Tornadoes are still one of the least understood weather phenomena and their relationship with climate change is complex
    - Changing atmospheric conditions could influence tornado formation in Michigan, but the exact changes are not clear

Environmental Health – Storms:

- Plant and animal disturbances from heavy precipitation, fast wind, and lighting strikes
    - Lighting strikes in dry areas wildfires
- Wind damage in forests
- Hazards associated with flooding

Economic Health – Storms:

- Direct costs of damages
  - Includes cost of clean up
- Lost revenue from business closures
- Crop damage
- Increased use of emergency services

Policy and Other Vulnerabilities:

There are other vulnerabilities Mt. Pleasant may face that do not fully fit into one of the categories above and were not discussed in detail in the presentation. Climate change will impact Mt. Pleasant in several indirect ways, including with socio-economic issues, global supply chains, and environmental issues that are not immediately tied to climate change, such as overexploitation of resources or garbage pollution. Whether direct or indirect, many vulnerabilities are closely tied to policy decisions at all levels of government, from local to federal. These vulnerabilities are only made worse by climate change.

Two examples that illustrate this point would be wildfires and homelessness. In many areas of the United States, using fire suppression methods in forests can have the opposite effect of its intended purpose. For decades, fires have been purposefully suppressed to stop them from turning into hazardous wildfires, but this just created more kindling for when a fire does break out. Combined with hot and dry conditions that come from climate change, this excessive buildup of plants can make wildfires happen more easily and become harder to control. Policy around land and water management can also create wildfire disaster situations from how areas design their properties or use water.

Homelessness, or more accurately, being unhoused, exists because it is a policy decision not to guarantee people the right to housing. There are millions of homes purposefully left empty for one reason or another, and those that are available have become too expensive for most people to afford. Put simply, if there were policies in place to give people the human right to housing, there would be a significantly lower unhoused population. Homelessness can be a public health issue for those who are experiencing it, but combined with extreme heat or severe storms, it becomes even more dangerous. All over America, including Mt. Pleasant, the unhoused population will be one of the first to experience the worst effects of climate change.

Along with the vulnerabilities right in Mt. Pleasant, issues that occur elsewhere can have far reaching impacts on Mt. Pleasant itself. A recent example of this would be the Canadian wildfires during the summer of 2023, which impacted air quality in Michigan. Smoke from the Canadian wildfires was carried by the wind to the Midwest, negatively affecting our air quality.

Other Potential Vulnerabilities:

- Vulnerable groups will be the first to experience the worst of climate change
    - Includes unhoused people, marginalized people like Indigenous and African American communities, and poor communities

- Stress on water resources
    - It may be a few years before Mt. Pleasant sees the demand for water get higher than the available supply
    - Michigan is connected to the largest freshwater supply in the United States and many other states need water because of droughts and groundwater overextraction
    - Recreational water activities on the Chippewa River may be impacted by the water becoming too shallow
- Issues happening elsewhere impacting Mt. Pleasant
    - Wildfires, droughts, etc.
- Potential global supply chain disruptions for essential goods like food or materials
    - Access to certain foods may be impacted
    - United States may not experience the worst of losing essential goods, but this could have an impact on those already struggling.

- Invasive species can take hold over native species because of weakened ecosystems and changing climate conditions
    - Loss of unique ecosystems
    - Some invasive species like emerald ash borer and Asian long-horned beetles can be extremely damaging to forests
- Changes to insect populations
    - Milder winters may increase insect population and cases of insect-borne diseases
    - More mosquitos and ticks in Michigan
    - Heat and other disturbances may kill or reduce certain native insect population which can have a domino effect through the whole ecosystem
- Increasing insurance cost from all the current and projected damages due to climate change
- Policy addressing climate change from local to federal may create short-term burdens from transitioning to a more sustainable future

Some of these vulnerabilities and hazards may represent worst-case scenarios with climate change, while others will become commonplace. Many of them are projections for what Michigan may experience from climate change, with some of them already beginning to occur. Implementing necessary changes now will help Mt. Pleasant become more resilient in the future, preparing for the effects of climate change or even potential worst-case scenarios.

Mt. Pleasant Risk Perception Assessment

Mt. Pleasant City Hall conducted a Climate Change Survey to get data on how concerned people are in Mt. Pleasant and the surrounding area about climate change risks. It is split into four sections: the first section contains ~~are~~ demographic questions to understand more about the survey respondent, the second section asks about their level of concern for climate change and hazards that may arise from it, the third section asks if they agree or disagree with certain statements about climate change, and the fourth section focuses on community resilience to climate change, with a final question allowing respondents to make comments about the survey.

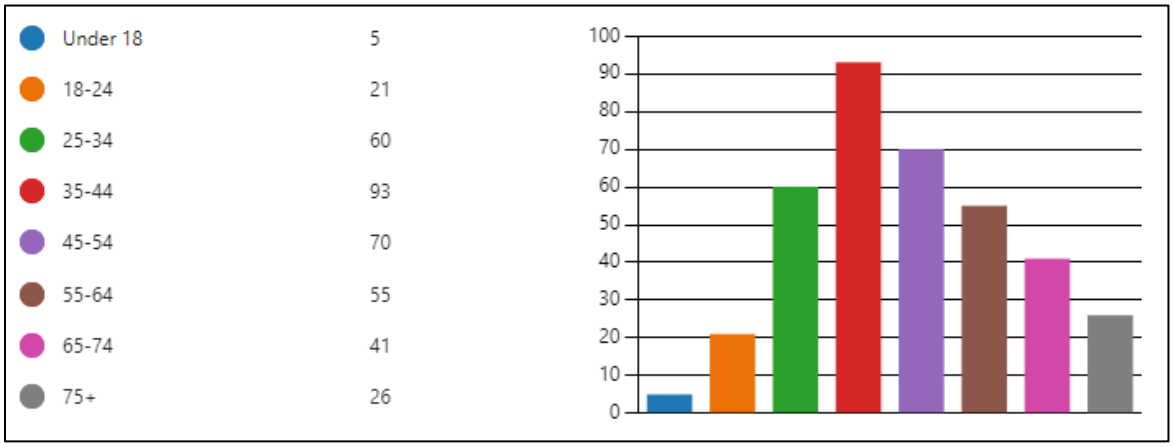
Residents in Mt. Pleasant or any of the townships in Isabella County were able to take the survey from June 11th to July 3rd. There were 371 responses to the Climate Change Survey. Outreach efforts were conducted to make every attempt to solicit responses from area community stakeholders from businesses, to CMU, to members of the Saginaw Chippewa Indian Tribe.

Section 1 – Demographics:

Of the 371 responses, 256 said they live in the city of Mt. Pleasant and 115 said they live outside the city limits. For those outside the city, they could answer which township in Isabella County they live in; 45 respondents chose Union township, 18 chose Deerfield township, 10 chose Isabella township, 9 chose

Lincoln township, and 8 chose Chippewa township. The rest of the townships had at least one person from them, except for Gilmore, Rolland, and Wise townships, which did not have any responses.

The chart below shows the age distribution of the people that took the survey. It follows a relatively normal bell curve distribution, with 93 responses falling in the middle age range of 35-44 years old. This is followed by the 45–54-year-old age group with 70 responses and the 25-34-year-old age group at 60 responses. The age group with the lowest responses is those under 18 with only 5.



To understand if the survey reached as many people as possible, the survey asked about the respondent's race and/or ethnicity. The categories used for this survey were White, Black or African American, American Indian or Alaskan Native, Native Hawaiian or Other Pacific Islander, Latino/a or Hispanic, Asian, Multiracial, or Other. Respondents were able to select more than one option to make the survey as inclusive as possible. Only 360 of the 371 responses answered this question because it was optional to answer. This was done to not force the survey taker to answer the question they were not comfortable answering. Of the 360 responses, 319 selected White as at least one of their answers, 14 selected American Indian or Alaskan Native, 12 selected Latino/a or Hispanic, 6 selected Multiracial, 4 selected Black or African American, 3 selected Other, and there was 1 for both Native Hawaiian or Other Pacific Islander and Asian.

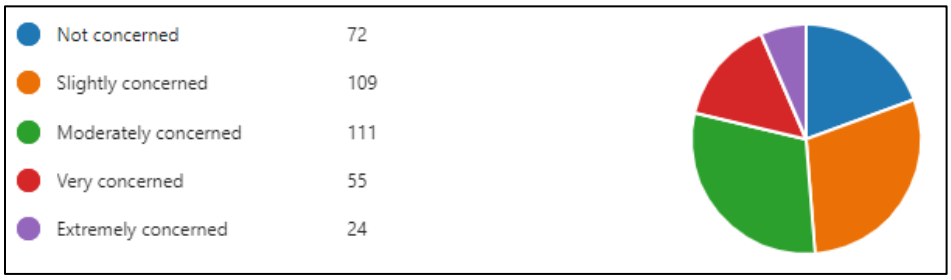
Section 2 – Concerns:

This section is mainly comprised of questions asking how concerned people are about issues related to climate change. Most of them are about environmental hazards that potentially become worse and/or more common in Michigan.

When asked on a scale of 1 to 10, with 1 being the lowest and 10 being the highest, how much of a priority should the world have for climate change-related issues, the highest was 10 with 39% or 144 responses, and the second highest being 1 at 13% or 47 responses. The average response was 7.13, which means most of the survey takers believe the world should have a somewhat high to high priority for climate change. This is further supported by there being 263 responses between 6 and 10 while there were 108 responses between 1 and 5.

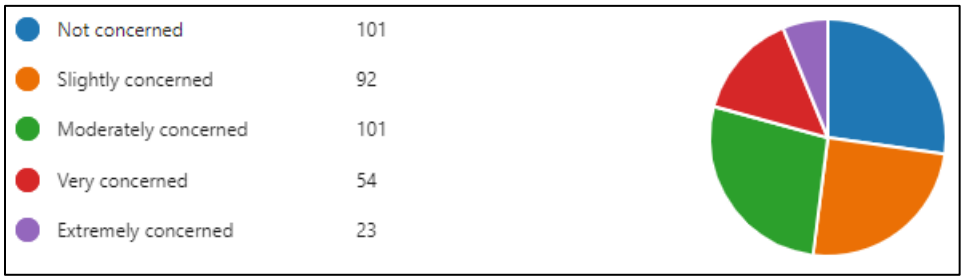
Flooding:

When asked how concerned they are about flooding in Mt. Pleasant, 19% or 72 respondents were not concerned, 29% or 109 respondents were slightly concerned, 30% or 111 respondents were moderately concerned, 15% or 55 respondents were very concerned, and 6% or 24 respondents were extremely concerned.



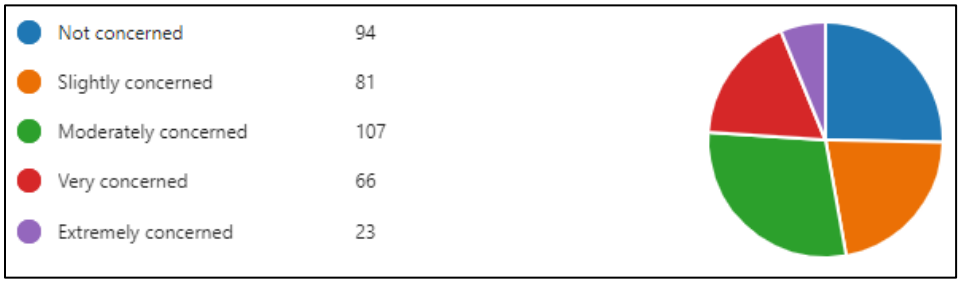
Droughts:

When asked how concerned they are about droughts in Mt. Pleasant, 27% or 101 respondents were not concerned, 25% or 92 respondents were slightly concerned, 27% or 101 respondents were moderately concerned, 15% or 54 respondents were very concerned, and 6% or 23 respondents were extremely concerned.



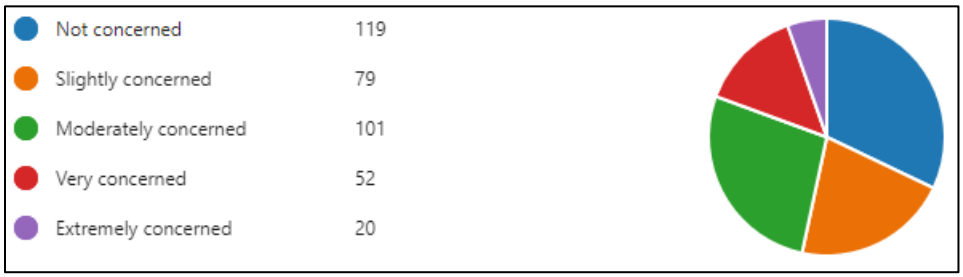
Heavy Rain and Severe Storms:

When asked how concerned they are about heavy rain and severe thunderstorms in Mt. Pleasant, 25% or 94 respondents were not concerned, 22% or 81 respondents were slightly concerned, 29% or 107 respondents were moderately concerned, 18% or 66 respondents were very concerned, and 6% or 23 respondents were extremely concerned.



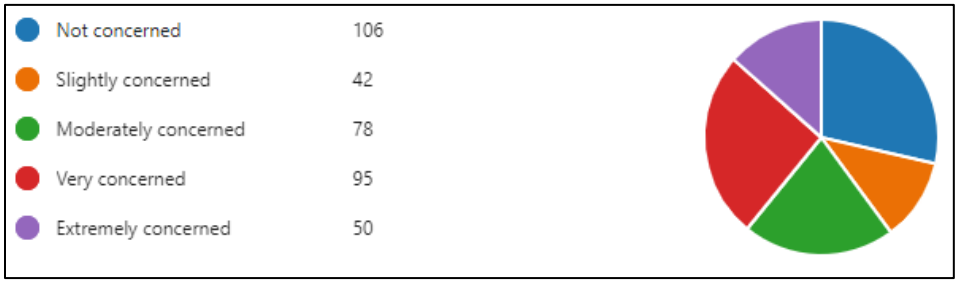
Severe Snowstorms:

When asked how concerned they are about severe snowstorms in Mt. Pleasant, 32% or 119 respondents were not concerned, 21% or 79 respondents were slightly concerned, 27% or 101 respondents were moderately concerned, 14% or 52 respondents were very concerned, and 5% or 20 respondents were extremely concerned.



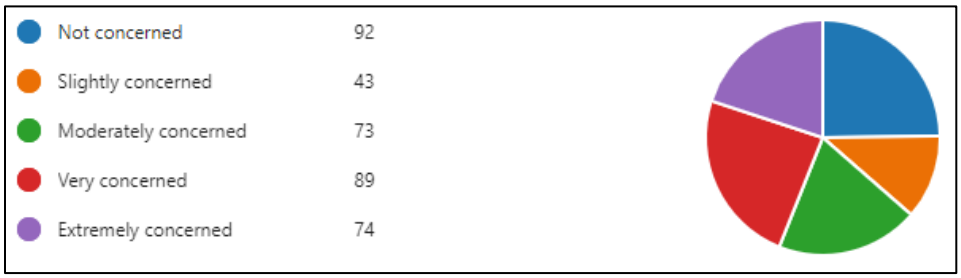
Uncharacteristic Weather Conditions:

When asked how concerned they are about uncharacteristic weather conditions in Mt. Pleasant, 29% or 106 respondents were not concerned, 11% or 42 respondents were slightly concerned, 21% or 78 respondents were moderately concerned, 26% or 95 respondents were very concerned, and 13% or 50 respondents were extremely concerned.



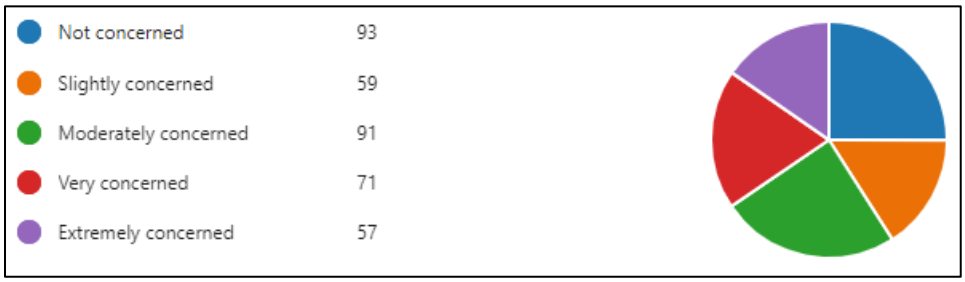
Ecosystem Disturbances:

When asked how concerned they are about ecosystem disturbances from climate change in Mt. Pleasant, 25% or 92 respondents were not concerned, 12% or 43 respondents were slightly concerned, 20% or 73 respondents were moderately concerned, 24% or 89 respondents were very concerned, and 20% or 74 respondents were extremely concerned.



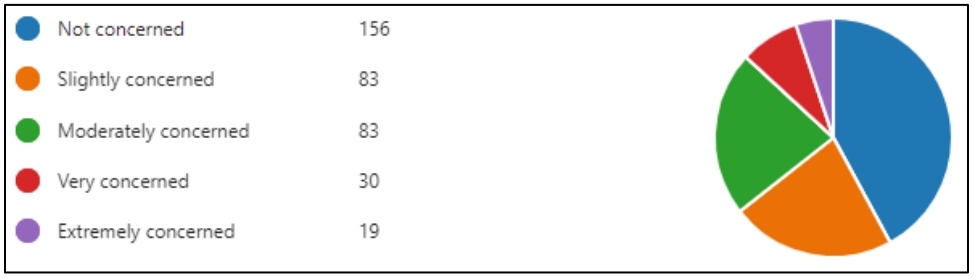
Air Quality:

When asked how concerned they are about poor air quality in Mt. Pleasant, 25% or 93 respondents were not concerned, 16% or 59 respondents were slightly concerned, 25% or 91 respondents were moderately concerned, 19% or 71 respondents were very concerned, and 15% or 57 respondents were extremely concerned.



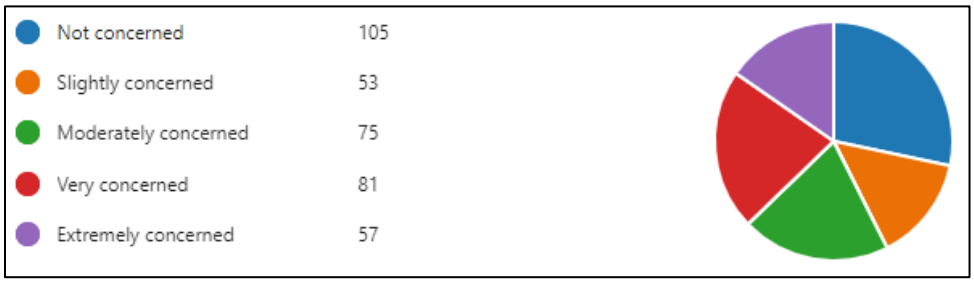
Wildfires:

When asked how concerned they are about wildfires in Mt. Pleasant, 42% or 156 respondents were not concerned, 22% or 83 respondents were slightly concerned, 22% or 83 respondents were moderately concerned, 8% or 30 respondents were very concerned, and 5% or 19 respondents were extremely concerned.



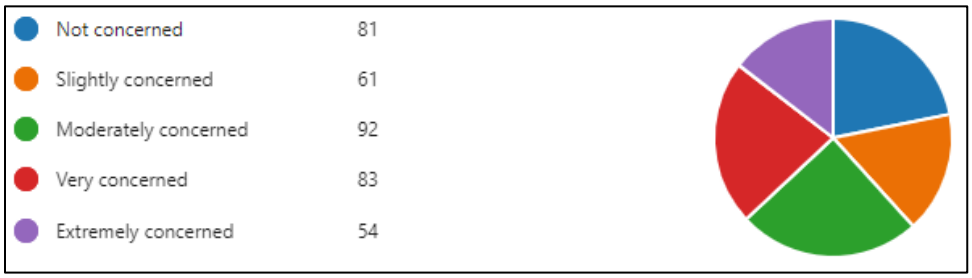
Heat Waves:

When asked how concerned they are about heat waves in Mt. Pleasant, 28% or 105 respondents were not concerned, 14% or 53 respondents were slightly concerned, 20% or 75 respondents were moderately concerned, 22% or 81 respondents were very concerned, and 15% or 57 respondents were extremely concerned.



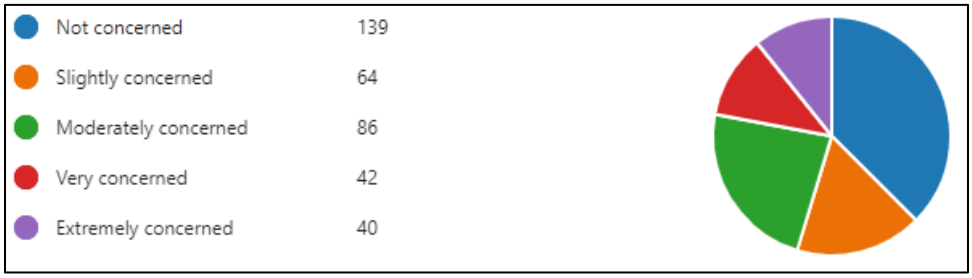
Crop Failures:

When asked how concerned they are about crop and garden failures in Mt. Pleasant, 22% or 81 respondents were not concerned, 16% or 61 respondents were slightly concerned, 25% or 92 respondents were moderately concerned, 22% or 83 respondents were very concerned, and 15% or 54 respondents were extremely concerned.



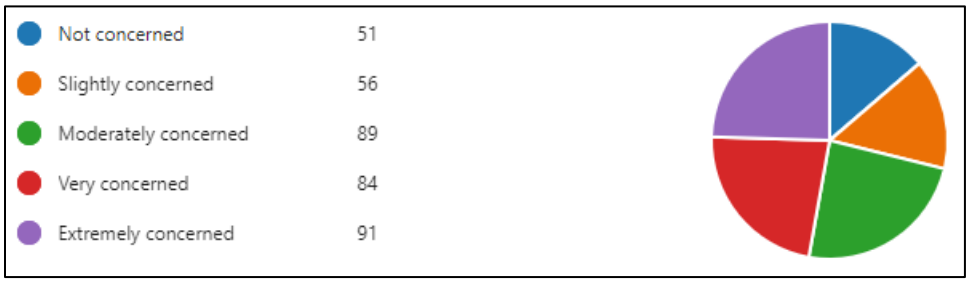
Water Scarcity:

When asked how concerned they are about water scarcity in Mt. Pleasant, 37% or 139 respondents were not concerned, 17% or 64 respondents were slightly concerned, 23% or 86 respondents were moderately concerned, 11% or 42 respondents were very concerned, and 11% or 40 respondents were extremely concerned.



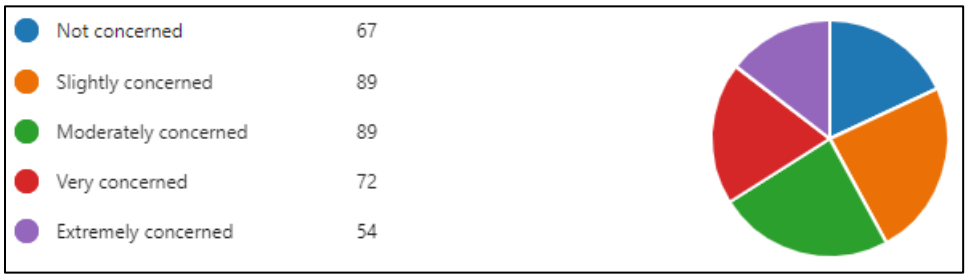
Water Pollution:

When asked how concerned they are about water pollution in Mt. Pleasant, 14% or 51 respondents were not concerned, 15% or 56 respondents were slightly concerned, 24% or 89 respondents were moderately concerned, 23% or 84 respondents were very concerned, and 25% or 91 respondents were extremely concerned.



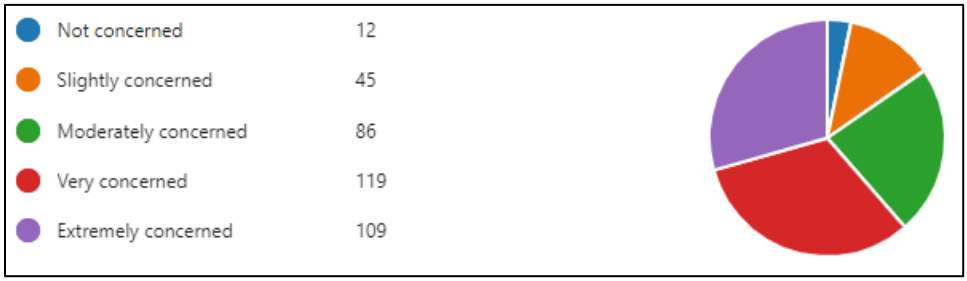
Insect-borne Diseases:

When asked how concerned they are about insect-borne diseases in Mt. Pleasant, 18% or 67 respondents were not concerned, 24% or 89 respondents were slightly concerned, 24% or 89 respondents were moderately concerned, 19% or 72 respondents were very concerned, and 15% or 54 respondents were extremely concerned.



Utility Costs:

When asked how concerned they are about utility costs in Mt. Pleasant, 3% or 12 respondents were not concerned, 12% or 45 respondents were slightly concerned, 23% or 86 respondents were moderately concerned, 32% or 119 respondents were very concerned, and 29% or 109 respondents were extremely concerned.

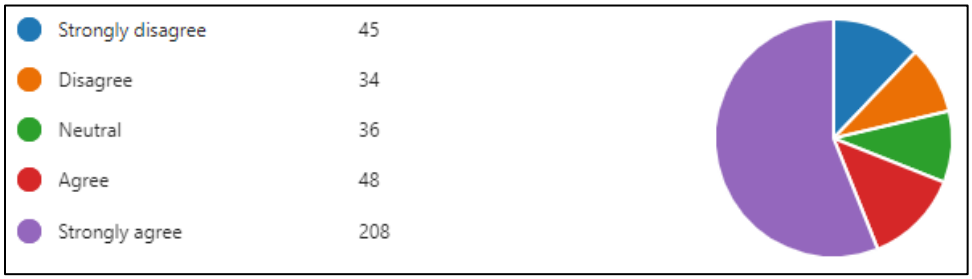


Section 3 – Impact:

This section asks people how much they agree or disagree with a variety of statements about climate change. Below are the statements the survey takers looked at. They could choose from strongly agree, agree, neutral, disagree, and strongly disagree.

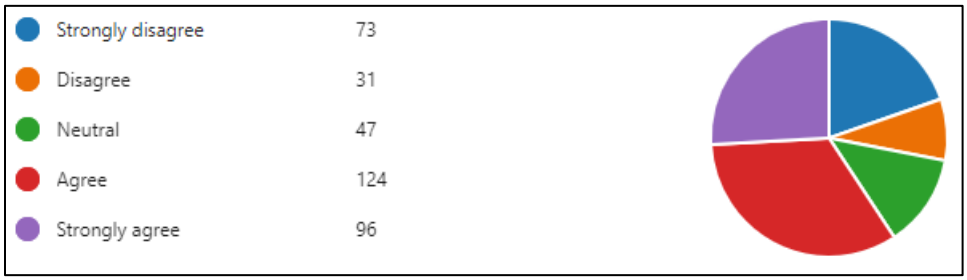
"Climate change is impacting people in the United States":

Overall, survey respondents believe climate change is impacting people in the United States with 56% or 208 respondents answering strongly agree. An additional 13% or 48 respondents agree with the statement. 12% or 45 respondents strongly disagree, while 9% or 34 respondents disagree with the statement that climate change is impacting people in the United States. 10% or 36 respondents are neutral about the statement.



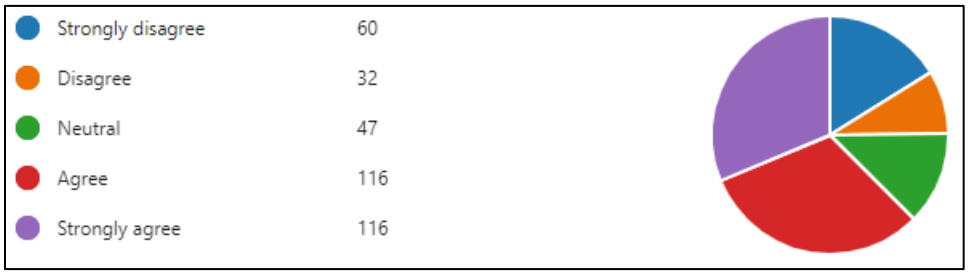
"Climate change is impacting me personally":

Fewer people strongly agree with this statement compared to the previous one, with strongly agree at 26% or 96 respondents. Those that agree came in at 33% or 124 respondents; when combined, that is 59% or 220 survey respondents that agree or strongly agree that they are personally impacted by climate change. For strongly disagree, it is at 20% or 73 respondents, with disagree at 8% or 31 respondents. This means that about 28% or 104 respondents in total disagree or strongly disagree that they are personally impacted by climate change. Neutral had 13% or 47 respondents.



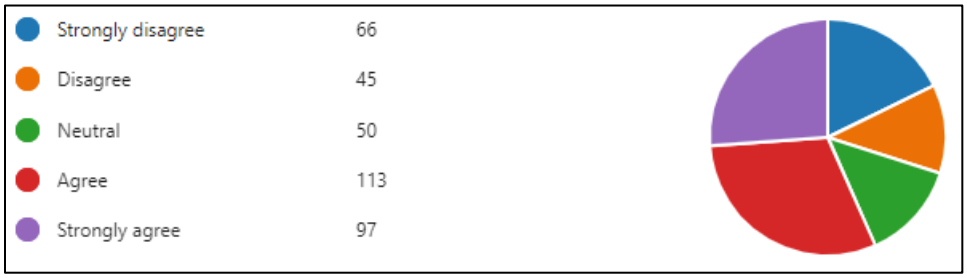
"Plants and animals in Mt. Pleasant are being impacted by climate change":

Agree and strongly agree are the same at 31% or 116 respondents, with the combined total being 62% or 232 respondents. Those that strongly disagree had 16% or 60 respondents and disagree had 9% or 32 respondents. In total, 25% or 92 respondents disagreed or strongly disagreed that plants and animals in Mt. Pleasant are being impacted by climate change. Neutral had 13% or 47 respondents.



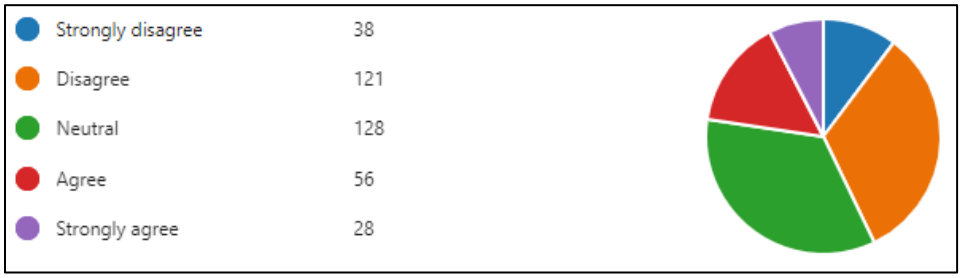
"Outdoor recreation activities in Mt. Pleasant are impacted by climate change":

30% or 113 respondents agree with the statement above, while 26% or 97 respondents strongly agree. Combined, this is 56% or 210 respondents that agree or strongly agree with the statement. Strongly disagree had 18% or 66 respondents and disagree had 12% or 45 respondents. When combined, this is 30% or 111 respondents that disagree or strongly disagree with the statement. Neutral had 13% or 50 respondents.



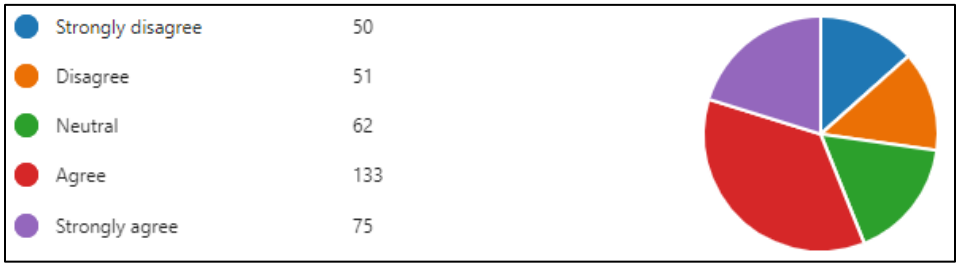
"Infrastructure (roads, bridges, and storm sewers) in Mt. Pleasant can withstand extreme weather conditions":

Neutral had the most answers with 35% or 128 respondents. Disagree had 33% or 121 respondents and strongly disagree had 10% or 38 respondents. When combined, that is 43% or 159 respondents that disagree or strongly disagree that Mt. Pleasant's infrastructure is resilient to extreme weather. Agree and strongly agree totals to only 23% or 84 respondents.



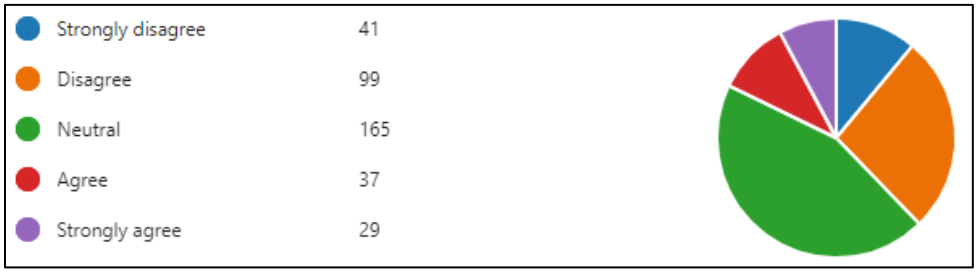
"Extreme weather events (prolonged drought, severe rain/thunderstorms) in Mt. Pleasant are more common now than in the past":

Agree had the most with 36% or 133 respondents, while strongly agree had 20% with 75 respondents. Combined, this is 56% or 208 respondents that agree or strongly agree with the statement. Disagree had 14% or 51 respondents and strongly disagree had 13% or 50 respondents. Neutral had 17% or 62 respondents.



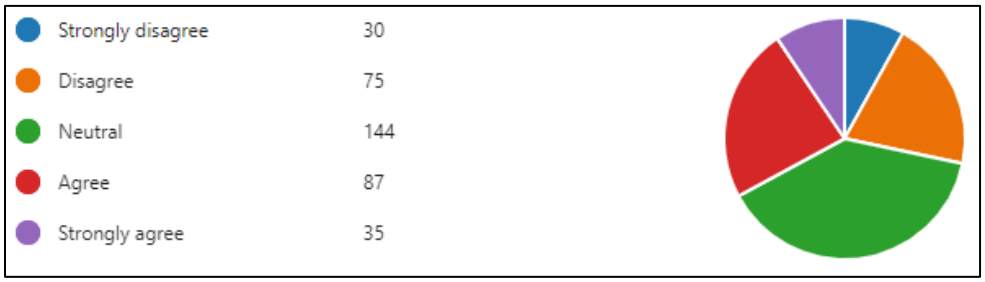
"The City of Mt. Pleasant is doing enough to address the hazards of climate change":

Once again, neutral had the most with 44% or 165 respondents. Disagree had 27% or 99 respondents and strongly disagree had 11% or 41 respondents. In total, this means that 38% or 140 respondents disagree or strongly disagree that Mt. Pleasant is doing enough to address the hazards of climate change. Agree had 10% or 37 respondents and strongly agree had 8% or 29 respondents.



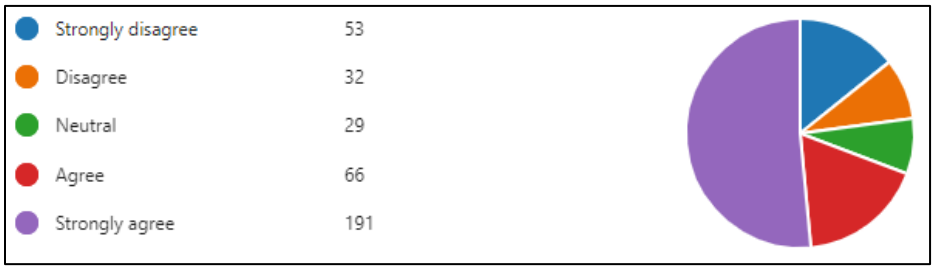
"Educational resources are readily available for me to learn about climate change and how it impacts my community":

Neutral had the most at 39% or 144 respondents. Agree had 23% or 87 respondents and strongly agree had 9% or 35 respondents. Disagree had 20% or 75 respondents and strongly disagree had 8% or 30 respondents.



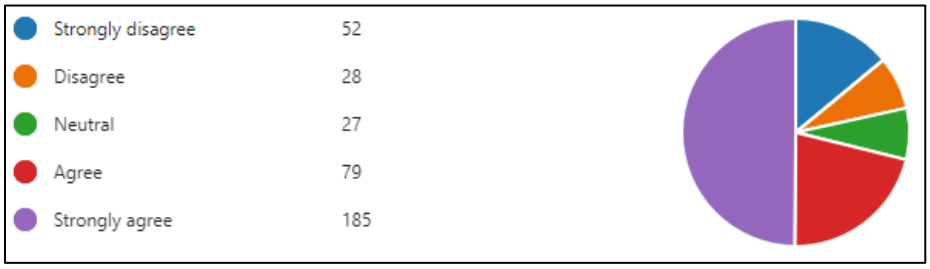
"The federal government must play a role in addressing climate change":

51% or 191 respondents strongly agree with the statement. An additional 18% or 66 respondents agree. When combined, this is 69% or 257 respondents that agree or strongly agree that the federal government should act on climate change. Disagree had 9% or 32 respondents and strongly disagree had 14% or 53 respondents. Neutral had 8 % or 29 respondents.



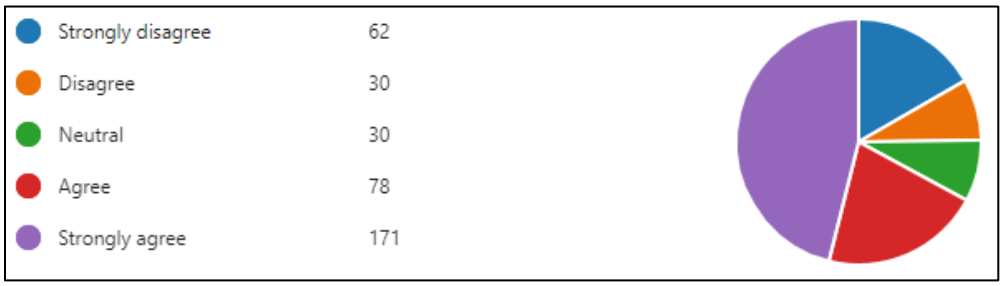
"State governments must play a role in addressing climate change":

50% or 185 respondents strongly agree with the statement above, while 21% or 79 respondents agree. Combined, this is 71% or 264 respondents that agree or strongly agree state governments should address climate change. Disagree had 8% or 28 respondents and strongly disagree had 14% or 52 respondents. Neutral had 7% or 27 respondents.



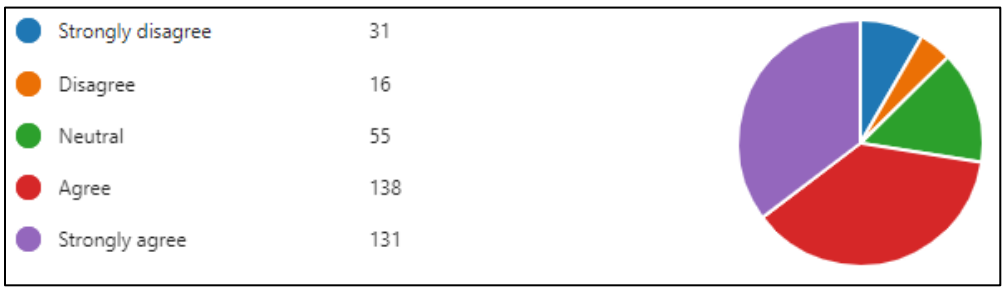
"Local governments must play a role in addressing climate change":

46% or 171 respondents strongly agree that local governments can play a role in addressing climate change, with an additional 21% or 78 respondents agreeing. Combined, this is 67% or 249 respondents that agree or strongly agree. Disagree had 8% or 30 respondents, while strongly disagree had 17% or 62 respondents. Neutral had 8% or 30 respondents.



"I can play a role in addressing climate change issues":

37% or 138 respondents agree that they can play a role in addressing climate change. 35% or 131 respondents strongly agree with the statement above. Combined, this is 72% or 269 respondents that agree or strongly agree with the statement. Disagree had 4% or 16 respondents and strongly disagree had 8% or 31 respondents. Neutral had 15% or 55 respondents.



Section 4 – Community Resilience:

This section is meant to get an understanding of how resilient the community is to stresses from climate change. Community resilience can be measured in many ways, so this survey was narrowed down to three specific ways Mt. Pleasant can be resilient: air conditioning, homeowners' insurance, and work experience.

Air Conditioning:

Air conditioning is a good tool for keeping homes and buildings comfortable, but with increasing temperatures, it may be essential for public health. Hot temperatures can be hazardous and when combined with high humidity, outdoor physical labor or activity can be dangerous. Having air conditioning is one of the only ways to escape hazardous conditions once heat and humidity hits a certain threshold.

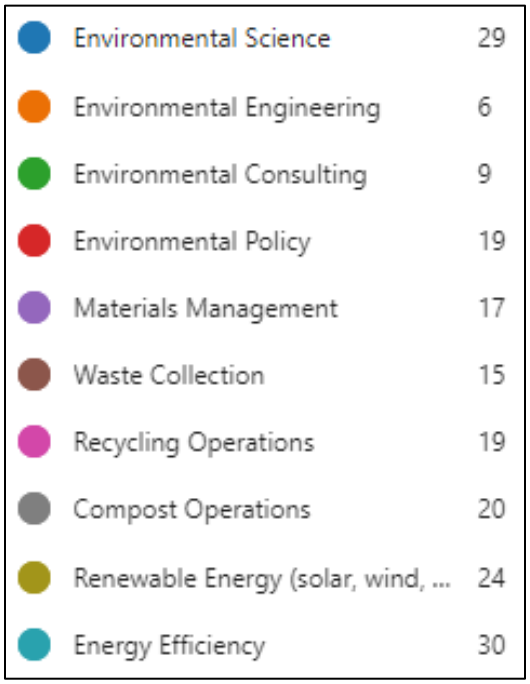
In the survey, it asks the person if they have air conditioning in their household. It can be central AC or a room window unit, either was allowed for the question. 92% or 343 respondents say they have some form of air conditioning in their household. 8% or 28 respondents do not have air conditioning in their household.

Homeowners' Insurance:

Insurance prices are rising overall, and it will require government action to address this issue, but right now, it can be helpful for people to have in the case of emergencies. Due to the damages that can come from climate change, homeowners' insurance will be a necessity for many people.

When asked if they have homeowners' insurance, 85% or 315 respondents say they have homeowners' insurance, with 11% or 39 respondents that do not have it. 5% or 17 respondents answered not sure.

Going further, the survey asks those who do have homeowners' insurance what is included in their coverage. 8% or 61 respondents chose flood damage, 23% or 171 respondents chose water damage, 29% or 212 respondents chose fire damage, 25% or 183 respondents chose storm damage, and 15% or 112 respondents chose not sure. Survey takers were able to select multiple answers for this question, so there is overlap with many of the responses for this one.



Work Experience or Expertise:

There was an optional question for people to put if they had work experience or expertise in certain fields that are related to climate change and sustainability. In this question, they could have put environmental science, environmental engineering, environmental consulting, environmental policy, materials management, waste collection, recycling operations, compost operations, renewable energy (solar, wind, water, or geothermal), and energy efficiency. They were also able to select multiple answers, so there is some overlap in the fields people have work experience or expertise in.

Ranking:

This section also asked survey takers to rank environmental health, public health, infrastructure, economy, and climate change education in order of importance for the city to consider when making further plans in Mt. Pleasant to address climate change. 1 is the most important and 5 is the least important.

Ranking based on survey results:

1. Public health
2. Environmental health
3. Infrastructure
4. Economy
5. Climate change education

Survey Comments:

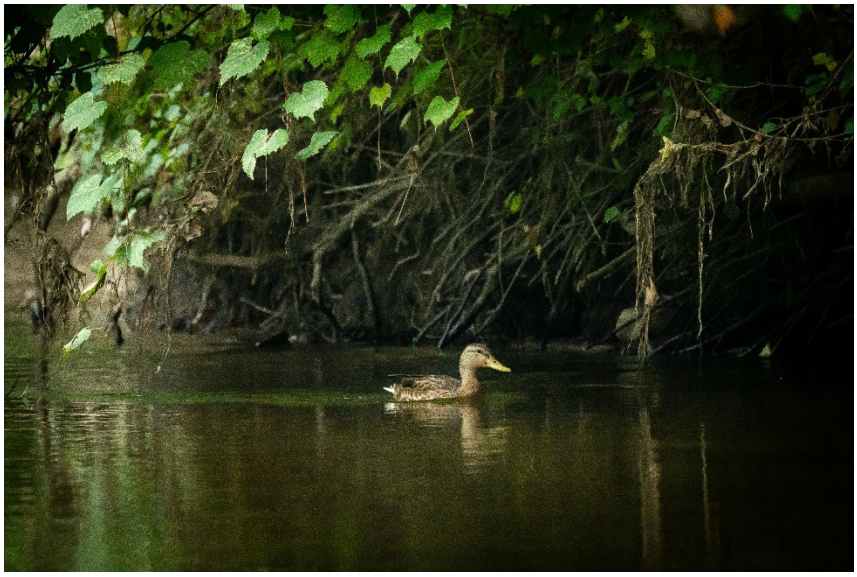
At the end of the survey, respondents were asked to share any thoughts about climate change related issues not addressed in the survey. This question was optional, so there were only 101 responses out of 371 total responses, but there were many constructive comments and suggestions given by the respondents. It was anticipated that there would be antagonistic comments in this section to this survey for various reasons; most of them were outright denial of anthropogenic climate change or voicing anger at the city for pursuing the climate change survey. Several themes can be seen in the constructive comments that are worth mentioning for this report.

Green space and permeable surfaces - [comments 6, 14, 26, 45, 74, 77]:

Many comments brought up the need for more green and permeable spaces. People are concerned about the issues that the lack of these spaces creates. Not having more green spaces in Mt. Pleasant raises temperatures and makes flooding more likely by not providing permeable spaces for water to flow into the ground. One comment mentions how much the temperature increases when driving by a paved section of Broomfield that used to be for band practice, "…as you drive by the temperature goes up 15 degrees in the summer on our car thermometer, just drive by for yourself. Add some damn trees and grass". Several other comments mention their desire to see more trees that can cool the air and provide aesthetic benefits, rather than more grey pavement and concrete.

Drinking water and Chippewa River quality - [comments 13, 30, 46, 48, 68, 75, 81]:

Although water quality was brought up in the survey, people still voiced their concerns in this section.



PFAS were mentioned with one comment saying, “PFAS in private wells – very concerned. Too afraid to test our well because don’t know what we would do for other options”. PFAS are a type of man-made chemical with thousands of variants that have been used in many different products and they are still being used in many things. These are considered “forever chemicals” that can accumulate in the environment and in humans; they are associated with a variety of health problems, including cancer. One comment expressed concern about lead pipes still being used. Several comments were concerned about the quality of the Chippewa River, especially regarding E. coli and waste dumping into the river. One comment says, “Pollution and overall state of the Chippewa River should be integral in the discussion of climate change in our community. The condition of our river is always a concern which impacts community members AND the surrounding wildlife we should be supporting”.

Renewable Energy - [comments 35, 57, 79, 80]:

There were several comments about the need for more renewable energy in Mt. Pleasant and to essentially decarbonize aspects of the city. One comment says, “Community solar, partnering with local trades people re: heat pump information, especially with upcoming federal government rebates. Need plans for charging stations. Need to become more bike friendly”. Another comment says, “The city could encourage the installation of solar photovoltaic panels on buildings, both residential and commercial. It could also work with the power companies to add wind turbines where space exists” … “burning fossil fuels urgently need to be replaced by solar and wind generated electricity. In the near future, everything will be electric, and we need to prepare for this change”. It seems that the responses regarding renewable energy acknowledge the need to phase out fossil fuel dependency while using more sustainable methods of energy generation.

Business regulations - [comments 60, 63, 94]:

Some respondents brought up the role of companies and businesses in contributing to climate change in a more significant way than residents do. They want businesses to take some form of financial responsibility for the disproportionate pollution they contribute to. One comment says, "Corporations/companies/businesses taking responsibility for contributing to climate change through events such as pollution… they tend to have far more impact than the average individual citizen/household. Especially at a time where corporate greed and profit margins are at an all-time high while the average citizen struggles, they have more resources to do something about important things like climate change and choose to do nothing a lot of the time". A different comment says that they should be required to pay more in taxes than residents.

Vulnerable communities in Mt. Pleasant - [comments 15, 50, 78]:

Several responses expressed concern for vulnerable communities that will see the worst of the environmental and social impacts of climate change. In Mt. Pleasant, many of the most vulnerable are unhoused, and comments reflect this reality. One comment that articulated this well says, "The racial and class disparity contained within [climate change issues]. This affects folks on the margins the most (unhoused, our Native American population, etc), and our government needs to do everything in its power to shatter the systems that create climate change and work toward an equitable future for EVERYONE – those who pay taxes and those who cannot. Humans are humans". Other comments expand on this by asking what help is available for the unhoused during extreme weather and temperatures. Clearly, several survey respondents recognize the need for support programs that help unhoused people in their dire circumstances due to climate change.

Other noteworthy comments:

Comment 41: One comment brings up the importance of utilizing Indigenous knowledge in sustainability and land stewardship. In the comment, it says, "[the] absolute importance of need for knowledge held by Indigenous societies who have the knowledge, knowhow historically, and the solution to the problem" when taking care of the environment. This comment is significant because approaching land management and sustainability from an Indigenous framework is essential to truly help address how Mt. Pleasant impacts the environment. The city is fortunate to be close enough to the Saginaw Chippewa Indian Tribe to reach out for resources on how to do this.

Comment 84: Another comment highlighted the importance of parks in Mt. Pleasant and how they could benefit the city even more. The comment says, "I feel that Mount Pleasant, being a city of wonderful parks, could further that by adding native to Michigan wildflower/native trees and shrubs in the city parks where they currently have non-native flowers and trees growing (replace with native)". Doing this could help mitigate flooding in some areas and provide habitat for crucial pollinators. The comment also says, "Why not make Mount Pleasant 'the city of parks' as a destination" … "People are looking for outdoor experiences in the wild more and more (look at how our national parks are crowded), why not provide that here".

Comment 38: The city reducing its own greenhouse gas emissions was addressed in one comment. It says, “I think it’s also very important for the city to reduce its own greenhouse gas emissions which contribute to climate change and its impacts. Doing so helps reduce the problem, saves money in the long term, and models the actions needed by businesses and all community members”. Leading by example is a good way to help the rest of the community see the importance of making necessary changes to address climate change. This means that the city should decarbonize its own operations, including transportation and energy use for municipal buildings.

Other Studies:

National studies on similar topics of climate change perception have been conducted by many reputable institutions, such as the Pew Research Center, Yale Program on Climate Change Communication, and the George Mason University Center for Climate Change Communication. Questions in these studies were used as a model for the questions in the Mt. Pleasant Climate Change Survey. Aside from their use as a model, these surveys provide additional information that can be used for analysis of Mt. Pleasant’s survey.

According to the report, “Climate Change in the American Mind: Beliefs and Attitudes, Spring 2024” from the Yale Program on Climate Change Communication and the George Mason University Center for Climate Change Communication, 70% of Americans believe global warming is happening, while only 13% do not think it is happening. Similarly, when narrowing the scope to Michigan with the Yale Climate Opinion Maps 2023, 71% of people in Michigan believe global warming is happening, while 16% do not believe it is happening. In the Mt. Pleasant Climate Change Survey, there are no questions asking if the respondent believes in climate change or global warming. This was done because data already suggests that a majority of Americans believe climate change is happening; in addition to that reason, there has been a long-standing scientific consensus that climate change is happening, and certain human systems are making it worse.

Yale Climate Opinion Maps 2023 also show that 57% of people in Michigan believe global warming is already harming people in the US. A smaller percentage (42%) of people in Michigan say they have personally experienced the effects of global warming. Results for similar questions in the Mt. Pleasant Survey about national and personal impact show higher percentages than those for the whole state. When asked how much they agree with the statement “Climate change is impacting people in the United States,” 69% of survey respondents strongly agreed or agreed that people in the United States are being impacted by climate change. When asked how much they agree with the statement “Climate change is impacting me personally,” 59% of respondents strongly agreed or agreed that they are personally being impacted by climate change.

In Michigan, Yale estimates that 55% of people think local officials should do more to address climate change. The Mt. Pleasant survey has a similar question that asks how much the respondent agrees with the statement, “Local governments must play a role in addressing climate change”. In total, 67% of Mt. Pleasant respondents strongly agreed or agreed that local governments must do something to address climate change. People in Mt. Pleasant may be more likely than the rest of the state to want the local municipal government to make changes that address climate change.

A question that was not asked in the Mt. Pleasant Climate Change Survey but was brought up in the Yale Climate Opinion Maps 2023 is how much corporations should be doing to address climate change. Their

study estimates that 70% of people in Michigan think corporations should do more to address climate change. This is significant because it suggests that most people in Michigan would support measures that require corporations address to climate change, especially considering companies and corporations are disproportionately more responsible for greenhouse gas emissions than individuals or households.

The Pew Research Center conducted several surveys that provide data on Americans' views of alternative energy sources like renewables. Based on the Pew study, 67% of Americans favor the United States prioritizing the development of alternative energy sources, like wind or solar. Even more people favor the United States taking steps to become carbon neutral by 2050, at 69% of Americans. Although there were no questions in the Mt. Pleasant survey asking how favorable alternative energy sources are for respondents, a "pro-renewables" sentiment can be seen in several comments from the last section of the survey. This does not mean most people think the United States should completely phase out fossil fuels. Pew data also show 68% of U.S. adults support the mixed use of fossil fuels and renewable sources for energy generation, with 31% supporting the phase-out of fossil fuels completely and relying instead on renewable energy. Younger adults are more likely to support the phase-out of fossil fuels completely than older adults. There are also differences in how political affiliation impacts Americans' views of renewable energy sources. Regardless of age, Republicans or right-leaning Americans are much less likely to support the phase-out of fossil fuels than Democrats or left-leaning Americans.

Study References

"Climate Change in the American Mind: Beliefs and Attitudes, Spring 2024"; Yale Program on Climate Change Communication, George Mason University Center for Climate Change Communication; July 16, 2024.

"Yale Climate Opinion Maps 2023"; Yale Program on Climate Change Communication; December 13, 2023.

"What the data says about Americans' views of climate change"; Pew Research Center; August 9, 2023.

MI Green Communities

General Information and Interest in Participation

Established in 2009, Michigan Green Communities (MGC) is a statewide initiative supporting municipalities and counties to integrate sustainability into their operations. MGC, a collaboration of multiple state agencies and organizations—including the Michigan Economic Development Corporation (MEDC), Michigan Department of Environment, Great Lakes, and Energy (EGLE), and Michigan Municipal League (MML)—provides communities with benchmarking, networking, and technical assistance to embed sustainable practices at local, regional, and state levels.

Central to MGC is the annual MGC Challenge, an action-based benchmarking program where communities log sustainability actions, track metrics, and achieve certification levels (bronze, silver, or gold) based on completed initiatives. Participants also receive free support from EGLE's Catalyst Communities program. The Challenge helps communities monitor and advance initiatives in areas like climate resilience, energy efficiency, water conservation, sustainable land use, and health.

Communities participating in MGC have access to free technical support from MGC and EGLE's Catalyst Communities program, as well as specialized expertise to implement sustainability actions effectively. This assistance helps local governments navigate complex projects and funding opportunities. The MGC Challenge enables communities to set benchmarks, track progress, and report on their sustainability actions. This structure not only creates a sense of accountability but also allows communities to measure impacts, recognize areas for improvement, and celebrate achievements.

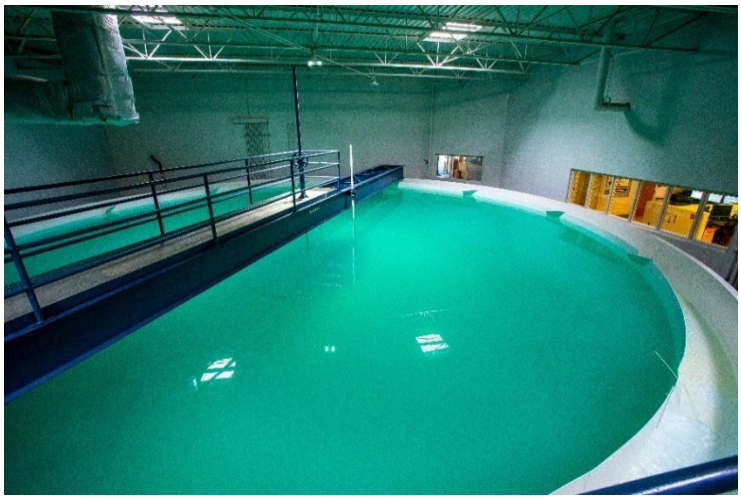
Past City Initiatives:

The City of Mt. Pleasant has operated with environmental consciousness in mind. Prior to engagement with the MI Green Communities initiative, the City has implemented many of the proposed best practices in addressing climate change and its impacts. The following is a list of those initiatives that have been completed:

- **Develop a hazard mitigation plan with climate projections included**: The City's Hazard Mitigation Plan was completed in collaboration with Isabella County in 2007 and has since been updated, most recently updated in 2022. The plan ranks likelihood of occurrence of various climate related hazards including severe weather, flooding, and infrastructure failure.

- **Implement hazard mitigation projects to address identified risks in the hazard mitigation plan:** The City has several hazard mitigation projects that have been implemented since the initial draft of the hazard mitigation plan in 2007. This includes:
    - Development of a tree planting and maintenance program

- Development of a comprehensive stormwater management ordinance
- Development of a multi-year stormwater infrastructure management plan



Conduct energy audits on municipal facilities: The City last conducted an energy audit in 2020. The energy audit led to the implementation of energy saving actions such as conversion to more efficient lighting and office amenities.

- **Implement a public financing or grant program to support community energy efficiency and renewable energy projects:** In order to encourage economic development, improve property valuation, increase employment, reduce energy costs, reduce greenhouse gas emissions and contribute to the public health and welfare in the City of Mount Pleasant, the City Commission established the City of Mount Pleasant Property Assessed Clean Energy Program which allows for special financing of green infrastructure initiatives.

- **Provide on-site organics collection for single-family residents and collection at drop-off site(s):** The City currently offers brush and leaf pick up to residents. The collected material is then composted and provided back to the community in partnership with area landscape firms.

Future Goals and Objectives:

Climate Resilience and Adaptation

CATEGORY	SUBCATEGORIES & DESCRIPTIONS	Current Progress	Timeline for Accomplishing Action
Climate Resilience & Adaptation	Develop a climate adaptation and resiliency plan in collaboration with the community.		Q1 2025
Climate Resilience & Adaptation	Establish baseline metrics for the MI Green Communities Challenge.		Q1 2025
Climate Resilience & Adaptation	Develop a municipal operations GHG inventory.		Q4 2027

Energy Efficiency and Renewable Energy

CATEGORY	SUBCATEGORIES & DESCRIPTIONS	Current Progress	Timeline for Accomplishing Action
Energy Efficiency & Renewable Energy	Update Capital Improvements Plan (CIP) or Asset Management Plans to include current or future municipal renewable energy project(s).		Q2 2026
Energy Efficiency & Renewable Energy	Work with local utility providers to ensure that energy and water bills include household energy and water use statistics over time.		Q4 2026
Energy Efficiency & Renewable Energy	Develop a plan to replace municipal traffic signals, street lighting, and/or parking illumination with energy efficient lighting technologies (e.g., LEDs and other technologies of equal or greater efficiency).		Q2 2026
Energy Efficiency & Renewable Energy	Track energy use for all municipal buildings using ENERGY STAR Portfolio Manager.		Q4 2026

CATEGORY	SUBCATEGORIES & DESCRIPTIONS	Current Progress	Timeline for Accomplishing Action
Energy Efficiency & Renewable Energy	Implement at least one new renewable energy project (e.g., solar thermal, solar photovoltaic, geothermal, wind, district heating/cooling systems, biodigesters, biomass, or energy storage system) on public buildings/property in the last year.		Q4 2029
Energy Efficiency & Renewable Energy	Upgrade/retrofit at least one municipal building in the last year to increase energy efficiency.		Q4 2026
Energy Efficiency & Renewable Energy	Audit the inventory and energy intensity of the municipal vehicle fleet and set a decarbonization target for the fleet.		Q4 2029

Protecting and Conserving Water Resources and Responsibly Managing Materials

CATEGORY	SUBCATEGORIES & DESCRIPTIONS	Current Progress	Timeline for Accomplishing Action
Protecting & Conserving Water Resources	Improve municipal water and wastewater treatment plant efficiency.		Q4 2027
Responsibly Managing Materials	Collect traditional recycle materials from single family homes:provide/allow for single hauler (municipal, contract, or franchise) curbside collection of traditional materials. Recycling program should be opt-out.		Q1 2025
Responsibly Managing Materials	Provide and/or require collection of traditional recycling materials at all multi-family housing, commercial properties, and public spaces/parks, as applicable.		Q4 2025

Support Clean and Inclusive Mobility

CATEGORY	SUBCATEGORIES & DESCRIPTIONS	Current Progress	Timeline for Accomplishing Action
Support Clean & Inclusive Mobility	Incorporate non-motorized transportation elements into new municipal infrastructure projects, as relevant.		Q4 2029
Support Clean & Inclusive Mobility	Assess needs and develop a plan for deployment of public electric vehicle (EV) charging infrastructure.		Q4 2025

Implementation and Monitoring:

Effective implementation and continuous monitoring are essential to the success of the City of Mt. Pleasant's Climate Change Preparedness Plan. Successful implementation requires coordinated efforts among various city departments, including Public Works, Planning and Community Development, Parks and Recreation, and Public Safety. Each department will have defined roles and responsibilities, ensuring that the objectives of the climate plan are aligned with departmental functions and resources.

The City will actively seek partnerships with state and federal agencies, non-profits, and the private sector to leverage expertise and resources. Additionally, grant opportunities, funding from the Michigan Green Communities program, and other financial resources will be pursued to support plan initiatives, particularly for high-impact, large-scale projects. The City will consult external experts in order to identify those goals and objectives that have the greatest impact and return on investment.

The City will release an annual Climate Action Progress Report to document completed actions, current progress, and upcoming projects. The report will include annual data collected and highlight successes and lessons learned. Based on this annual review, adjustments to strategies and timelines may be made to reflect new insights, technologies, or funding opportunities. The Climate Change Preparedness Plan will undergo a comprehensive review every five years. This process will consider emerging climate science, regional trends, and community feedback. Adjustments will be made as necessary to incorporate new best practices and respond to changing conditions.

Through these structured implementation and monitoring efforts, Mt. Pleasant will maintain a clear, adaptable path toward a climate-resilient future. This approach not only promotes accountability but also ensures that the City can proactively adjust its strategies to meet evolving challenges and opportunities in climate resilience.