



HANCOCK MASTER PLAN

City of Hancock, Michigan | Master Plan (2018)



Document Personnel

City of Hancock City Council

Lisa McKenzie, *Mayor*
Ted Belej, *Mayor Pro-Tem*
Joseph Bauman
Ron Blau, *Ward I*
John Haeussler
Paul LaBine, *Ward III*
Dan Seguin, *Ward II*

City of Hancock Administration

Glenn Anderson, *City Manager*
Mary Babcock, *City Clerk*

City of Hancock Master Plan

Planning Commission Members:

Glenn Anderson
Ron Blau
Devin Leonarduzzi
David Lucchesi
Deb Mann
Lisa McKenzie
Stephanie Swartzendruber
Bob Wenc
Tony Wilmers

City of Hancock Master Plan

Steering Committee Members:

Susan Burack	Deb Mann
Cynthia Cote	Lisa McKenzie
Melissa Davis	Stephan Olsson
John Diebel	Jeff Ratcliffe
Crissy Gerhart	Jay Ruohonen
Ray Gerhart	Dan Seguin
Barry Givens	Ray Sharp
Mark Johnson	Kevin Store
Philip Johnson	Curt Webb
Jeff Lang	

Approval/Rejection Statement

At a City Council meeting held on November 12, 2017, the Council, according to MCL 125.3843 subsection (3) asserted the right to approve or reject the Master Plan. The City Council approved the Master Plan at its meeting held on 00/00/0000

Mary B. Babcock, *City Clerk*

Acknowledgments

Developed by the City of Hancock, Michigan with assistance from OHM Advisors and Land Information Access Association. Document prepared by OHM Advisors.

This project is part of the Michigan Association of Planning’s Master Planning for Sustainability and Resiliency grant program. Financial assistance for this project was provided, in part, by the Michigan Coastal Zone Management Program, Office of the Great Lakes, Department of Environmental Quality, under the National Coastal Zone Management Program, through a grant from the National Oceanic and Atmospheric Administration, U.S. Department of Commerce.





Dear Citizens & Stakeholders,

Originally founded as a mining community, the City of Hancock has always been reliant on the area's natural resources. Today, the City serves as the gateway to Michigan's beautiful Keweenaw Peninsula. Tourism continues to enhance the long-term economic health. If we do not approach community planning through a resiliency and sustainability lens, we risk compromising our local economy in addition to compromising the integrity of one of the most beautiful and unique landscapes in the world.

Though the challenges ahead are complex and interconnected, demanding an ever-evolving approach, the City of Hancock's ongoing hard work and dedication to sustainability and resiliency will contribute to the well-being of every member of the community and ultimately the state, country and planet. As just one of six communities chosen to pilot the grant-funded Michigan Association of Planning's Planning for Sustainability and Resiliency program, we are proud to help lead this very important initiative.

This document is the result of contributions from stakeholders who care deeply about the community in addition to information from state and local experts who span various disciplines, including planning, engineering, chemistry, natural resources, economy and sociology. With this, this Master Plan establishes a pathway to a more sustainable community from multiple perspectives, working to achieve long-term social, environmental and economic health, otherwise known as the triple bottom line. This is a critical and necessary step forward in building a more sustainable future where every community member has a role to play.

Thank you to all who participated in this process.



Sincerely,
Glenn Anderson, *City Manager*

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Chapter One | Introduction

This chapter provides an overview of sustainability and resiliency planning and how to best use this Plan.



The Need for Sustainability & Resiliency Planning

Today's quickly changing social, environmental and economic conditions require thoughtful and impactful responses from local governments to achieve a more sustainable future. Communities include subsystems of infrastructure and services that, when working, create a functioning community system, but when compromised, threaten the community's ability to thrive.

Specifically, shifts in climate, economics and technology are rapidly occurring and a local government that does nothing or tries to apply old answers to the challenges ahead will not do well. To be successful, local governments need to be proactive in understanding what is likely to come and carry out plans that meet the anticipated challenges.

Some of the main challenges include:

1. **Climate:** Temperatures are rising, snow and rainfall patterns are shifting and more extreme climate events, like heavy rainstorms and record high temperatures, are already happening. This is causing unprecedented levels of flooding, fires and other issues that many communities are not prepared to handle.
2. **Economics:** Funding opportunities for local governments are becoming more limited and competitive. Meanwhile infrastructure systems in many communities have aged to the point of critically needing replacement. Creative financing and better coordinated and careful budgeting is therefore more important than ever.
3. **Technology:** Technological advances will offer many opportunities to increase efficiency and improve quality of life. However, because technological advances are happening so quickly, many of the changes will be disruptive and confusing unless municipalities get ahead of the technology, embrace it and use it to their advantage.

Because of these changes, the practice of planning for sustainability and resiliency is a necessary approach.

This Master Plan is one of the first in Michigan to be developed with sustainability and resiliency at the forefront and while many of the expected challenges of the future are daunting, this Plan helps to ensure that the City of Hancock's best years are still ahead and holds the potential for bringing new levels of ingenuity and vibrancy to the City.

Planning for the 21st Century – Sustainability & Resiliency Master Plans Defined:

In comparison to the urban renewal style plans of the 1960s and 1970s and the growth management style plans of 1980s and 1990s, sustainability and resiliency master plans are holistic and bring together concepts like placemaking, which elevates economic development and overall quality of life, with environmental stewardship, which calls for the responsible use and protection of the natural environment. The aim of sustainability and resiliency plans is to institutionalize best practices in sustainable operations.

In a sustainability and resiliency master plan process, communities gain an understanding of what is likely to come socially, economically and environmentally and develop a balanced strategy to meet both existing and anticipated challenges in these areas.



Specific to this planning effort, the legal basis for developing a Master Plan in Michigan is paired with the intention of the Planning for Resiliency and Sustainability grant.

The grant is intended to increase Michigan's coastal communities' capacity to anticipate, prepare for and avoid or mitigate the impacts of severe weather events and trends, which can include hazards to property and public health and safety caused by shoreline erosion, flooding, ice jams, fluctuating water levels, or deteriorating surface water quality.

Anticipating and preparing for the City's future.

This Plan is therefore intended to serve as:

1. A general statement of the community's goals and policies that provide a single, comprehensive view of the community's desire for the future.
2. The statutory basis upon where zoning decisions are made. The Michigan Zoning Enabling Act (Act 110 of 2006) states a zoning ordinance shall be based upon a plan.
3. A document that helps guide decisions toward public improvements, community programs and private developments that support sustainability.
4. An educational tool that gives citizens, property owners, developers and adjacent communities an understanding of the existing and likely future conditions of the City Hancock and a clear indication of the community's desired direction in response.
5. A tool to position the City of Hancock as a desirable coastal community to live and do business in.



How to Use this Plan

This Plan is intended to be used as decisions are made concerning new development, redevelopment capital improvements, economic incentives and other matters involving the City. The following is a summary of how decisions and processes should align with the Plan.

Annual Work Programs & Budgets

City departments and administrators should be aware of the contents of the Plan when preparing annual work programs and budgets.

Development Approvals

Administrative and legislative approvals of development proposals, including rezoning, should be a central means of implementing the Plan. Decisions made by elected and appointed officials should reference relevant Plan recommendations and policies. City plans and codes should also reflect and support the vision and recommendations in the Plan.

A Plan developed as a tool to be used by the City for constructive future decision making

Capital Improvement Plan

The City's Capital Improvement Plan (CIP) should be prepared consistent with the Plan's recommendations. New improvements that are not reflected in the Plan, which could dramatically impact the Plan's goals, objectives and strategies, should necessitate an amendment to the Plan.

Economic Incentives

Economic development incentives proposed by the City should be reviewed to ensure consistency with the goals, objectives and strategies of the Plan.

Private Development Decisions

Property owners and developers should consider the goals, objectives and strategies of the Plan in their investment decision.

The Plan is intended to be used as a guide in development deliberations, such as zoning matters and infrastructure improvements.

This Plan should be used as a tool by the City to clearly communicate to property owners and developers the vision for what is desired in the City.

Overall Guide

The Plan should operate as a guide to help the City, development community and local residents plan for the future of Hancock.

The Plan is intended to be flexible and fluid and should be updated and amended as appropriate. New information should influence the evolution of the goals, objectives and strategies over time.





Chapter Two | Creating the Plan

This chapter explains how the Plan was built using data, expert insight and first-hand knowledge from members of the Steering Committee and the public.



Overview

This Plan works to establish sustainability and resiliency as the foundation of the Plan. The overarching ambition of the planning effort was to fully prepare the City of Hancock to meet the challenges of the future, handle potential shocks to community systems and find ways to become self-sufficient.

Within that framework, the goals for the planning process included:

1. Engaging the public to ensure support
2. Advancing a strong sense of place and community
3. Identifying vision, goals and implementation strategies to create a truly usable plan

Preparing the City to meet the challenges of the future.



Canal Run (Hancock, Michigan)

Approach

In combination, the planning process phases offered a balanced approach that involved both an objective evaluation of the current conditions and a community assessment based on local insight and opinions. A balanced approach placed high value on pairing

technical research with feedback from the public to allow for decision-making to be based on both factual and intuitive knowledge. Utilizing both sources of perspective is essential to creating a plan tailored to meet the needs of the community.

Research

A key component of this planning process was the development of a report titled *Building Resiliency in the City of Hancock*, which was authored by the Land Information Access Association (LIAA), a non-profit based in Traverse City that provides expertise and technical assistance to local units of government. Language and information from the report is incorporated into this document. A full copy of the report is included in the Appendix. The report was completed as a result of a public process that involved local officials, regional stakeholders and community leaders.

The assessment process included analysis of social, environmental and economic data and maps as well as interviews with local stakeholders, with the goal of identifying ways in which the City of Hancock is especially vulnerable. The development of the report included a resiliency workshop and a series of stakeholder meetings.

Resiliency Workshop

LIAA and OHM Advisors hosted a Resiliency Workshop on June 13, 2016, at the Hancock First United Methodist Church. The purpose of the meeting was to introduce information in changing climate trends and coastal dynamics to the City of Hancock Master Plan Steering Committee. During the workshop, local experts, Dr. Sarah Green and Dr. David

Watkins, from Michigan Technological University, presented on local changes and impacts. Attendees also participated in an exercise to discuss how climate changes may be impacting the City.

Stakeholder Meetings

On June 14, 2016, the project team met with representatives from a number of local, regional and state agencies to learn about the community from a variety of perspectives.

This information helped inform the recommendations of the report and the goals, objectives and strategies of this Plan.

Meetings were held with following groups & agencies:

- Houghton County Emergency Manager
- Michigan Department of Natural Resources (MDNR)
- Keweenaw Economic Development Alliance (KEDA)
- Western Upper Peninsula Planning & Development Region (WUPPDR)

Summary of Findings

The main findings of the report include:

The quality of road infrastructure may be increasingly threatened by more intense rain and snow events, greater erosion along the shoreline and increasing “rain on snow” events in the spring and fall.

A number of areas in the City of Hancock have relatively high populations that may be more sensitive to extreme weather events. The City can take advantage of an extended summer tourism season by embracing its waterfront through placemaking, signage and creative recreational opportunities.

Due to the likelihood of more mild winters in the future, the City should work to adapt winter-based tourism to year-round tourism as much as possible.

Hancock is home to significant critical infrastructure including major transportation routes, hospitals and shelters. Collaborative emergency planning will become even more necessary as more severe storms and extreme weather are expected in the region.

Wildlife changes should be expected as tree species, plant communities and habitat shift due to increasing temperatures. This is likely to impact the diversity of health of wildlife in the area.

Wildfire risk is very high and likely to increase in surrounding communities. The City of Hancock should participate in regional emergency response planning and work to understand where areas within the City may be at risk.



Coordination with Other Plans

The consultant team reviewed all available planning documents and reports for the City of Hancock and has worked to incorporate these documents into this Plan. Key reports and plans include the City’s Design Guidelines, the Draft Non-Motorized Transportation Network Plan, the City’s Recreation Plan and the Houghton County Housing Target Market Analysis.

Community Engagement

Steering Committee

The planning process was led by a Steering Committee comprised of representatives from various sectors of the community. In addition to the Steering Committee, the process included web-based feedback.

A project website served as a community resource. Through this website, residents, business owners, local officials and other interested citizens had access to project news, information and an opportunity to provide input.

Public Open House

On September 12, 2016, the planning team and Steering Committee hosted an open house from 6:00 p.m. to 8:00 p.m. at the Copper Country Community Arts Center. The purpose of this meeting was to get input from City residents about what possible changes they would like to see in the City.



To obtain this information, draft goals, objectives and strategies, along with a draft future land use and waterfront conceptual design were presented on poster boards at this meeting. The draft goals objectives and strategies were derived from a review of existing planning documents and reports for the City, preliminary findings from the resiliency report, a review of best planning practices and Steering Committee discussions.

The draft map and conceptual waterfront design was created from a review of the existing Zoning Ordinance, existing planning documents, best planning practices and Steering Committee discussions. They were also designed to reflect the goals, objectives and strategies as they pertain to land use.

Meeting participants were able to provide written comment using notes that they could stick right on the boards, as well as providing verbal feedback to the consultant team and Steering Committee members. Over sixty (60) community members participated in this meeting and feedback from participants helped shape the final recommendations presented in this Plan.

Public Open House used to gain input from City residents about changes they would like to see in the City of Hancock



Chapter Three | The Context

This chapter presents background information on the City of Hancock and the social, environmental and economic trends that were considered during the development of this Plan.



**The City of Hancock
Sunny Side U.P., Finnish Style**
The City of Hancock (2015 population: 4,555) is sculpted into the steep hillside of the northern bank of Portage Lake, otherwise known as “the sunny side”. Hancock serves as both Michigan’s northernmost city and gateway into the Keweenaw Peninsula, Michigan’s Copper Country.

The City is connected with the rest of the county by the Portage Lake Lift Bridge. The City is bordered by Franklin, Quincy and Hancock Townships to the east, north and west, respectively and has a total land area of 2.43 square miles (1,557 acres).

The Keweenaw Peninsula once flourished with strong copper mining and smelting industries.¹ However, by 1968, virtually

all mining activities ceased. Today, the City is known for its beautiful landscape and attracts many summer and winter visitors to enjoy nearby assets like the pristine waters of Lake Superior, the largest Great Lake, and Mont Ripley, a premier downhill skiing facility.

The City of Hancock is home to Finlandia University², whose International School of Art and Design program, along with the Copper Country Community Arts Center³, has helped to give the City a reputation as one of the leading small art towns in the Upper Midwest. Numerous individual art exhibits and shows take place in the City every year highlighting local artists and crafts people.

The City of Hancock has a strong Finnish heritage that is embedded into the community and is a sister city of Porvoo, Finland.



*“Finlandia University was founded in 1896 as Suomi College, but its heritage extends hundreds of years before that. After years of hard labor in the Upper Peninsula mining and lumber camps, Finnish immigrants began to dream of a better life for their children and future Finnish-American generations. They found their answer in Suomi College.”
(www.finlandia.edu/about/our-finnish-heritage/)*

Environmental Trends

We are facing warmer temperatures as presented in the Superior Watershed Partnership Lake Superior Climate Adaptation, Mitigation and Implementation Plan. Temperatures have significantly increased in the Upper Peninsula in recent decades, with the 2000s being the hottest decade recorded followed by the 1990s having the second hottest temperatures.

By the year 2100, “summer temperatures in the Great Lakes region are projected to rise between 5 degrees and 20 degrees.” This means that the Upper Peninsula may feel more like Northwest Illinois or possibly like Kansas by the end of the century, which will have great impact on how the City of Hancock functions. The impact of rising temperatures is already being observed, as shown in the table.



January 2015 (F.J. McLain State Park)

Erosion has been a persistent problem at F.J. McLain State Park, causing rangers to close some park campsites and other features.

Observed Climate & Coastal Changes in the Western U.P.

Warmer temperatures overall with periods of drought in the summer
Warmer temperatures in Lake Superior, inland lakes and rivers
Spring arriving earlier and generally shorter winter
Increased number and severity of rain events, even in winter
Less ice cover on Lake Superior causing stronger and taller waves
Less predictable snowfall, with snow pack staying on the ground for fewer days
Increased occurrences of flooding and shoreline erosion

Recent Events

August 1, 2002 A significant windstorm recorded gusts up to 92 mph in Houghton County, downing numerous trees and power lines and causing damages to structures, some severe.
May 11, 2003 A significant rainfall (2.6 inches in Hancock) caused widespread damage throughout the U.P.
July 16, 2006 Large hail, damaging winds and severe thunderstorms in the upper reaches of Houghton County caused significant damage and transportation disruptions throughout the region.
Late April 2013 Rapidly melting snow caused extensive flooding, causing severe damage and a disaster declaration.
January 2015 About 1/3 of the Keweenaw Peninsula’s F.J. McLain State Park closed as a result of coastal erosion.
July 2016 Severe storms in the Western U.P. caused straight line winds up to 90 mph and caused extensive damage to infrastructure throughout the area.

The information presented in these tables came from a variety of sources, including the Great Lakes Integrated Sciences + Assessments Center and the Lake Superior Climate Adaptation and Implementation Plan. For more information, see the Building Resiliency in the City of Hancock report.



Warming Temperatures Impact on Local Animals, Plants & Water

As this trend continues, the likely impacts on the animals, plants and water in the City of Hancock and surrounding region include:

- Habitats for many species will shrink and move further north
- Cold-water fish may decline; warm-water fish may increase
- Change in forest composition; decline in species like jack pine & birch
- New species may become established in the area such as turkey, ticks and a variety of birds
- Increased risk of invasive species, pests and diseases
- Habitat fragmentation may increase, disconnecting vital habitat & migration corridors
- Change in wetlands: temperature, seasonality and habitat
- Increased risk of wetland habitat loss to erosion and flooding
- Declining seabird populations due to damaging coastal waves and eroding beach habitat
- Possible declines in particular fish species like whitefish due to declining ice cover
- Increased runoff may cause chronic flooding and water quality concerns
- Septic systems may be damaged from increased precipitation, triggering water quality and human health concerns
- Wetland health may decrease, reducing flood control and habitat



Social Trends

Aging Population

According to the U.S. Census Bureau, by 2050, the population aged sixty-five (65) and over is projected to be 83.7 million, almost double its estimated population of 43.1 million in 2012. In 2011, baby boomers began turning sixty-five (65) and by 2050, the surviving baby boomers will be over the age of eighty-five (85). In 2010, the median age in the City of Hancock was thirty-four (34) and the 2015 census estimate places it at thirty-six point two (36.2).

Lifestyle and daily needs of this group shift as they age. Most individuals are living longer and having fewer children. They are working longer and will be more ethnically diverse than their predecessors at age sixty-five (65) and over. As for housing, the large majority of this group prefers to stay in their current home or community as they age. Their needs and demands include proximity to amenities including healthcare, low-cost and appropriate housing and transportation.

Need “Missing Middle Housing”

Current national trends show that the majority of individuals choose where to live based on location first and then resolve the logistics of finding employment and housing.

The result of this change is more competition for jobs and housing in popular urban areas that offer the desired amenities. Because of this, a declining number are choosing to live in outlying suburbs, small towns and rural areas as these locations lack the sought-after amenities and have less opportunities for employment.

As housing needs and wants change with the shifting demographics, gaps in affordability and availability also become apparent. Average-income earning individuals and families are struggling to find suitable, affordable housing.

An increasingly popular solution considers “Missing Middle Housing.” This term refers to multi-unit or clustered housing types with a range in affordability that help meet the growing demand for walkable urban living.

It addresses the desires of both millennials and baby boomers while considering the available housing stock. As the emphasis on walkability and the diversifying of lifestyles, households and incomes increase, it is extremely important to address the location and type of housing in the community.

In 2016, a Target Market Analysis Study was completed for Houghton County, which assessed development opportunities available for “Missing Middle Housing.”

According to the study, the following locations are opportunities in the City of Hancock:

- 206 Quincy Street offers opportunities for façade improvements and vertical expansion for upper level flats for lofts.
- Historic 1903 3-level masonry structure at 307 Quincy offers potential for a historical rehab and rental rehab of the existing apartment and conversion of vacant 3rd floor to lofts.
- 235 Hancock Street offers opportunities for renovation for condos, flats, or lofts.
- 109 Quincy Street presents potential rental rehab for upper level flats and lofts.
- 100 Quincy Street has potential for a historical rehab for mixed-use with condos and lofts on the upper levels.

Placemaking is Important to Thrive

Placemaking is the process of creating quality places where people want to live, work, play and visit. People are choosing to live in walkable, mixed-use communities that offer resources, amenities, social and professional

networks and opportunities to support thriving lifestyles. Perceptions of the ideal built environment are changing as people more greatly value a strong sense of place.

Establishing community identity has proven to help foster the connection between people and place. It gives residents a sense of belonging and stability, in turn improving quality of life. Art, history and heritage play a large role in this.

Transportation Preferences & Technology are Changing

Changes in transportation include an increase in ride sharing, driver-less cars, electric or eco-efficient cars, public transportation and non-motorized mobility.

This shows a shifting attitude in which individuals view how they travel. Positive impacts on cities and downtowns are expected from this shift in use as a variety of transportation modes offers more affordable and often safer options.

In connection with evolving transportation modes is the mindset about road design and infrastructure. Complete Streets, for example, are designed to accommodate all users, including multiple modes of transportation, ages and abilities. Transportation planning with a Complete Streets policy works to increase function and safety for users while maintaining traffic capacity and flow.

Complete Street applications can include, but are not limited to, the following: bike lanes, shared lanes, wide sidewalks, bus lanes, street trees, curb ramps, median islands and roundabouts. The focus of Complete Streets does not stop at providing alternate forms of transportation, but also places importance on the creation and enhancement of the public realm.

The City of Hancock currently has a Complete Streets Ordinance in place and is in the process of developing a Non-Motorized Transportation Plan. The City also provides door to door public transit services with discounts for students, seniors and youth.

Social Equity, Health, & Temperature Changes are Related

As the country’s demographics shift toward higher racial and ethnic diversity and the gap between economic status widens, it becomes increasingly important to consider planning for equity.

This is especially true in light of the environmental changes that are expected from warming temperatures. Some of the most vulnerable populations, such as children, low-income individuals and families and the elderly will be the most susceptible to health risks.

These health risks include:

- Increased risks of water-borne respiratory and vector-borne disease as a result of flooding
- Wildfire smoke, severe storms and high temperatures may exacerbate existing health problems in vulnerable populations like the elderly and disabled
- Increase in health problems like asthma and allergies
- Increased precipitation can pollute public water supplies and cause disease
- Increasing air temperatures may stress populations that lack access to air conditioning



City Population & Household Sizes are Decreasing

Based on the 2015 census population estimate, there are 4,555 people in the City of Hancock, which is an 11% decrease since 1980, but a slight uptick from 2000. At the time of the 2010 census, the population density was 1,782.3 inhabitants per square mile. The racial makeup of the City was 94.7% White, 1.2% African American, 1.0% Native American, 1.7% Asian, 0.1% Pacific Islander, 0.1% from other races, and 1.3% from two or more races. Hispanic or Latino of any race were 1.4% of the population.

In terms of household size and composition, in recent decades, the nationwide trend has been a decline in household size due to higher divorce rates, families having fewer children and elderly living alone.

The City of Hancock follows these national trends. In 2010, there were 1,882 households of which 21.4% had children under the age of eighteen (18) living with them, 36.4% were married couples (living together), 9.7% had a female householder with no husband present, 3.6% had a male householder with no wife present, and 50.4% were non-families. 37.7% of all households were made up of individuals and 13% had someone living alone who was sixty-five (65) years of age or older. The average household size was 2.20 and the average family size was 2.90.

**Economic Trends
We are Transitioning to the New Economy**

Michigan is still in the recovery process from the recession and like everywhere, Michigan is shifting from the “old economy” to the “new economy.” The old economy is based on industrial activity that had once generated a great amount of wealth for communities, which promoted growth and extensive development of infrastructure.

The “new economy” refers to a global, entrepreneurial and knowledge-based economy where business success comes increasingly from the ability to incorporate knowledge, technology, creativity and innovation into their products and services. This departs from old economic principles familiar in the manufacturing sector, such as “economies of scale.” Decreases in the U.S. manufacturing economy have accompanied a shift toward an economy built upon creativity and knowledge.

The job market is increasingly geared towards people with increased technological skills, higher education and vast social connections rather than towards skilled laborers. The shift from the old economy to the new economy requires communities to consider placemaking attributes, such as cultural amenities and access to nature-based recreation to help attract, retain and inspire new economy workers.

Specific to the City of Hancock and the Keweenaw region, between 1968, when the region’s last copper mine closed, until the mid-1980s, many manufactures either closed or downsized. At times, the area saw an unemployment rate of 20% or more.



Michigan Technological University

In the mid-to late 1980s, a coalition of municipalities, businesses, banks,

utilities, and Michigan Technological University joined together to support the retention, expansion and start-up assistance to local companies and diversify the economy.

This approach has helped the area sustain and become known as one of the Upper Peninsula’s economic hubs. The main employers in Hancock today are Finlandia University, Michigan Technological University, and UP Health System – Portage.



To continue diversifying and strengthening the region’s economy, the Keweenaw Economic Development Alliance (KEDA), a regional organization created to assist communities and businesses with economic development, created a strategic plan with the following goals.

- **Foster Business Growth.** Foster the startup, retention, expansion and attraction of small companies that increase the diversification of the regional economy and take advantage of its unique resources and complement efforts in the attraction and retention of talent.
- **Improve Infrastructure.** Ensure that the infrastructure needed by business and community is in place and at a level and cost to meet current and future demands.
- **Revitalize Our Communities.** Create communities in Baraga, Houghton and Keweenaw Counties that are attractive to recruiting and retaining talent.
- **Develop & Attract Talent.** Develop a comprehensive attraction, retention and education system that seeks out, attracts and retains skilled talent and allows area residents to develop the talent and skills most appropriate for them and the local economy.
- **Enhance Cultural & Recreational Opportunities.** Develop and market the region’s cultural and outdoor oriented family friendly lifestyle.

A forward-thinking plan aimed at assisting communities and businesses by diversifying and strengthening the region’s economy.

Climate Trends Impact the Economy

In relation to the environmental trends that show an increase in temperatures, the City of Hancock could see the following opportunities and issues in relation to the economy:

- Longer summer growing season, which benefits tourism and agriculture
- Uncertain snowfall may result in a declining winter tourism industry
- Energy costs may increase in the summer due to air conditioning; heating costs may decline in mild winters
- Cold water fishing may decrease; warm water fishing may increase
- Increase in hunting opportunities for deer and turkey
- Birding opportunities may be less reliable and overall bird diversity may decrease
- Fluctuating lake levels may make navigation more difficult
- Changes in tree species and forestry may mean shifts in timber and logging
- Tourism is likely to increase as opportunities for clean water recreation decline elsewhere

From a local government budgeting perspective, warming temperatures may also have an impact on the funds that are needed to provide necessary public services and infrastructure.

These impacts include:

- Wildfire risks may increase in the summer and spring, requiring extra capacity and resources for prevention and firefighting
- Increased need for emergency shelters with backup generators
- Increased demand for emergency response, flooding rescue and recovery assistance
- Greater risk of damage to critical facilities like utilities, power generation and water supply lines
- Increased stress on roads, bridges, and culverts caused by flooding and fluctuating temperatures
- Transportation routes may require relocation as a result of increased coastal erosion
- Power outages and communication interruptions may become more common



Chapter Four | Goals, Objectives & Strategies

This chapter presents the goals, objectives and strategies that were developed from the data, expert insights, and community feedback. These goals, objectives and strategies serve as the Plan's policies.



Goal One:
Establish Downtown Hancock as a thriving, attractive community center.

Objective 1.1: Improve walkability and navigation.
Strategy 1.1.1: Install wayfinding signage. Strategy 1.1.2: Address areas with high slipping potential and other pedestrian safety hazards.
Objective 1.2: Develop signature events and attractions.
Strategy 1.2.1: Increase local partnerships to improve existing and/or program more festivals and activities in the downtown. Strategy 1.2.2: Install and develop a maintenance plan for local art throughout the downtown and parks. Strategy 1.2.3: Form a creative district to attract artists and visitors and spur economic activity. Strategy 1.2.4: Improve downtown landscaping and develop a maintenance plan for shrubs, flowers, and other downtown plantings.
Objective 1.3: Honor the City’s historic character.
Strategy 1.3.1: Follow and encourage established design guidelines. Strategy 1.3.2: Install an appropriate amount of interpretative signage that tells the history of the downtown. Strategy 1.3.3: Re-engage with the Main Street Program.
Objective 1.4: Create more public gathering spaces.
Strategy 1.4.1: Develop pocket parks and programs with movable chairs, outdoor games, or other items that encourage social connections and activity and establish a long-term maintenance plan for these parks. Strategy 1.4.2: Create a town square that potentially includes a splash pad/ fountain/ice rink.

Objective 1.5: Attract a variety of sustainable businesses to the downtown.
Strategy 1.5.1: Work to attract a grocery store, such as the Keweenaw Co-op, or a similar store to the downtown. Strategy 1.5.2: Complete a parking needs study to address existing and future parking demands. Strategy 1.5.3: Install electric vehicle parking stations in the downtown. Strategy 1.5.4: Become Redevelopment Ready Community certified.
Objective 1.6: Improve the downtown’s appearance.
Strategy 1.6.1: Fill empty storefront windows with exhibits from local artists. Strategy 1.6.2: Develop a façade improvement program.



Laurn-Grove Park – Established 1947 (West Hancock)

Outdoor Public Gathering Spaces

The game of ice hockey runs deep in the Keweenaw’s past. Creating an outdoor ice rink in the downtown area could serve as a general recreational area, a way to attract people to the downtown stores and a grand stage for local ice events (existing and new). Outdoor hockey events have become popular in today’s sporting world, celebrating the heritage of the classic sport in its purest form.

Goal Two:
Protect and celebrate the area’s natural resources.

Objective 2.1: Increase community connection to the waterfront.
Strategy 2.1.1: Develop and implement a waterfront area plan that includes signage, wayfinding, and other placemaking strategies to better connect the City to the waterfront.
Objective 2.2: Direct development away from sensitive and significant natural areas.
Strategy 2.2.1: Utilize zoning to encourage the majority of business development to occur in and adjacent the downtown. Strategy 2.2.2: Use downward lighting fixtures in specific areas to allow for dark sky preservation.
Objective 2.3: Invest in outdoor recreation facilities.
Strategy 2.3.1: Further develop the area’s trail system. Strategy 2.3.2: Maintain stairways to MDNR trail and waterfront. Strategy 2.3.3: Increase safe bicycle routes for both paved roads and trails. Strategy 2.3.4: Explore creative ways to use the City’s alleys for recreation and access, such as an ice skating path, snowshoeing, cross country skiing, biking and walking. Strategy 2.3.5: Explore the possibility of programming and developing summer activity opportunities at winter recreation areas. Strategy 2.3.6: Strengthen accessibility to the waterfront to meet or exceed ADA standards. Strategy 2.3.7: Develop a dog park. Strategy 2.3.8: Create more family and youth recreational opportunities, such as a sledding hill and ski loop.

Objective 2.4: Maintain healthy forested areas and street trees.
Strategy 2.4.1: Partner with the MDNR to monitor threats to trees including invasive species, pests, and storm damage. Strategy 2.4.2: Create a landscape plan to include the control of trees and shrubs on the slope between Water Street and the waterfront and at the US-41 scenic lookout.
Objective 2.5: Protect the water quality of inland lakes, streams, rivers, and Lake Superior.
Strategy 2.5.1: Pilot the construction of pedestrian and biking trails with pervious pavement and open drains, especially near the shoreline. Strategy 2.5.2: Create deterrents to reduce goose and other animal waste at the Waterfront. Strategy 2.5.3: Protect water corridors and other key natural features through protective ordinances.



EJ. McLain State Park, Lake Superior Surfing



Goal Three:

Grow the area’s economic opportunities.

Objective 3.1: Attract high-tech industries.

Strategy 3.1.1: Develop an action plan that addresses the infrastructure necessary, such as energy sources, housing, workforce development opportunities and communications to attract these businesses.

Strategy 3.1.2: Orient placemaking activities to attract high-tech companies.

Objective 3.2: Cultivate healthcare industry.

Strategy 3.2.1: Work with Finlandia University, Michigan Technological University and local hospitals to determine growth opportunities and needs and how to fulfill these needs.

Strategy 3.2.2: Create initiatives that promote healthy lifestyles.

Objective 3.3: Increase awareness & grow Hancock’s high quality of life.

Strategy 3.3.1: Brand Hancock as a premier destination with adventure recreational opportunities, a growing arts movement, a unique and interesting history, abundant natural beauty, and many other assets; engage in a comprehensive marketing campaign to share this image.

Strategy 3.3.2: Promote waterfront activities through recreation planning and partnerships with organizations such as visitors bureaus, the Keweenaw Chamber of Commerce, and other organizations.

Strategy 3.3.3: Increase the variety of events and festivals during all seasons.

Strategy 3.3.4: Package regional tourism planning strategies with neighboring jurisdictions, the MDNR, WUPPDR, and other regional partners.

Strategy 3.3.5: Become a Michigan Trail Town and develop a plan to keep trails well maintained.

Strategy 3.3.6: Encourage historic character preservation to maintain authenticity and become better known as a historic area.

Strategy 3.3.7: Continue to cultivate the growing arts movement and integrate art and artistic opportunities throughout the City.

Objective 3.4: Provide a variety of quality housing options to meet the needs of existing residents and attract new employers and workers.

Strategy 3.4.1: Follow the recommendations of the Target Market Analysis.

Strategy 3.4.2: Work with local officials to improve blight reduction efforts.

Strategy 3.4.3: Explore sample blight reduction ordinance language and adopt stronger blight reduction ordinances.

Strategy 3.4.4: Develop partnerships between housing agencies, service organizations, and realtors to help people find quality housing options and resources for property maintenance.

Objective 3.5: Support the local food economy.

Strategy 3.5.1: Support and promote convenient access to local food sources such as the Tori Market and Ryan Street Community Garden.

Strategy 3.5.2: Work with local growers and distributors to identify barriers to the local food economy’s growth.

Strategy 3.5.3: Identify locations appropriate for food storage and medium-sized food processing facilities.

Strategy 3.5.4: Encourage collaboration with the U.P. Food Exchange and the Michigan State University Extension.

Objective 3.6: Facilitate the location of base (industries that draw money to the area).

Strategy 3.6.1: Assist with the redevelopment of buildings to house these companies.

Strategy 3.6.2: Identify the infrastructure needs of base industry companies and work to provide infrastructure to both attract and support the success of these companies.

Strategy 3.6.3: Develop suitable business park locations.



City of Hancock City Hall & Police Department

Goal Four:

Provide and maintain quality public services and infrastructure.

Objective 4.1: Plan for the long-term maintenance of all City-owned infrastructure.

Strategy 4.1.1: Develop and implement a capital improvements plan that addresses the initial and lifecycle costs associated with public infrastructure.

Strategy 4.1.2: Create a city-wide trail, parks and campground maintenance and management plan.

Objective 4.2: Provide a transportation system that is well-maintained & accessible to everyone.

Strategy 4.2.1: Follow Complete Streets Ordinance.

Strategy 4.2.2: Implement the Non-Motorized Network Plan.

Strategy 4.2.3: Explore opportunities for efficiencies between the Hancock and Houghton transit systems.

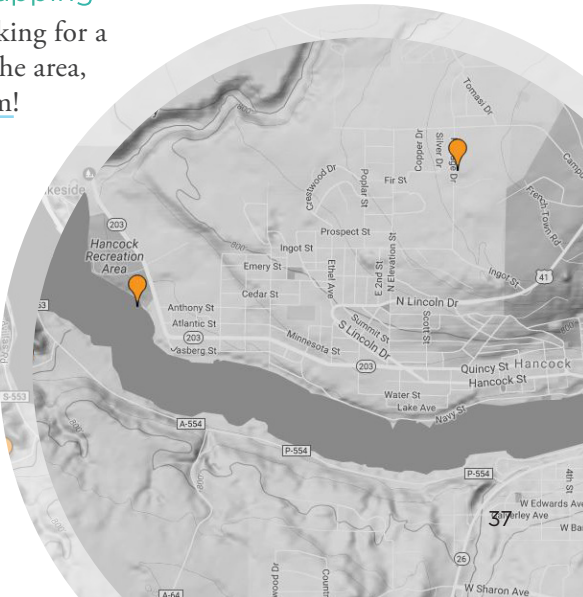
Trail Genius® Recreational Mapping



If you’re looking for a fun trail in the area,

look no further than [trailgenius.com!](https://www.trailgenius.com/)

Trail Genius is a service provided by two Michigan Technological University alumni who have made their mission to map the world, Trail Genius style. Their mapping system provides a completely interactive virtual experience for users. Many of their maps are located in the Hancock and Keweenaw area!





Prepare for hazards and adapt to changing environmental conditions.



Parking Lot Snowfall (Michigan Technological University)

Goal Five:
Prepare for hazards and adapt to changing environmental conditions.

Objective 5.1: Explore and encourage the use of renewable energy options.

Strategy 5.1.1: Develop ordinances and permitting processes that direct, support and streamline the ability to install renewable energy applications.

Strategy 5.1.2: Encourage the use of solar and wind energy alternatives.

Strategy 5.1.3: Explore opportunities for other renewable energy options, such as geo-thermal.

Objective 5.2: Provide resources for vulnerable populations during hazards.

Strategy 5.2.1: Establish and advertise warming and cooling stations during extreme temperature events.

Strategy 5.2.2: Identify public locations with back-up power supplies.

Strategy 5.2.3: Implement and test emergency communication systems.

Strategy 5.2.4: Convene collaborative discussions regarding emergency management planning and long-term adaptation strategies between the City of Hancock, Finlandia University, Michigan Technological University, and the City of Houghton.

Strategy 5.2.5: Ensure transportation services are available to vulnerable populations, especially low-income children, to have appropriate access to amenities, healthcare, and services.

Strategy 5.2.6: Ensure there is a plan in place to provide lake crossing in the event that the bridge is catastrophically damaged.

Objective 5.3: Protect properties from coastal erosion and flooding.

Strategy 5.3.1: Identify coastal areas at risk for flooding. Develop these areas as parks, trails, or other community amenities that can withstand temporary flooding.

Strategy 5.3.2: Acquire property or easements along the waterfront as they become available.





Chapter Five | Future Land Use


This chapter presents the Future Land Use Plan for the community. The Future Land Use is a reflection of the Plan's policies as they relate to land use.


Future Land Use Categories


The future land use definitions for this Plan were originally developed by compiling language from various planning documents, planning concepts related to the goals of this Plan, and the Zoning Ordinance. The Steering Committee then refined the language and this was further refined based on public feedback.


The future land use categories are as follows:

-  **Conservancy**
The Conservancy Districts are lands that help preserve necessary and valued natural features.
-  **Working Lands**
The Working Lands category includes land that is being used for resource-based industries, such as forestry. The purpose of this district is to preserve large, contiguous blocks of productive and potentially productive lands to support forestry and extraction farming industries.

-  **General Residential**
The General Residential category includes land that is used for single, two-family and multi-family dwellings. The desired character of this category is a traditional neighborhood design, such a grid street system, sidewalks, small lots, and shallow setbacks.


-  A subcategory of General Residential is **Historical Residential**, which are areas that have a concentration of historic homes.


-  **General Mixed Use**
The Mixed Use category provides for areas where combinations of employment, housing, shopping, services, and recreational amenities are integrated into a compact, pedestrian-oriented form.


-  **Shoreline Mixed Use**
The Shoreline Mixed Use category includes land that is used for all residential and commercial uses along the waterfront. The desire for these developments is to incorporate techniques which minimize the potential negative environmental and aesthetic impacts on the water resource.


For example, shoreline buffers that help prevent erosion and pervious pavement that allows for the filtration of stormwater runoff is an encouraged design feature of all new shoreline developments. In addition, developments that provide visual access to the water, pedestrian paths, public parks and open space are preferred over developments that “wall off” the community from water resources.

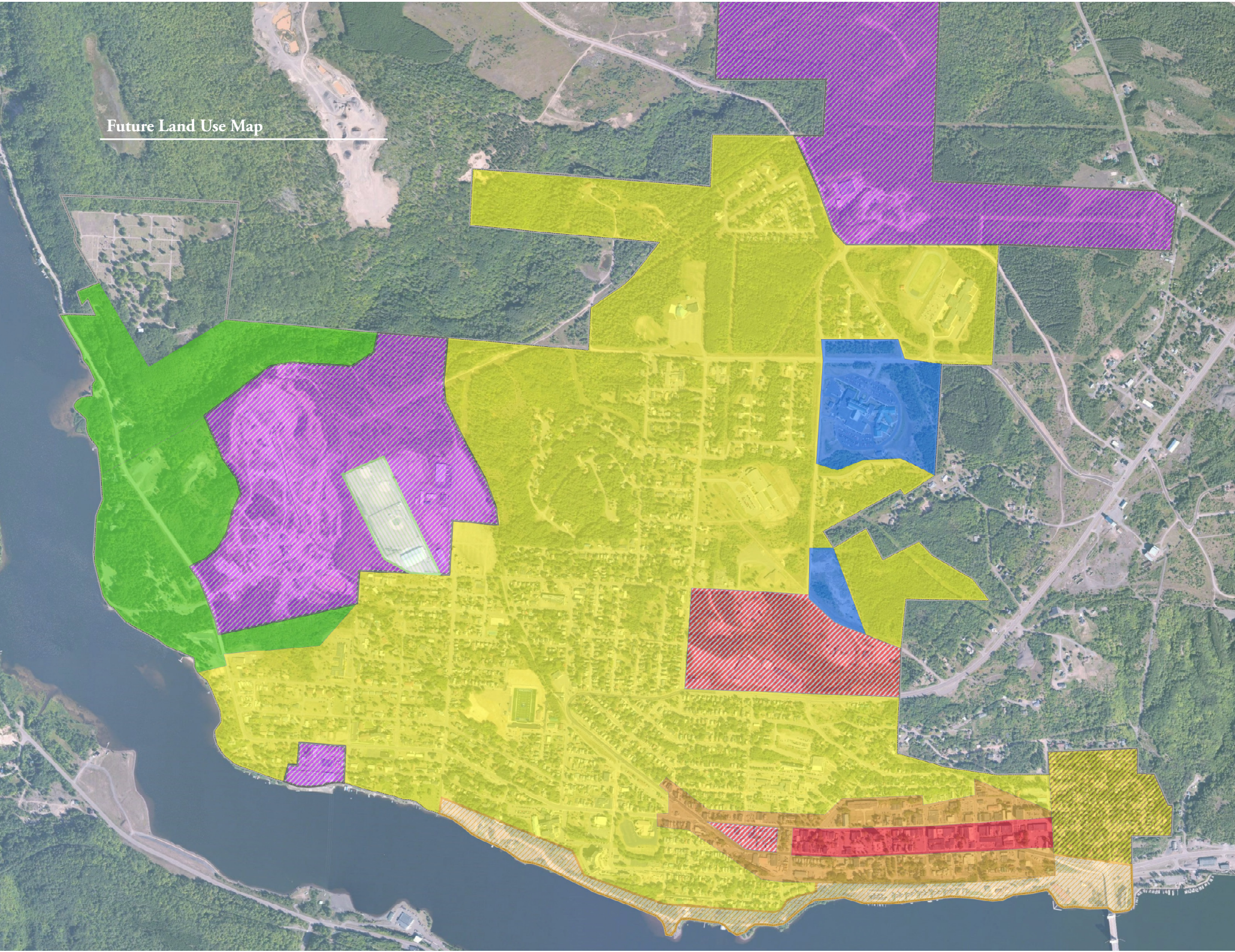
Refining the Plan based on public meetings and feedback.

-  **Downtown Mixed Use**
The Downtown Mixed Use category includes traditional downtown structures that provide a historic Hancock character, which typically include retail, dining, and entertainment on the lower levels and offices and residential on upper levels. Public uses and spaces, such as City Hall and small parks are also included in this category.

-  **General Commercial**
This category includes all commercial uses that serve both residents and the nearby surrounding communities.

-  **Business Campus**
The Business Campus category provides for high-tech, industrial, or medical uses. Ideally, these uses will have campus-style character with pedestrian amenities, attention to landscaping, and environmental protection techniques in place. In addition, unified signage, entrances and internal streetscaping are desired.

-  **Recreation**
The Recreation category includes existing and future recreational facilities identified in the Recreation Plan. In general, this includes active and passive parks in addition to specialty parks, regional facilities, water access, trails and other unique facilities based on physical features or community focus.



Waterfront

As a coastal community special emphasis was placed on the waterfront. The waterfront concept presented on the following pages (44-45), was developed to both protect and support a stronger connection between the community and this key asset.



Arts & Culture District

Vision: Make connections to Finlandia University, nearby churches, schools and cultural centers and other arts and cultural related elements within the City. Identify opportunities to create usable artistic and cultural spaces along the waterfront that pay homage to the history, people and culture of Hancock.

Natural District

Vision: Incorporate sustainable materials and design solutions to develop the waterfront and enhance the natural environment. Utilize existing natural areas to develop a “green corridor” along the waterfront, melding the urban landscape with the natural landscape. Emphasize the importance of native species within the design.

Active District

Vision: Utilize existing amenities and develop new concepts to create opportunities for enjoyment of the four seasons. Create connections and hubs to the numerous local trails offering biking, walking, snowshoeing, cross-country skiing and a variety of water related activities.



This Conceptual Waterfront Area Plan proposes an Arts & Culture, Natural, and Active District as described on page 44, to help link the community to the Waterfront.



Chapter Six | Putting the Plan Into Action

This final chapter of the Plan presents a strategy for implementing the Plan, including a guideline on planning for capital improvements, a matrix that gives direction on partners, resources, and timing for each strategy and any necessary zoning changes to ensure compatibility between this Plan and the Zoning Ordinance.



Ryan Street Community Garden (www.ryanstreetgarden.blogspot.com)

Plan & Zoning Relationship

The Zoning Ordinance is a regulatory tool to manage land use that is enabled by the Michigan Zoning Enabling Act (MZEa), PA 110 of 2006. Section 203 (1) of the act requires that zoning be based on a plan, given that a plan describes the vision and policies for the future and the Zoning Ordinance provides the regulatory tool to achieve these policies.

For instance, the Zoning Ordinance will help direct land uses to appropriate areas through zoning districts and promote community attractiveness through dimensional and other standards designated for each land use.

Proposed Changes to the Zoning Ordinance

Upon the adoption of this Plan, the City will review the Zoning Ordinance to consider the appropriate implementation of the goals, objectives, strategies, and future land use descriptions and map that are included in this Plan. To accomplish this, a revised Zoning Ordinance may be written to:

- Promote development that retains and complements the historic nature and general character of the City
- Ensure waterfront development works to strengthen the role of the water as a key community asset

- Promote outdoor recreation as a community attraction
- Direct commercial development to lands that have the capacity to support such development and are adequately served by existing public roads and utilities
- Direct development away from key natural features and establish environmental protection standards
- Allow for a range of housing options to provide “Missing Middle Housing” options

To link the Zoning Ordinance to the Plan, the zoning districts will need to connect to the future land use districts described in Chapter Five and displayed on the Future Land Use Map. The chart on the following pages (50-51) describes how the existing zoning districts roughly correspond with the proposed future land use districts and presents a set of suggested changes to the Zoning Ordinance to become compatible with this Plan.

Ryan Street Community Garden

The garden is located downtown and provides Hancock residents the opportunity to grow healthy, affordable, fresh food for their households. It also serves as a place for social interaction and creates an educational landmark in the community demonstrating ecologically-sound and climate practices.



Zoning Plan Matrix

Future Land Use Categories	Approximate Existing Zoning Districts	Proposed Changes to the Zoning Ordinance
Conservancy	Conservancy	<i>Limit the uses by right and apply natural feature protection ordinances to these areas:</i> The intention of the conservancy district is to preserve valued natural features. However, the Zoning Ordinance currently allows for a number of uses in these districts, including single-family residential, agricultural, golf courses, schools, and churches. To truly preserve the natural features in these areas, allowed uses should be limited and natural feature protection ordinances should be applied.
Working Lands	Industrial	<i>Change some areas from Industrial to Working Lands:</i> The working lands category is meant to allow for forestry, farming, and extraction industries while minimizing industrial activities in these areas. The purpose of this is to preserve the scenic character and the integrity of the natural features in Hancock. The currently allowed uses should be reviewed and certain uses, such as research and experimental laboratories, should be included in the Business Campus district instead.
General Residential Historic Residential	One-Family Residential	<i>Consider using a variety of zoning tools to protect, preserve and promote strong neighborhood character:</i> The residential districts will remain under density based (R-1, single family dwelling) zoning requirements. The City or a neighborhood may initiate a proposal for overlays or design guidelines to protect and preserve neighborhood character, which the City may adopt only adopt a thorough public review process.
	Two-Family Residential	
	Multi-Family Residential	
General Mixed-Use	Local Business	<i>Consider a form-based code approach and remove greenbelt requirements:</i> The goal of the mixed-use district is to create compact, walkable areas where employment, shopping, recreation, and other uses can be easily reached from someone’s residence. Currently the Local Business Zoning District allows for rooming houses and apartments, but proposes a greenbelt between business and residential districts. To reach the goals of a mixed-use district, new zoning tools should be considered to allow for a wider range of housing types and a greenbelt buffer separating the district from residential districts should not be a required condition.
Shoreline Mixed-Use	Waterfront Residential Districts	<i>Allow for a variety of uses:</i> A mixed-use district along with waterfront will allow businesses, such as restaurants and boutique shops, along with home and recreation uses along the waterfront. This will benefit both residents and visitors to Hancock by providing better access and ways to enjoy the waterfront. Specifically, this Plan proposes Culture, Natural, and Active sub-districts along a portion of the waterfront to help bolster the waterway as a key community asset.
	Local Business	



Future Land Use Categories	Approximate Existing Zoning Districts	Proposed Changes to the Zoning Ordinance
Downtown Mixed-Use	Local Business	<i>Consider the application of a downtown overlay:</i> The historic downtown is one of Hancock’s greatest assets but is also in need of more investment. Downtown overlays which unify the district and promote a mix of uses has proven to help many downtowns preserve their character while increasing private investment, leading to higher property values, promoting tourism, and supporting the development of a good business climate.
General Commercial	Local Business	<i>Review business zoning districts to ensure they meet community needs:</i> Complete a thorough assessment of the business districts to determine if there are any regulatory barriers to entrepreneurship in these areas. Determine what types of businesses are most desired by residents and orient the code to support the attraction and cultivation of these businesses.
	General Business	
	Community Business	
Business Campus	Industrial	<i>Change some areas from Industrial to Business Campus:</i> Business Campus district designations will help attract high-tech and healthcare industries to the community. With a zoning code that specifically addresses the needs of a high-tech and healthcare industries, the City of Hancock can send a message to investors and developers that these types of industries are desired and that the community is ready to host them.
Recreation	No Equivalent	<i>Designate recreation districts:</i> To promote outdoor recreation tourism investment and ensure that recreational amenities are provided to residents, recreational areas should be designated in the Zoning Ordinance.



Capital Improvement Plan (CIP) Overview

A CIP is a tool to identify and prioritize the long-term capital project requirements of a local unit of government. The CIP is a schedule of proposed improvements to a community’s public facilities that includes a prioritization of projects over a six (6) year period. The first year of the CIP is the capital budget and the CIP is updated annually. The CIP’s relationship to the Master Plan, as stated in the Michigan Planning Enabling Act (Act 33 of 2008), is “to further the desirable future development of the local unit of government under the Master Plan.”

To accomplish this, the planning commission, legislative body, or chief administrative official (depending on language in the charter), shall annually prepare the CIP to assist the planning commission and board or council in reviewing and approving public infrastructure projects, such as streets, parks, and utility infrastructure.

A Capital Improvement Plan (CIP) is a tool to identify and prioritize the long-term capital project requirements of a local unit of government. The Capital Improvement Plan is a schedule of proposed improvements to a community’s public facilities that includes a prioritization of projects over a six (6) year period. The first year of the Capital Improvement Plan is the capital budget and the Capital Improvement Plan is updated annually. The CIP’s relationship to the Master Plan is “to further the desirable future development of the local unit of government under the Master Plan.”

Capital Improvement Plan (CIP) Process

A process known to be successful in creating Capital Improvement Plans is as follows:

1. Define Capital Improvement Plan Process & Roles

- a. Appoint a CIP coordinator to lead the project
- b. Identify participants and roles for CIP preparation
- c. Establish a CIP Review Team
- d. Review, provide input and update capital improvement policies
- e. Collect data to assist with review, including budget projections, Master Plan amendments, policy changes and new regulations
- f. Define cost threshold, lifespan and types of projects to qualify for CIP
- g. Establish agreement on priority system to evaluate projects.

Key considerations should include:

- Is the project supported by the Master Plan or other plan?
- Is it legally required?
- Is it fiscally responsible?
- Is it a high priority for the community?
- Relationship to or coordination with other projects
- Estimate of annual income from projects
- Estimate of annual operating expenses
- Duration of project
- Sequencing
- Project mandated by the state and/or federal law
- Projects essential to public health or safety
- Projects that save in operating costs



2. Hold Launch Meeting

- a. The CIP Review Team hosts launch meeting to explain purpose of CIP and roles in the process
- b. Members of the public are encouraged to share information about infrastructure needs and priorities
- c. Project lead summarizes feedback from the public and provides to staff for consideration in identifying projects

3. Identify Projects

- a. Complete asset inventory of existing capital investments, which includes:
 - Age, condition and replacement dates
 - Status of projects currently underway
- b. Develop a schedule for replacement and improvement needs based on asset inventory
- c. Complete project application forms of projects to be considered for CIP

4. Evaluate & Score Projects

- a. The CIP Review Team uses criteria established in Step 1 to evaluate and score project requests (scoring can be done individually or as a team).

5. Rank Projects & Draft the CIP

- a. The CIP Review Team ranks projects based on:
 - Criteria established in Step 1
 - Available funding
 - Capacity to complete projects
- b. The project lead organizes the projects into a table, with funding shown over six years (unfunded projects should also be included and scheduled for later years or compiled in a separate section)

6. Review & Approve the CIP

- a. The CIP Review Team provides draft to the Planning Commission
- b. Planning Commission reviews and conducts public hearing
- c. Planning Commission adopts the CIP and forwards to Council or Board
- d. Council or Board adopts CIP and uses for annual budget

7. Annually Review CIP

- a. For communities with two year budgets, the second year is a simple update
- b. Update costs, funding sources, and timing for a six-year system



Implementation Matrix

Goal One:
Establish Downtown Hancock as a thriving, attractive community center.

Goals, Objectives & Strategies	Potential Funding / Resources	Timeline
Objective 1.1: Improve walkability & navigation.		
Strategy 1.1.1: Install wayfinding signage.	MI Place (www.miplace.org/placemaking)	Short (0-3 years)
Strategy 1.1.2: Address areas with high slipping potential and other pedestrian safety hazards.		Medium (4-6 years)
Objective 1.2: Develop signature events & attractions.		
Strategy 1.2.1: Increase local partnerships to improve existing and/or program more festivals and activities in the downtown.	Michigan Downtown Association (www.michigandowntowns.com)	Short (0-3 years)
Strategy 1.2.2: Install and develop a maintenance plan for local art throughout the downtown and parks.	Michigan Council for Arts & Cultural Affairs (www.michiganbusiness.org/community/council-arts-cultural-affairs/#mcaca-mission)	Long (7+ years)
Strategy 1.2.3: Form a creative district to attract artists and visitors and spur economic activity.	Michigan Council for Arts & Cultural Affairs (www.michiganbusiness.org/community/council-arts-cultural-affairs/#mcaca-mission)	Long (7+ years)
Strategy 1.2.4: Improve downtown landscaping and develop a maintenance plan for shrubs, flowers, and other downtown plantings.	Michigan State University (MSU) Extension Master Gardner Volunteers	Short (0-3 years)
Objective 1.3: Honor the City’s historic character.		
Strategy 1.3.1: Follow and encourage established design guidelines.		Long (7+ years)
Strategy 1.3.2: Install an appropriate amount of interpretative signage that tells the history of the downtown.		Short (0-3 years)
Strategy 1.3.3: Re-engage in the Main Street Program.	Main Street America (preservationnation.org/main-street/) Michigan Main Street Center (www.michiganmainstreetcenter.com)	Medium (4-6 years)

Today, a diverse economy and employment is supported by two Universities (Finlandia University & Michigan Technological University), along with the MTEC SmartZone, and UP Health System – Portage. Both summer and winter tourism opportunities abound and the Portage Lake Lift Bridge funnels most area tourists into the main stream of the City. Combining the traditional economy with the emerging high technology economy broadens our appreciation for the unique area that we are in. With an authentic downtown and active business recruitment, the City is poised for growth while preserving our quality of life for future generations.

Goals, Objectives & Strategies	Potential Funding / Resources	Timeline
Objective 1.4: Create more public gathering spaces.		
Strategy 1.4.1: Develop pocket parks and programs with moveable chairs, outdoor games, or other items that encourage social connections and activity and establish a long-term maintenance plan for these parks.		Short (0-3 years)
Strategy 1.4.2: Create a town square that potentially includes a splash pad/fountain/ice rink.	Crowdfunding (www.crowdfundingmi.com)	Short (0-3 years)
Objective 1.5: Attract a variety of sustainable businesses to the downtown.		
Strategy 1.5.1: Work to attract a grocery store, such as the Keweenaw Co-op, or a similar store to the downtown.	Michigan Downtown Association (www.michigandowntowns.com)	Medium (4-6 years)
Strategy 1.5.2: Complete a parking needs study to address existing and future parking demands.	Michigan Council for Arts & Cultural Affairs (www.michiganbusiness.org/community/council-arts-cultural-affairs/#mcaca-mission)	Medium (4-6 years)
Strategy 1.5.3: Install electric vehicle parking stations in the downtown.	Michigan Council for Arts & Cultural Affairs (www.michiganbusiness.org/community/council-arts-cultural-affairs/#mcaca-mission)	Short (0-3 years)
Strategy 1.5.4: Become Redevelopment Ready Community certified.	https://www.miplace.org/communities/rrc/	Short (0-3 years)
Objective 1.6: Improve the downtown’s appearance.		
Strategy 1.6.1: Fill empty storefront windows with art exhibits from local artists.		Short (0-3 years)
Strategy 1.6.2: Develop a façade improvement program.		Short (0-3 years)



Goal Two:
Protect and celebrate the area’s natural resources.

Goals, Objectives & Strategies	Potential Funding / Resources	Timeline
Objective 2.1: Increase community connection to the waterfront.		
Strategy 2.1.1: Develop and implement a waterfront area plan that includes signage, wayfinding, and other placemaking strategies to better connect City to the waterfront.		Medium (4-6 years)
Objective 2.2: Direct development away from sensitive & significant natural areas.		
Strategy 2.2.1: Utilize zoning to encourage the majority of business development to occur in and adjacent the downtown.	EPA Smart Growth Principles (www.epa.gov/smartgrowth)	Medium (4-6 years)
Strategy 2.2.2: Use downward lighting fixtures in specific areas to allow for dark sky preservation.	International Dark-Sky Association (www.darksky.org/lighting/lighting-ordinances/)	Long (7+ years)
Objective 2.3: Invest in outdoor recreation facilities.		
Strategy 2.3.1: Further develop the area’s trail system.	Michigan Department of Natural Resources (michigan.gov/dnr)	Medium (4-6 years)
Strategy 2.3.2: Maintain stairways to trail and waterfront.		Short (0-3 years)
Strategy 2.3.3: Increase safe bicycle routes for both paved roads and trails.	MDOT Transportation Alternatives Program (TAP) (www.michigan.gov/mdot/0,1607,7-151-9621_17216_18231---,00.html)	Short (0-3 years)
Strategy 2.3.4: Explore creative ways to use the City’s alleys for recreation and access, such as an ice skating path, snowshoeing, cross country skiing, biking and walking.	Crowdfunding (www.crowdfundingmi.com/)	Long (7+ years)
Strategy 2.3.5: Explore the possibility of programming and developing summer activity opportunities at winter recreation areas.		Long (7+ years)
Strategy 2.3.6: Strengthen accessibility to the waterfront to meet or exceed ADA standards.		Long (7+ years)
Strategy 2.3.7: Develop a dog park.		Long (7+ years)
Strategy 2.3.8: Create more family and youth recreational opportunities, such as a sledding hill and ski loop.		Medium (4-6 years)



Goals, Objectives & Strategies	Potential Funding / Resources	Timeline
Objective 2.4: Maintain healthy forested areas & street trees.		
Strategy 2.4.1: Partner with the MDNR to monitor threats to trees including invasive species, pests, and storm damage.	Michigan Department of Natural Resources Michigan Invasive Species Grants Program (www.michigan.gov/dnr/0,4570,7-153-58225_69835---,00.html)	Long (7+ years)
Strategy 2.4.2: Create a landscape plan to include the control of trees and shrubs on the slope between Water Street and the waterfront at the US-41 scenic lookout.	Crowdfunding (www.crowdfundingmi.com) Michigan Technological University (MTU) – Forestry Department	Medium (4-6 years)
Objective 2.5: Protect the water quality of inland lakes, streams, rivers & Lake Superior.		
Strategy 2.5.1: Pilot the construction of pedestrian and biking trails with pervious pavement, especially near the shoreline and open drains.	Michigan Downtown Association (www.michigandowntowns.com)	Long (7+ years)
Strategy 2.5.2: Create deterrents to reduce goose and other animal waste at the waterfront.		Medium (4-6 years)
Strategy 2.5.3: Protect water corridors and other key natural features through protective ordinances.	Michigan Department of Environmental Quality (www.michigan.gov/deq/)	Medium (4-6 years)



Goal Three:

Grow the area’s economic opportunities.

Goals, Objectives & Strategies	Potential Funding / Resources	Timeline
Objective 3.1: Attract high-tech industries.		
Strategy 3.1.1: Develop an action plan that addresses the infrastructure necessary, such as energy sources, housing, workforce development opportunities and communications to attract these businesses.	MEDC Business Development Initiatives (www.michiganbusiness.org/community/development-assistance/#section1)	Short (0-3 years)
Strategy 3.1.2: Orient placemaking activities to attract high-tech companies.		Short (0-3 years)
Objective 3.2: Cultivate healthcare industry.		
Strategy 3.2.1: Work with Finlandia University, Michigan Technological University and local hospitals to determine growth opportunities and needs and how to fulfill these needs.		Short (0-3 years)
Strategy 3.2.2: Create initiatives that promote healthy lifestyles.	Michigan Fitness Foundation, <i>Building Healthy Communities</i> (www.michigan.gov/deq/)	Medium (4-6 years)
Objective 3.3: Increase awareness of & continue to grow Hancock’s high quality of life.		
Strategy 3.3.1: Brand Hancock as a premier destination with adventure recreational opportunities, a growing arts movement, a unique and interesting history, abundant natural beauty, and many other assets; engage in a comprehensive marketing campaign to share this image.		Short (0-3 years)
Strategy 3.3.2: Promote waterfront activities through recreation planning and partnerships with organizations such as visitors bureaus, Keweenaw Chamber of Commerce, and other nonprofits.		Medium (4-6 years)
Strategy 3.3.3: Increase the variety of events and festivals during all seasons.		Medium (4-6 years)

Goals, Objectives & Strategies	Potential Funding / Resources	Timeline
Strategy 3.3.4: Package regional tourism planning strategies with neighboring jurisdictions, the MDNR, WUPPDR, and other regional partners.	Pure Michigan Tourism Strategic Plan – Pure Michigan Travel (www.michigan.org/industry/michigan-tourism-strategic-plan/)	Medium (4-6 years)
Strategy 3.3.5: Become a Michigan Trail Town and develop a plan to keep trails well maintained.	Michigan Trails & Greenways Alliance (www.michigantrails.org/) for toolkits & funding information	Medium (4-6 years)
Strategy 3.3.6: Encourage historic character preservation to maintain authenticity and become better known as a historic area.		Long (7+ years)
Strategy 3.3.7: Continue to cultivate the growing arts movement and integrate art and artistic opportunities throughout the City.		Long (7+ years)
Objective 3.4: Provide a variety of quality housing options to meet the needs of existing residents & attract new employers/workers.		
Strategy 3.4.1: Follow the recommendations of the Target Market Analysis.	Target Market Analysis (www.wuppdr.org/wp-content/uploads/2016/06/1a-UP-TMA-HOUGHTON-06-06-16.pdf)	Short (0-3 years)
Strategy 3.4.2: Work with local officials to improve blight reduction enforcement.		Short (0-3 years)
Strategy 3.4.3: Explore sample blight reduction ordinance language and adopt stronger blight reduction ordinances.	Michigan Municipal League sample blight ordinances & resources (www.mml.org/resources/information/blight_sample_ordinances.htm)	Medium (4-6 years)
Strategy 3.4.4: Develop partnerships between housing agencies, service organizations, and realtors to help people find quality housing options and resources for property maintenance.		Medium (4-6 years)



Goals, Objectives & Strategies	Potential Funding / Resources	Timeline
Objective 3.5: Support the local food economy.		
Strategy 3.5.1: Support and promote convenient access to local food sources such as the Tori Market and Ryan Street Community Garden.		Medium (4-6 years)
Strategy 3.5.2: Work with local growers and distributors to identify barriers to the local food economy's growth.		Medium (4-6 years)
Strategy 3.5.3: Identify locations appropriate for food storage and medium-sized food processing facilities.		Long (7+ years)
Strategy 3.5.4: Encourage collaboration with the U.P. Food Exchange and the Michigan State University Extension.		Long (7+ years)
Objective 3.6: Facilitate the location of base industry companies (industries that draw money to the area).		
Strategy 3.6.1: Assist with the redevelopment of buildings to house these companies.		Medium (4-6 years)
Strategy 3.6.2: Identify the infrastructure needs of base industry companies and work to provide infrastructure to both attract and support the success of these companies.		Medium (4-6 years)
Strategy 3.6.3: Develop suitable business park locations.		Short (0-3 years)

Goal Four:

Provide and maintain quality public services and infrastructure.

Goals, Objectives & Strategies	Potential Funding / Resources	Timeline
Objective 4.1: Plan for the long-term maintenance of all city-owned infrastructure.		
Strategy 4.1.1: Develop and implement a capital improvements plan that addresses the initial and lifecycle costs associated with public infrastructure.	Redevelopment Ready Communities (RRC) Capital Improvement Plan Guide (www.michiganbusiness.org/cm/Files/Redevelopment_Ready_Communities/CIP-guide.pdf)	Short (0-3 years)
Strategy 4.1.2: Create a city-wide trail, parks and campground maintenance and management plan.		Short (0-3 years)
Objective 4.2: Provide a transportation system that is well-maintained & accessible to everyone.		
Strategy 4.2.1: Follow Complete Streets Ordinance.	Michigan Municipal League Complete Streets Resources (www.mml.org/resources/information/complete_streets.html)	Medium (4-6 years)
Strategy 4.2.2: Implement the Non-Motorized Network Plan.		Medium (4-6 years)
Strategy 4.2.3: Explore opportunities for efficiencies between the Hancock and Houghton transit systems.		Medium (4-6 years)

Goal Five:

Prepare for hazards and adapt to changing environmental conditions.

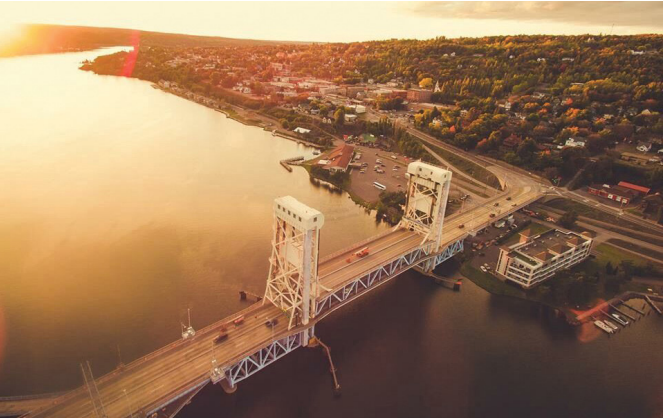
Goals, Objectives & Strategies	Potential Funding / Resources	Timeline
Objective 5.1: Explore & encourage the use of renewable energy options.		
Strategy 5.1.1: Develop ordinances, permitting processes and programs that direct, support and streamline the ability to install renewable energy applications.	Property Assessed Clean Energy (PACE) Program Michigan Saves - Home Energy Loan Program	Long (7+ years)



Goals, Objectives & Strategies	Potential Funding / Resources	Timeline
Strategy 5.1.2: Encourage the use of solar and wind energy alternatives.	Solar Ready Michigan Manual (www.ccc-mi.org/communities/programs/michigan-renewable-energy-tools/solar-ready-community/) Gratiot County Wind Ordinance (www.gratiotmi.com/LinkClick)	Long (7+ years)
Strategy 5.1.3: Explore opportunities for other renewable energy options, such as geo-thermal.		Long (7+ years)
Objective 5.2: Provide resources for vulnerable populations during hazards.		
Strategy 5.2.1: Establish and advertise warming and cooling stations during extreme temperature events.		Short (0-3 years)
Strategy 5.2.2: Identify public locations with back-up power supplies.		Short (0-3 years)
Strategy 5.2.3: Implement and test emergency communication systems.		Short (0-3 years)
Strategy 5.2.4: Convene collaborative discussions regarding emergency management planning and long-term adaptation strategies between the City of Hancock, Finlandia University, Michigan Technological University, and the City of Houghton.		Short (0-3 years)
Strategy 5.2.5: Ensure transportation services are available to vulnerable populations, especially low-income children, to have appropriate access to amenities, healthcare, and services.		Short (0-3 years)
Strategy 5.2.6: Ensure there is a plan in place to provide lake crossing in the event that the bridge is catastrophically damaged.		Short (0-3 years)

Goals, Objectives, & Strategies	Potential Funding / Resources	Timeline
Objective 5.3: Protect properties from coastal erosion & flooding.		
Strategy 5.3.1: Identify coastal areas at risk for flooding. Develop these areas as parks, trails, or other community amenities that can withstand temporary flooding.		Long (7+ years)
Strategy 5.3.2: Acquire property or easements along the waterfront as they become available.		Medium (4-6 years)

Implementation Matrix Re-Cap



The City of Hancock provides a superior location to live, work and play. The City’s proximity to majestic Lake Superior gives it beautiful, mild summers and wonderful, snowy winters.

- Goal One:** Establish Downtown Hancock as a thriving, attractive community center.
- Goal Two:** Protect and celebrate the area’s natural resources.
- Goal Three:** Grow the area’s economic opportunities.
- Goal Four:** Provide and maintain quality public services and infrastructure.
- Goal Five:** Prepare for hazards and adapt to changing environmental conditions.







Resiliency Report

Acknowledgments
This report was prepared by the Land Information Access Association (LIAA) as part of the City of Hancock 2016 Master Plan Project. OHM Advisors facilitated the planning process and partnered with LIAA for the creation of this report. This project was funded by the Michigan Coastal Zone Management Program, Department of Environmental Quality, Office of the Great Lakes; and the National Oceanic and Atmospheric Administration, U.S. Department of Commerce through the Michigan Association of Planning.

A Huge Thank You!
A special thank you is owed to the organizations and individuals that contributed to the planning process.

Building Resiliency in the City of Hancock



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Chapter One

Why Plan for Greater Resiliency?

It is no secret the Great Lakes are one of the most unique and precious environmental features in the world. The Great Lakes contain more than 20% of the world’s surface freshwater and support a population of more than 30 million people. Michigan is home to nearly 3,300 miles of Great Lakes shoreline, with 36,000 miles of rivers and streams, and 11,000 inland lakes.

Coastal communities have an especially important role to play in protecting the Great Lakes. Despite the great value of Michigan’s coastal resources, coastal areas throughout Michigan are often not adequately protected from development pressures or environmental processes such as natural fluctuations in water levels. The Michigan Department of Environmental Quality has acknowledged the strong role local planning plays in protecting coastal areas from habitat fragmentation, loss of agricultural and forest lands, and increased impervious surfaces. Planning for coastal areas at the local level requires knowledge of the dynamic coastal systems of Lake Superior and increasingly, an understanding of how global climate change is altering this system. This report aims to address these challenges for the City of Hancock and provide clear, well-founded recommendations for the future.

About this Report

Building Resiliency in the City of Hancock summarizes a Resiliency Workshop and Vulnerability Assessment conducted for the City of Hancock during the summer of 2016. This report was developed as part of the City of Hancock Master Planning process facilitated by OHM Advisors and was funded by Michigan’s Coastal Zone Management Program through the Michigan Association of Planning.

The process to create this report included a Resiliency Workshop and a Vulnerability Assessment, each conducted with the goal of increasing the community’s knowledge of coastal resources and strengthening the City of Hancock’s commitment to protecting valuable coastal areas. The Land Information Access Association (LIAA) developed this report and OHM Advisors worked collaboratively with LIAA throughout the process.

The key findings in this report, including the goals and objectives, were presented to the City of Hancock Master Plan Steering Committee and Planning Commission and were used to inform the City of Hancock 2016 Master Plan. A similar planning process was conducted simultaneously in nearby Baraga Township, and many stakeholder meeting interviews, public meetings, and presentations were conducted jointly.



Coastal Michigan

The City of Hancock sits on the Keweenaw Waterway, which connects at both ends to Lake Superior. Coastal assets are part of what makes Hancock unique, and it is important to understand how to best plan for and manage dynamic coastal areas.

Coastal processes are influenced by natural systems such as wind, waves, lake levels, sediment and weather. Understanding coastal processes can help plan for naturally-occurring changes and activities along the shoreline.

This report looks at the impacts of a changing climate on the entire community, with an emphasis on coastal resources. Sectors including public health, water management, infrastructure, and public services are discussed in detail in Chapter Three.

Public Process

This report was completed as a result of a public process that involved local officials, regional stakeholders, and community leaders.

Resiliency Workshop

LIAA and OHM Advisors hosted a Resiliency Workshop on June 13, 2016, at the First United Methodist Church in Hancock. The purpose of the meeting was to introduce information on changing climate trends and coastal dynamics to the City of Hancock Master Plan Steering Committee. During the workshop, attendees participated in an exercise to discuss how climate changes may be impacting the City as well as Baraga Township. Chapter Two in this report summarizes the significant climate and coastal trends identified at the meeting by the Master Plan Steering Committee.

The agenda for the Monday, June 13th, 2016 meeting was as follows:

- Overview of Project & Welcome – Heather Seyfarth, OHM Advisors
- What Is Resilience? – Harry Burkholder, LIAA
- Climate Change Impacts in the U.P. & Lake Superior – Dr. David Watkins & Dr. Sarah Green, Michigan Tech
- Vulnerability Assessment Overview – Katie Moss Sieb, LIAA
- Scenario Activity



Resiliency Workshop attendees worked as a team to brainstorm possible responses to the region’s climate vulnerabilities.

Stakeholder Meetings

On June 14, 2016, the project team met with representatives from a number of local, regional, and state agencies to learn about the community from a variety of perspectives.

This information helped inform the action plan found in Chapter Four. In addition to conversations with the Master Plan Steering Committee, meetings were held with the following groups and agencies:

- Houghton County Emergency Manager
- Michigan Department of Natural Resources (MDNR)
- Keweenaw Economic Development Alliance (KEDA)
- Western Upper Peninsula Planning and Development Region (WUPPDR)

What is a Vulnerability Assessment?

This report includes the results of a qualitative vulnerability assessment conducted for the City of Hancock. This vulnerability assessment process included analysis of social, environmental, and economic data and maps as well as interviews with local stakeholders, with the goal of identifying ways in which the City of Hancock is especially vulnerable to a changing climate.

The assessment results can help local officials and planning commissioners understand where the most vulnerable populations in the community live and prioritize adaptation strategies. The assessment’s findings and subsequent adaptation strategies can increase the community’s resilience to extreme weather events and long-term projected changes to the climate in the future.

Summary of Main Findings

In general, the main findings from the vulnerability assessment process for the City of Hancock include:

- The quality of road infrastructure may be increasingly threatened by more intense rain and snow events, greater erosion along the shoreline, and increasing “rain on snow” events in the spring and fall.

- The City can take advantage of an extended summer tourism season by embracing its waterfront through placemaking, signage, and creative recreational opportunities.
- Due to the likelihood of more mild winters in the future, the City should work to adapt winter-based tourism to year-round tourism as much as possible.
- Hancock is home to significant critical infrastructure including major transportation routes, hospitals, and shelters. Collaborative emergency planning will become even more necessary as more severe storms and extreme weather are expected in the region.
- Wildlife changes should be expected as tree species, plant communities, and habitat shift due to increasing temperatures. This is likely to impact the diversity and health of wildlife in the area.
- Wildfire risk is very high and likely to increase in surrounding communities. The City of Hancock should participate in regional emergency response planning and work to understand where areas within the City may be at risk.
- A number of areas in the City of Hancock have relatively high populations that may be more sensitive to extreme weather events.

The City of Hancock can take a number of steps toward increasing its resiliency to climate and coastal threats as discussed in Chapter Four.

The climate in the Western Upper Peninsula is changing, and is expected to change even more. The impacts of climate variability are far-reaching, impacting economic, transportation, and natural systems. For coastal communities in the Upper Peninsula like the City of Hancock, it is especially important to understand what a changing climate may mean for Lake Superior.

Chapter Two

What is Changing in the Western Upper Peninsula?

Scientists from many fields have observed and documented significant changes in the Earth's climate. Many of the changes observed in the Western U.P. can be summarized into two trends: warmer temperatures and increased precipitation.

Warmer Temperatures

According to the Great Lakes Integrated Sciences + Assessments Center (GLISA), the average air temperature in the Great Lakes region increased by 2.3 degrees Fahrenheit from 1900 to 2012.¹

This regional trend holds true in the Western Upper Peninsula, where the decadal average annual temperature has risen by about 2.5 degrees as shown in Figure 2.1.

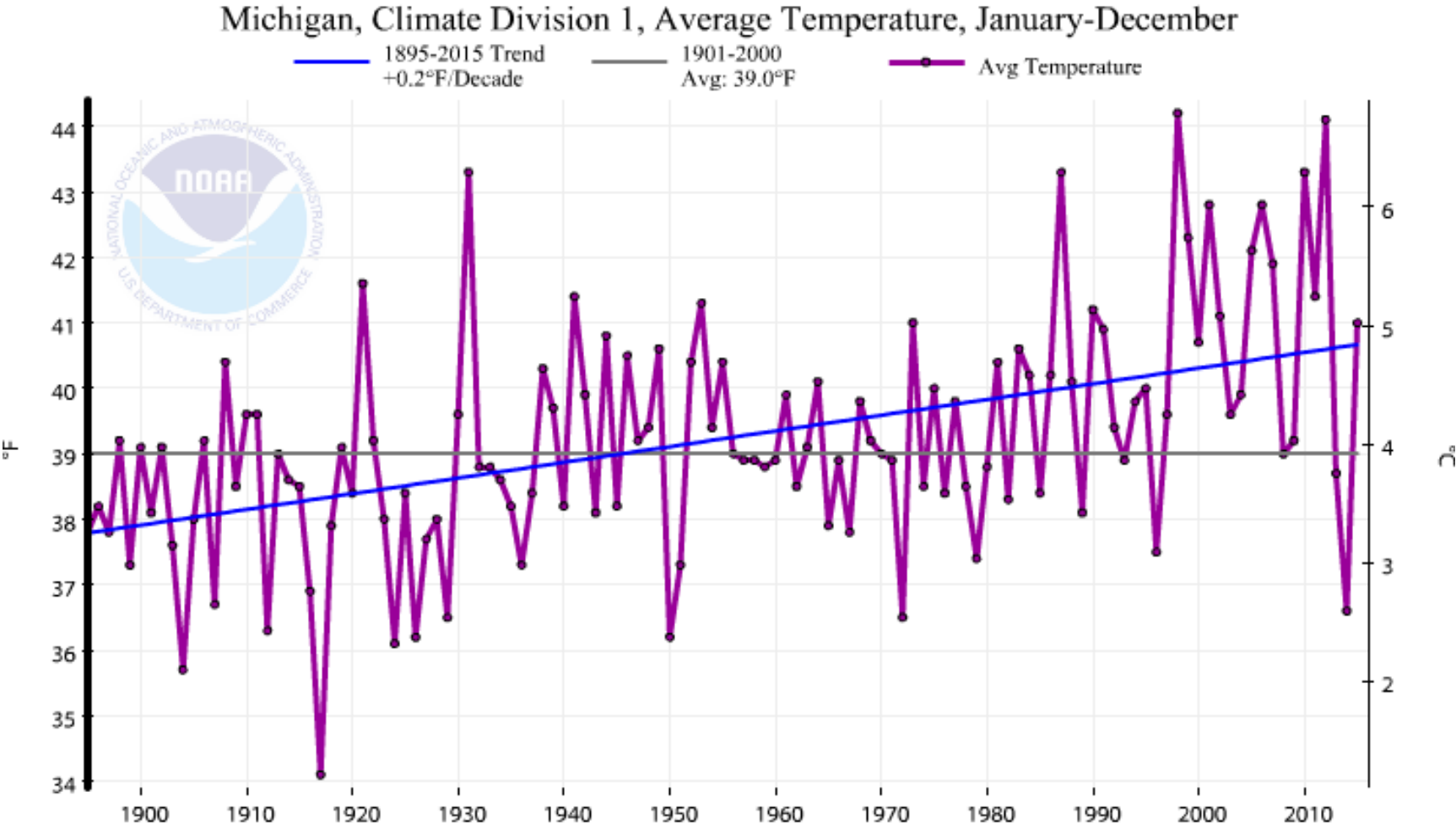
GLISA has predicted an additional increase of 1.8 to 5.4° F in average air temperatures by 2050. Even a small increase in average temperature can drive dramatic changes in Michigan's climate and greatly impact the Great Lakes.

Figure 2.2 (following page) shows how temperatures in Michigan might feel by the end of the century under three different emissions scenarios. In the lower emissions scenario, Michigan's Upper Peninsula may feel more like Northwest Illinois, and if emissions continue to rise it may feel more like Kansas by 2099. Either way, air temperature increases will create a host of changes for communities in the Western Upper Peninsula.

Climate & Weather

Climate and weather are directly related, but not the same thing. Weather refers to the day-to-day conditions in a particular place, like sunny or rainy, hot or cold. Climate refers to the long-term patterns of weather over large areas. When scientists speak of global climate change or climate variability, they are referring to changes in the generalized, regional patterns of weather over years and decades.

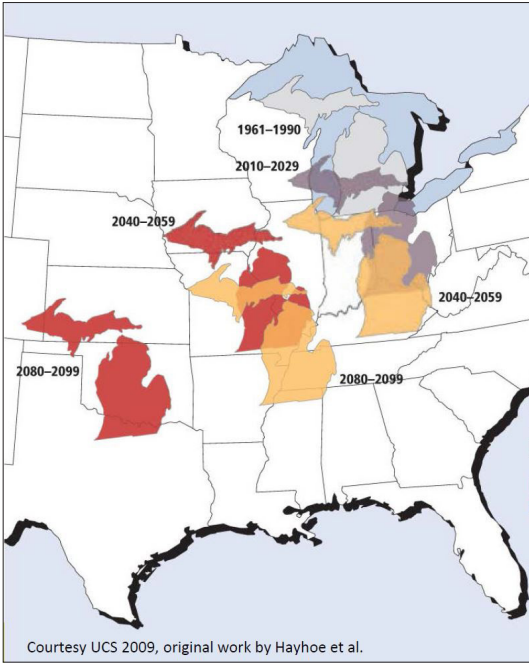
Figure 2.1 Average Annual Temperature in the Western U.P., 1895-2015



The average annual temperature in the Western Upper Peninsula has risen over time. Figure 2.1 shows the average annual temperature from 1895 to 2015 in the Western U.P. The blue line represents the trend per each decade and shows that the average temperature has increased locally, similar to regional trends.

Source: NOAA National Center for Environmental Information Climate at a Glance: Global Time Series, published July 2016, retrieved on August 9, 2016 from <http://www.ncdc.noaa.gov/cag/>

Figure 2.2 Temperatures in Michigan by 2099

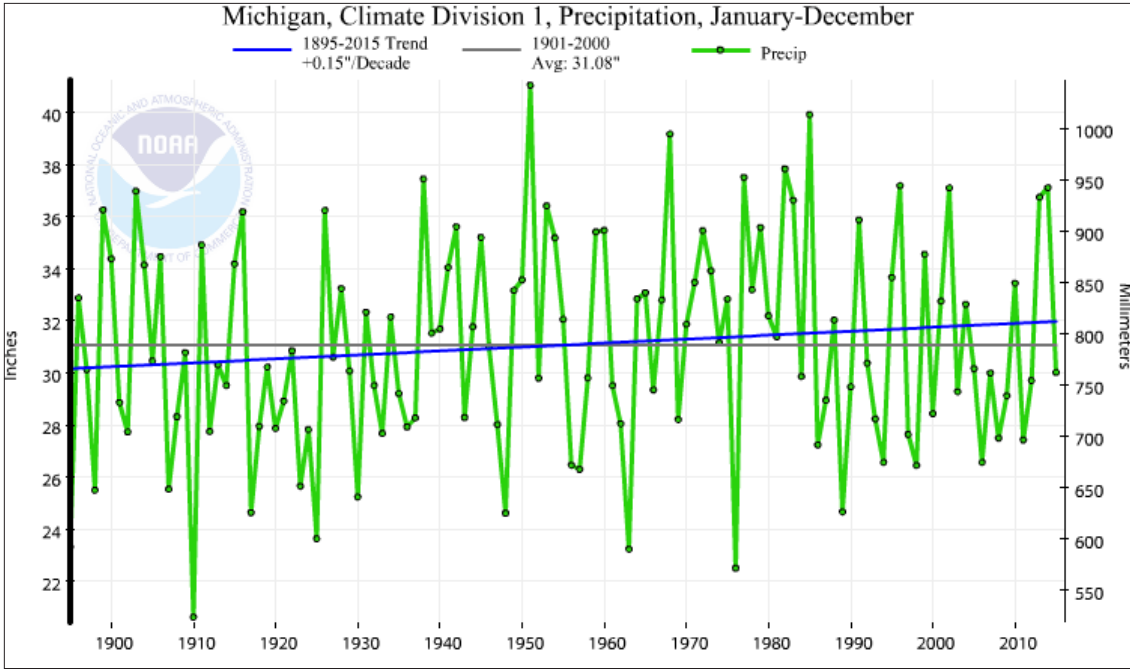


Source: U.S. Global Change Research Program. *Global Climate Change in the United States*, 2009. Cambridge University Press, Cambridge, MA.

Increasing Precipitation

Increasing precipitation, primarily falling as rain, is a second major climate trend in the Western U.P. Both the number and severity of precipitation events has increased since as recently as the 1950s. In fact, GLISA reports that the amount of precipitation in the heaviest 1% of storms increased by 37% from 1958 to 2012 in the Midwest. In other words, heavy storms are becoming not only more frequent, but more severe.

Figure 2.3 Annual Precipitation in Inches in the Western U.P., 1895-2015



The amount of precipitation in the Western U.P. has increased over time. Figure 2.3 shows the total inches in precipitation falling each year from 1895 to 2015 in the Western U.P. The blue line represents the trend per each decade and shows that precipitation has increased locally, similar to regional trends.

Source: NOAA National Center for Environmental Information Climate at a Glance: Global Time Series, published July 2016, retrieved on August 9, 2016 from <http://www.ncdc.noaa.gov/cag/>

The number of inches of precipitation has also increased in the Western U.P., as shown in Figure 2.3. More precipitation may sound like good news to snow lovers in the U.P., and in fact, additional snowfall may be a reality in the years to come. However, additional precipitation is likely to occur as rain, and predominantly in the shoulder seasons of

spring and fall. Warmer air temperature combined with increasing precipitation means that communities in the Western U.P. may see snow melting earlier in the year, and more precipitation, triggering greater amounts of runoff as winter transitions to spring. Snow is likely to become less reliable, with more snow resulting from sporadic lake-effect events.

Coastal Trends

Coastal communities in the Upper Peninsula are accustomed to Lake Superior’s powerful waves, erosion, and quickly changing shorelines. Each of these natural process require thorough planning for development and infrastructure along the coast. Warmer temperatures and increasing precipitation, however, are augmenting these natural processes, and requiring preemptive planning in coastal communities. Researchers have found that the Lake Superior shoreline may be subject to more erosion and flooding risk as a result of climate variability.

Erosion

Increasing precipitation in the Western U.P. has caused an increase in the number and severity of severe storms. Storms create wind and rain patterns that result in powerful and tall waves along the coastline. Powerful and tall waves are natural conditions, but increases in the number and severity of severe storms is likely to increase the pace of erosion on and near the shoreline.

The Federal Emergency Management Agency (FEMA) projects approximately 28% of structures within 500 feet of a Great Lakes shoreline will be susceptible to erosion by 2060. Hancock, situated along the Keweenaw Waterway, is less likely to experience erosion directly, although changes in the Lake Superior shoreline may have economic impacts on the City of Hancock (e.g., disruptions to tourism, transportation, etc.).

Riverine & Localized Flooding

An increase in severe storms throughout the Western U.P. is also likely to increase the risk of riverine flooding in coastal communities like the City of Hancock. Floods can happen when intense rainfall, ice jams, melting snow, or the failure of natural or manmade dams cause rivers and stormwater infrastructure to exceed carrying capacities and overflow.

While riverine flooding is natural and occurs regularly in many places, future flooding may extend over several days, damage homes and roads, and have lasting impacts on water quality and public health. Increasing precipitation in the Western U.P. is likely to increase the risk of riverine flooding, especially in spring when the ground is still frozen or saturated with melting snow, and temperatures are likely to fluctuate quickly and unpredictably.

Shoreline flooding is caused by powerful and tall waves that overwhelm natural or manmade shoreline protective structures. Strong storms can cause storm surges that temporarily tilt the water surface up by as much as 8 feet on Lake Superior. According to the Houghton County Hazard Mitigation Plan, this has happened a number of times along the Lake Superior shoreline in Houghton County. Severe storms are capable of pushing water inland from the shoreline, especially during periods of high water levels on Lake Superior.

Due to its location along the Keweenaw Waterway, the City of Hancock is not likely to experience shoreline flooding. Heavy rains in the City of Hancock, however, can cause severe localized flooding due to the City’s steep slopes. The risk of localized flooding is explored in more detail in the next chapter.

Powerful Waves

High energy waves are high in speed and strong in intensity and are primarily created as fast winds move across the surface of the water for extended distances. Wave setup is the height of the water as waves reach the shore.



Erosion along the Great Lakes endangers infrastructure built too close to the shoreline. This photo is of the Lake Superior shoreline near F.J. McLain State Park, where thirty-two (32) campsites were closed due to coastal erosion in 2015.

Summary of Climate Trends

The following table summarizes the climate trends expected in coastal communities in the Western U.P. The information in this table comes from a variety of data sources, including the | Great Lakes Integrated Sciences + Assessments Center and the Lake Superior Climate Adaptation and Implementation Plan.

Observed Climate & Coastal Changes in the Western U.P.

Warmer temperatures overall with periods of drought in the summer
Warmer temperatures in Lake Superior, inland lakes, and rivers
Spring arriving earlier and generally shorter winter
Increased number and severity of rain events, even in winter
Less ice cover on Lake Superior causing stronger and taller waves
Less predictable snowfall, with snowpack staying on the ground for fewer days
Increases occurrences of flooding and shoreline erosion

Recent Events

August, 1, 2002

A significant windstorm recorded gusts up to 92 mph in Houghton County, downing numerous trees and power lines and causing damages to structures, some severe.

May, 11, 2003

A significant rainfall (2.6 inches in Hancock) caused widespread damage throughout the U.P.

July, 16, 2006

Large hail, damaging winds, and severe thunderstorms in the upper reaches of Houghton County caused significant damage and transportation disruptions throughout the region.

Late April, 2013

Rapidly melting snow caused extensive flooding, causing severe damage and a disaster declaration.

January 2015

About 1/3rd of the Keweenaw Peninsula’s F.J. McLain State Park closed as a result of coastal erosion.

July 2016

Severe storms in the Western U.P. caused straight line winds up to 90 mph and caused extensive damage to infrastructure throughout the area.



Flooding events resulting from heavy rains and melting snow are nothing new in Michigan, but are likely to increase in frequency and intensity.

Recent Events

The observed changes to climate and coastal areas in the Western U.P. will have many impacts including severe storms, coastal erosion, and flooding. The recent events listed in the table on this page are chronicled in the Houghton County Hazard Mitigation Plan and are consistent with the events likely experienced as a result of climate and coastal variability.

Chapter Three

Key Issues in the City of Hancock

Chapter Two described some of the major changes expected in the City of Hancock and the Western U.P. in the future. This chapter attempts to answer the question, “What do these changes mean for the City of Hancock?” The table on the next page identifies the high-risk climate impacts likely in the City of Hancock, as organized by sector.

Defining Risk & Vulnerability

Climate adaptation experts define risk as a measure of both likelihood and impact. In other words, likelihood, or the probability of an event occurring, can be evaluated separately from the impact, or consequence, of an event occurring. An event may have little chance of ever happening but might be catastrophic if it does occur. This would be an example of an event with low likelihood but high impact.

The table on the next page summarizes climate impacts by sector that have either moderate or high risk, which can mean either moderate to high likelihood or moderate to high impact.

The particular impacts discussed in depth in this report were classified as moderate-to-high, in most cases, by stakeholder feedback gathered during the process to develop this report. Most of these risks match those identified in the Lake Superior Climate

Adaptation, Mitigation, and Implementation Plan completed for the region in 2014 by the Superior Watershed Partnership. In addition to understanding the severity of risk associated with a climate impact, it is also helpful to think about how vulnerable the community is to a particular climate event.

In general, vulnerability is defined as a measure of both sensitivity and exposure. Sensitivity refers to the degree to which a community or certain segments of a community could be impacted by an event, while exposure refers to hazards in the natural or built environment.

Vulnerability occurs when the environment is more susceptible to extreme weather and where more sensitive populations live. This chapter describes how well the City can cope with moderate- or high-risk climate impacts.

Risk & Vulnerability

The table on the next page summarizes climate impacts by sector that have either moderate or high risk for the City of Hancock. This chapter describes the ways in which the City may be particularly vulnerable to the moderate-to-high risks identified on the next page.





Moderate to High Risk Climate Impacts By Sector for Coastal Western U.P.

Plants & Animals

Habitats for many species will shrink and move farther north
Cold-water fish may decline; warm-water fish may increase
Change in forest composition; decline in species like jack pine and birch
New species may become established in the area such as turkey, ticks, and a variety of birds
Increased risk of invasive species, pests, and diseases
Habitat fragmentation may increase, disconnecting vital habitat and migration corridors
Changes in wetlands, including changes in temperature, seasonality, and habitat
Increased risk of wetland habitat loss to erosion and flooding
Declining seabird populations due to damaging coastal waves and eroding beach habitat
Possible declines in particular fish species like whitefish due to declining ice cover

Water Management

Increased runoff may cause chronic flooding and water quality concerns
Septic systems may be damaged from increased precipitation, triggering water quality/human health concerns
Wetland health may decrease, reducing flood control and habitat

Human Health

Increased risk of water-borne, respiratory, and vector-borne disease as a result of flooding
Wildfire smoke, severe storms, and high temperatures may exacerbate existing health problems in vulnerable populations like the elderly and disabled
Increase in health problems like asthma and allergies
Increased precipitation can pollute public water supplies and cause disease
Increasing air temperatures may stress populations that lack access to air conditioning



Vulnerability occurs when the natural environment is more susceptible to extreme weather patterns and where more sensitive populations live.

Public Services

Wildfire risk may increase in the summer and spring, requiring extra capacity and resources for prevention and firefighting
Increase need for emergency shelters with backup generators
Increased demand for emergency response, flooding rescue, and recovery assistance
Greater risk of damage to critical facilities like utilities, power generation, and water supply lines

Infrastructure

Increased stress on roads, bridges, and culverts caused by flooding and fluctuating temperatures
Transportation routes may require relocation as a result of increased coastal erosion
Power outages and communication interruptions may become more common

Economy

Longer summer growing season, good for tourism and agriculture
Uncertain snowfall may result in a declining winter tourism industry
Energy costs may increase in the summer due to air conditioning; costs may decrease in mild winters
Cold-water fishing may decrease; warm-water fishing may increase
Increase in hunting opportunities of deer and turkey
Birding opportunities may be less reliable and overall bird diversity may decrease
Fluctuating lake levels may make navigation more difficult
Changes in tree species and forestry may mean shifts in timber and logging
Tourism is likely to increase as opportunities for clean water recreation decline elsewhere

Key Vulnerabilities in the City of Hancock

The following section provides additional information on the moderate-to-high risks for each sector and ways in which the City of Hancock may be particularly vulnerable to climate variability. Recommendations for action are included in the next chapter.

Plants & Animals

The Keweenaw Peninsula and Western U.P. are well known for abundant flora and wildlife. It is important, therefore, to recognize the challenges that climate trends will pose for forest and wildlife management in the future and what changes are likely to occur in the region. The information in this section comes primarily from the Michigan Department of Natural Resources Forest Management Plan as well as from stakeholder discussions with wildlife and aquatic biologists and other experts.

Forest Management

The types of trees in the Western U.P. are likely to change in the future as a result of climate variability. The MDNR Management Area closest to the City of Hancock is the Central Keweenaw Management Area just north of the City of Hancock. The Central Keweenaw Management Area is about 3,600 acres of small, scattered parcels dominated by mesic forest comprised of upland spruce and fir, cedar, and semi-open lowlands.

Much of the land in and near the MDNR forests are managed for timber production and wildlife habitat that depends on this forest type. The climate impacts identified on the previous page may have a number of ramifications on forest management in the Western U.P. overall, including:

- Increased soil erosion and storms may compromise the ability of forest managers to access areas of the forest
- Increased salvage cuts may be necessary as a result of increased tree mortality/stress
- Pest management will become even more important as warmer temperatures and fewer inches of snow pack may facilitate insect growth and migration

The projected impacts of climate change on forest type, distribution, and health are significant, especially in areas like the Western U.P. that have a strong cultural, economic, and recreational connection to forestlands.

However, it’s unclear exactly how vulnerable the region’s forests are to climate change impacts. The MDNR has qualitatively assessed the region’s ability to cope with negative climate change impacts.



Changing Trees
Due to shifts in temperature, precipitation, forest conditions are changing. There are a number of tree species expected to decrease in the Western U.P. according to the USDA. These include:

- | | |
|----------------|------------------|
| • Balsam Fir | • N. White Cedar |
| • Black Ash | • Paper Birch |
| • Black Spruce | • Yellow Birch |

There are also a number of tree species expected to increase. These include:

- | | |
|------------------|----------------|
| • American Beech | • River Birch |
| • American Elm | • Silver Maple |
| • Black Walnut | • White Ash |
| • Red Mulberry | • White Oak |

For more information, including a complete list of tree species, see the Forest Ecosystem Vulnerability Assessment and synthesis Report online at: <http://www.nrs.fs.fed.us/pubs/46393>

There are several ways in which the forests near Hancock are less vulnerable to climate change impacts including:

- The region has more exposed bedrock and moraines that other areas in Michigan. Forests that have adapted to such conditions are likely to be more resilient to other changes.
- The forests in the Western U.P. are less reliant on replanting and have greater capacity for natural regeneration than others in Michigan. This means that species may experience less stress overall.
- The region has a lower wildfire risk than other locations generally, which allows easier adaptation and migration.

There are also a number of ways in which the forests near Hancock may be particularly vulnerable to climate change. These include:

- The forest is not contiguous, which may impede migration and adaptation of species.
- The forests in the Western U.P. are home to many rare and endangered species which are likely to be further stressed by climate change impacts.
- The region has many hardwood forests which may experience greater productivity but which are particularly vulnerable to drought stress, pests, and disease triggered by climate variability.

- The Western U.P. overall is more exposed to migrant and invasive species as a result of close proximity to other forest types in Wisconsin and Southern Michigan. New and invasive species threaten forest health by increasing competition and exacerbating existing stressors. Invasive plants in the area include Canada Thistle, Garlic Mustard, Purple Loosestrife, and others.

With these factors taken into account, the MDNR has determined a number of steps to manage forests for greater resiliency in the future. There are a number of steps the City of Hancock can take to better understand regional forest vulnerabilities, as identified in the action plan in the next chapter.

Wildlife changes

Changes in wildlife health and distribution are likely to result from climate shifts and increased human activities. The following summarizes some of the expected impacts to wildlife in the area as a result of the Western U.P.’s particular vulnerabilities.

Birds

Climate projections show an increase in precipitation events, both in frequency and severity, for the U.P. Severe rain events and wetter spring months can have negative impacts on the populations of ground-hatching birds. Chick health and survival can be threatened by storms, floods, rain events,



Canada thistle is an example of an invasive, exotic species that has been documented within or near the Central Keweenaw forests. The Canada thistle has a very deep root system that threatens to crowd out native plants and reduce crop yields when found in agricultural areas.



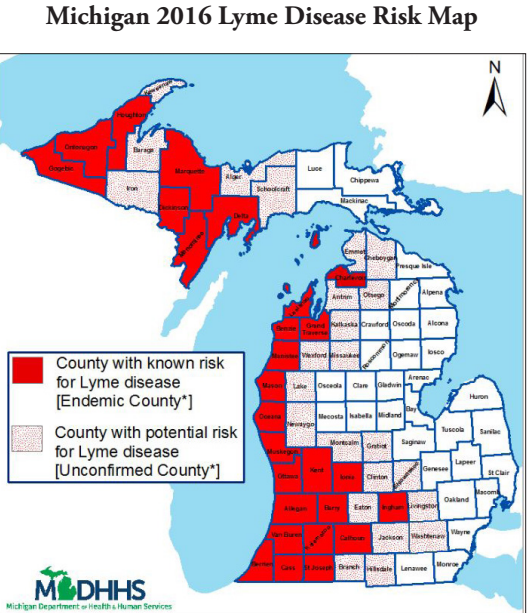
Forest composition is changing due to warmer temperatures and may drive out many tree species that produce beautiful fall colors, including sugar maple.

and fluctuating temperatures. Food supply can be strained if grasslands flood and insect populations shrink. Habitat loss through human development and deer overpopulation also pose serious threats to birds in northern areas. Climate changes impact the migration patterns and habitats of many birds that depend on particular vegetation and temperatures. Earlier onsets of spring and changes in forest distribution have caused birds such as the Black-throated Blue Warbler and the Rose-breasted Grosbeak to arrive in the U.P. about three weeks earlier than in the 1960s.⁴ Earlier springs also mean insects hatch too soon before migratory birds like warblers, tanagers, thrushes, and flycatchers arrive.

Ticks

Less severe winters allow tick populations to survive year round. Year-round tick populations have increased the risk of Lyme disease in Michigan. A number of counties, including Houghton County, are endemic with Lyme disease according to the Michigan Department of Health and Human Services.²

Year-round tick populations can also cause damage to wildlife. Notably, the moose population in the Western U.P. has declined in recent years partly as a result of severe tick infestations.³ Lyme disease also poses a risk to human health, as described later in this chapter.



This map shows the counties where ticks infected with Lyme disease have been found (dark red) and counties with potential risk. Houghton County is listed as endemic with Lyme disease.

Deer

Less severe winters in the Western U.P. have a profound effect on wildlife, especially deer. Deer populations tend to be higher after a mild winter than after a severe winter, but excess deer populations can damage forest vegetation and other ecological processes.



White-tailed deer are abundant in the Western U.P. and populations are expected to grow due to milder winter conditions.



Whitefish are a popular Lake Superior export and generate the greatest income for Great Lakes fisheries. Whitefish is one example of a fish that may have trouble adapting to rising water temperatures. A number of groups, including Michigan Sea Grant, have been working on restoration projects to stabilize whitefish populations in Lake Superior.

Fish

Warming waters and severe storms have an impact on fish survival. Less ice cover on Lake Superior may have a negative impact on some species like whitefish, whose eggs survive best in waters protected from windy winter storms by a thick layer of ice.

In addition, warming rivers and streams may make it more difficult for cold-water fish, such as trout, to survive. Warming water makes it easier for invasive, predatory fish like the sea lamprey to survive, further threatening trout and other cold-water fish like whitefish.

Water Management

A severe storm or flooding event has a number of effects on property, infrastructure, and human health. Each of these are implications of climate variability that the City of Hancock may be particularly vulnerable to. The City's position on a hilltop, with steep grades leading south to the Keweenaw Waterway, have created serious flooding and erosion concerns in the past. See Map 1 in Appendix A for the elevation of the City's land. Impervious surfaces like roads and buildings generate more stormwater runoff than natural landscapes.

The City's urbanized areas, including downtown and waterfront development, likely contribute to increased localized flooding. The City has already taken a number of steps to address its flooding vulnerabilities. Additional improvements may be necessary to keep flooding under control given the likelihood of increased precipitation. For example, as the spring season starts earlier in the year, creek depths may rise due to melting snow earlier than usual, causing runoff that may overwhelm the stormwater infrastructure that was previously sufficient.

Even after recent investments in infrastructure, the Houghton County Emergency Management Plan continues to list urbanized flooding as a high-risk event for the City. A number of strategies for the City to reduce stormwater runoff through green infrastructure and Low Impact Development

techniques are described in Chapter Four. In addition to flooding control benefits, proper water management can reduce risks to water quality, public health, and habitat.

Threats to Water Quality

As snow melts and rain falls onto impervious surfaces like roads and buildings, toxins can be flushed into streams, rivers, and lakes. These toxins can trigger water quality concerns that are avoided when excess water is given the opportunity to naturally percolate into the ground. Chronic flooding can even influence the water quality of public drinking water systems.

Threats to Public Health

Rain events and severe storms can cause health problems in the immediate and long term. During a flood event, people are at risk of drowning and injury caused by landslides, deep floodwaters, or other dangers.

Rerouting traffic from washed-out roads and rescuing people trapped in cars or buildings can overwhelm the capacity of emergency responders. In the long term, people can be susceptible to shock, emotional stress from loss or injury, and disease or infection resulting from contact with polluted flood waters, mold exposure in damaged homes, and water-borne diseases.

Water Management

The City of Hancock has taken a number of steps to reduce its vulnerability to flooding including:

- *Constructing a network of storm sewers, retention ponds, and drainage ditches to channel water safely away from homes.*
- *Installing landscaping buffers and other soil erosion measures through site plan review.*
- *Over \$14 million in investment in new water mains, rehabilitated storm sewers, and updated sewer infrastructure.*
- *A current Stormwater, Asset Management, and Wastewater Program to better understand the City's carrying capacity and condition.*

Damaging Effects of Flooding

In addition to damage to properties and infrastructure, flooding poses a threat to human health and safety. The Michigan Department of Health and Human Services' Climate Health Adaptation Program has identified a number of public health concerns that result from severe flooding including risk of water-borne diseases, ongoing water quality concerns, and mental health concerns during flood recovery. City leaders should be aware and empowered to address these challenges with educational and policy tools, as discussed more in Chapter Four.

² http://www.michigan.gov/emergingdiseases/0,1607,7-186-25890_26143-95445--,00.html
³ <http://www.freep.com/story/news/local/michigan/2015/03/17/survey-moose-population-decline-michigan/24915125/>
⁴ <http://www.audubon.org/sites/default/files/documents/gwandbirds.pdf>

Wetlands

As temperatures rise and waters warm, shallow wetlands may evaporate or shrink and the quality of habitat in the wetlands may decline. Wetlands provide a number of benefits, including flood absorption, carbon storage, and vital habitat for many plants and animals.

A loss of wetlands threatens the health of many species of waterfowl, amphibians, and even mammals like moose that depend on aquatic plants. Wetlands in the Hancock community may provide erosion control benefits as well, by helping to temporarily hold and slowly release flood waters caused by severe storms.

However, an increase in the number and intensity of storms may threaten wetland health, as storms may deposit silt and sedimentation into some wetlands. Several wetland complexes in Houghton County are managed by the MDNR to support birds and wildlife.

This provides a quality-of-life benefit for local residents that visit these natural areas, as well as a boost to the local economy. A map of the City’s land use from 1978 shows the locations of several wetland complexes in the northern reaches of the City (see Map 2 in Appendix A).

Human Health

A number of the climate impacts described in this chapter have direct and secondary impacts on human health. Climate impacts will pose new threats to humans including Lyme disease, new allergens due to changing plant communities, and an increased risk of heat stress due to warming temperatures.

Increases in the number of intense severe storms and heavy rains provide more opportunity for vector-borne and water-borne disease, while flooding can cause mental and physical distress and increased risk of injury to fishers and swimmers. Pollution to air and water caused by wildfires, severe storms, and rising temperatures can trigger asthma and other health problems in vulnerable populations like the elderly and the disabled.

Rising temperatures may put residents of the Upper Peninsula at increased risk of heat stress. This is particularly problematic as most residents of the Upper Peninsula are not accustomed to extreme heat, do not live and work in air-conditioned environments, and may not recognize the signs of heat stress.

Researchers who study the impacts of climate change on human health have found that several groups of people tend to experience the most harm from an extreme weather event.

The following populations are considered relatively more sensitive, one element of overall vulnerability.⁵ Sensitive populations include:

- Residents sixty-five (65) years of age and over - Studies indicate that older age is associated with higher hospital admission rates during heat waves and other emergencies.



Polar vortexes and extreme cold can damage water infrastructure. Just as temperature overall is expected to rise, extreme cold is also a likely reality given changes in the jet stream due to polar shifts in temperature. Many U.P. communities are evaluating the cost to retrofit water infrastructure, often by burying water lines deeper in the ground.

- Residents living alone - Although living alone is not necessarily a risk, people who are socially isolated are at greater risk during an extreme weather event. Isolated people may not be able to recognize symptoms of illness and may fail to take proper action.
- Minority populations - Studies also suggest that minorities are at greater risk during extreme weather events. In many communities, this may be true for various reasons, including less reliable access to health care, transportation, and other social supports needed to reduce exposure. In other words, a correlation generally exists between non-white populations and increased sensitivity to extreme weather.
- Populations in poverty - Living in poverty is associated with increased heat-related morbidity, lower health outcomes, and mortality as a result from extreme weather. In general, persons living at or below the poverty line have less access to resources, like air conditioning and health care. This can limit a person’s access to relief from an extreme weather event.
- People over twenty-five (25) with less than a high school education - Similarly, studies demonstrate a link between low educational attainment and lower health outcomes.

Map 3 attempts to identify areas where these more-sensitive populations live in the City of Hancock. There are a number of areas within the City with relatively high concentrations of sensitive populations, including the Census Block Groups along Keweenaw Waterway, areas already at elevated risk of flooding. This does not mean residents in areas with higher overall sensitivity are in immediate danger. Rather, Map 3 provides planning officials a new way of identifying areas where extreme weather could present serious problems for a significant number of citizens.

Map 3 shows where the highest concentrations of the five populations listed above live at the Census Block Group level. It is important to note that this information came from the United States Census Bureau’s American Community Survey data, collected on a rolling basis from 2009 to 2013. This data may count some people twice, such as in cases where a person is both a minority and over sixty-five (65). This may overestimate the severity of the sensitivities in some locations. On the other hand, there are other factors that could increase an individual’s risk of heat-related illness that were not mapped in this assessment.

⁵ Sensitive populations and vulnerability assessment methodology are based on a University of Michigan report: <http://graham.umich.edu/media/files/ClimateChateActionDetroit.pdf>

Many additional variables could be collected through local surveys or other sources including:

- The degree of social connections among individuals within a community
- Populations with preexisting health concerns like substance addiction, mental illness, or confinement
- Populations who live in overcrowded conditions or tall buildings

A number of recommendations for addressing Hancock’s human health vulnerability to climate change are included in the next chapter, while many of the recommendations in other sectors also have human health benefits.



Healthcare buildings, like the UP Health System – Portage, in Hancock, are critical facilities for vulnerable populations in times of emergency.

Public Services

Demand for quality public services may become more difficult to satisfy as a result of climate variability. In particular, more frequent severe storms may strain the capacity of emergency responders and damage or isolate critical facilities. Increasing wildfire risk, both north and south of the City of Hancock, may also have an impact on City systems. As demand for services increase, the cost for government agencies to provide services is also likely to grow.

Emergency Management

Increases in extreme weather are likely to pose a significant challenge to first responders. Flooding in residential areas may require search and rescue, evacuation, and recovery assistance. Wildfires in the region may strain Hancock’s capacity to house refugees, while failures in critical infrastructure could impede the ability of people to leave Copper Island or receive medical care.

Critical Facilities

Anyone traveling via road to Copper Harbor, Calumet, or any location on Copper Island must travel through Hancock. The City is therefore home to a hub of critical facilities that support the region, including two major hospitals, nursing homes, and amenities like grocery stores, gas stations, and schools.

Emergency planning is required to better understand how flooding or extreme weather may isolate these critical facilities or otherwise restrict access to them. Critical facilities in the City of Hancock are identified on Map 4 in Appendix A.

Wildfire

Nationwide, the risk of wildfires have increased substantially, often requiring more resources for fire suppression at great financial cost.⁶ The financial cost to suppress and recover from wildfires is burdensome for many local communities equipped with volunteer fire departments and little capital funding for equipment. Wildfires also pollute the air and trigger respiratory problems that may require hospital visits in both vulnerable and healthy populations. Additionally, wildfires actually increase the future risk of flooding as less vegetation remains to absorb rain water.

Unfortunately, climate trends suggest that the Western Upper Peninsula, including the southern areas of Houghton County, can expect to have drier soils and warmer conditions at certain points of the year, exacerbating conditions suitable to wildfires. Recommended actions, such as exploring wildfire risk in Houghton County with regional partners, are included in Chapter Four.



Beach heath may become a more common concern in Hancock as precipitation events occur more frequently. Heavy rain events can flush toxins from roads and buildings into water bodies like the Keweenaw Waterway.

Who is more sensitive to climate impacts in the City of Hancock?

The sensitivity map (Map 3) attempts to capture where more-sensitive populations live in the City. Emergency managers, township officials, and community service organizations should work together to identify emergency response strategies to communicate with and assist vulnerable populations during or after an extreme weather event.



Flooding in Grand Rapids in 2013 exceeded the capacity of emergency response. Volunteers worked to prepare for expected flooding by sandbagging and also assisted in flood recovery.

Infrastructure

Increases in temperatures, precipitation, and erosion risk all pose threats to infrastructure in the City of Hancock and surrounding region. Infrastructure includes transportation networks like roads and bridges as well as utilities and communications infrastructure like power lines and phone lines. Railways, major trucking routes, bridges, water supply lines, water treatment facilities, hospitals, and power generation and transmission facilities are all important infrastructure that should be evaluated for damage risk from extreme heat and heavy rains.

Roads & Bridges

While roads are designed to withstand some fluctuation in temperature, sustained periods of high temperatures can cause road surfaces to soften and expand, leading to damaging potholes and rutting, especially on bridges.⁶ Meanwhile, heavy rains, can weaken and erode the soil and culverts, causing further damage to roads and bridges. Chronic flooding shortens the lifespan of the road surface, requiring costly reconstruction and rebuilding of infrastructure. Fluctuating temperatures coupled with increased precipitation, most notably during the transition from the winter to spring season, create difficult road conditions. During this period, snow may temporarily melt and cause runoff to pool on low-lying roads.

Evening temperatures or a front of colder air can cause this standing water to refreeze, putting extreme stress on road surfaces, and bridges. Economic hardship in the post-mining era has impacted the City of Hancock’s infrastructure over time, but even with less revenue and fewer resources, the City has undergone a number of infrastructure investments to maintain a quality transportation network.

Non-motorized transportation linkages are especially important, and provide quality of life, recreational, and economic benefits to the community. A comprehensive non-motorized system can also provide an alternative to the traditional transportation network that may prove useful during emergencies and natural disasters.

Portage Lake Lift Bridge

Perhaps the most vital piece of critical infrastructure in the City of Hancock is the Portage Lake Lift Bridge. The bridge is the only non-water transportation link connecting Copper Island to the rest of the Keweenaw Peninsula. Many people rely on the bridge for transportation to work, home, and school, while tourists travel across the bridge in both the summer and winter. Thankfully, very few bridge failures have occurred and community leaders have continually worked to keep the bridge maintained. A Michigan Department of Transportation project recently completed \$8.4 million in upgrades to the bridge.

The project represented one of the largest overhauls to the bridge since the 1950s and included major upgrades to mechanical and electrical systems.

Critical Facilities

Critical facilities are defined by the Federal Emergency Management Agency as any structure that because of its size, service area, or uniqueness has the potential to cause bodily harm, extensive property damage, or disruption of vital socioeconomic activities if destroyed or damaged. Critical facilities include:

- | | |
|-------------------------------|-----------------|
| • Hospitals | • Fire Stations |
| • Emergency Operation Centers | • Nursing Homes |
| • Electric Substations | • Schools |
| • Police Stations | • Shelters |

Wildfire & Precipitation

It may seem contradictory that wildfire risk is expected to increase along with overall precipitation. However, increases in precipitation are expected to take the form of more severe storms, with periods of drought in between. Drought is an essential contributor to wildfire risk, and a prolonged period of dry conditions can create the right fuel conditions for ignition and a quickly spreading fire. Warmer temperatures also contribute to increased wildfire risk.

⁶ <https://www3.epa.gov/climatechange/impacts/transportation.html#landtransportation>

The City of Hancock recently participated in a regional planning process to create the Incident Management Plan for the Bridge to prepare for a short- and long-term bridge failure. The emergency planning process identified the many partners that could provide shelter, food, transportation, and other critical services to the thousands that would potentially be impacted by a long-term bridge closure. The emergency plan includes temporary conveyances from shore-to-shore and other transportation measures to bring people across the Keweenaw Waterway.

Despite these efforts, it is unclear how likely the bridge is to be impacted by climate variability. Changes in temperature and precipitation, such as increases in ice storms and heavy rains, may have a negative impact on the bridge's structural integrity. Further research is recommended to better understand these concerns, as noted in Chapter Four.

Subsidence

Subsidence, or ground collapse, occurs as a depress, crack, or sinkhole in the ground. Subsidence can have catastrophic consequences to both people and property. Unfortunately, historical mining activity in the region has put the City of Hancock and surrounding areas at moderate to extreme risk for subsidence events.⁷ Risk is highest in areas above previous and active mining cavities and may damage structures with low strain

tolerances (such as dams and utility lines) more so than other structures. Subsidence can also be triggered by heavy rain and snow, adding weight to weak ground. For this reason, the risk of subsidence may be elevated due to increasing precipitation caused by climate variability. Very few subsidence events have occurred in Houghton County in the past, and thankfully, the location of mines in more urban areas like the City of Hancock are well known to the County Mine Inspector. As noted in the Houghton County Emergency Management Plan, areas such as Quincy Hill and other nearby slopes may be at greater risk for subsidence.

Erosion

Erosion can cause roadbeds to give way and damage shoreline and riverine infrastructure. Costly reconstruction and relocation of roads, especially high-volume local roads, can result in a financial burden to communities.

While coastal erosion is less of a concern to the City of Hancock, it is a growing problem in coastal jurisdictions throughout the Keweenaw Peninsula. Erosion elsewhere in the region may have indirect impacts on the quality of life and safety of Hancock residents. A number of areas near the City of Hancock are already designated as High Risk Erosion Areas by the Michigan Department of Environmental Quality. These areas have a history of eroding by at least one foot per year over a 15-year period.



Road washouts like this one occurred throughout the Western U.P. as a result of heavy storms in July 2016.



The Portage Lake Lift Bridge is one of the largest in the country. Built in the 1950s, thousands of people rely on the Portage Lake Lift Bridge for transportation to work, school and recreation.


⁷ Houghton County Emergency Management Plan 2013-2018

Development in a High Risk Erosion Area must be a certain distance from the shoreline in order to protect structures from erosion for a period of 30 to 60 years. The required setbacks and the High Risk Erosion Areas in the Hancock region are shown in Map 5 in Appendix A and vary depending on the size and type of new construction.

However, because the High Risk Erosion Areas are based on historical erosion and do not consider recent and projected increases in severe storms, erosion is likely more severe than noted in Map 5. For example, F.J. McLain State Park closed over 1/3rd of its campsites in 2015 due to coastal erosion.

Utilities & Communications

In rural communities, a power or communication outage can be especially damaging. Emergency services may not be notified or capable of responding to an emergency, such as a severe storm, wildfire, or extreme heat event. Vulnerable populations such as the elderly, disabled, or poor may not be able to access necessary resources and services like grocery stores or health care. Shelters may not be universally accessible or familiar to residents, and often lack backup electrical power.

 *Downed power lines are a common occurrence during a severe wind and/or rain storm.*

The likelihood of power outages is particularly high in isolated areas that draw electricity from miles of lines in forested areas. The time for utility companies to identify and fix a problem can be lengthy, and outages are common both in winter months and summer months due to storms. Power outages in the City of Hancock may pose additional challenges to vulnerable populations.

Economy

The City of Hancock and surrounding communities are largely dependent on tourism and natural resources for jobs and industry. Climate variability is likely to change the viability of particular recreational activities and may provide an opportunity for increased water-based tourism.

Tourism

Changes in temperature and precipitation may mean a longer summer tourism season in the Western U.P. and a less reliable winter tourism industry. As spring begins earlier and the first frost occurs later in the year, the summer season may extend and hunting, birding, mountain biking, camping, hiking, and other forms of recreation may be possible for more days each year. However, increased rain events and severe storms may mean the spring season is fraught with rainy days and less predictability. Winter tourism, including snowmobiling, skiing, ice fishing and other winter activities, rely on continuous days of frozen ground and snowpack.



Heavy rain and snow over abandoned mines can increase the risk of subsidence.

Effects of Erosion

Erosion is a natural process and most shoreline property owners understand that the dynamic coast changes year to year. Climate change, however, is causing stronger storms on Lake Superior and may exacerbate erosion rates. Erosion can have a number of negative impacts that communities should be aware of, including damage to properties and people, degradation of fish spawning areas and natural habitat, and decreases in water quality as septic systems are damaged and pollutants in runoff are carried to water bodies.

Climate impacts are likely to reduce the number of days with snow on the ground in the Western U.P. by as many as 25 to 50 days each year.⁸ However, it is certain that even less snow will fall in southern areas, which may give the Western Upper Peninsula an advantage in attracting some winter tourism. Recommendations for adapting winter-based tourism to year-round tourism are listed in Chapter Four.

Waterfront Tourism

As drought conditions are expected to worsen in many places across the Sun Belt and Southwest U.S., the Great Lakes are an increasingly important natural resource and economic driver. Access to clean water and water-based tourism is an important economic asset for Michigan's coastal communities.⁹

Many communities across the state are realizing their full potential to attract tourism through investments in shoreline amenities like kayak launches, bike trails, and waterfront redevelopment projects. Recreational boating, fishing, birding, beach visits, and kayaking help support a \$17 billion tourism industry in Michigan. Increased turbulence on Lake Superior may even be an opportunity for adventure sports like surfing and wind surfing. These activities are already becoming more popular in the Great Lakes region. The City of Hancock could capitalize on changing climate conditions to capture more water-based tourism in the summer months.

A number of steps to do so are included in the next chapter. Already, the City has worked to provide public access to recreational facilities along the Keweenaw Waterway with waterfront parks, shared-use trails, and a water trail.

Other Stressors

Other stressors in the community can exacerbate the risk of damage from extreme weather, shifts in tourism, or other changes. Examples of these include:

- Under-supplied housing - A Target Market Analysis shows that the City of Hancock should expect additional growth in housing in the future. When housing is under-supplied, affordability may become a problem for residents, making more residents less able to cope with the stress and financial burden of an extreme weather event or economic change.
- High energy costs - The cost to bring electricity to the U.P. is transferred, in part, to consumers. Higher energy costs may make it more difficult for residents to purchase air conditioning or other cooling methods that may become more necessary as temperatures rise.

Many of the strategies to address these and other stressors in the community would have a secondary benefit of increasing resiliency in the City of Hancock. For examples of co-benefits, see Chapter Four.



Snowmobiling is a popular draw for tourism in the U.P. Unfortunately, it seems likely that climate change may reduce the number of days each year with snow on the ground in the Western U.P. However, other places are sure to have even less snow than the Western U.P.



Water-based recreation, like kayaking and paddling, are becoming increasingly popular in the Great Lakes region, and the Upper Peninsula may have a longer summer season as a result of climate variability.

Chapter Four

Creating an Action Plan

This action plan was created by the Land Information Access Association (LIAA) for the City of Hancock as part of the City's Master Planning Process in 2016. It is important to note that these actions are merely recommended options the community could choose to take, and may not all be suitable for local circumstances in the City of Hancock.

The recommendations included in this action plan are grouped by sector. The goals and actions are designed to help the City address its vulnerabilities as identified in Chapter Three and are derived from a variety of sources including:

- The Resiliency Workshop
- Stakeholder feedback from key leaders and organizations in the Western U.P.
- The Lake Superior Climate Adaptation, Mitigation, and Implementation Plan conducted by the Superior Watershed Partnership and other regional planning documents including studies produced by the Michigan Department of Natural Resources, the U.S. Forest Service's Northern Institute of Applied Climate Science, and others.

- The City of Hancock Planning Commission should review this action plan and include the appropriate actions in the Master Plan and other City policies.

Co-Benefits

Planning for greater resiliency has positive side effects. The recommendations in Chapter Four will help the City address other challenges including:

- Local food sourcing - Climate change is likely to cause disruptions in the global food system, but may change conditions for local growers. Investment in the local food economy is an important resiliency tool and boosts the local economy.
- Recreational needs - The City of Hancock Recreation Plan lists many amenities that residents would like to see. Many recreational amenities help relieve stress in climate-vulnerable populations in addition to improving social cohesion and quality of life. Splash pads, for example, are part of a community's resiliency infrastructure by providing an opportunity for cooling down in the summer heat.

- Economic challenges - As the City works to bring in new industries and retain graduates from nearby universities, investment in waterfront landscaping, placemaking, and additional pedestrian access may boost the economy and provide a host of climate-related benefits.

What is Resiliency?

Resiliency is the ability to withstand, adapt to, and recover from changing conditions. Resilience is an umbrella term for the planning strategies needed to help communities develop the necessary capacity to address new challenges. The goals and action steps included in this Action Plan are designed to help the City of Hancock be resilient to the impacts of a changing climate.

A Regional Approach

Many of these actions require regional partnerships and collaboration with neighboring communities. Houghton County, the City of Houghton, and the Superior Watershed Partnership are natural allies in implementing many of the action steps in this chapter.

⁸ Center for Climatic Research, University of Wisconsin-Madison
⁹ <http://michiganblueeconomy.org/wp-content/uploads/2015/03/Michigan-Blue-Economy-Report.pdf>



Actions to Build Resiliency in the City of Hancock

Sector: Plants & Animals

Climate Impacts	Actions
<ul style="list-style-type: none">Habitats for many species will shrink and move farther northCold-water fish may decline; warm-water fish may increaseChange in forest composition; decline in species like jack pine and birchNew species may become established in the area such as turkey, ticks, and a variety of birdsIncreased risk of invasive species, pests, and diseasesHabitat fragmentation may increase, disconnecting vital habitat and migration corridorsChanges in wetlands, including changes in water temperature, seasonality, and habitatIncrease risk of wetland habitat loss to erosion and floodingDeclining seabird populations due to damaging coastal waves and eroding beach habitatPossible declines in particular fish species like whitefish due to declining ice cover	<p>Goal: Maintain healthy forests and street trees.</p> <ul style="list-style-type: none">Build relationships with state and federal agencies like the MDNR and U.S. Forest Service to identify appropriate forest adaptation projects to fund and support.Adopt and enforce a tree protection and replacement ordinance or other standards to minimize vegetative disruptions in new development.Work with arborists to ensure that new street trees are compatible with climate projections.Encourage large landowners to complete a forest management plan through the U.S. Forest Service’s Northern Institute of Applied Climate Science.Consider funding an arborist position to evaluate the health of existing trees and plan for appropriate plantings.Pilot a tree planting program to increase tree canopy in areas most vulnerable to heat stress and shoreline destabilization.Monitor threats to trees including invasive species, pests and storm damage.
	<p>Goal: Protect the habitats of vulnerable plants and animals.</p> <ul style="list-style-type: none">Evaluate existing culvert and road infrastructure for its impact on aquatic organism passage. Remove any barriers currently in place.Reduce landscape fragmentation by promoting cluster development and open-space preservation.Decrease street lights and use downward-facing lighting fixtures to preserve nocturnal habitat.Zone for low intensity and low density around environmentally sensitive habitats and natural areas.Direct development to areas near and within existing infrastructure by using proactive zoning and natural feature protection ordinances.
	<p>Goal: Minimize damage from invasive species.</p> <ul style="list-style-type: none">Create educational materials to distribute to residents on recognizing and eradicating invasive plant species.Work with local conservation organizations to map the locations of invasive species and target resources.

Sector: Water Management

Climate Impacts	Actions
<ul style="list-style-type: none">Increased runoff may cause chronic flooding and water quality concernsSeptic systems may be damaged from increased precipitation, triggering water quality and human health concernsWetland health may decrease, reducing flood control and habitat	<p>Goal: Protect water quality in the City by enhancing stormwater control measures and green infrastructure.</p> <ul style="list-style-type: none">Adopt site plan requirements that reduce or eliminate allowable runoff.Encourage green infrastructure on private properties through programs and incentives, such as a stormwater utility fee rate structure.Identify coastal areas at risk for flooding. Develop these as parks, trails or other amenities that can withstand temporary flooding.Pilot the construction of pedestrian and biking trails with pervious pavement, especially near open drains and shorelines.Prioritize open-space protection for areas that are contiguous, provide flood protection, and filter stormwater.Partner with public works and engineers to study the feasibility of installing alternative stormwater controls on public properties. Examples include grey water storage and reuse, green roofs, rain barrels and bioswales.Require a buffer of native vegetation around waterways and lakes.
	<p>Goal: Protect water quality, habitat, and reduce flooding risk by protecting wetlands.</p> <ul style="list-style-type: none">Identify existing wetlands in the City by ground-truthing national and state mapping tools.Protect existing wetland with a local wetlands ordinance that buffers wetlands not covered under the Department of Environmental Quality’s regulations.





Actions to Build Resiliency in the City of Hancock

Sector: Human Health

Climate Impacts	Actions
<ul style="list-style-type: none">Increased risk of water-borne, respiratory, and vector-borne disease as a result of floodingWildfire smoke, severe storms, and high temperatures may exacerbate existing health problems in vulnerable populations like the elderly and disabledIncrease in health problems like asthma and allergiesIncrease precipitation can pollute public water supplies and cause diseaseIncreasing air temperatures may stress populations that lack access to air conditioning	<p>Goal: Collaborate on and promote public education and awareness of climate change impacts.</p> <ul style="list-style-type: none">Coordinate with public schools to incorporate environmental education about health risks, such as tick protection.Create and build on recreational opportunities that bring diverse groups together.Develop a guidebook with educational information to homeowners living within sensitive landscapes.Include data and information on the City website and other communication methods to ensure residents are aware of warnings and resources.Promote healthy lifestyles through City programs that acknowledge the growing health impacts of climate change, such as childhood asthma or Lyme disease awareness events.Host educational events for local leaders and staff to learn about climate impacts.
	<p>Goal: Integrate public health goals into local decision making.</p> <ul style="list-style-type: none">Collaborate with the Health Department to assess the readiness of local emergency response, public health, social services, communications, and energy plans to cope with climate changes.Consider the public health impacts of development, perhaps by requiring a Health Impact Assessment for Planned Development projects.Participate in county-wide emergency response and hazard mitigation planning processes.
	<p>Goal: Allocate services and programming toward sensitive populations including those who are low-income, elderly, or disabled.</p> <ul style="list-style-type: none">Provide transportation services to amenities, healthcare and essential services.Partner with local leaders in public health, public safety and social services to investigate the impacts of severe storms, extreme heat and coastal hazards.Use information about where vulnerable populations live when allocating new emergency shelters, community gardens, parks or other amenities in order to relieve stress in vulnerable populations.

Sector: Public Services

Climate Impacts	Actions
<ul style="list-style-type: none">Wildfire risk may increase in the summer and spring, requiring extra capacity and resources for prevention and firefightingIncreased need for emergency shelters with backup generatorsIncreased demand for emergency response, flooding rescue, and recovery assistanceGreater risk of damage to critical facilities like utilities, power generation and water supply lines	<p>Goal: Prepare for increased wildfire risk in the region.</p> <ul style="list-style-type: none">Cooperate with regional entities to investigate wildfire risk areas using information such as available water supply, adequacy of road systems for access and the capacity of each fire department.
	<p>Goal: Increase capacity for emergency response through effective communications.</p> <ul style="list-style-type: none">Educate the public about new warning systems and response plans.Establish a Reverse 911 automated call-back system in order to notify residents of evacuation or other emergency notices.Implement an early warning system for extreme storms, flooding, heat waves, poor air quality days, and disease outbreak.
	<p>Goal: Increase emergency management preparations.</p> <ul style="list-style-type: none">Convene collaborative discussions regarding emergency management.Rehearse emergency management response plans.Recommend changes to the Houghton County Hazard Mitigation Plan that address climate and coastal trends.Designate shelters for extreme cold and warm weather events and advertise them to the public, particularly to sensitive populations like the elderly and low-income residents.Identify public locations with backup power supply.Equip emergency shelters with backup energy systems, such as generators.Identify alternative routes and modes for transportation during and after an emergency.Ensure large institutions have emergency plans.
	<p>Goal: Protect critical infrastructure from severe weather damage.</p> <ul style="list-style-type: none">Identify essential services that are located in flood zones or that could be isolated by flooding and work to ensure reliable services.Explore ways in which the Portage Lake Lift Bridge may be particularly vulnerable to extreme weather.
	<p>Goal: Continue to explore energy alternatives.</p> <ul style="list-style-type: none">Evaluate the Zoning Ordinance and City policies to identify and remove unnecessary barriers to alternative energy.Develop ordinances that guide, support, and streamline the ability for residents and businesses to install renewable energy applications.Explore the use of solar, wind and geothermal.



Actions to Build Resiliency in the City of Hancock

Sector: Infrastructure

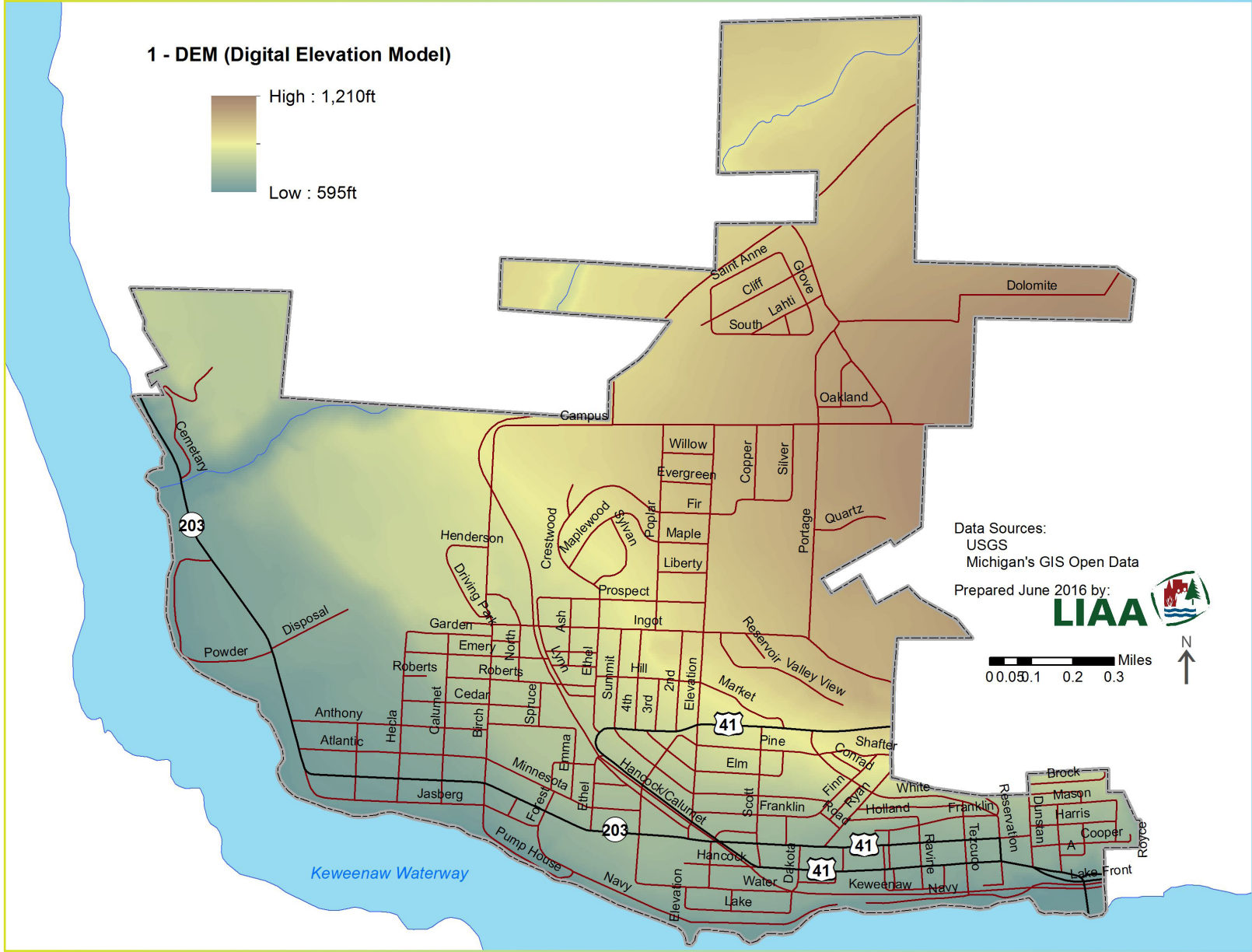
Climate Impacts	Actions
<ul style="list-style-type: none">Increased stress on roads, bridges, and culverts caused by flooding and fluctuating temperaturesTransportation routes may require relocation as a result of increased coastal erosionPower outages and communication interruptions may become more common	<p>Goal: Protect properties from erosion, subsidence, and flooding.</p> <ul style="list-style-type: none">Adopt performance standards to minimize on-site soil and vegetative disruptions, especially in vulnerable coastal areas.Consider creating a Shoreline Protection Zone to require enhanced building standards and further setbacks in coastal areas.Identify the proximity of coastal development to sensitive habitats and areas with high erosion and subsidence risk. Consider acquiring areas with the highest risk.In new development along the coastline, consider clustering development in less vulnerable coastal areas.Acquire property easements or properties along the waterfront as they become available.Work with the County Mine Inspector to evaluate the subsidence risk in the City of Hancock.
	<p>Goal: Reduce stress on transportation and communication infrastructure.</p> <ul style="list-style-type: none">Map and inventory the road damages caused by extreme weather. Identify areas subject to repeated damages.Inventory infrastructure most vulnerable to extreme weather.Identify areas that would allow for the safe burial of power lines to avoid power interruption.Reduce reliance on conventional energy by investing in green building designs and other energy-saving methods on public properties.Plan for the initial and life-cycle costs of infrastructure in Capital Improvement Planning to better capture the cost savings of green infrastructure.
	<p>Goal: Plan for future conditions when building and repairing infrastructure.</p> <ul style="list-style-type: none">Adopt building design standards that better reflect climate conditions, such as the provision of an ice falling zone.Incorporate updated precipitation tables in construction or repair of roads, culverts, bridges, and hydraulic structures.

Sector: Economy

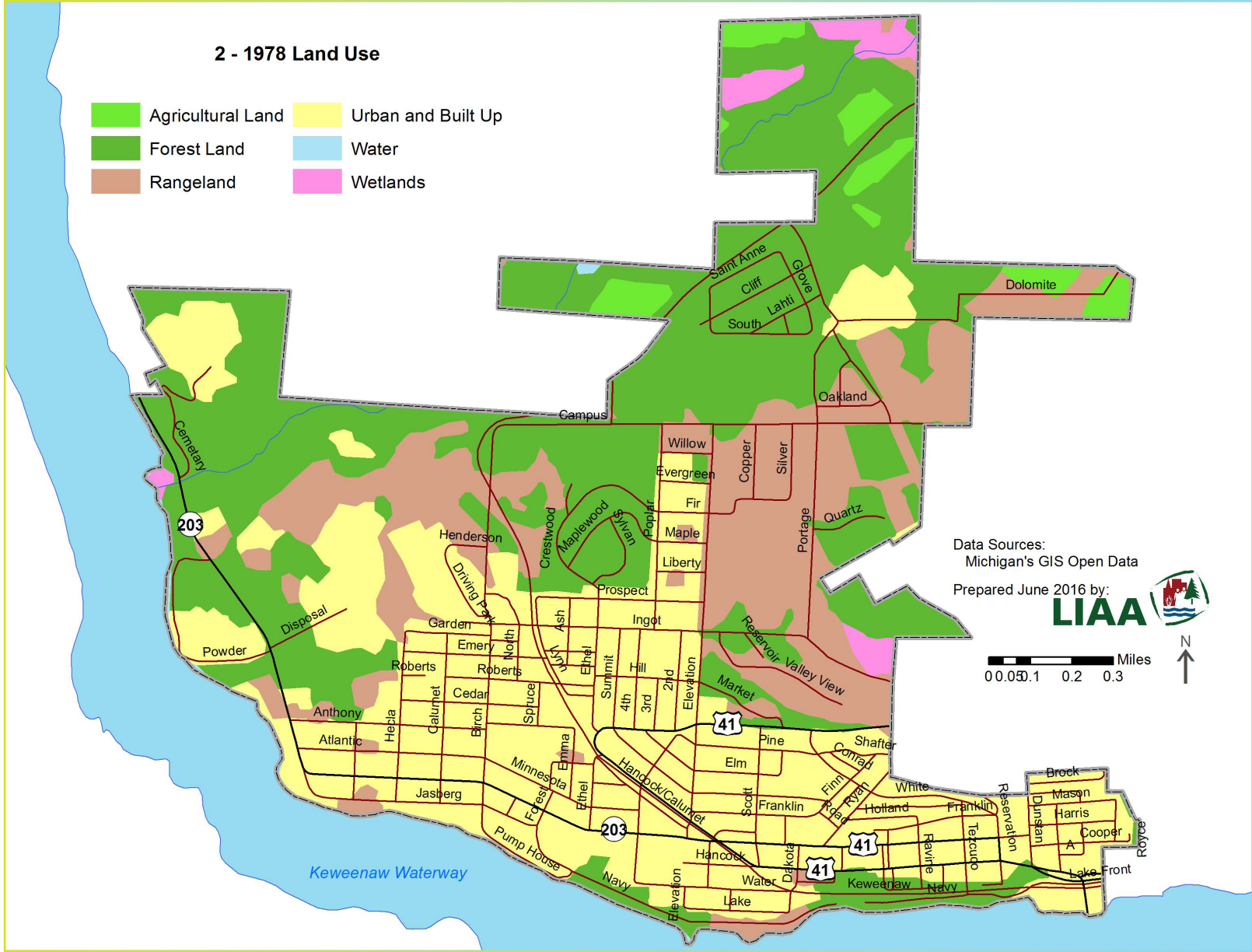
Climate Impacts	Actions
<ul style="list-style-type: none">Longer summer growing season, good for tourism and agricultureUncertain snowfall may result in a declining winter tourism industryEnergy costs may increase in the summer due to air conditioning; costs may decrease in mild wintersCold-water fishing may decrease; warm-water fishing may increaseIncrease in hunting opportunities of deer and turkeyBirding opportunities may be less reliable and overall bird diversity may decreaseFluctuating lake levels may make navigation more difficultChanges in tree species and forestry may mean shifts in timber and loggingTourism is likely to increase as opportunities for clean water recreation decline elsewhere	<p>Goal: Ensure the sustainability of timber and fishing industries.</p> <ul style="list-style-type: none">Hold meetings with timber industry leaders in the region to discuss the predicted climate trends and identify management strategies.Require sustainable forest management plans for any commercial logging.Work with regional organizations to identify vulnerable breeding grounds for cold-water fish and conduct habitat improvements as feasible.
	<p>Goal: Invest in water-based and waterfront recreation</p> <ul style="list-style-type: none">Gather information from local businesses and visitor’s bureaus to understand the region’s tourism capacity and projected growth.Partner with recreation groups to plan appropriate locations for kayak, paddling, and boat launch areas.Enliven waterfront parks through events and transportation shuttles during the summer.Create additional marketing promotions to attract adventure tourism.Promote waterfront activities through event and recreation planning.Explore creative ways to reuse the City’s alleys for year-round recreation and access.Connect downtown to the waterfront through signage, wayfinding, and placemaking projects.Create and connect boardwalks for recreational use along the waterfront.Host community discussions on ways to help local businesses minimize economic losses and take advantage of increased summer tourism.
	<p>Goal: Prepare for a possible decrease in winter tourism due to more mild winters.</p> <ul style="list-style-type: none">Adapt winter-based recreation opportunities to year-round opportunities, such as the conversion of snowmobile trails to multi-use trails.
	<p>Goal: Address climate variability in recreation planning.</p> <ul style="list-style-type: none">Update recreation plan to include amenities that will reduce climate-induced stress in the population, such as splash pads and shaded parks.

1. Digital Elevation Model

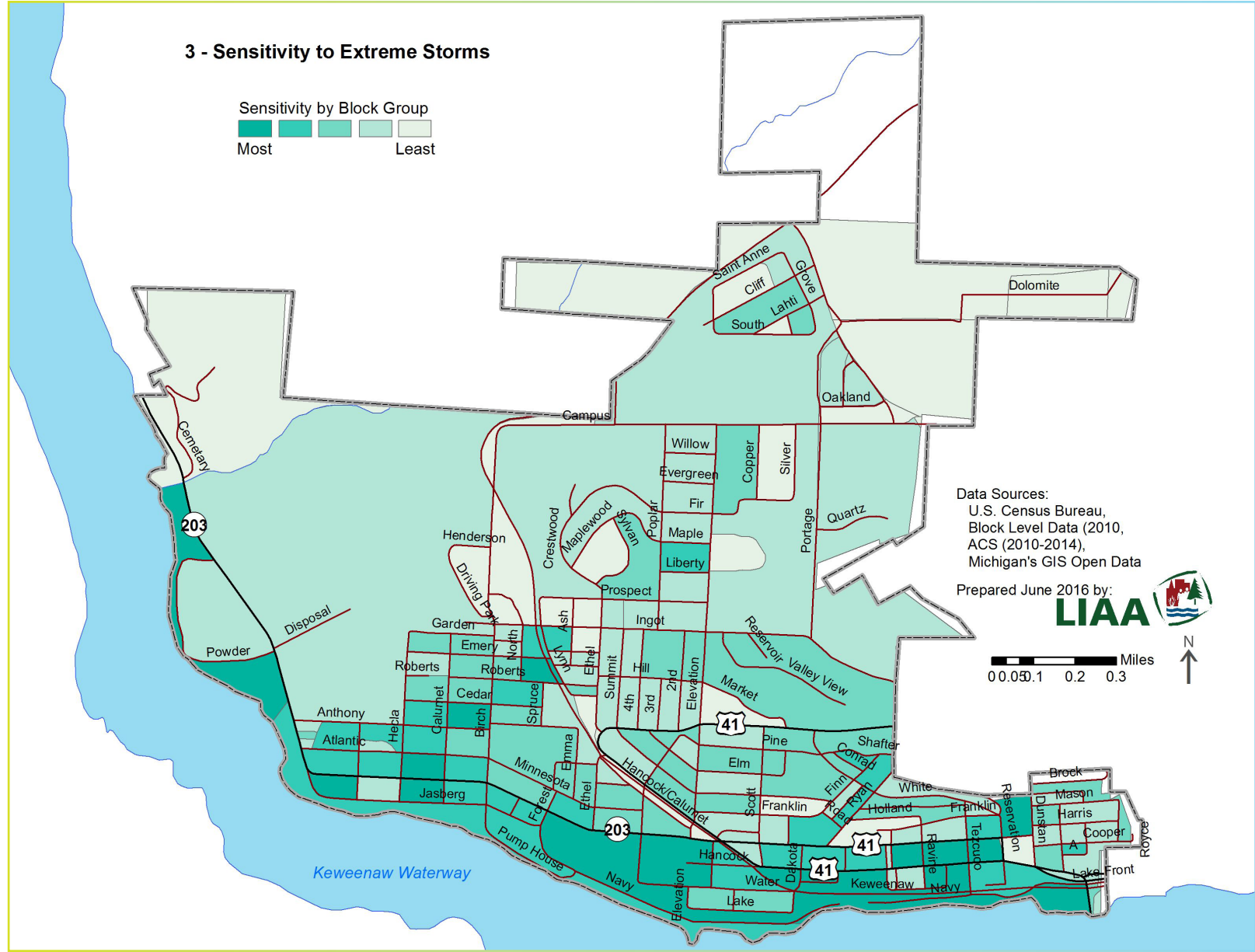
Report Maps



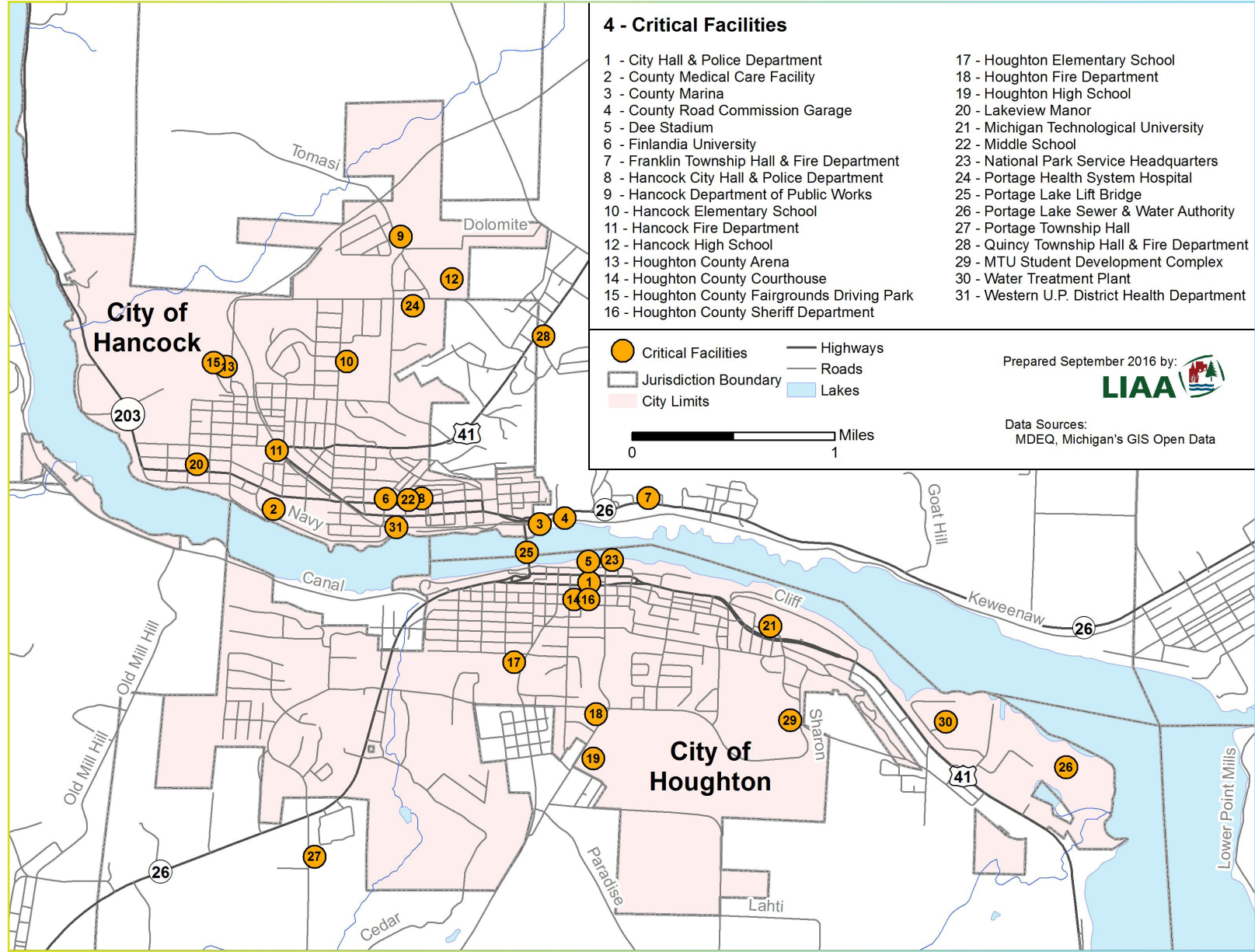
2. 1978 Land Use



3. Sensitivity to Extreme Weather in the City of Hancock



4. Critical Facilities in Hancock and Houghton



Photography

Credit Index

Cover

Kite Aerial Photography with Nathan Invincible, Nathan Miller
Cover – A snowy afternoon/evening in Hancock, Michigan. The city of Hancock has already received over 5-feet of snowfall for the 2013-2014 season, all before the official beginning of winter. Photo taken from a camera suspended from a kite - kite aerial photography (KAP)

Forward

City of Hancock
p.5: Letter – City Manager Glenn Anderson out on the Swedetown Creek Trail, which is a groomed trail by the Keweenaw Nordic Ski Club located in Hancock, Michigan.

Kite Aerial Photography with Nathan Invincible, Nathan Miller
p.5-6: Background Image – City of Hancock

Dividers

Kite Aerial Photography with Nathan Invincible, Nathan Miller
p. 8-9, 14-15, 20-21, 30-31, 40-41, 46-47, 50-51: Divider Background Image – City of Hancock

Chapter One

Leslie Kehmeier (www.explore.usnwc.org)
p. 10: Copper Harbor – Stairway to Heaven Bike Trail

Finlandia University
p. 11: City of Hancock

pixels.com
p. 12-13: Construction, Thumbs-Up, Solar Panels, Money, Map, Plan Meeting

Meg Lang, OHM Advisors
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Copper Country Community Arts Center (www.coppercountryarts.com)
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OHM Advisors, Heather Seyfarth
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Chapter Three

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p. 22: Background Image – Hancock Michigan

Mineralogical Society of America (www.minsocam.org)
p. 22: Miner’s Image (Circle) – Miners on mancar just up from the Quincy mine. The shafts were inclined so that a mancar rather than a cage (like an elevator - used in vertical shafts) were used to take miners down into the mine. Miners used candles or oil lamps to provide light underground during this period (later, they used carbide or electric lamps). Time was transition from “soft” hardhats to more rigid ones. The candles were often attached to the hats with clay.

UP Panorama, Eric Ollis
p. 22: Quincy Mine (Circle) – The Quincy Mine Shaft under Northern Lights with hoist house and boiler house in the background. The passing International Space Station can be seen left of the mine.

Finlandia University
p. 23: Heikinpaiva Parade

Michigan Miles
p. 24: McLain Strate Park Beach Erosion – Erosion has been one of those no-win deals for a long time.

Grand Superior Lodge (www.grandsuperior.com)
p. 25: Big Waves on the Big Lake (Background)

Morgan Sherburn
p. 25: Tree Pests (Circle Top)

pixels.com
p. 25: Glass of Water (Circle Middle)

Enterprise, Hunter D’Antuono
p. 25: Dead Whitefish (Circle Bottom)

Houghton County Medical Facility (www.houghtonmcf.com)
p. 26: Houghton County Elderly Resident Laughing

City of Hancock (www.cityof Hancock.com)
p. 27: Salt Shipment (Circle) – The salt for use on Western Upper Peninsula roads and highways, finally arrives in Hancock for the upcoming Winter season.

Michigan Technological University
p. 28: University Academic Logo

Finlandia University
p. 28: University Academic Logo

pasty.com
p. 28: Jutila Center – The Finlandia University Jutila Center Campus, at 200 Michigan St. in Hancock, is just a few blocks from the main campus. Located on the banks of Portage Waterway, the renovated former hospital was dedicated in 2005. The eight-story building houses Finlandia’s International School of Art & Design (ISAD) and the Lily I. Jutila Center for Global Design and Business (CGDB).

Chapter Four

OHM Advisors, Brockit, Inc.

p. 32: City of Hancock Street Construction Project

Construction Equipment Guide

p. 33: Reconstruction Images (Circles) – The Hebert Construction Co. is reconstructing a portion of U.S. 41 (Reservation and Quincy Streets) in the city of Hancock (Houghton County) in northern Michigan for the Michigan Department of Transportation (MDOT). The \$7.1 million Hancock Streetscape Project, which began on May 2 will be completed in July 2017.

Kevin Madson

p. 34: Lurn-Grove Park Outdoor Rink – February, 4, 2012 - “Attempted to drive around the area and take some pictures of outdoor ice rinks for the Keweenaw Convention & Visitors Bureau but found that most of them were melting. The temperatures here have been way above average, I believe it was 36 today! Looks like I’ll have to go back when it’s cooler.”

flickr.com, Igmaino

p. 35: McLain Strate Park Lake Superior Surfer

OHM Advisors, Brockit, Inc.

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Trail Genius (www.trailgenius.com)

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bing.com, State of Michigan,

OHM Advisors, & The City of Hancock

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3x3 Design (www.behance.net/3x3Design)

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brasada.com

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pixels.com

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pixels.com

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blog.homedepot.com

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thenorthernecho.co.uk

p. 44: Miner Statue

www.surfsauna.net

p. 44: Surf Sauna

pixels.com

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superioriceclimbingadventures.com

p. 44: Night Ice Climbing

funflicks.com

p. 44: Night Outdoor Movie

Michigan Trail Report

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aaronpeterson.net

p. 44: Northen Lights Mountain Biker

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Kite Aerial Photography with Nathan

Invincible, Nathan Miller

p. 48: Quincy Mine No. 2 Hoist House – Built in 1918, the Quincy Mine No. 2 Hoist House (newer version on the left) contains the largest steam hoisting engine in the world. It is now a part of the Keweenaw National Historic Park and is being preserved so that future generations can learn about the Keweenaw Peninsula’s copper mining heritage.

ryanstreetgarden.blogspot.com

p. 49: Ryan Street Community Garden Workers

K.C. Bonkers (www.facebook.com/KCBonkers)

p. 51: K.C. Bonkers’ Latte & Games

Milly’s (www.facebook.com/Millys-Hancock)

p. 51: Milly’s Sign

Alice Roache, OHM Advisors

p. 51: Lake Superior Ice Fishing

pixels.com

p. 52: Work Plan

Terry Dahl, OHM Advisors

p. 57: The Great Deer Chase Mountain Bike Race (Downtown Hancock) & Hiking on the Holy Transfiguration Skete Monk’s Hiking Trail at Jacob’s Creek (Far Left & Far Right Images)

ProNav (www.pronavmarine.com)

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torimarket.blogspot.com

p. 60: Vendor at the Tori Market

Kitchen Joy (www.kitchenjoyblog.com)

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LIAA & OHM Advisors

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NOAA

p. 71: Figure 2.1: Average Annual Temperature in the Western U.P., 1895-2015 – NOAA National Center for Environmental Information Climate at a Glance: Global Time Series, published July 2016, retrieved on August 9, 2016 (www.ncdc.noaa.gov/cag)

Global Change Research Program

p. 72: Figure 2.2: U.S. Global Change Research Program. Global Climate Change in the United States, 2009. Cambridge University Press, Cambridge, MA.

NOAA

p. 72: Figure 2.3: NOAA National Center for Environmental Information Climate at a Glance: Global Time Series, published July 2016, retrieved on August 9, 2016 from (www.ncdc.noaa.gov/cag)

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p. 73: E.J. McLain State Park Lake Superior shoreline erosion.

Fox 11 News (www.fox11online.com)

p. 74: Highways closed in the U.P. Due to Flooding Highways closed in the U.P. due to flooding. About 35-feet of M-94 in Marquette County, Michigan washed out during flash flooding on Oct. 18, 2016. (SkyFox)

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p. 75: E.J. McLain State Park

Mike Killion

p. 76, Snow Surfer (Circle)

pixels.com

p. 76, Fish in a Bucket (Circle)

Midwest Living (www.midwestliving.com)

p. 78: Fall Car Ride

Wikimedia Commons, Thomas Nugent

p. 79: Canada thistle is an example of an invasive, exotic species that has been documented within or near the Central Keweenaw forests. The Canada thistle has a very deep root system that threatens to crowd out native plants and reduce crop yields when found in agricultural areas.

Wikimedia Commons, Chris857

p. 79: Forest composition is changing due to warmer temperatures and may drive out many tree species that produce beautiful fall colors, including sugar maple.

Michigan Department of Health & Human Services

p. 80: Michigan 2016 Lyme Disease Risk Map – This map is produced by the Michigan Department of Health and Human Services and shows the counties where ticks infected with Lyme disease have been found (dark red) and counties with potential risk. Houghton County is listed as endemic with Lyme disease.

Michigan Sea Grant

p. 80: Whitefish are a popular Lake Superior export and generate the greatest income for Great Lakes fisheries. Whitefish is one example of a fish that may have trouble adapting to rising water temperatures. A number of groups, including Michigan Sea Grant, have been working on restoration projects to stabilize whitefish populations in Lake Superior.

NASA

p. 82: Polar vortexes and extreme cold can damage water infrastructure.

UP Health System

p. 83: UP Health System – Portage Main Campus in Hancock, are critical facilities for vulnerable populations in times of emergency.

Wikimedia Commons, Steve Depolo

p. 84: Flooding in Grand Rapids in 2013 exceeded the capacity of emergency response.

Gary Jackson (mlive.com)

p. 86: Road washouts like this one occurred throughout the Western U.P. as a result of heavy storms in July 2016.

Kite Aerial Photography with Nathan Invincible, Nathan Miller

p. 86: The Portage Lake Lift Bridge is one of the largest in the country. Built in the 1950s, thousands of people rely on the Portage Lake Lift Bridge for transportation to work, school and recreation.

LCNewsgroup.com

p. 87: Heavy rain and snow over abandoned mines can increase the risk of subsidence.

michigan.org, gosnowmobiling.org

p. 88: Snowmobiling is a popular draw for tourism in the Upper Peninsula. Unfortunately, it seems likely that climate change may reduce the number of days each year with snow on the ground in the Western U.P. However, other places are sure to have even less snow than the Western U.P.

MISH Watersports (www.mishwatersports.com)

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Alice Roache, OHM Advisors

p. 91: Lake Superior Backpacking

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LIAA, USGS, Michigan’s GIS Open Data

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UP Panorama, Eric Ollis

p. 86, Keweenaw Water Way

