City of Wasilla
2023 Hazard Mitigation Plan Update

July 6, 2023

Prepared by:

City of Wasilla Planning Team
City of Wasilla
Fairweather Science, LLC

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Acronyms/Abbreviations

°F	Degrees Fahrenheit
AICC	Alaska Interagency Coordination Center
AK	Alaska
BRIC	Building Resilient Infrastructure and Communities
CFR	Code Of Federal Regulations
City	City of Wasilla
DCCED	Department of Commerce, Community, and Economic Development
DCI	Disaster Cost Index
DCRA	Division of Community and Regional Affairs
DGGS	Division of Geological and Geophysical Survey
DHS	Department of Homeland Security
DHS&EM	Division of Homeland Security and Emergency Management
DMA 2000	Disaster Mitigation Act Of 2000
DMVA	Department of Military and Veterans Affairs
ENSO	El Niño/La Niña Southern Oscillation
EPA	Environmental Protection Agency
EQ	Earthquake
FEMA	Federal Emergency Management Agency
FL	Flood
ft	Feet
GIS	Geographic Information System
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
Kts	Knots
M	Magnitude
MAP	Mitigation Action Plan
Mat-Su	Matanuska-Susitna (Valley or Borough)
MH	Multi-Hazard
MMI	Modified Mercalli Intensity
mph	Miles Per Hour
MSB	Matanuska-Susitna Borough
NCAR CCSM4	National Center for Atmospheric Research Community Climate System Model 4.0
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NWS	National Weather Service
PGA	Peak Ground Acceleration
RCP(s)	Representative Concentration Pathway(s)
SHMP	2018 Alaska State Hazard Mitigation Plan
SNAP	Scenarios Network for Alaska + Arctic Planning
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
SW	Severe Weather
UAF	University of Alaska Fairbanks
US, U.S., or USA	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USDM	U.S. Drought Monitor

Acronyms/Abbreviations

USGCRP	United States Global Change Research Program
USGS	United States Geological Survey
VAF	Volcanic Ashfall
WF/CF	Wildland Fire/Community Fire

EXECUTIVE SUMMARY

The purpose of hazard mitigation planning is to reduce or eliminate long-term risk to people and property from hazards. The City of Wasilla (City) updated their Hazard Mitigation Plan (HMP) to make the residents of the City area less vulnerable to future hazard events. This plan was prepared following the requirements of the Disaster Mitigation Act of 2000 so that the City would be eligible for the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance (HMA) grant programs and other federal programs.

The City followed a planning process prescribed by FEMA, which began with the formation of a Hazard Mitigation Planning Team comprised of key City representatives across various departments. The Planning Team reviewed the 2018 HMP to identify areas of the Plan that needed to be updated; conducted a risk assessment review that identified and profiled hazards that pose a risk to the City; assessed their vulnerability to those hazards; and examined the capabilities currently in place to mitigate them.

The people, property, and lands that the community members depend on are vulnerable to several hazards that are identified, profiled, and analyzed within this Plan. Earthquake, severe weather, wildland and community fires, flood, and volcanic ashfall are among the hazards that can have a significant impact on the people, property, and lands in the City.

The hazards of greatest concern to the Planning Team are severe weather, specifically high winds, wildland and community fire, and earthquake.

Based upon the risk assessment review and goal setting process, the Planning Team developed the following overarching goals for this Plan:

1. Minimize loss of life and property from natural hazard events
2. Increase public awareness of risk from natural disasters
3. Protect public health and safety
4. Promote rapid hazard disaster recovery

The 2023 HMP Update establishes a series of specific mitigation strategies that were developed collaboratively with the intent to meet the identified mitigation goals, by the Planning Team. These strategies provide a basis for continued planning to develop specific action plans. These will be implemented over time and can provide a means to measure progress towards hazard reduction. The Plan also describes future update and maintenance procedures.

Participating Jurisdiction(s): City of Wasilla

Year HMP Completed: 2023

Executive Summary Snapshot

	Earthquake	Severe Weather	Wildland and Community Fire	Volcanic Ashfall	Flood
# of people:	9,227	9,227	9,227	9,227	24
# of CF:	33	33	33	33	0
$ of CF:	$402,022,254	$402,022,254	$402,022,254	$402,022,254	0
# of residences	4,264	4,264	4,264	4,264	8
$ of residences	$2.6 billion	$2.6 billion	$2.6 billion	$2.6 billion	$3,375,100*
Probability	H	H	H	L	L
Extent (Magnitude/Severity)	Critical to Catastrophic	Limited to Critical	Critical	Negligible	Limited
Recent Development	Shoppes at Sun Mountain shopping center (including Fred Meyer fuel station, The Salvation Army, Six Roblee's Inc., Allen & Petersen Appliance Center, The Transmission Center, The Trout House, The Fish House, Windbreak Hotel, Tacos Cancun Mexican Grill, Cake Studio) Parks Highway reconstruction and improvements.				None
Planned Development	Stormwater improvements, utility relocation, park, trail, cemetery, and campground improvements, culvert replacement, rail crossing improvements, WW treatment plant improvements, septic tank replacements, sewer system repair, waterline redundancy project, water system repairs, new water towers, airport improvements, Sports Center improvements				None

	Earthquake	Severe Weather	Wildland and Community Fire	Volcanic Ashfall	Flood
Priority Mitigation Actions	Evaluate critical public facilities with significant seismic vulnerabilities and complete retrofit. (e.g., public works buildings, potable water systems, wastewater systems, electric power systems, heritage centers (alternate EOC), etc.) Install non-structural seismic restraints for large furniture such as bookcases, filing cabinets, heavy televisions, and appliances in critical facilities to prevent toppling damage and resultant injuries to small children, elderly, and pets.	Encourage the installation of damage- resistant glass in vulnerable critical facilities by including a requirement in future RFPs for contractors to use damage-resistant glass. Existing critical facilities will be evaluated by the facility owner and retrofitted. Reduce or eliminate glaciation on the Parks Highway caused by wind blowing across the frozen surface of Wasilla Lake by constructing a seasonal snow fence/wind screen. Review accident report information for roads and intersections with a high number of weather-related accidents to determine if change or enhancement of road design will reduce accidents or severity of accidents. Assign City Public Works Department to work with ADOT/PF to fund identified changes. Provide NOAA weather radios to all government buildings and medical facilities; work with staff to	Notify all landowners whose property is at high risk for fire due to weeds and trash and encourage them to remedy the problem. The City intends to partner with the MSB to spread awareness of the FireWise program. Include a link to local fire danger information on the City website. Remove beetle killed trees within City limits. Coordinate with the MSB to participate in future updates of the Community Wildfire Protection Plan (CWPP). Develop a spruce bark beetle trap log program with City limits. Spray affected trees with environmentally safe pesticide to kill birch leafminer.	Provide information on where to access information about the wind direction and the amount of ash in the atmosphere. Assess critical facilities for appropriate ash loading capacity and ensure all roofs can withstand ash load and retrofit.	Buyout three residential properties in the Snowmelt Flood Area that flood annually. Install water level monitoring sensors at the Cottonwood Creek and E. Glenwood Ave crossing.

	Earthquake	Severe Weather	Wildland and Community Fire	Volcanic Ashfall	Flood
		develop a process to disseminate information to ensure an early warning of potential weather events.			

H/M/L= High, Medium, Low

*This number includes estimations for the 5 residences in the 100-yr flood zone as well as the 3 properties in the Snowmelt Flood Area.

	Facility	Facility Owner
Government	Wasilla City Hall	City
	U.S. Post Office	Federal
	Wasilla Public Works Shop/Parks Building	City
	Wasilla Roads Shop	City
	Wasilla Airport Shop	City
Emergency Services	Wasilla Police Department	MSB
	Central Mat-Su Fire Department (Station 6-1)	MSB
	MATCOM Dispatch Center	MSB
Medical Facilities	Mat-Su Regional Urgent Care	MSB
	Wasilla Medical Clinic	City
	Benteh Nuutah Valley Native Primary Care Center	Southcentral Foundation
Shelters	Wasilla High School	MSB
	Wasilla Middle School	MSB
	Iditarod Elementary School	MSB
	Burchell High School	MSB
	Menard Sports Complex	City
	City of Wasilla Library	City
	Wasilla Museum & Visitors Center	City
	Museum Townsite Buildings	City
	Dorothy G. Page Museum	City
Transportation Facilities	Wasilla Airport	City
	Mat-Su Community Transit (MASCOT)	MSB
	Alaska Railroad	AKRR
Utilities & Communication	Wastewater Treatment	City
	Spruce Well & Reservoir	City
	Bumpus Well & Reservoir	City
	Iditarod Well & Reservoir	City
	Susitna Well & Reservoir	City
	Richmond Hills Booster Station	City
	Water Pressure Reducing Valve Building	City
	Wasilla Downtown Bulk Water Station	City
	MTS Sub-station	MEA
	MEA Herning Sub-station	MEA

	Facility	Facility Owner
Vulnerable Populations	Wasilla Area Seniors, Inc. (WASI) (assisted living)	WASI
	Primrose Retirement Community of Alaska (nursing home, assisted living, independent living, townhome villas)	Primrose Senior Holdings
	Briar Rose Assisted Living Facility	Private
	Comfort Rose Assisted Living Facility	Private
National Register of Historic Places	Teeland Country Store (now Krazy Moose Subs)	City
	Oscar and Blanche Tryck House	Tryck Joint Revicable
	Wasilla Depot (now Chamber of Commerce)	City
	Wasilla's First School House (now in historic townsite behind museum)	City
	Whitney Section House (now located at the Museum of Transportation and Industry (MATI))	Museum AK Trans & Ind, Inc.

FEMA APPROVAL LETTER

PLAN DISTRIBUTION LIST

The City of Wasilla's 2023 Hazard Mitigation Plan Update is distributed to:

- City of Wasilla
- Federal Emergency Management Agency (FEMA)
- State of Alaska Division of Military and Veterans Affairs (DMVA), Department of Homeland Security and Emergency Management (DHS&EM)

RECORD OF CHANGES

Hazard Mitigation Plans should be continually updated as circumstances change, new data becomes available, hazards are mitigated, etc. This Record of Changes Table is included to summarize and document changes to this document as they are made throughout time.

Change ID	Description of Changes	Date
01	Updated October 2018 HMP	XX

1. PLAN INTRODUCTION AND BACKGROUND

Hazard Mitigation planning is required under the Disaster Mitigation Act of 2000 (DMA 2000) which identified the need for Tribal, Local, and State jurisdictions to coordinate mitigation planning and implement mitigation efforts. It also provided the legal basis for the Federal Emergency Management Agency's (FEMA) mitigation plan requirements for mitigation grant assistance.

1.1 PURPOSE

Disasters may cause loss of life, damage buildings and infrastructure, and have devastating effects on a community's economic, social, and environmental well-being. The City intends to reduce or eliminate the long-term risk to life and property from hazards by implementing a Hazard Mitigation Plan. The Plan is intended to reduce community risk and promote long-term sustainability by:

- Protecting the public and preventing loss of life and injury.
- Reducing harm to existing and future community assets.
- Preventing damage to a community's cultural, economic, and environmental assets.
- Minimize downtime and speed up recovery following disasters.
- Reducing the costs of disaster response and recovery and the exposure of first responders to risk.
- Help accomplish other community objectives, such as leveraging capital improvements, infrastructure protection, and economic resiliency.

1.2 HAZARD MITIGATION PLAN LAYOUT DESCRIPTION

The City of Wasilla's 2023 Hazard Mitigation Plan (HMP) Update consists of the following sections and appendices:

- **Section 1- Introduction and Background**

  Defines what a hazard mitigation plan is, outlines federal requirements and authorities, and introduces the Hazard Mitigation Assistance program. This program lists the various grant programs and their historical funding levels. Provides Wasilla's general history and background, including historical trends for population, the demographic and economic conditions that have shaped the area, as well as the government and leadership within the City.

- **Section 2- Planning Process**

  Describes the planning process for the HMP update, identifies the City's Planning Team members, lists the meetings held as part of the planning process, and lists the key stakeholders within the surrounding area. This section documents public outreach activities performed by the City (support documents are in Appendix D); including document reviews and relevant plans, reports, and other appropriate information data utilized for HMP update development; actions that the City plans to implement to assure continued public participation; and their methods and schedule for keeping the plan current.

- **Section 3- Risk Assessment/Hazard Analysis/Summary of Vulnerability**

  Describes the process through which the Planning Team identified, screened, and selected the hazards for profiling in this version of the HMP Update. The hazard analysis includes the nature of the hazard, previous occurrences (history), location, extent and impact of past events, and future event recurrence probability for each hazard. When available, historical impact and hazard location figures are included.

  Identifies the City's potentially vulnerable assets—people, critical facilities, critical infrastructure, and residential and non-residential buildings (where available). The resulting information identifies

the full range of hazards that the community could face and the potential damages, economic losses, and social impacts. Land use and development trends are also discussed.

- **Section 4- Mitigation Strategy**

  Defines the City's mitigation strategy which provides a blueprint for reducing the potential losses identified in the vulnerability analysis. This section lists the community's policies, programs, available resources, and governmental authorities.

  The Planning Team developed a list of specific mitigation goals and potential actions to address the risks facing the City. Mitigation actions include structural projects, emergency services, natural resource protection strategies, property protection techniques, preventive initiatives, and public information and awareness activities.

- **Section 5- Plan Maintenance**

  Describes the formal Plan maintenance process to ensure that the HMP remains an active and applicable document. This section includes an explanation of how the City's Planning Team intends to organize their efforts to ensure that improvements and revisions to the HMP occur in an efficient, well-managed, and coordinated manner.

- **Section 6- Plan Update**

  This section provides an explanation of how the Planning Team intends to organize their efforts to ensure that improvements and revisions to the 2023 HMP occur in an efficient, well-managed, and coordinated manner.

- **Section 7- Plan Adoption**

  Describes the City's adoption process of the HMP Update. Supporting documentation can be found in Appendix C.

- **Section 8- References**

  Lists reference materials and resources used to prepare this HMP Update.

- **Section 9- Appendices**

  Appendix A: Delineates federal, state, and other potential mitigation funding sources. This section will aid the City with researching and applying for funds to implement their mitigation strategy.

  Appendix B: Provides the FEMA Local Mitigation Plan Review Tool, which documents compliance with FEMA criteria.

  Appendix C: Provides the City's adoption resolution.

  Appendix D: Provides public outreach information, including newsletters.

1.3 COMMUNITY PLANNING AREA

This section describes Wasilla's location, history, climate, natural environment, transportation, demographic, and economic information.

1.3.1 LOCATION

The City of Wasilla is the 4th largest city in Alaska and is located midway between the Matanuska and Susitna Valleys in southcentral Alaska on the George Parks Highway at 61º 58' North Latitude and 149º 43' West Longitude. The City lies south of the Talkeetna Mountains and about 12 miles north of the Knik Arm on the Cook Inlet and is located along the Alaska Railroad main line from Anchorage to Fairbanks. Wasilla is approximately 43 miles north of Anchorage, which is about one hour's drive depending on the time of year and weather conditions. The City's boundaries encompass approximately 13 square miles of land and 0.7 square miles of water.

Figure 1-1 Wasilla Location Map

Current Population: 9,098 (2021 Census); 9,227 (2021 Department of Commerce, Community, and Economic Development [DCCED] estimate)

- Pronunciation: wah sill' uh
- Incorporation Type: First Class City
- Borough: Matanuska-Susitna Borough
- Census Area: Matanuska-Susitna Census Area

1.3.2 HISTORY

The area surrounding Wasilla was called "Benteh", meaning many lakes, by the Dena'ina, the Athabaskans who lived in this part of Alaska until the latter part of the 19th century. The numerous lakes and streams in the area provided ample fishing for indigenous populations, and the area became a popular wintering ground for small semi-permanent native villages. Trails connected these villages to hunting grounds in the Susitna Valley and the Talkeetna Mountains, while others linked the villages to the Ahtna people north of the Matanuska River.

The town site of Wasilla is named after Chief Wasilla, a local Dena'ina chief and shaman, who died in 1907. Wasilla's history as a community date back to 1916 when the Alaska Engineering Commission constructed a work camp at the intersection of the Alaska Railroad and the Carle Wagon trail (now known as Wasilla-Fishhook Road) which linked the coastal community of Knik with the Willow Creek mining district. The work camp housed men engaged in surveying, clearing, and establishing the rail line that would eventually connect the port of Seward to Fairbanks. After platting the town site in June 1917, the Alaska Engineering Commission auctioned off town site lots from the railroad platform in Wasilla. This new community led to the demise of the older settlement at Knik. Once established, Wasilla became the most important distribution point in the Valley.

Homesteading and the founding of the Matanuska Colony under President Roosevelt's New Deal increased the population in the area. Several colony farms were located near Wasilla. World War II ended the mining boom, and drained workers from local farms and businesses. However, economic activity increased during this period due to an influx of military personnel to area bases. Many of these soldiers chose to stay, or returned to the Wasilla area, at the end of their enlistment. These residents formed farms and other businesses.

Construction of the George Parks Highway through Wasilla in the early 1970s provided direct access to and from Anchorage. This enabled workers and their families to live in the Wasilla area and commute to jobs in Anchorage. Support and service industries began to develop in the area to meet the needs of these new residents. The Parks Highway is also heavily used throughout the year by tourist and resident Alaskans traveling between Anchorage and Fairbanks and to Denali National Park. The City was incorporated in 1974 as a second-class City under Alaska statutes and has continued to develop as the retail and commercial hub of the central Matanuska-Susitna Valley. Wasilla became a first-class City in 1984.

1.3.3 CLIMATE

Wasilla's climate is transitional between the extremes of Interior Alaska and the wet maritime conditions found along the coastal areas. The Chugach and Talkeetna Mountains, and the Alaska Range generally protect Wasilla from the extreme cold experienced by Interior Alaska. The City averages 15.27 inches of precipitation per year, and an average of 47.7 inches of snowfall per year. On average, temperatures range from 4.5 to 21.6 degrees Fahrenheit (°F) in January and from 48.2ºF to 67.4ºF in July. The frost-free period in spring and summer averages 115 days, with the first frost usually arriving by September 1 each year.

Table 1-1 shows average weather data for the Wasilla area.

Table 1-1 Average Weather Data for the Wasilla Area (1991-2020)

Season	Max Temp (ºF)	Min Temp (ºF)	Avg Temp (ºF)	Rainfall (in)	Snow (in)
Annual	45.4	28.0	36.7	14.37	49.5
Winter	25.3	9.3	17.3	2.61	28.1
Spring	47.0	27.5	37.2	1.59	9.5
Summer	66.4	48.3	57.3	5.62	0.0
Autumn	43.0	27.1	35.0	4.55	11.9

Data collected at the Matanuska Experiment Farm and Extension Center, roughly 7 miles east of the City of Wasilla.
Source: NCEI 2023- U.S. Climate Normals Quick Access

1.3.4 NATURAL ENVIRONMENT

Wasilla is surrounded by the Talkeetna and Chugach Mountain ranges. The area owes its varied setting to the glacial forces that shaped the area during the end of the last ice age. Several glacial advances and retreats left a complex system of hills, ridges, glades, and lowlands that define the topography. Landforms in and around Wasilla consist of undulating ridges of glacial till and flat benches of sand and gravel. Elevation varies from 300 to 500 feet above sea level within the City boundaries. Generally, the terrain gradually rises from south to north. The downtown area is relatively flat.

The most prominent water features are Wasilla Lake and Lucille Lake (or Lucile Lake, Lake Lucile). Cottonwood Creek, Lucille Creek, and several smaller streams traverse the area.

Moose are abundant in the Wasilla area and are found in stream valleys, lowlands, and south facing hills foraging on willow, birch, and aspen. All five species of pacific salmon are present as King, Coho, Sockeye, Pink, and Chum salmon pass through the City streams and lakes each year. Wasilla's lakes, creeks, and streams provide important habitat for migration, spawning, and rearing of these anadromous fish. Rainbow, Dolly Varden, and Cutthroat trout are also present. Spawning salmon draw both brown and black bears to the Wasilla area each year where they take advantage of this readily available food source. Small game such as fox, rabbit, coyote, mink, weasel, muskrat, and beaver are also abundant.

1.3.5 TRANSPORTATION

The George Parks Highway and the Glenn Highway connect the City of Wasilla to Palmer, Anchorage, Fairbanks, and Canada. While the Matanuska-Susitna Borough is larger than West Virginia, approximately 90% of residents live along the 55-mile stretch of the road system between Willow on the Parks Highway and Sutton on the Glenn Highway.

Alaska Railroad Corporation, a full-service railroad, runs passenger and freight service between Anchorage and Fairbanks. Projects are currently underway to reduce the travel time between Wasilla and Anchorage from 90 to 58 minutes. A Commuter Rail Study and Operations Plan is underway to create a profile of Wasilla residents and other Alaskans who would use a commuter rail service. Some of the essential issues to be addressed include questions about location of depots and park and rides, transport of commuters from the train depot to the workplace, ticket prices, and facilities and equipment upgrades.

The Matanuska-Susitna (Mat-Su) Community Transit (MASCOT) a private non-profit corporation, has been in operation since March 1999 and provides opportunities for trips to destinations around Wasilla, and to other communities such as Palmer and Anchorage. MASCOT provides a variety of transportation options such as a Fixed Route System for point-to-point service, a Demand Response System to lower density population areas such as Big Lake or Houston, and Door to Door Paratransit for seniors and disabled persons. MASCOT's commuter service links with the PeopleMover bus system in Anchorage with shared daily or monthly passes that allow free movement between both systems. At present, MASCOT has a ridership of almost 65,000 rides a year.

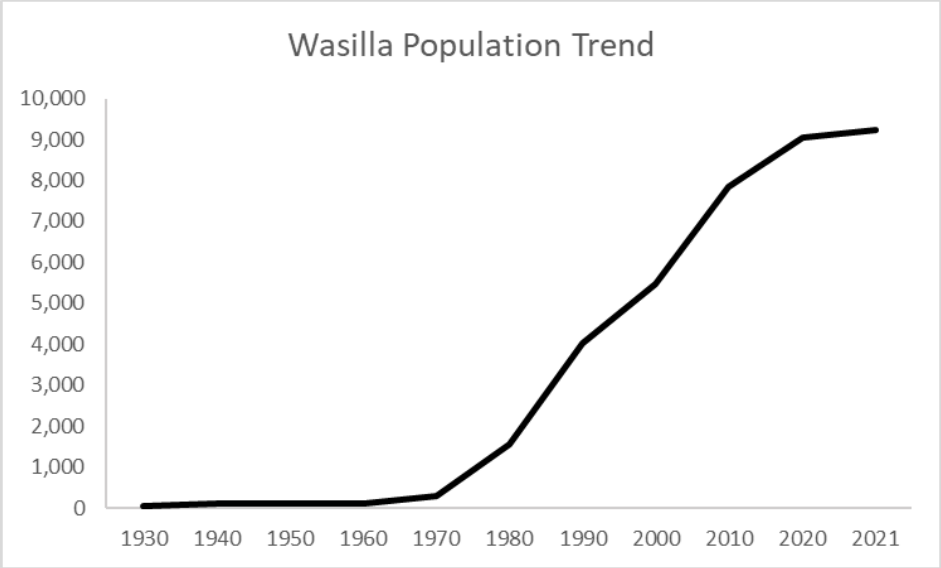
Wasilla Airport was constructed in 1993 on 370 acres owned by the City. The paved 3,700-foot runway for general aviation aircraft which is about 15 minutes from the heart of town replaced a previous smaller gravel airstrip located in the center of town. The Wasilla Airport includes a radio-controlled runway, taxiways, security lighting, engine and airframe repair and fuel service available on site, and Air-Taxi Services. Lease lots are available and paved lease spaces for aircraft tie-down are also available. Floatplanes land at Wasilla Lake, Jacobsen Lake, and Lake Lucille. In addition, 10 private airstrips can be found in the vicinity. Anchorage International Airport with commercial jet service is a little over an hour away.

Many residents of the MSB commute daily to Anchorage for work- 34,471 vehicles pass daily through a traffic bottleneck, near the Parks and Palmer-Wasilla Highway intersection (2011 Wasilla Comprehensive Plan).

1.3.6 DEMOGRAPHICS

Wasilla is one of the fastest-growing cities in Alaska. Wasilla's 2021 population was estimated to be 9,098 by the 2021 Census; the Alaska DCCED estimates the 2021 population to be 9,227. The 2021 Census data indicated that the population of Wasilla increased by 16.18% from 2010 to 2021 and from 2000 to 2021, the population increased by 488.08%. In 2009, the State projected that Wasilla would grow at an average annual rate of 3.1% until 2034.

Figure 1-2 illustrates the City's historical population.

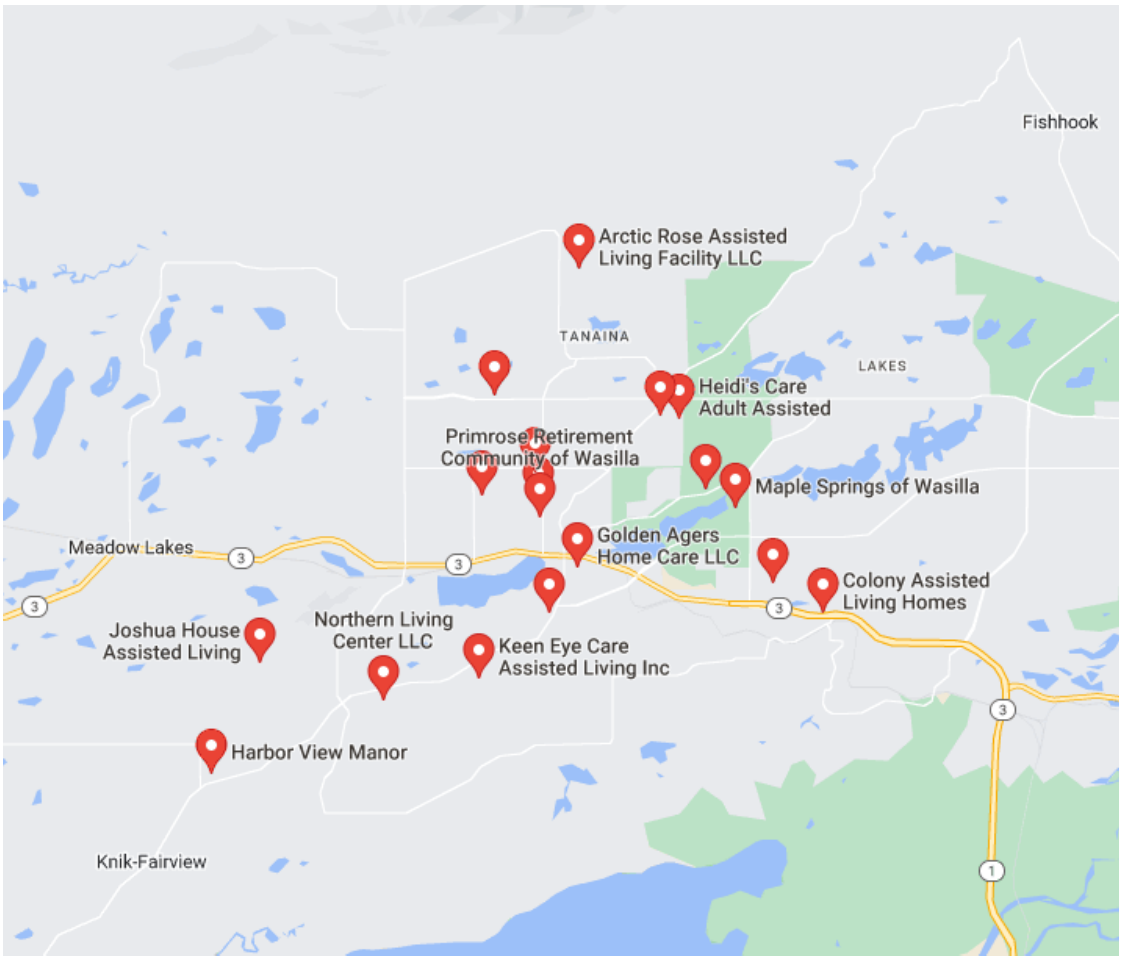


Source: DCRA 2023

Figure 1-2 Historical Population of Wasilla

The 2021 U.S. Census found that 25% of the City's population was younger than 18 as compared to 24.5% for the State (2022 estimate) and 22.2% for the nation (2022 estimate). The median age in 2021 for Wasilla residents was 36.7. The 2021 Census reported a total of 3,900 households in Wasilla with an average household size of 2.32.

Like the rest of the state, Wasilla's population is aging. In 2000, the U.S. Census reported 6.7% of the City's residents were age 65 or older. By 2010, the percentage of residents 65 or older in Wasilla had grown to 10.7%. The 2021 Census found 16.58% of Wasilla's population to be 65 or older. The continued development of quality senior residential facilities centered around the core area of the City may maintain this trend during this decade. Figure 1-3 shows a map of senior or assisted living facilities in Wasilla. There are 4 nursing home/assisted living facilitates located within City limits.



The 4 senior/assisted living facilities in City limits are Wasilla Area Seniors, Inc. (WASI), Primrose Retirement Community, Briar Rose Assisted Living Facility, and Comfort Rose Assisted Living Facility.
Source: Google Maps 2023

Figure 1-3 Senior and Assisted Living Facilities in Wasilla as of April 2023

1.3.7 ECONOMY

Wasilla's expanding economy offers a wide range of employment and business development opportunities, particularly in the retail and services industries. Wasilla is the center of commercial activity in the Mat-Su Borough. Retail and shopping outlets abound in several malls and along the shopping strip; several statewide banks have outlets and service branches here, and utility, real estate, insurance, and medical service organizations consider Wasilla their home base.

Retail shopping outlets provide local employment opportunities to many local residents. Large retailers include Walmart, Fred Meyer, Carrs (Safeway), and hardware giants Home Depot and Lowes. Wasilla's unique location makes it the retail and service center for an area, that extends far beyond its borders and beyond what would be expected from its population. It is a central shopping area not only for residents and tourists, but also for Alaskans from remote communities and rural areas. Wasilla is home to branches of several statewide banks as well as utility, real estate, insurance, and medical organizations. A growing number of automobile dealerships cater to local residents and compete successfully for Anchorage business.

Commercial and industrial activities include steel fabrication, agriculture, concrete products, building materials distribution, millwork, and building truss manufacture. Because of the location of several hundred small, private aircraft in the Wasilla-Palmer area, aircraft maintenance has also become a very important

service. Catering to the tourist trade is another huge enterprise in Wasilla. There will be found hotels, motels and bed and breakfast operations and in total, over 100 lodging rooms are available in the Greater Wasilla marketing area.

Industrial activities that contribute to the economic base include steel fabrication, agriculture, manufacturing of concrete products and wood products, and distribution of building materials. Robust residential and commercial markets have kept the construction industry busy, making it a significant contributor to job growth. Tourism and recreation services are important sources of income and revenue. Every year, thousands of visitors vacation in the area. Flight services and aircraft support are especially important—there are several hundred small, private aircraft in the area.

The 2021 Census revealed that the total potential work force (ages 16-64) in Wasilla was 5,579, of which, 4,066 residents were employed. The unemployment rate in 2021 was 27.12%. The 5-year average from 2016-2020 revealed that approximately 1,387 residents live below the poverty line and 1,927 residents live below 125% of the poverty level. The median family income in 2021 was $80,905.

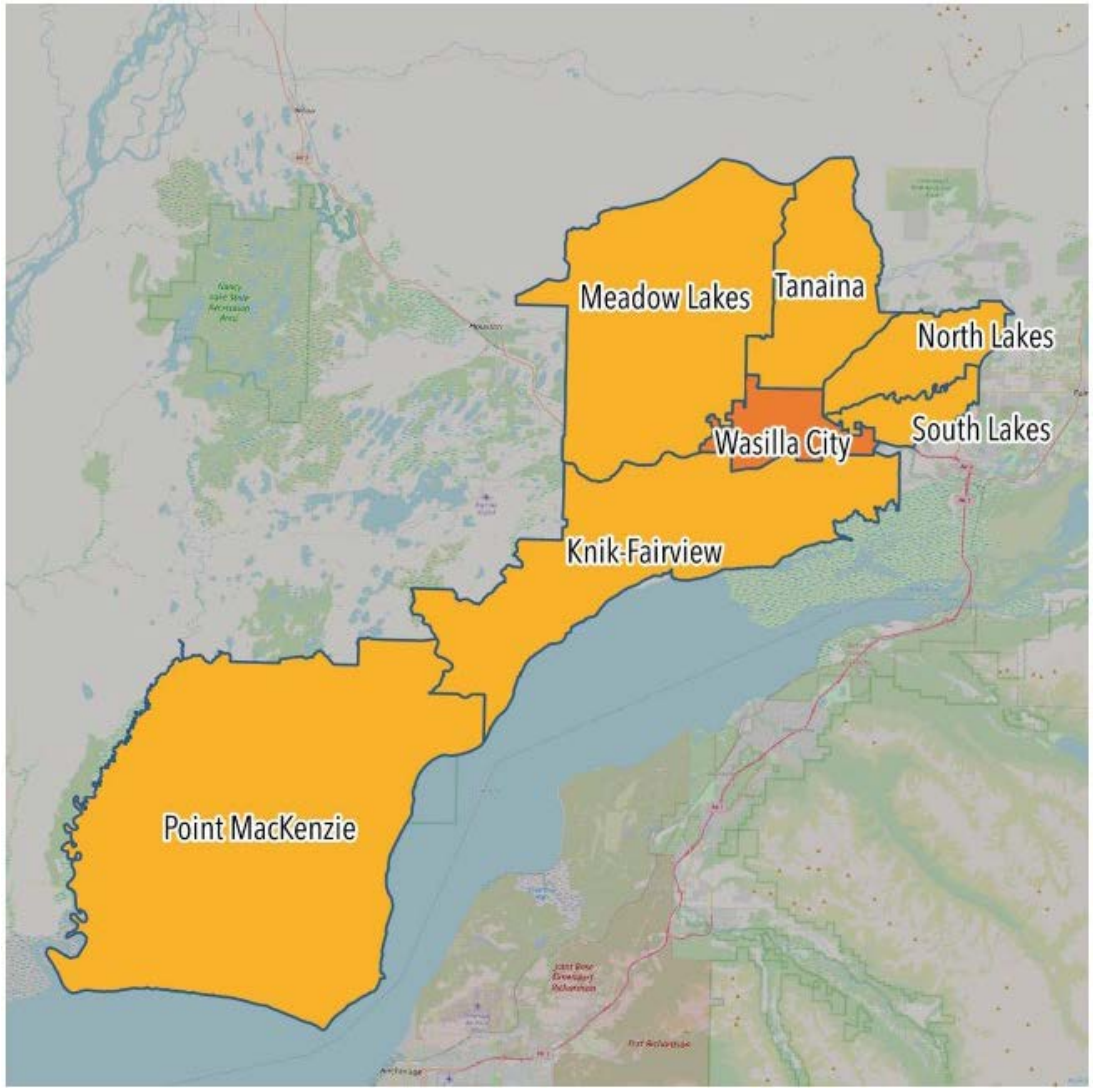
Table 1-2 summarizes workforce, unemployment, and median family income for the City of Wasilla from 2016-2021.

Table 1-2 Wasilla Workforce, Unemployment, and Median Family Income Statistics (2016-2021)

Year	Workforce (16-64 years old)	# of workforce that did not work	Unemployment Rate (workforce/did not work)	Median Family Income
2021	5,579	1,513	27%	$80,905
2020	6,327	1,850	29%	$82,966
2019	6,139	1,900	31%	$72,393
2018	5,963	1,941	33%	$70,000
2017	5,774	1,791	31%	$75,450
2016	5,702	1,650	29%	$77,321

Source: US Census: ACS 5-year estimates subject tables.
Table S2303: Work status in the past 12 months, Table S1901: Income in the past 12 months (in yearly inflation-adjusted dollars)

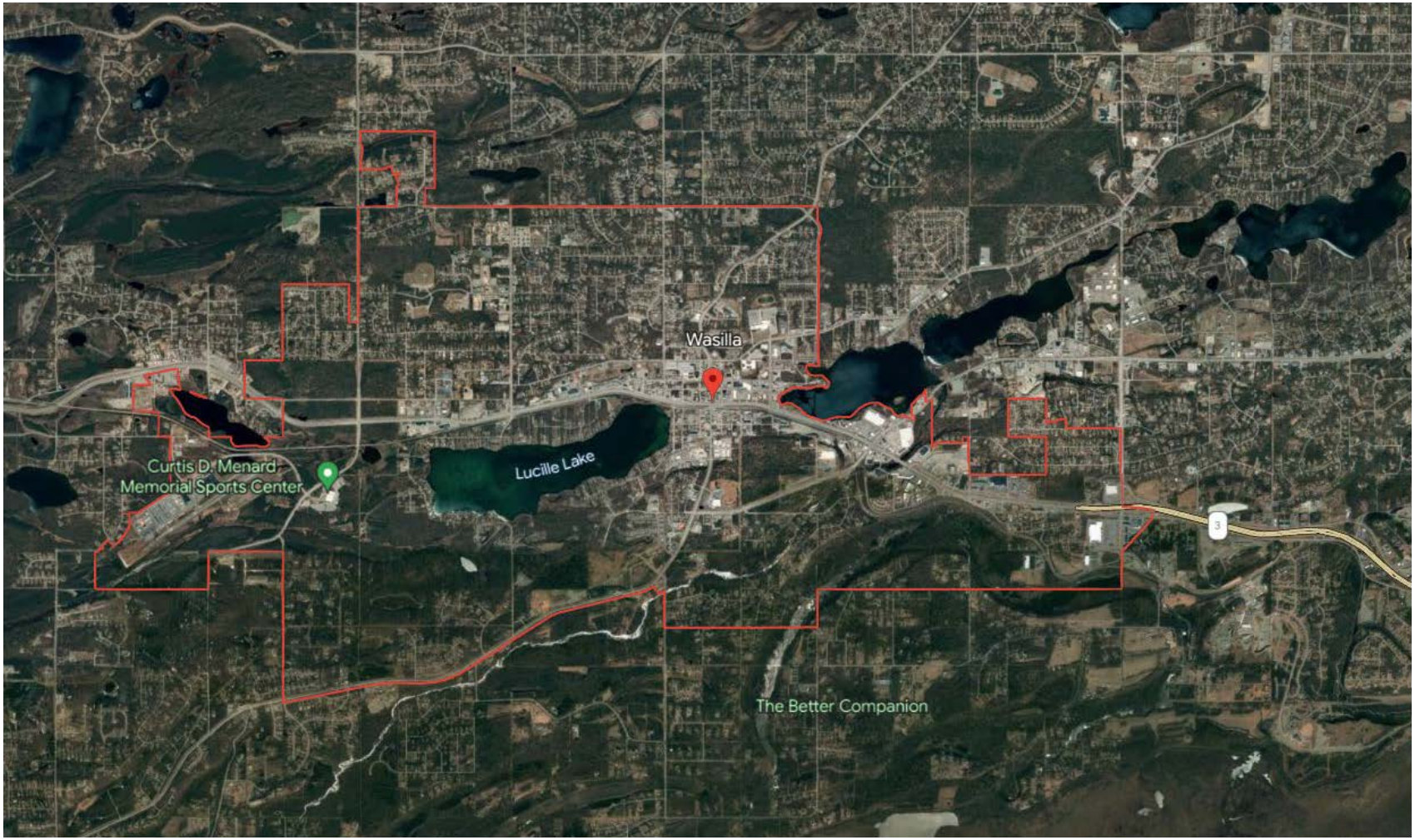
Figure 1-4 shows a map of the Greater Wasilla Economic Area (GWEA) with Census Designated Places (CDPs).



Source: McKinley Research Group 2023- Wasilla Comprehensive Economic Development Strategy (CEDS) Report

Figure 1-4 Greater Wasilla Economic Area (GWEA) with Census Designated Places (CDPs)

Figure 1-5 is an aerial photograph of the Wasilla's city limits and surrounding areas.



Source: Google Earth 2023

Figure 1-5 Map of Wasilla's City Limits and Surrounding Areas

Figure 1-6 is an aerial image of Wasilla in the summer.

Source: Adobe Stock Images 2023

Figure 1-6 Aerial Image of Wasilla

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2. PLANNING PROCESS

This section provides an overview of the planning process; identifies the key stakeholders and Planning Team members, documents public outreach efforts, and summarizes the review and incorporation of existing plans, studies, and reports used to update this HMP. Meeting information regarding the Planning Team and public outreach efforts are included below and outreach support documents are provided in Appendix D.

This section addresses Element A Local Mitigation Plan regulation checklist.

Regulation Checklist- 44 Code of Federal Regulations (CFR) § 201.6 Local Mitigation Plans
ELEMENT A. Planning Process
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))
A1-a. Does the plan document how the plan was prepared, including the schedule or time frame and activities that made up the plan's development, as well as who was involved?
A1-b. Does the plan list the jurisdiction(s) participating in the plan that seek approval, and describe how they participated in the planning process?
A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process? (Requirement 44 CFR § 201.6(b)(2))
A2-a. Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this opportunity?
A3. Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1))
A3-a. Does the plan document how the public was given the opportunity to be involved in the planning process and how their feedback was included in the plan?
A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement 44 CFR § 201.6(b)(3))
A4-a. Does the plan document what existing plans, studies, reports, and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document?
Source: FEMA 2022 (Local)

2.1 OVERVIEW

The City of Wasilla contracted Fairweather Science, LLC (Fairweather Science) to facilitate and guide the Planning Team through the HMP update process.

This HMP Update follows the following FEMA Guidance for Mitigation Planning:

- FEMA 2022/2023 Local Mitigation Planning Policy Guide (Released April 2022, Effective April 2023).

The planning process began in February with the MSB Local Emergency Planning Commission (LEPC) reviewing windstorm data and coordinating with the Planning Commission and City Council to update the City's 2018 HMP. In May 2023, the HMP update process began with a teleconference with Fairweather Science and Crystal Nygard, City of Wasilla Deputy Administrator. Fairweather Science described the overall HMP update process, roles and responsibilities of Fairweather Science and the City of Wasilla, project timeline/schedule, and discussed key components/members of the Planning Team. Due to the expedited timeline of this HMP update, the formal kickoff meeting with the Planning Team was scheduled for the following week.

On May 16, 2023, Fairweather Science met with the Planning Team at the City Offices. Fairweather Science provided a project overview to the Planning Team and collected initial information to start updating the

HMP. The Planning Team reviewed and selected hazards that impact the City, discussed hazard history and significant events, identified available City resources and capabilities, reviewed mitigation projects from the 2018 HMP and provided status updates, and began discussing new mitigation actions the City wishes to pursue. The Planning Team also discussed public participation and reviewed a draft community survey that will be made available online.

The community survey was posted on May 15, 2023 and shared on the City website and Facebook page to update the public and stakeholders about the planning process and request information to inform the draft risk assessment.

On June 21, 2023, the Planning Team met Fairweather Science to discuss the draft risk assessment that they reviewed. The team shared feedback on the draft risk assessment, discussed their top three hazards of concern, which they identified (in no particular order) as severe weather, specifically high wind, earthquake, and wildland fire. The Planning Team also prioritized a list of proposed mitigation projects they wish to pursue, and reviewed the public feedback received through the public survey.

On June 26, 2023, the draft risk assessment was made available for public review. The City published a memo on the City website with a link to the draft risk assessment and contact information to whom to direct public comments to.

On July 7, 2023, the Draft HMP was made available for public review and comment. The City published a memo on the City website with a link to the draft HMP and contact information to who to direct comments to.

The following changes were made to the Draft HMP based on comments received:

- Update based on comments received

In summary, the following five-step process took place from February 2023 through October 2023.

1. Organize resources: members of the Planning Team identified resources needed in the development of the hazard mitigation plan update- including staff, agencies, and local community members who could provide technical expertise and historical information.
2. Monitor, evaluate, and update the Plan: the Planning Team developed a process to monitor the plan to ensure it was used as intended while fulfilling the needs of the community. The team then developed a process to evaluate the plan to compare how their decisions affected recognized hazard impacts. The team then outlined a method to share their successes with members of the community. By sharing their successes, the team aimed to encourage support for mitigation activities and to provide data for incorporating mitigation actions into existing planning mechanisms and to provide data for the plans five-year update.
3. Assess risks: with the assistance of a hazard mitigation planning consultant (Fairweather Science), the Planning Team identified the hazards specific to the City of Wasilla and the consultant developed the risk assessment for the identified hazards. The Planning Team reviewed the risk assessment prior to and during the development of the mitigation strategy.
4. Assess capabilities: the Planning Team reviewed current capabilities to determine whether existing provisions and requirements adequately addressed relevant hazards. Examples of these capabilities are administrative and technical, legal, and regulatory, and fiscal.
5. Develop a mitigation strategy: after reviewing the risks posed by each defined hazard, the Planning Team developed a comprehensive range of potential mitigation goals and actions. The Planning Team then identified and prioritized the actions for implementation.

Table 2-1 describes Planning Team meetings convened to update this HMP.

Table 2-1 Hazard Mitigation Planning Team Meetings

Date	Agenda	Attendees	
05/12/2023	HMP overview, project schedule, roles and responsibilities, Planning Team composition, schedule date for kickoff meeting with the Planning Team.	Wasilla City Planner/Project Manager	Crystal Nygard
		Fairweather Science	Laura Young Olivia Kavanaugh
05/16/2023	Project Kickoff Meeting. Review hazards identified in the 2018 HMP, identify/update City resources and capabilities, review projects from the 2018 HMP and obtain statuses for each, initial suggestions for mitigation projects, discussion about community input via an online survey.	City of Wasilla Planning Team	Tina Crawford Bethany Buckingham Follett Bill Rapson Erich Schaal Robert Walden Scott Bell
		Fairweather Science	Laura Young Olivia Kavanaugh
06/21/2023	Review of draft risk assessment and comments from planning team, identify top three hazards of concern, discuss current ideas for mitigation projects. Review and prioritize a list of proposed mitigation actions, review public feedback from the survey results.	City of Wasilla Planning Team	Crystal Nygard Bethany Buckingham Follett Bill Rapson Erich Schaal Robert Walden Scott Bell Lisa Bartgis Mayor Glenda Ledford
		Fairweather Science	Laura Young, Olivia Kavanaugh

2.2 HAZARD MITIGATION PLANNING TEAM

The local Planning Team members are Crystal Nygard, Bethany Buckingham Follett, Bill Rapson, Erich Schaal, Robert Walden, Scott Bell, and Lisa Bartgis.

Table 2-2 identifies the complete hazard mitigation Planning Team.

Table 2-2 Hazard Mitigation Planning Team

Name	Title	Organization	Key Input
Crystal Nygard	Deputy Administrator/ Project Manager	City of Wasilla	Planning team lead, project management, data input, and HMP review.
Bethany Buckingham Follett	Museum Curator and Backup Public Information Officer	Wasilla Museum and Visitors Center	Planning team member, data input, and HMP review.
Bill Rapson	Police Chief	Wasilla Police Department	Planning team member, data input, and HMP review.

Table 2-2 Hazard Mitigation Planning Team

Name	Title	Organization	Key Input
Erich Schaal	Public Works Director	City of Wasilla Department of Public Works	Planning team member, data input, and HMP review.
Robert Walden	Deputy Director	City of Wasilla Department of Public Works	Planning team member, data input, and HMP review.
Scott Bell	Recreational Services Director	Menard Sports Center	Planning team member, data input, and HMP review.
Lisa Bartgis	Records Coordinator	City of Wasilla	Planning team member, data input, and HMP review.
Laura Young	Project Manager, Hazard Mitigation Planner	Fairweather Science, LLC	Responsible for project management/ coordination, subject matter expertise in plan development, and HMP review.
Olivia Kavanaugh	Staff Scientist, Hazard Mitigation Planner	Fairweather Science, LLC	Responsible for HMP development, writer, research, and analysis.

2.3 OPPORTUNITIES FOR STAKEHOLDERS AND OTHER INTERESTED PARTIES TO PARTICIPATE

Fairweather Science extended an invitation to all individuals and entities identified on the project mailing list in which they described the planning process and announced the upcoming communities' planning activities. The announcement was emailed to relevant academia, nonprofits, and local, state, and federal agencies on July 6, 2023.

The following neighboring communities were also notified and invited to participate Palmer, MSB, Anchorage, Meadow Lakes, Knik-Fairview, Big Lake, Houston. The following agencies were invited to participate and review the HMP:

- Matanuska Susitna Borough (MSB)
    - Central Mat-Su Fire Department- Fire Marshal
    - MSB Director of Emergency Services
    - MSB Emergency Manager
    - MSB Floodplain Manager
    - MSB Health Services
    - MSB Local Emergency Planning Commission (LEPC)
    - MSB Planner
    - MSB School District
- Neighboring Communities
    - Big Lake
    - Butte
    - City of Palmer
    - Houston

    - Knik-Fairview
    - Meadow Lakes
    - Municipality of Anchorage
- Neighboring Native Villages/Corporations
    - Eklutna Native Corporation
    - Knik Tribe
    - Knikatnu Inc.
- American Red Cross of Alaska- Disaster Program Manager
- American Red Cross of Alaska- Wasilla Office
- Alaska Department of Community, Commerce, and Economic Development (DCCED)
    - DCCED, Division of Community and Regional Affairs (DCRA)
    - DCCED, National Flood Insurance Program (NFIP)
    - DCCED, Risk Mapping, Assessment and Planning (Risk MAP)
- Alaska Department of Environmental Conservation (DEC)
    - DEC, Division of Spill Prevention and Response (DSPR)
- Alaska Department of Fish and Game (ADF&G)
- Alaska Department of Health and Social Services (DHSS)
- Alaska Department of Military and Veterans Affairs (DMVA)
    - DMVA, Division of Homeland Security and Emergency Management (DHS&EM)
- Alaska Department of Natural Resources (DNR)
    - DNR, Mining, Land, and Water (MLW)
    - DNR, Division of Geological and Geophysical Surveys (DGGS)
        - DGGS, Coastal Hazards
        - DGGS, Geology
    - DNR, Division of Forestry (DOF)
- Alaska Department of Public Safety (DPS)
- Alaska Department of Transportation and Public Facilities (DOT/PF)
    - Central Region
- Alaska State Troopers- Wasilla
- FEMA Region 10
- National Oceanic and Atmospheric Administration (NOAA)
    - NOAA, National Weather Service (NWS)
        - NWS Northern Region
        - NWS Southeast Region
        - NWS Southcentral Region
- University of Alaska Fairbanks (UAF)
    - UAF, Alaska Earthquake Information Center (AEC)
    - UAF, Alaska Volcano Observatory (AVO)
    - UAF, Geophysical Institute (GI)
    - UAF, Scenarios Network for Alaska + Arctic Planning (SNAP)

- US Army Corps of Engineers, Alaska Region (USACE)
- US Bureau of Land Management (BLM)
- US Department of Agriculture (USDA)
    - USDA, Division of Rural Development (RD)
    - USDA, Natural Resources Conservation Service (NRCS)
- US Department of Housing and Urban Development (HUD)
- US Environmental Protection Agency (EPA)
- US Fish & Wildlife Service (USFWS)
- US Geological Survey (USGS)
    - USGS, Alaska Science Center

2.4 PUBLIC INVOLVEMENT

The public was encouraged to provide input regarding local hazards and ideas for mitigation projects via an online survey. The link to the survey was available on the homepage of the City of Wasilla's website and the City of Wasilla's Facebook page. A memo about the HMP update was also published on the City website. A flyer with a QR code linked to the survey was posted at the main entrance, visitor center desk, and checkout stands at the Wasilla Museum.

Additionally, a flyer with information about the HMP Update and survey QR code was posted at all four entrances at the Annual Wasilla Block Party at the Wasilla Museum and Visitor Center on May 20, 2023. Participation in the survey was added to the event passport where attendees were to visit booths and get marked off to then put the passport in for a prize drawing. If attendees completed the survey, they received an extra entry into the prize drawing.

The public was also informed of the HMP Update through the Mayor's Minutes which is a weekly radio segment by the Mayor of Wasilla, Glenda Ledford, as well as through a featured news article in the Mat-Su Valley Frontiersman local newspaper.

Several newsletters discussing the hazard mitigation planning process, requesting public input, and to notify the public of the availability of the Draft Risk Assessment and Draft HMP were shared with members of the community. The newsletters were posted on the City Website and City Facebook pages, as well as sent via email to project stakeholders and the City's email distribution list.

Feedback received from the public was used in confirming natural hazards that impact the City, level of concern of each hazard, and critical facilities that the public relies on. Additionally, the Planning Team reviewed the list of mitigation projects that the public suggested; the one project suggested was not mitigation related, and was not incorporated into this HMP Update.

Outreach support documents and survey results are provided in Appendix D.

2.5 REVIEW AND INCORPORATION OF EXISTING PLANS, STUDIES, AND REPORTS

During this HMP update, the Planning Team reviewed and incorporated pertinent information from available resources since the 2018 HMP was completed. Newly collected data included available plans, studies, reports, and technical research listed in Table 2-3. The new data was reviewed and referenced throughout the document.

Table 2-3 Documents Reviewed

Existing plans, studies, reports, ordinances, etc.	Contents Summary (How will this information improve mitigation planning?)	Data Used (How was this information incorporated into this HMP?)
2004, 2012, and 2018 City of Wasilla Hazard Mitigation Plans	Review past hazard events, mitigation activities, and planning processes.	Compared hazard profiles, history, and impacts of events for risk assessment.
2018 State of Alaska Hazard Mitigation Plan (SHMP)	Defines statewide hazards and their potential locational impacts.	Compared hazard profiles, history, and impacts of events for risk assessment.
2020 Matanuska-Susitna Borough Hazard Mitigation Plan	Defines hazards and their potential locational impacts in the Matanuska-Susitna Borough.	Compared hazard profiles, history, and impacts of events for risk assessment. Used provided Shakemaps for earthquake scenarios and risk information in the risk assessment.
MSB Threat and Hazard Identification and Risk Assessment (THIRA)	A three-step risk assessment process that helps communities understand their risks and what they need to do to address those risks.	Reviewed hazards and impacts that the MSB identified that affect the Borough.
2011 Wasilla Comprehensive Plan	Sets forth a vision and goals for a city's future and provides the overall foundation for all land use regulation in the city.	Cited information from the Plan throughout the HMP such as community background information, land use information, future goals of the community, and various figures and maps.
2013-2028 Downtown Wasilla Area Plan	Provides a vision of the future that reflects those who live and/or work in Wasilla daily. Community values, preferences, and concerns are documented, as well as opportunities to improve the quality of life.	Reviewed prior to updating HMP. Discusses future land use, economic development, transportation, and public facilities and utilities recommendations. Discusses overall future vision of the community through 2028.
Wasilla's FY2024 Capital Improvement Plan	The City's Capital Improvement Plan (updated annually) lists approved street, building, water, sewer, and storm water capital improvement needs, their estimated costs, and priority for funding.	Reviewed proposed capital improvement projects.
Wasilla Emergency Operations Plan (EOP)	Information pertaining to the deployment, mobilization, and tactical operations of City of Wasilla in response to emergencies.	The EOP was reviewed to confirm hazards that impact Wasilla, level of risk, and critical facilities/personnel that are utilized during a disaster.
Wasilla Continuity of Government/ Continuity of Operations (COG/COOP)	Outlines facilities and resources available for emergency use, hazards that may impact the community and associated risk for each, community information.	Updated Section 1.3 with community background information from COG/COOP, compared identified hazards and associated risk, current inventory of critical facilities and resources.
Wasilla Comprehensive Economic Development Strategy (CEDS)	Charts/outlines future economic development in Wasilla.	Reviewed economic development goals and projects to update the Land Use and Future Development sections.

Table 2-3 Documents Reviewed

Existing plans, studies, reports, ordinances, etc.	Contents Summary (How will this information improve mitigation planning?)	Data Used (How was this information incorporated into this HMP?)
City of Wasilla Museum Strategic Plan (FY2023-2028)	Identifies the Museum's 5-year vision, along with goals and strategies to achieve the vision.	Reviewed goals, vision, and strategy for potential mitigation projects and updated Future Development section.
1999 Wasilla Sewer Master Plan	The Sewer Master Plan, completed in 1999, evaluates sewer-related issues, both short- and long-term, including potential community growth through 2050. Short-term issues include how to improve treatment at the current sewer treatment plant. Long-term issues include a shift away from the current Septic Tank Effluent Pumping system that uses septic tanks and force mains for collection, an outfall to Knik Arm, and a new sewer treatment plant near Knik Arm.	Reviewed prior to updating HMP. Provided details on the existing sewer system in Wasilla and potential future upgrades.
2001 Wasilla Water System Facilities Master Plan	The Water System Facilities Master Plan was completed in 2001 and evaluates short-term and long-term drinking water issues and includes potential community growth through 2015. Short-term issues include building in system backups, while long-term issues include meeting demand as it occurs through 2015.	Reviewed prior to updating HMP. Provided details on the existing water systems in Wasilla and outlined short-term and long-term recommendations for facility upgrades.
Wasilla Storm Water Master Plan	The Storm Water Master Plan was completed in 2001. The plan identifies major storm water issues facing the City, which include failing drywells in City streets and failing water quality in Wasilla Lake, Lake Lucille, and Cottonwood Creek. It also categorizes long-term capital projects to replace the dry wells and protect the community's water quality.	Reviewed prior to updating HMP for completed and future projects that may be combined with proposed mitigation actions.
2013 City of Wasilla Airport Master Plan	Aimed to determine how the Wasilla airport can best serve the future interests and needs of the flying public, the aviation community, the City, and other stakeholders. This plan is currently being updated.	Reviewed prior to updating HMP for information regarding the Wasilla airport.
2023 Wasilla Zoning Map	Shows the current zoning districts in Wasilla.	Used in Section 3.4.7 to describe the land use in the City.
2035 Matanuska-Susitna Borough Long Range Transportation Plan	Helps guide transportation solutions, improvements, funding decisions, and policy development by the MSB and the State of Alaska both in the near and long term through 2035.	Used information and maps in Section 3.4.8 pertaining to future transportation developments in Wasilla.
FEMA Risk Report - MSB and Incorporated Cities of Houston, Palmer, and Wasilla	The FEMA Risk Report was completed in 2016 and showcases the results of an in-depth risk assessment for flood, earthquake, landslide, and wildfire hazards in the MSB. This assessment was performed through the FEMA Risk Mapping, Assessment, and Planning (Risk MAP) program.	Used loss estimations and data for updating the risk assessment.
2007 USACE Erosion Information Paper-Wasilla, Alaska	Baseline erosion assessment of the community.	Used to describe historical erosion locations and impacts, of which there are none in the City of Wasilla.
2018 National Climate Assessment	Assesses the science of climate change and variability and its impacts across the U.S., now and throughout the century.	Assessment cited several times in hazard sections describing how climate change will influence future conditions.

Table 2-3 Documents Reviewed

Existing plans, studies, reports, ordinances, etc.	Contents Summary (How will this information improve mitigation planning?)	Data Used (How was this information incorporated into this HMP?)
UAF/SNAP Database	Provides historical data and future projections on climate change impacts, wildfire danger, and other applicable hazards.	Cited several figures and other data in hazard profiles.
October 2022 DHS&EM Disaster Cost Index	Provides details for historic statewide disasters.	Incorporated relevant disaster descriptions in each applicable hazard profile to strengthen the hazard history, extent, and impact sections.

A complete list of references in provided in Section 8.

3. RISK ASSESSMENT/HAZARD ANALYSIS

This section identifies and profiles the hazards that could affect the City of Wasilla.

This section addresses a portion of Element B of the Local Mitigation Plan regulation checklists.

Regulation Checklist- 44 CFR § 201.6 Local Mitigation Plans
ELEMENT B. Risk Assessment
B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events? (Requirement 44 CFR § 201.6(c)(2)(i))
B1-a. Does the plan describe all natural hazards that can affect the jurisdiction(s) in the planning area, and does it provide the rationale if omitting any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area?
B1-b. Does the plan include information on the location of each identified hazard?
B1-c. Does the plan describe the extent for each identified hazard?
B1-d. Does the plan include the history of previous hazard events for each identified hazard?
B1-e. Does the plan include the probability of future events for each identified hazard? Does the plan describe the effects of future conditions, including climate change (e.g., long-term weather patterns, average temperature, and sea levels), on the type, location, and range of anticipated intensities of identified hazards?
B1-f. For participating jurisdictions in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and/or vary from those affecting the overall planning area?
Source: FEMA 2022 (Local)

3.1 OVERVIEW

Hazard identification is the process of recognizing any natural events that may threaten an area. Natural hazards result from uncontrollable or unexpected natural events of sufficient magnitude. This plan does not take in account any man-made, technological, or terrorism related hazards. Historical hazards are noted, but all natural hazards that have the potential to affect the study area must be considered. Any hazards that are determined to be unlikely to occur or cause little to no damage, are eliminated from consideration.

A hazard analysis includes the identification, screening, and profiling of each hazard.

Hazard profiling entails describing hazards in terms of their nature, history, location, magnitude, frequency, extent, and probability. Hazards are identified through historical and anecdotal information collected by members of the community, previous mitigation plans, studies, and study area hazard map preparations/reviews, when appropriate. Hazard maps are then used to define the geographic extent of a hazard, as well as define the approximate boundaries of the risk area.

3.2 HAZARD IDENTIFICATION AND SCREENING

On May 16, 2023, the Planning Team reviewed and updated the possible hazards from the existing HMP that could affect the area. The Planning Team then evaluated and screened the comprehensive list of potential hazards. They took into consideration a range of factors including prior knowledge of the hazard and the relative risk presented by each hazard, their ability to mitigate the hazard, and the known or expected availability of information on the hazard (Table 3-1).

The Planning Team determined that five hazards pose a threat to the City of Wasilla: earthquake, severe weather (including high winds), wildland and community fire, volcanic ashfall, and flood. The Planning Team decided to not profile climate change as a standalone hazard, but rather have the future conditions including climate change be included in each individual hazard.

As part of this update, two hazards were eliminated or combined within another hazard profile: high wind and erosion, as described in Table 3-1.

The assets at risk of the identified hazards, both within and outside of the planning area, are identified in Section 3.4.5.

Table 3-1 Identification and Screening of Hazards

Hazard Type	Updated from 2018 HMP or New Hazard?	Explanation
Earthquake	Updated	Earthquakes with detectable magnitudes are recorded frequently near Wasilla. Wasilla experienced shaking from both the 1964 Good Friday Earthquake and the November 2002 Denali Fault Earthquake, but no damage was reported. Wasilla experienced road damage (outside of City limits) and cracks in walls of multiple buildings including schools from the November 2018 M7.1 earthquake, but no fatalities were reported.
Severe Weather (Cold, Drought, Rain, Snow, Wind, etc.)	Updated High Wind is now incorporated into Severe Weather	Wasilla experiences severe weather events such as the following: extreme cold, freezing rain/ice storms, heavy and drifting snow, blizzards, winter storms, heavy rain, high winds, dust storms, and droughts. In 1999, temperatures in Wasilla reached -42°F and in 2003, sustained temperatures of 0ºF with a wind-chill -53ºF were recorded. During an ice storm in 2013, several school buses slid off the road and one flipped on its side because of ice accumulation on the roads. Wind gusts of 93 mph have been recorded in Wasilla. Wasilla experiences severe storm conditions accumulating over 10 inches of snowfall within several hours. In 2002, 29.61 inches of snow fell in Wasilla during a winter storm. During a high wind event in 2022, there were reports of blown-over trucks, toppled Cessna airplanes at the Wasilla Airport, downed trees and power lines (with power outages across the Valley causing pipes to burst and people to seek shelter elsewhere due to the prolonged cold), windows broken, cars damaged due to flying debris, and siding ripped off homes and businesses. Emergency Management reported multiple CO poisoning calls, requests to be transported to the hospital, along with cases of frostbite.
Wildland and Community Fire	Updated	Wasilla and the surrounding forest become very dry in summer months with weather (such as drought and lightning) and human caused incidents igniting dry vegetation in the adjacent area (burning trash outside their landfill's burn box, campfires, etc.). Wasilla is within an area designated as Critical Protection Level- the highest level of suppression action provided for a wildland fire in the Alaska Interagency Fire Management Plan. According to the Alaska Interagency Coordination Center (AICC), 8,507 wildland fires occurred within 100 miles of Wasilla in an 83-year period (1939-2022). Of the 8,507 total wildfires, 77 were prescribed fires. Since 1939, 263 wildland fires burned 0.5 acres or more, of which, 41 were prescribed fires.
Volcanic Ashfall	Updated	Wasilla experienced volcanic ash in 1989, 1990, and 1992 from Mt. Redoubt and Mt. Spurr. These eruptions disrupted transportation services and industry, particularly jet aircraft.
Flood	Updated	There are no river systems within the City boundaries. Cottonwood Creek, Lucille Creek, and several smaller streams traverse the area. The most prominent water features in the City are Wasilla Lake and Lake Lucile. Flooding is not a large concern for the City, as flooding within City limits is not commonly reported. In the City limits, there are 5 residential properties, one store, and one restaurant in the 100-year flood zone. None of these structures are critical facilities.
Significant Hazard Potential Dam	New	There is one dam with Wasilla's city limits: the Lake Lucile Dam (AK00182). This dam is classified as having "Significant" hazard potential. At this time, FEMA does not require that dams with Significant hazard ratings be profiled in HMPs. New FEMA guidelines require that HHPDs are profiled in HMPs, so this new hazard profile will be the framework for the City to update if future guidelines require Significant hazard potential dams to be profiled, or the rating of the Lake Lucile Dam changes to High Hazard. The Planning Team wished to include the Lake Lucile Dam in this HMP update as it is within City limits and a dam failure event may impact City assets, residential properties, and the residents of Wasilla.

Table 3-1 Identification and Screening of Hazards

Hazard Type	Updated from 2018 HMP or New Hazard?	Explanation
Climate Change	New- discussed within each hazard	The Planning Team does not feel that climate change is a significant threat to the City. However, updated FEMA guidelines require that the influence of climate change is discussed as it pertains to each hazard; therefore, climate change is addressed in this HMP Update. The Planning Team chose to incorporate the influence of climate change into each hazard rather than profiling it as a standalone hazard. In Wasilla, spring rainfall is projected to increase by 54% by the end of the century (UAF/SNAP 2023). In Southcentral Alaska, warmer and drier conditions will likely cause further shifts in native and invasive species. Shorter, milder winters allow for greater survival of pest species, as was the case with recent bark beetle outbreaks. Higher temperatures result in a longer growing season, which could have significant effects on wildlife mating cycles, plant growth and flowering, water availability in soil and rivers, and hunting and fishing (UAF 2013). Climate change within Alaska is likely to result in increased drought and longer fire seasons and shifts in vegetation will influence the intensity and frequency of fires (IPCC 2019). A warming climate is also projected to increase the frequency and size of wildfires, potentially changing the type and extent of wildlife habitat favorable for some important subsistence species (USGCRP 2018). Increased wildfires may lead to decreased air quality in the City, and result in smoke inhalation affecting vulnerable populations.
Erosion	Removed	Erosion has been removed as a hazard for this 2023 HMP Update. The Planning Team reviewed the 2018 HMP and agreed that natural erosion has not historically impacted the City of Wasilla, and decided to remove this hazard for this HMP Update. The Public Works Department states that there are no active natural erosion sites in the community. Self-induced erosion is occurring is from past gravel extraction, which has led to steep slopes on the bluff above the train depot. Cottonwood Creek, Lucille Creek, and Wasilla Creek are not movable bed type of creeks and do not have the standard erosion problems that are found in the Knik River, Little Susitna River, or the Matanuska River. In 2007, USACE completed an erosion assessment for Wasilla as a part of their 2009 Alaska Baseline Erosion Assessment. This assessment, dated September 4, 2007, states: *"Lucille Creek and Cottonwood Creek flood periodically, but there are no reports of erosion problems."* *"No erosion damages were reported by the City of Wasilla."* *"No photos were provided by the community as there were no reports of erosion problem areas during the Community Erosion Survey. A diagram was not prepared."* (USACE 2007) Erosion has been profiled in updated HMPs since the 2004 City of Wasilla HMP, but previous versions have focused on wind erosion leading to dust storms and decreased air quality, which the Planning Team states are not related. The Planning Team states that there are no active or historical locations that experience wind erosion in the City limits. Dust storms from high winds and decreased air quality will be discussed in the Severe Weather section of this HMP Update.

3.2.1 HAZARDS NOT PROFILED IN THIS HMP UPDATE

- **Erosion:** In this HMP Update, erosion was removed as a natural hazard impacting the City of Wasilla. The Planning Team reviewed the 2018 HMP and agreed that natural erosion has not historically impacted the City of Wasilla and no longer wishes to profile erosion. Previous versions of this HMP have focused on wind erosion leading to dust storms and decreased air quality, which the Planning Team states are not related. Dust storms from high winds and decreased air quality will be discussed in the Severe Weather section of this HMP Update.

- **Avalanche:** Alaska experiences many snow avalanches every year. The exact number is undeterminable as most occur in isolated areas and go unreported. Avalanches tend to occur repeatedly in localized areas and can sheer trees, cover communities and transportation routes, destroy buildings, and cause death. Alaska leads the nation in avalanche accidents per capita. Areas near Wasilla are subject to avalanches; however, the City itself does not experience avalanches and the Planning Team does not consider avalanches to be a hazard.

- **Ground Failure (Permafrost, Landslide):** Permafrost is frozen ground in which a naturally occurring temperature below 32°F has existed for two or more years. According to the 2018 State HMP, permafrost is isolated or absent in the Wasilla area.

  A landslide refers to the downward and outward movement of slope-forming materials reacting under the force of gravity. Landslides usually consist of natural soil, rock, artificial fill, or a combination of those items. The term covers a range of events including mudflows, mudslides, rock flows, rockslides, debris flows, debris avalanches, debris slides, and earth flows.

  Wasilla does not generally experience ground failure related to permafrost thaw or landslides.

- **Tsunami/Seiche:** A tsunami is a series of long waves generated in the ocean by a sudden displacement of a large volume of water. Underwater earthquakes, landslides, volcanic eruptions, meteor impacts, or onshore slope failures can cause this displacement. Most tsunamis originate in the Pacific "Ring of Fire," the area of the Pacific bounded by the eastern coasts of Asia and Australia and the western coasts of North America and South America that is the most active seismic feature on earth. Wasilla is not a coastal community and is not in an area directly impacted by tsunamis or seiches.

3.3 HAZARD PROFILES

The specific hazards selected by the Planning Team for profiling have been examined based on the following factors:

- Nature (type)
- History (previous occurrences)
- Location
- Extent (includes magnitude and severity)
- Impact (provides general impacts associated with each hazard)
- Probability of Future Events

Each hazard is assigned a rating based on the following criteria for magnitude/severity (Table 3-2) and probability of future event (Table 3-3). Estimating magnitude and severity are determined based on historic events using the criteria identified in the following tables.

Table 3-2 Hazard Magnitude/Severity Criteria

Magnitude / Severity	Criteria
Catastrophic	• Multiple deaths. • Complete shutdown of facilities for 30 or more days. • More than 50 percent (%) of property is severely damaged.
Critical	• Injuries and/or illnesses result in permanent disability. • Complete shutdown of critical facilities for at least two weeks. • More than 25% of property is severely damaged.

Magnitude / Severity	Criteria
Limited	• Injuries and/or illnesses do not result in permanent disability. • Complete shutdown of critical facilities for more than one week. • More than 10% of property is severely damaged.
Negligible	• Injuries and/or illnesses are treatable with first aid. • Minor quality of life lost. • Shutdown of critical facilities and services for 24 hours or less. • Less than 10% of property is severely damaged.

Table 3-3 Hazard Probability of Future Events Criteria

Probability	Criteria
Highly Likely	• Event is probable within the calendar year. • Event has up to 1 in 1 year chance of occurring (1/1=100 percent [%]). • History of events is greater than 33% likely per year.
Likely	• Event is probable within the next three years. • Event has up to 1 in 3 years chance of occurring (1/3=33%). • History of events is greater than 20% but less than or equal to 33% likely per year.
Possible	• Event is probable within the next five years. • Event has up to 1 in 5 years chance of occurring (1/5=20%). • History of events is greater than 10% but less than or equal to 20% likely per year.
Unlikely	• Event is possible within the next ten years. • Event has up to 1 in 10 years chance of occurring (1/10=10%). • History of events is less than or equal to 10% likely per year.

The hazards profiled for the City of Wasilla are presented throughout the remainder of this section. The presentation order does not signify their importance or risk level.

Climate Change

The Planning Team decided to not profile climate change as a standalone hazard, but rather have the future conditions including climate change be included in each individual hazard. General background information regarding climate change in Alaska is described below.

Nature

Climate change is the long-term variation in Earth's average weather patterns and atmospheric composition. These variations may be natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil, and gas) which produce heat-trapping gases. These gases act as a blanket over the Earth, and with more gasses, the thicker the blanket, the warmer the earth. Trees and other plants are not able to absorb the excess carbon dioxide in the atmosphere, and this excess carbon dioxide changes precipitation and temperature patterns. These changes in precipitation patterns lead to increasing frequency and intensity of storms and floods, wildfires, and substantial changes in flora, fauna, fish, and wildlife habitats.

For the past million years the natural climate has oscillated between warm periods and ice ages. This shifting in and out of warm periods and ice ages is correlated strongly with Milankovitch cycles. These cycles affect the amount of sunlight and therefore, energy, that Earth absorbs from the Sun. They provide a strong framework for understanding long-term changes in Earth's climate, but Milankovitch cycles can't explain all climate change that's occurred over the past 2.5 million years. Milankovitch cycles cannot account for the current period of rapid warming Earth has experienced since the pre-Industrial period (years 1850-1900), and particularly since the mid-20th Century. Earth's recent and continual warming is primarily due to human activities- specifically, the direct input of carbon dioxide into Earth's atmosphere from burning fossil fuels. This is significant because hazard mitigation planning relies greatly upon the historical record.

As noted in the 2018 National Climate Assessment, the effects of climate change in Alaska will include:

- Increase in ocean acidification which will affect marine habitats.
- Lack of sea ice, which will contribute to increased storm surge and coastal flooding and erosion.
- Increase in the size, intensity, and frequency of wildfires.
- Thawing permafrost, melting glaciers, and the associated effects on the state's infrastructure and hydrology.
- Increase of health threats, such as injuries, smoke inhalation, damage to vital infrastructure, decrease of food and water security, and new infectious diseases.

Location

Alaska has been called a ''climate canary'' because it is already seeing the early effects of global climate change. Climate researchers expect future climate change in Alaska and other Arctic places to be more pronounced than it is elsewhere in the world (Larsen et al. 2008). In Southcentral Alaska, projected increases in temperature and precipitation coupled with the drying effects of greater evapotranspiration are expected to result in higher incidence of insect outbreaks and forest fires and the further spread of invasive species. Ocean acidification may impact fisheries (UAF 2013).

Despite the global nature of climate change, amplified local/regional effects occur and can be significant. The entire community of Wasilla is vulnerable to climate change.

Impact

Climate change in Alaska is causing widespread environmental change that is damaging critical infrastructure, especially in coastal communities. As climate change continues, infrastructure may become more vulnerable to damage, increasing risks to residents and resulting in large economic impacts (Melvin et al. 2016).

It is estimated that climate change in Alaska could add $3.6–$6.1 billion (+10% to +20% above normal wear and tear) to future costs for public infrastructure between 2008 and 2030 and $5.6–$7.6 billion (+10% to +12%) between 2008 and 2080 (Larsen et al. 2008).

Water availability in glacier-fed basins is shifting in amount and seasonality, due to changing patterns of snow accumulation and spring melt runoff, as well as the melting of glaciers. This will affect hydroelectricity production, although evidence is thus far limited, with decreases as well as increases witnessed by various hydropower facilities throughout the world (IPCC 2019). According to Renewable Energy Project Alaska, hydroelectricity is the leading source of renewable energy in Alaska, with hydroelectric plants providing roughly 25% of Alaska's electricity per year of standard water availability (REAP 2020).

Climate change is impacting food security in Alaska, especially that of Indigenous Alaskans who rely on subsistence hunting, fishing, and gathering. Observed greening of tundra biomes and browning of boreal forest biomes is affecting the abundance and distribution of animals such as reindeer and salmon, reducing available harvests of these important subsistence species, and is impacting access to and availability of foraging plants (IPCC 2019). Ocean acidification is a less commonly known impact of climate change by

which the pH level of ocean waters decreases due to the absorption of atmospheric carbon dioxide. According to the NOAA, the world's oceans have become 30% more acidic since the Industrial Revolution, and as atmospheric CO_2 rises, more of this gas is absorbed by the oceans (NOAA 2020). Ocean acidification has also been shown to disrupt some fish species and their ability to identify suitable habitats and detect predators and can impact the shells and sensory organs of crab. Additionally, ocean warming is impacting available fish stocks, and marine animal biomass is projected to decrease in the 21st century by as much as 6.4% in a low emissions scenario, and 24.1% in a high emissions scenario. Ocean acidification and warming are anticipated to be irreversible on human time scales, indicating that societies will be required to adapt to these changing conditions and reductions of fish availability (IPCC 2019).

The combined impacts of changes to boreal forest and tundra biomes, ocean acidification, and ocean warming could prove highly disruptive to food security and the economy of Alaska, which relies heavily on subsistence and commercial hunting and fishing. The IPCC's 2019 report concludes that these ecosystem changes will further erode the cultural identities and livelihoods of Indigenous as well as non-Indigenous peoples (IPCC 2019).

In Southcentral Alaska, where Wasilla is located, regional impacts of climate change will include:

> *"… warmer and drier conditions will likely cause further shifts in native and invasive species. Shorter, milder winters allow for greater survival of pest species, as was the case with recent bark beetle outbreaks. Non-native insects such as the green alder sawfly have caused extensive mortality of thinleaf alders in this region. Warmer weather and insect-killed trees may also lead to increased incidence and severity of forest fire.*
>
> *Species shifts could negatively impact ecosystem function and subsistence activities. However, longer growing seasons and milder winters could also expand agricultural potential. Higher temperatures result in a longer growing season, which could have significant effects on wildlife mating cycles, plant growth and flowering, water availability in soil and rivers, and hunting and fishing.*
>
> *In the Southcentral boreal forest, invasive species are the dominant mechanism of change. Invasive plants such as orange hawkweed, purple loosestrife and white sweetclover spread aggressively and outcompete native vegetation. The spread of invasive species alters forest structure and regeneration. The indirect effects on water and nutrient availability will likely determine future productivity of trees in Southcentral Alaska."* (UAF 2013)

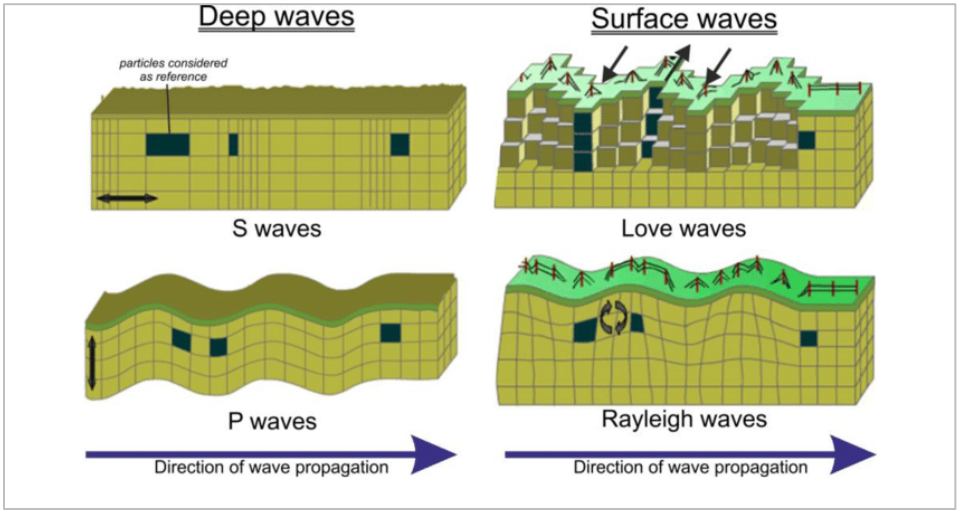
3.3.1 EARTHQUAKE

3.3.1.1 NATURE

An earthquake can be defined as any shift along the Earth's tectonic plates and faults due to accumulated strain built up by friction which precipitates a sudden movement or trembling of the Earth's crust. This sudden movement can be felt at sometimes very distant sites from the epicentre, and it usually occurs without warning. The movement can build rapidly after just a few seconds and cause significant, sometimes catastrophic, damage and severe numbers of casualties, and this often-violent motion or shaking is the most common effect of earthquakes.

Like sound, the motion of the ground is the strongest near the source and increases in concert with the amount of energy released. It also attenuates with distance, i.e., decreases in force as you travel farther away from the epicentre of the earthquake. An earthquake causes several types of waves both with the Earth's interior (seismic waves) and along the surface of the Earth (surface waves). Two distinct types of seismic waves are produced during an earthquake. Primary waves (P waves) are compressional and longitudinal in nature, and this causes back and forth oscillation in parallel to the direction of travel (the vertical motion). Secondary waves (S or shear waves) are slower in nature than the P waves and cause

vibrations that are in the side-to-side plane (horizontal motion). Additionally, there are two types of surface waves: both Rayleigh and Love waves travel more slowly and usually cause considerably less damage than the seismic waves. A visual depiction of each of these waves is shown below (Figure 3-1).



Source: Martinez-Moreno 2015

Figure 3-1 Types of Seismic Waves

Besides the motion and resultant damage, there are also several other hazards which occur due to earthquakes. These are:

Fault Displacement: this is distinct movement on the surface along the two sides of a seismic fault. These displacements can be very considerable in both length and width, i.e., as much as 7 metres vertically and more than 60 kilometres along the rupture line. This type of faulting can cause severe damage to surface structures such as pipelines, roads, railways, and tunnels.

Liquefaction: when granular soil or sediments that is saturated becomes distorted due to the vibrations and surface movements. The empty spaces between the granules can collapse, and water pressure within the pores may increase enough to make the soil/sediments behave more like a fluid during the earthquake causing sometimes serious deformations. Horizontal movements (i.e., lateral spreading) of 5 metres are common but can be as much as 30 metres. Massive flows (i.e., flow failures) that are typically tens to a hundred metres can sometimes extend even to 6-7 kilometres. Liquefaction can also cause a considerable loss of bearing strength, and this can result in structures settling significantly or tipping severely. All of this can result in severe property damage.

Both the intensity and magnitude are considered during the measurement of the severity of earthquakes. The observed level of damage and effects on people, nature, and human structures are variables when describing the intensity. The severity of intensity generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. The scale most often used in the U.S. to measure intensity is the Modified Mercalli Intensity (MMI) Scale.

As shown in Table 3-4, the MMI Scale consists of 10 increasing levels of intensity that range from imperceptible to catastrophic destruction. Peak ground acceleration (PGA) is also used to measure earthquake intensity by quantifying how hard the earth shakes in a given location, or measured as acceleration due to gravity (g). The USGS describes the MMI Scale as:

> *"The effect of an earthquake on the Earth's surface is called the intensity. The intensity scale consists of a series of certain key responses such as people awakening, movement of furniture, damage to chimneys, and finally - total destruction. Although numerous intensity scales have*

been developed over the last several hundred years to evaluate the effects of earthquakes, the one currently used in the United States is the Modified Mercalli (MM) Intensity Scale.

The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the non-scientist than the magnitude because intensity refers to the effects actually experienced at that place.

The following table is an abbreviated description of the comparisons of earthquake magnitude, intensity, ground-shaking comparisons, perceived shaking, and damage.

Table 3-4 Magnitude/Intensity/Ground-Shaking Comparisons

Magnitude	Intensity	PGA: Acceleration (g)	Perceived Shaking	Damage
1.0-3.0	I	<0.000464	Not felt	None
3.0-3.9	II-III	0.000464 - 0.00297	Weak	None
4.0-4.9	IV	0.00297 - 0.0276	Light	None
	V	0.276 - 0.115	Moderate	Very slight
5.0-5.9	VI	0.115 - 0.215	Strong	Light
	VII	0.215 - 0.401	Very Strong	Moderate
6.0-6.9	VIII	0.401 - 0.747	Severe	Moderate/Heavy
	IX	0.747 - 1.39	Violent	Heavy
7.0+	X+	>1.39	Extreme	Very Heavy

Adapted from: USGS (2008) and Er et al. (2010)

3.3.1.2 HISTORY

Reliable data in the seismology of Alaska has been recorded only since 1973 for most locations, and this makes the data relatively young compared to other areas. Obtained for the U.S. Geological Survey (USGS) and the archives of the UAF Geophysical Institute, State of Alaska, the information provided is based on the best-known data. Thorough research was conducted for all events since 1950 (1950-1972 data is less reliable than current data) and up to the present within the earthquake database of the USGS. Since 1932, there have been 38 recorded earthquakes M5.0 and greater within 50 miles of Wasilla.

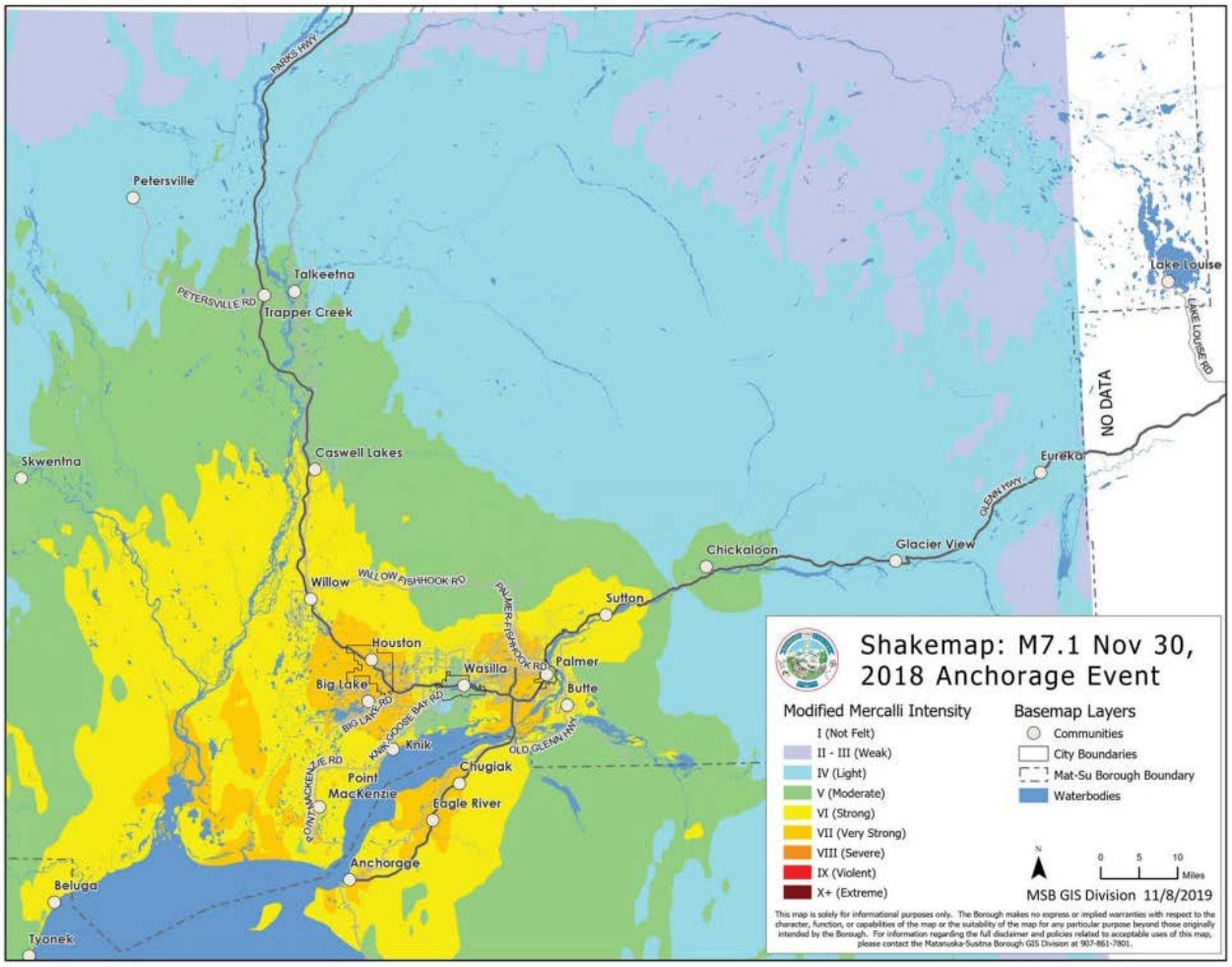
Alaska's strongest earthquake, and the second largest earthquake in the world, occurred on March 27, 1964, in Prince William Sound and was magnitude M9.2. Similar to most earthquakes in Alaska, this one occurred near the Alaska-Aleutian subduction zone and was felt by many residents throughout the State. Residents in Wasilla felt the shaking, but no damages or injuries were reported.

Another notable earthquake occurred on November 3, 2002. The Denali Fault Earthquake, which measured M7.9 in magnitude, lasted for roughly 90 seconds. The earthquake struck a sparsely populated region, and caused thousands of landslides, but little structural damage and no deaths were reported. Residents in Wasilla felt the shaking, but no damage was reported.

On November 30, 2018, at 8:29 am, a M7.1 earthquake hit Southcentral Alaska and shook for about 30 seconds. The epicenter occurred near Point Mackenzie, roughly 20 miles southwest of Wasilla, and 10 miles north of Anchorage. Tsunami warnings were issued for nearby coastal communities, including the Cook Inlet and Kenai Peninsula, but were lifted shortly after. Over 80 aftershocks of various magnitudes immediately followed the event, and three measured greater than M5.0. Aftershocks from this event are still being recorded in 2023. There were no fatalities reported because of this earthquake, but there was severe damage throughout the region. In the Mat-Su region, there was damage to schools and roads. A section of Vine Road buckled and became impassable. In addition, Matanuska Electric Association reported that 46,000 customers were left without electricity immediately after the earthquake. Overall, damage in

Anchorage was estimated to be at least $30 million, including $10 million to repair pipes, and $10 million in public facilities. Damage estimates to the Anchorage School District ranged from $25 to $50 million.

Figure 3-2 shows the Shakemap from the November 2018 M7.1 Anchorage earthquake.



Source: 2020 MSB HMP

Figure 3-2 Shakemap, M7.1 November 30, 2018 Anchorage Earthquake

Table 3-5 lists the historical earthquakes M5.0 and greater within 50 miles of Wasilla. The historical earthquake data was pulled from the USGS Earthquake Catalog from January 1, 1900, through April 11, 2023, but the first dataset for this area was from 1932.

Since the 2018 HMP was adopted, there have been 10 earthquakes, M5.0 or greater, within 50 miles of Wasilla.

Table 3-5 Wasilla's Historical Earthquakes (M5.0 and greater within 50 miles of Wasilla)

Date	Latitude	Longitude	Magnitude
09/14/1932	60.971	-148.689	5.95
05/10/1962	61.97	-150.138	5.39
04/14/1964	61.429	-150.514	5.31
05/11/1965	61.33	-149.52	5.5
09/01/1966	61.66	-149.778	5.33

Date	Latitude	Longitude	Magnitude
10/07/1966	61.58	-150.126	5.63
12/29/1974	61.597	-150.511	5.6
12/30/1974	61.982	-149.686	5.1
01/01/1975	61.909	-149.738	5.9
05/12/1978	62.25	-149.398	5.1
07/17/1979	62.273	-148.136	5.3
11/14/1979	61.381	-150.094	5.1
08/28/1981	61.738	-150.452	5.1
08/14/1984	61.857	-149.104	5.8
12/30/1985	61.541	-150.34	5.5
12/07/1990	61.5728	-150.4083	5
04/26/1991	61.2503	-150.1528	5.2
12/07/1991	60.9537	-150.3277	5.2
05/18/1993	60.9778	-149.9147	5.1
02/17/1995	61.8362	-148.4617	5
05/24/1995	61.007	-150.1237	5.5
05/06/1997	61.5642	-149.7177	5.3
09/27/1998	61.5682	-149.6563	5
07/22/1999	61.2907	-149.318	5.3
03/16/2000	61.3927	-149.8951	5
02/06/2002	61.1741	-149.7255	5
02/06/2002	61.2017	-149.7001	5.1
08/06/2002	61.4161	-150.355	5
11/30/2018	61.3464	-149.9552	7.1
11/30/2018	61.2822	-149.9571	5.8
11/30/2018	61.459	-149.9541	5.2
11/30/2018	61.384	-150.0795	5
12/01/2018	61.4833	-149.9362	5
12/01/2018	61.3548	-149.9913	5.1
01/01/2019	61.2975	-149.9523	5
01/13/2019	61.2993	-150.0647	5
11/07/2020	61.52	-149.9144	5.1
02/27/2021	61.319	-149.9334	5.3

Source: USGS 2023a

Other instances of earthquakes, some outside of a 50-mile radius, impacting Wasilla are listed below.

Date	Event Description	Impacts to Wasilla
07/22/1937	An earthquake measuring 7.3 struck Central Alaska	Shaking felt in the Wasilla area
10/15/1947	An earthquake measuring 7.3 struck Central Alaska	Shaking felt in the Wasilla area
07/09/1958	An earthquake measuring 7.9 struck Southeast Alaska	Shaking felt in the Wasilla area

Date	Event Description	Impacts to Wasilla
03/27/1964	An earthquake initially reported at 8.5 and recalibrated to 9.2 struck the Anchorage area causing 115 deaths and major damage in Anchorage	Shaking felt in the Wasilla area
03/07/1979	An earthquake measuring 6.9 struck southeast Alaska at 11:27 AM.	Very little damage was reported, but hundreds of aftershocks were felt. One aftershock registered 5.4 at 9:08 PM, and one felt on March 8, 1979, registered 5.4.
1984	An earthquake measuring 5.7 was generated from the Castle Mountain fault.	Shaking felt in Sutton
11/03/2002	The Denali fault earthquake, registering 7.9	Shaking felt in the Wasilla area. The event occurred in a remote location and no injuries or property damage in Wasilla were reported because of the earthquake.
01/23/2018	An earthquake measuring 7.9 was generated south of Kodiak Island.	Shaking felt in the Wasilla area
11/30/2018	An earthquake measuring 7.1 struck 10 miles north of Anchorage.	Shaking was felt in the Wasilla area along with damage to several roads.

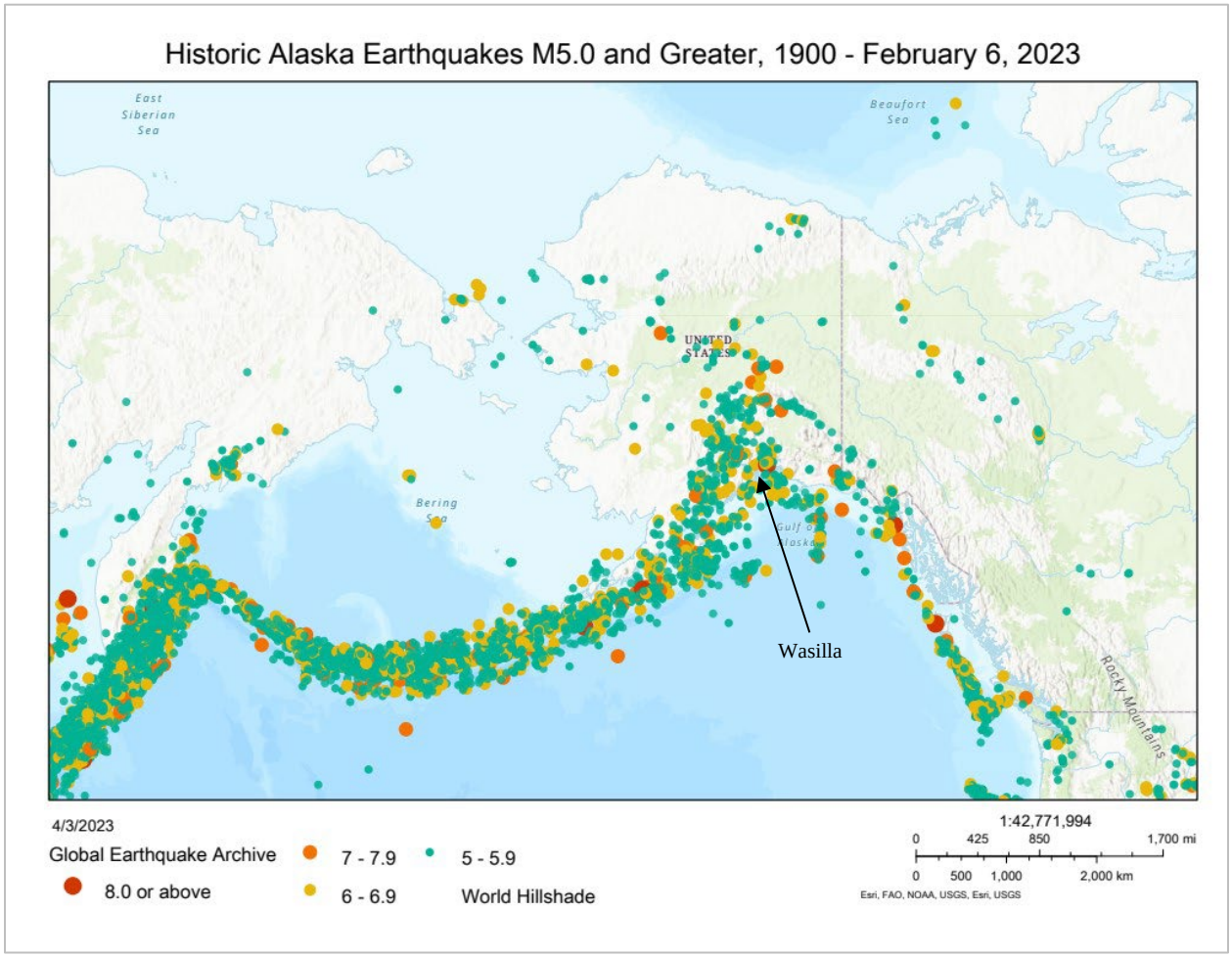
Additionally, the October 2022 DHS&EM Disaster Cost Index (DCI) provides historical earthquake disaster declarations that may have impacted Wasilla. The index lists the following events:

03-203 Denali Fault Earthquake (AK-DR-1440) Declared November 6, 2002, by Governor Knowles then FEMA Declared November 8, 2002: A major earthquake with a preliminary magnitude of 7.9 occurred on the Denali Fault in Interior Alaska on November 3, 2002, with strong aftershocks. The earthquake caused severe & widespread damage and loss of property, and threat to life & property in the Fairbanks North Star Borough, the Denali Borough, the Matanuska-Susitna Borough, and numerous communities within the Delta Greely, Alaska Gateway, Copper River, and Yukon-Koyukuk Regional Education Attendance Areas including the cities of Tetlin, Mentasta Lake, Northway, Dot Lake, Chistochina and Tanacross, and the unincorporated communities of Slana and Tok. The areas experienced severe damage to numerous personal residences requiring evacuations and sheltering of residences; extensive damage to primary highways including the Richardson Highway, the Tok Cutoff, the Parks Highway, and road links to communities including the road to Mentasta and Northway. Damage to supports for the Trans-Alaska Pipeline necessitated the shutdown of the pipeline. Additionally, fuel spills from residential storage tanks, significant damage to water, septic, sewer, and electrical systems also occurred. Not all of the areas listed in the State disaster were included in the Federal Individual Assistance Program. Assistance to those areas was thought the State Individual Assistance Program. Additionally, not all of the areas listed in the State declaration were eligible for all categories of assistance under the federal Public Assistance Program. Those areas were only eligible for Debris Removal & Emergency Protective Measures under the Federal Public Assistance Program but were eligible for all Permanent Work categories under the State public Assistance Program. FEMA also authorized 404 Mitigation funding. DOT submitted an appeal letter after funding was denied by FEMA for permanent repair of the runways at Northway and Gulkana Airports. On August 10, 2004, FEMA granted the second appeal, which awarded DOT an extra $13.5 million to conduct the repairs. Individual Assistance totaled $67K for 12 applicants. Public Assistance totaled $24.8 million for 17 applicants with 53 PW's.

AK-18-265 2018 November Cook Inlet Earthquake declared by Governor Walker on December 2, 2018, then FEMA declared an Emergency Declaration on November 30, 2, 2018 (EM-3410) then declared a Major Declaration on January 31, 2019 (DR-4413). On November 30, 2018, a major earthquake measured at magnitude 7.0 produced strong seismic shaking that caused widespread and severe damage primarily within the Municipality of Anchorage, Matanuska-Susitna Borough, and Kenai Peninsula Borough. The Municipality of Anchorage and Matanuska-Susitna Borough have each issued local declarations of disaster emergency in response to this event
The disaster resulted in widespread and severe seismic shaking damage to major highways and critical community roads, bridges, and other transportation infrastructure; undermining of road embankments and railroad tracks, and loss

of track base; widespread power, water, and communication disruption; structural collapse and resulting fires to several community buildings; and severe damage to private homes and personal property.
These conditions have required local emergency protective measures to protect life and property, including activation and staffing of emergency operations centers; emergency debris clearance of roads and railroad tracks to protect critical infrastructure and maintain access; placement of road barricades to protect roads and bridges; operation of mass shelters for affected residents; school, business, and government office closures.

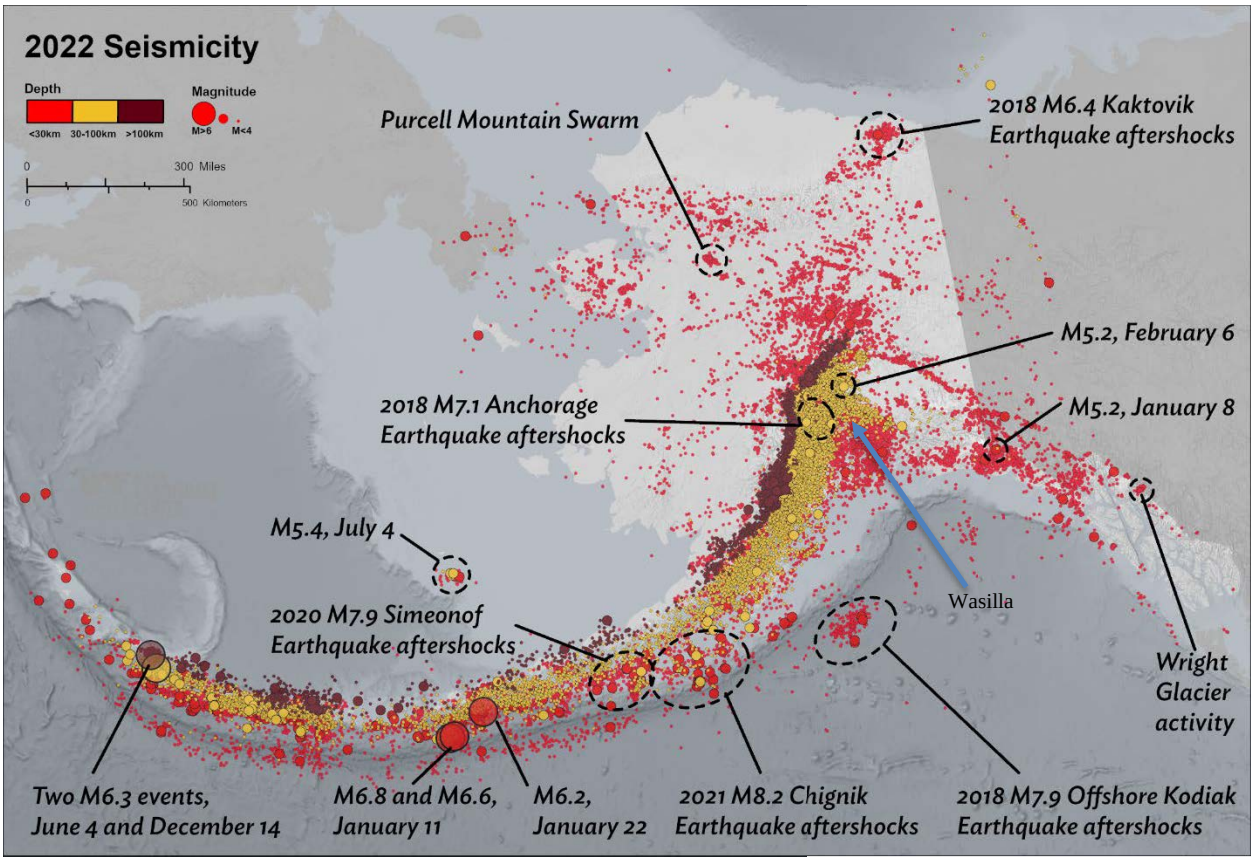
Figure 3-3 shows historical earthquakes from 1900- February 6, 2023, M5.0 and greater statewide.



Source: Global Earthquake Archive, Accessed 4/3/2023

Figure 3-3 Historical Alaska Earthquakes Greater than M5.0, 1900- February 6, 2023

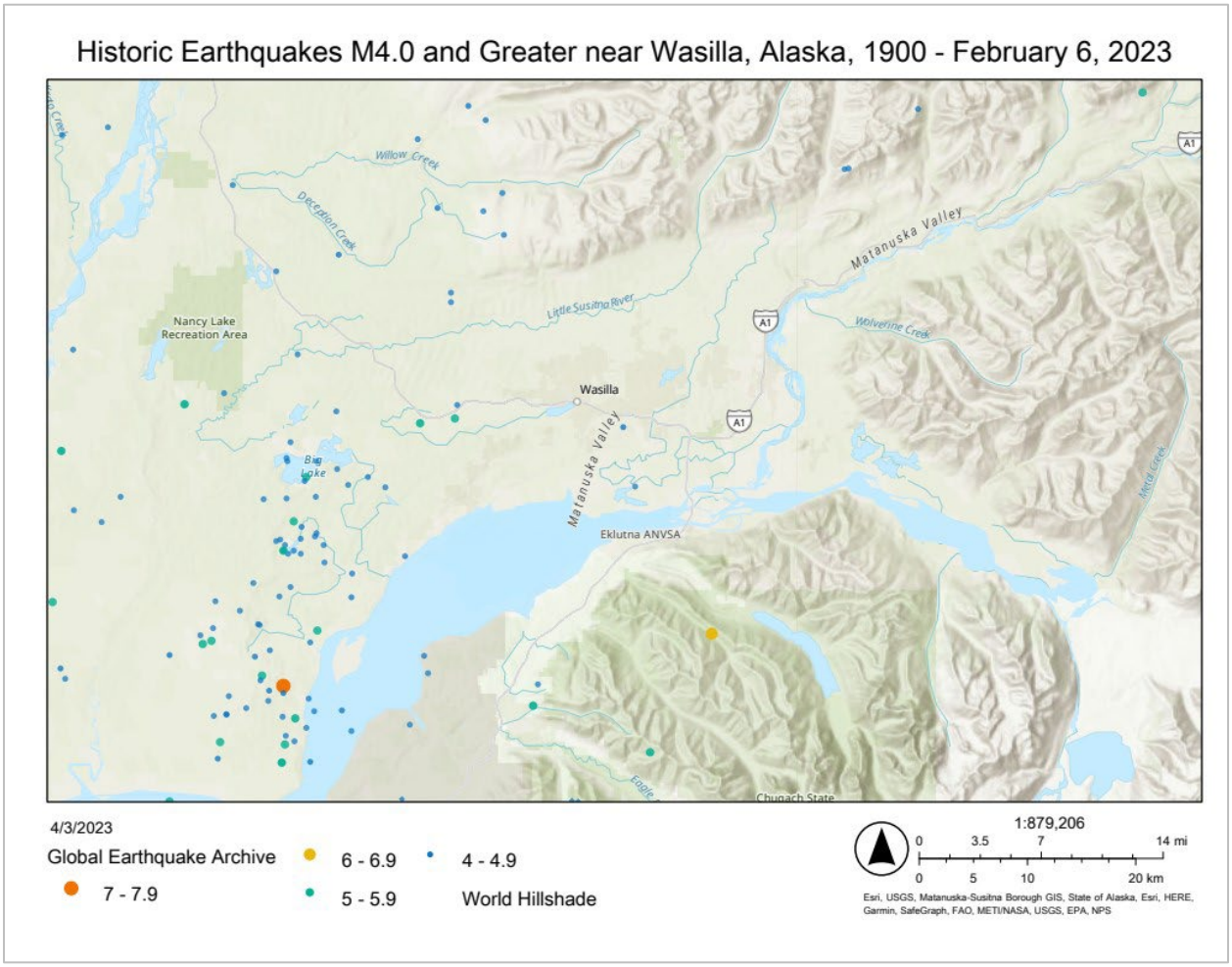
Figure 3-4 depicts one year of earthquake activity in Alaska during 2022. The Alaska Earthquake Center (AEC) states that "Alaska had a relatively quiet 2022 as far as earthquakes go" (AEC 2023). Statewide, there were an average 902 reported earthquakes per week, mostly occurring in the Aleutians (AEC 2023).



Source: AEC 2023

Figure 3-4 Map of Alaska's Recorded Earthquakes in 2022

Figure 3-5 depicts historical earthquakes M4.0 and greater within ~50 miles of Wasilla.



Source: Global Earthquake Archive, Accessed 4/3/2023

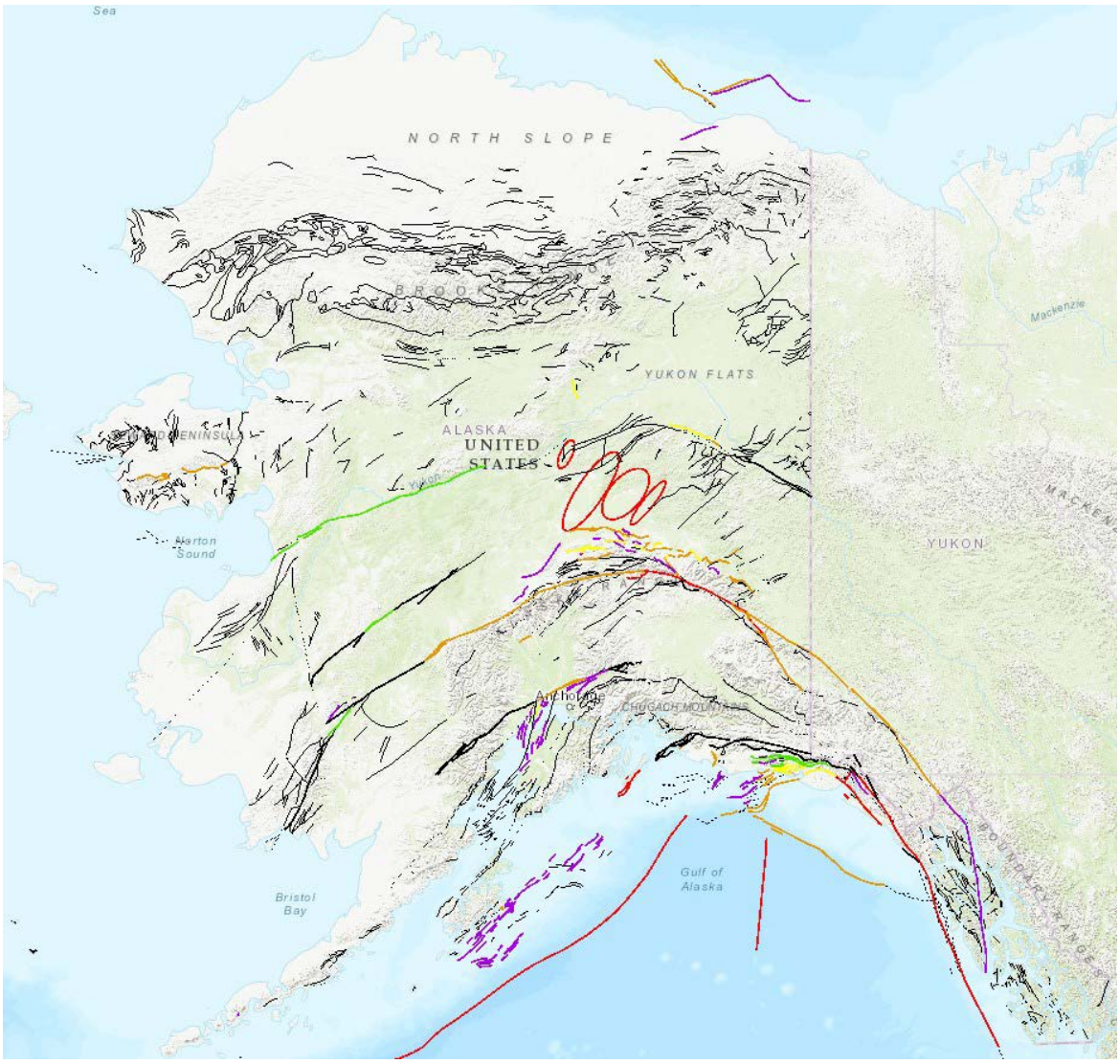
Figure 3-5 Historical Earthquakes M4.0 and Greater Near Wasilla

Within ~50 miles of Wasilla, the largest earthquake occurred on November 30, 2018, and measured 7.1 in magnitude. Roads surrounding the community were severely damaged.

3.3.1.3 LOCATION

Wasilla is in the Cook Inlet basin, which is a northeast-trending fore arc basin located between the Chugach and Kenai Mountains to the south and the Alaska Range and the Aleutian volcanic arc to the north and west. Major fault zones are close to the margin of the basin. In relation to Wasilla, the Castle Mountain fault is to the north, the Bruin Bay fault is to the southwest, and the Border Ranges fault is to the south/southeast (Figure 3-8). Folds in the basin are complex, discontinuous structures that have variable shape and convergence and are commonly anchored by blind thrust faults. These are thrust faults that do not rupture all the way up to the surface so there is no evidence of it on the ground. They are "buried" under the uppermost layers of rock in the crust.

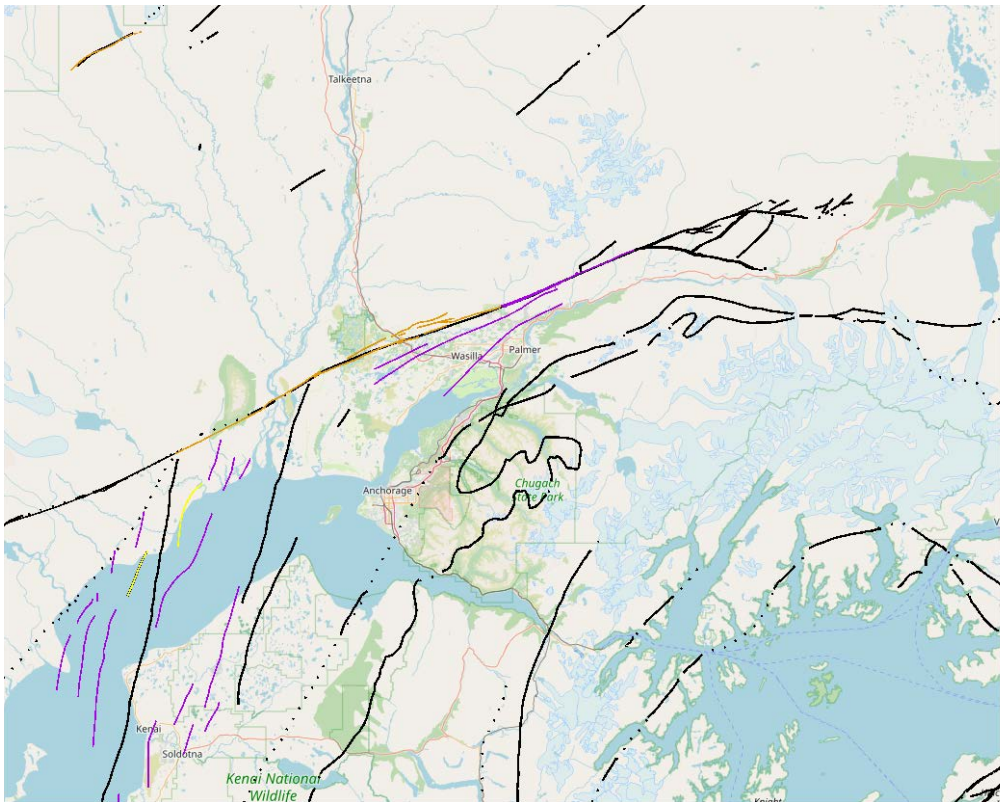
Figure 3-6 shows Alaska's earthquake faults and folds. The accompanying legend is below.



Source: DGGS Quaternary Fault and Folds Database (2013)

Figure 3-6 Alaska's Faults and Folds

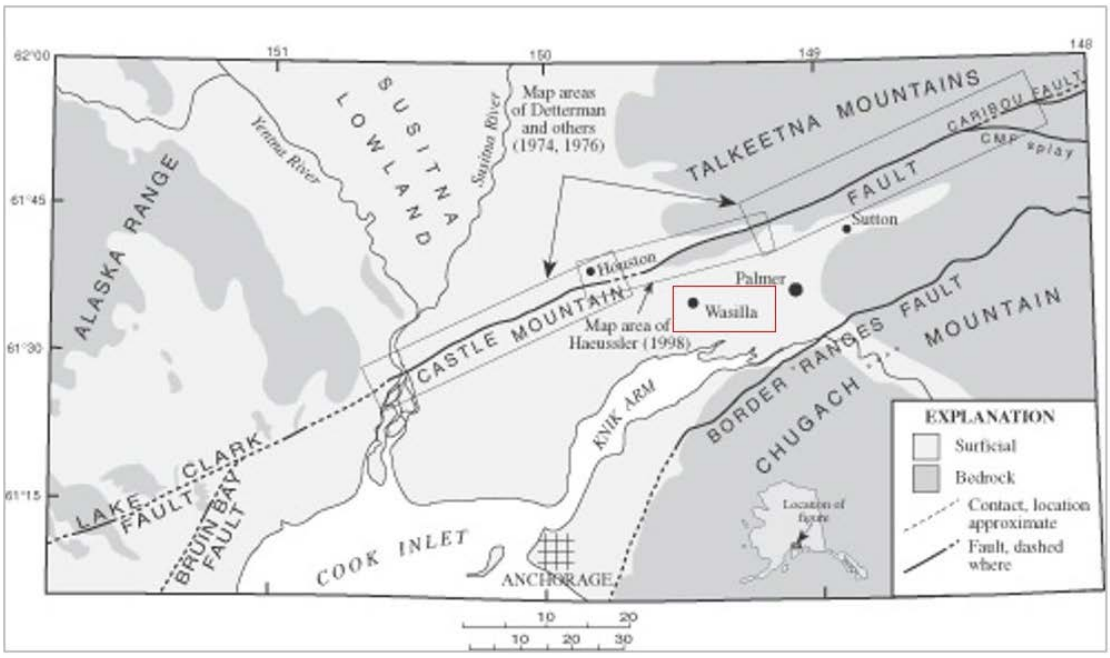
Figure 3-7 is a zoomed in image of the Quaternary Fault and Folds near Wasilla. The legend above is applicable to this figure as well.



Source: DGGS Quaternary Fault and Folds Database (2013)

Figure 3-7 Faults and Folds in the Wasilla Area

Figure 3-8 shows the location and names of numerous faults surrounding Wasilla.



Source: USGS 2001

Figure 3-8 Name and Location of Faults Surrounding Wasilla

3.3.1.4 EXTENT (MAGNITUDE AND SEVERITY)

Intensity is a subjective measure of the strength of the shaking experienced in an earthquake. Intensity is based on the observed effects of ground shaking on people, buildings, and natural features. It varies from place to place within the disturbed region depending on the location of the observer with respect to the earthquake epicenter.

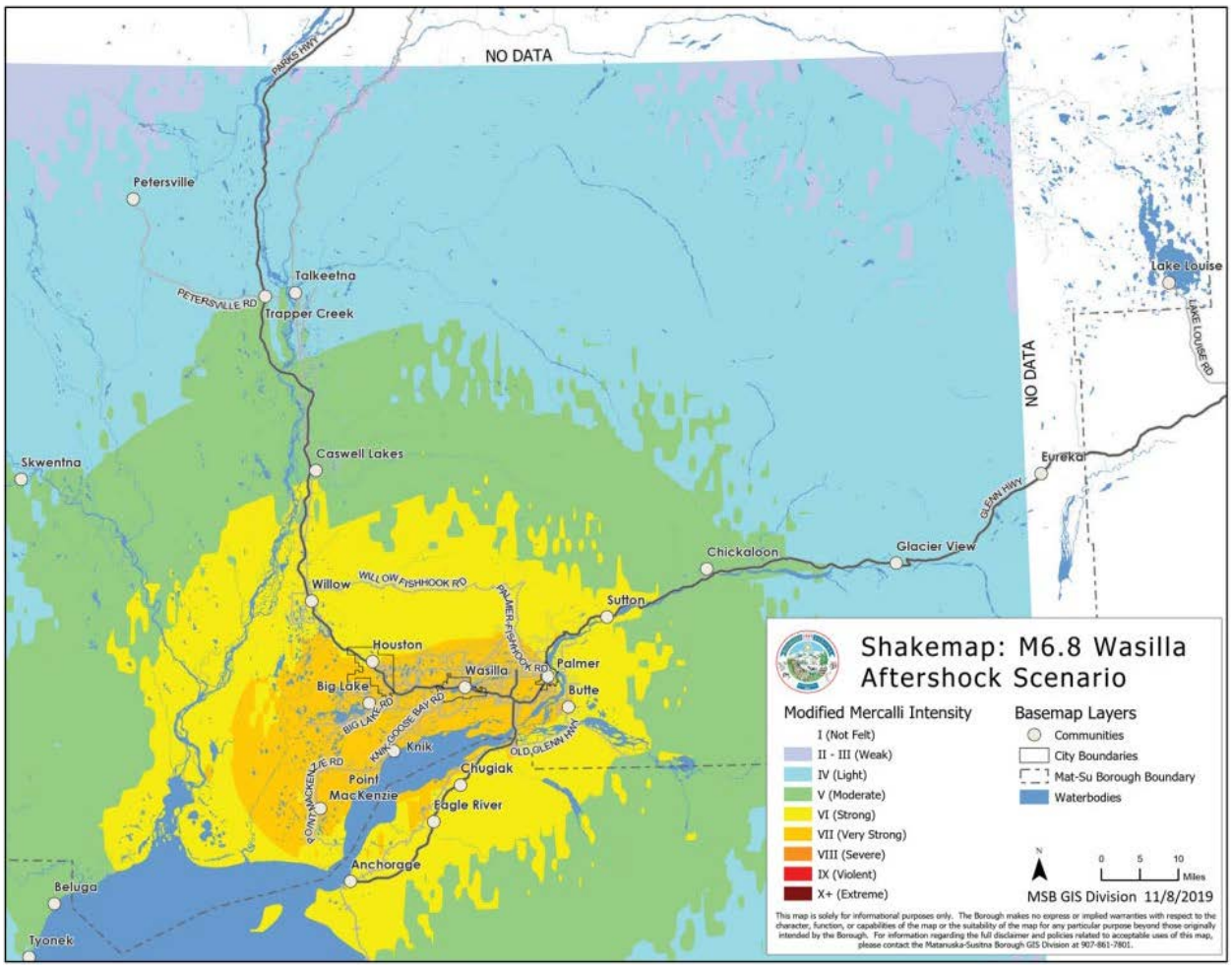
The "intensity" reported at different points generally decreases away from the earthquake epicenter. Local geologic conditions strongly influence the intensity of an earthquake; commonly, sites on soft ground or alluvium have intensities two to three units higher than sites on bedrock. The Richter scale expresses magnitude as a decimal number.

A M2.0 or less is called a microearthquake; they cannot even be felt by people and are recorded only on local seismographs. Events of about M4.5 or greater are strong enough to be recorded by seismographs all over the world. A M5.0 earthquake is a “moderate” event, a M6.0 characterizes a “strong” event, a M7.0 is a “major” earthquake, and a “great” earthquake exceeds M8.0. Great earthquakes occur once a year on average worldwide; some examples of Great earthquakes are British Columbia 1700, Chile 1960, and Alaska 1964. The Richter Scale has no upper limit, but for the study of massive earthquakes, the moment magnitude scale is used. The modified Mercalli Intensity Scale is used to describe earthquake effects on structures (Table 3-4).

Numerous major fault zones are close to Wasilla- the Castle Mountain fault is to the north, the Bruin Bay fault is to the southwest, and the Border Ranges fault is to the south/southeast.

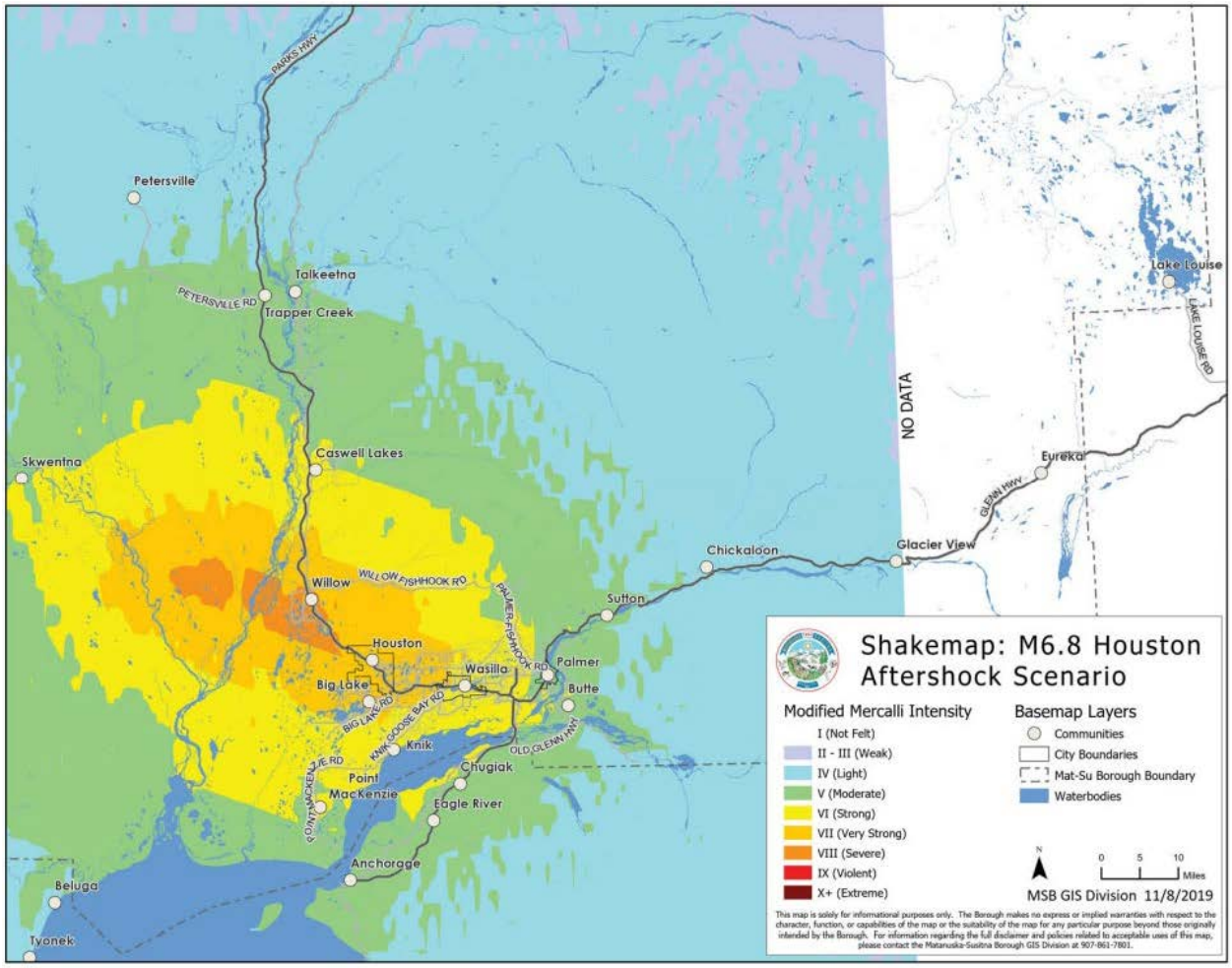
Most earthquake injuries and fatalities occur within buildings from collapsing walls and roofs, flying glass, and falling objects. As a result, the extent of Wasilla’s risk depends not just upon its location relative to known faults, and its underlying geology and soils, but also on the design of its structures. Buildings that have not been constructed to meet seismic standards can pose major threats to life and the continued functioning of key public services during an earthquake.

The following Shakemaps provide a visual of estimated shaking intensities for various earthquake scenarios that may impact Wasilla.



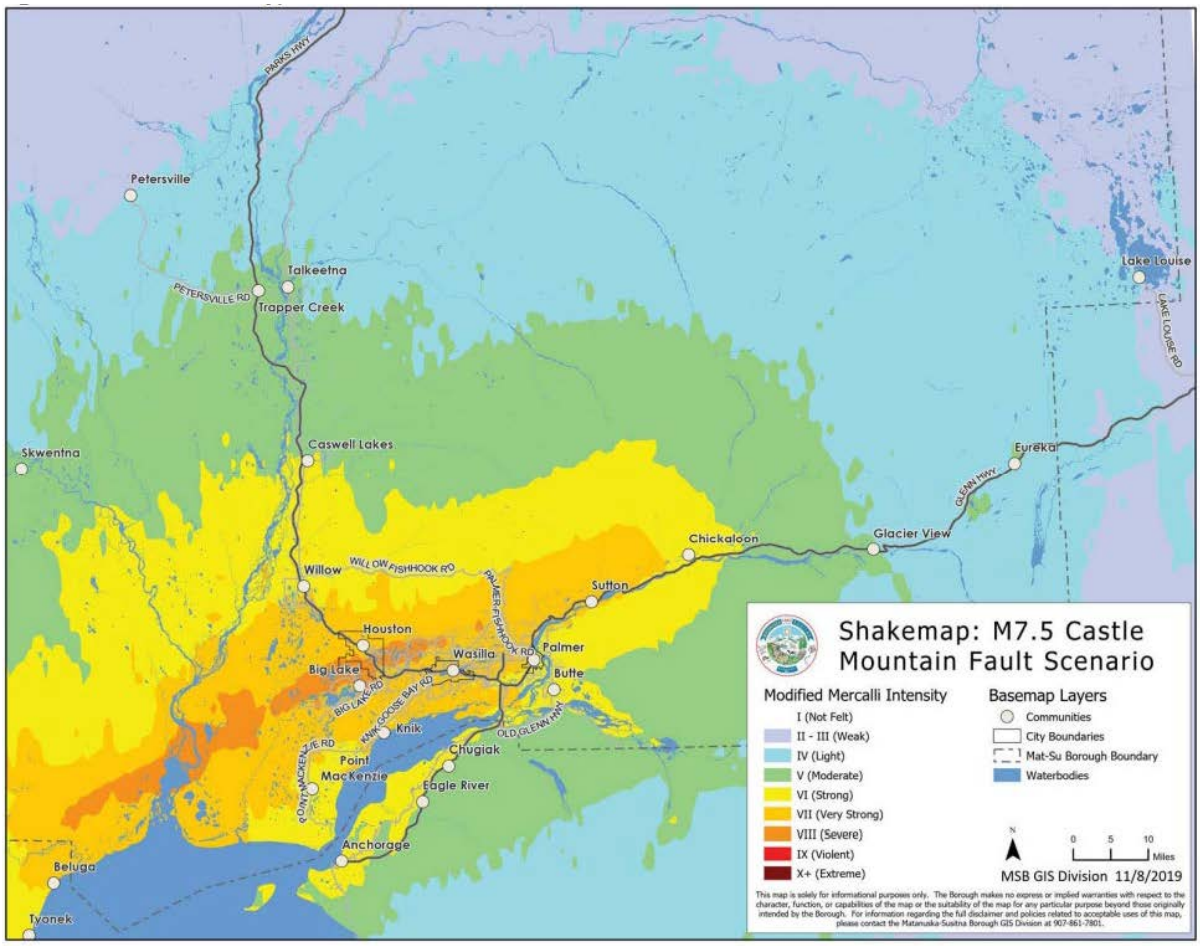
Source: 2020 MSB HMP

Figure 3-9 Shakemap, M6.8 Wasilla Aftershock Scenario



Source: 2020 MSB HMP

Figure 3-10 Shakemap, M6.8 Houston Aftershock Scenario



Source: 2020 MSB HMP

Figure 3-11 Shakemap, M7.5 Castle Mountain Fault Scenario

It was determined in the 2016 FEMA Risk Report that the following facilities in Wasilla would be most affected by the Castle Mountain earthquake scenario:

- Iditarod Elementary School (now the new Wasilla police department building)
- Wasilla Middle School
- Central Mat-Su PSB 6-1
- Mat-Su Regional Urgent Care
- Burchell High School
- Mat-Su Central School
- Wasilla Police Department (now the Wasilla EOC/dispatch center)
- Wasilla U.S. Post Office
- Wasilla City Hall
- Mat-Su Water Rescue
- Wasilla Library (now the Dorothy Page Museum/Historic Townsite)
- Jake Wright DES Fleet Maintenance Facility
- Dorothy Page Museum/Historic Townsite
- Wasilla CCS Early Learning Head Start Preschool
- Wasilla Senior Campus, Senior Housing and Community Center
- Valley Performing Arts Center
- Museum of Alaska Transportation and Industry

The 2016 FEMA Risk Report for the Mat-Su Borough and incorporated Cities of Houston, Palmer, and Wasilla, provides the following information about potential losses during future earthquake scenarios:

> *"Earthquake assessments based on the Magnitude (M) 7.1 earthquake event (referred to as Border Ranges Scenario), the M7.5 Castle Mountain Scenario, and the M9.2 1964 Great Alaskan Earthquake Scenario, were created to simulate the estimated potential loss regarding the identified event.*
>
> ***For all simulations**, the **heaviest losses** occurred in the **City of Wasilla**, with estimated building and content losses of $34 million for the M7.1 Border Ranges Scenario, $120 million for the M7.5 Castle Mountain Scenario, and $20 million for the M9.2 1964 Great Alaskan Earthquake Scenario. Loss ratios from the M7.5 Castle Mountain Scenario are highest in Wasilla, at 6.69%. The team also projected losses for transportation systems (highways, railways, light rail, buses, ports, ferries, and airports), utility systems (potable water, wastewater, natural gas, crude and refined oil, electric power, and communication facilities), and essential facilities (educational, fire, government, health care, and police)."*

The following table is an excerpt from the 2016 FEMA Risk Report for the MSB and provides loss estimations in Wasilla for various earthquake scenarios. For the M7.5 Castle Mountain scenario, loss ratios in the MSB are highest in the City of Wasilla (6.69%). For the 1964 Great Alaskan Earthquake scenario, the City of Wasilla is one of the three communities/areas with the second highest estimated losses ($20 million).

Table 3-6 Loss Estimations in Wasilla for Various Earthquake Scenarios

Total Estimated Value (Building and Contents)	Total Number of Buildings	M 7.1 Border Ranges Scenario		M7.5 Castle Mountain Scenario		M9.2 1964 Great Alaskan Scenario	
		Total Dollar Loss	Loss Ratio (Dollar Losses/Total Value)	Total Dollar Loss	Loss Ratio (Dollar Losses/Total Value)	Total Dollar Loss	Loss Ratio (Dollar Losses/Total Value)
$1.9B	3,423	$34.0M	1.82%	$120.0M	6.69%	$20.0M	1.00%

Source: 2016 FEMA Risk Report- MSB

Based on past event history and the criteria identified in Table 3-2, the extent of earthquakes and resultant damages to people and infrastructure in Wasilla are considered Critical to Catastrophic, where past injuries/fatalities associated with earthquake events have occurred; shutdown of critical facilities occurred for at least two weeks; and 25-50 percent of property was damaged.

3.3.1.5 IMPACT

An earthquake could affect the entire City of Wasilla and surrounding areas. The exact number and location of impacted structures would depend on the size, location, and frequency of the earthquake. The type of building would also play a role as some facilities are designed to withstand larger magnitudes earthquakes. Earthquake damage would be area-wide with potential damage to critical infrastructure including the complete abandonment of key facilities.

As a result of the M7.1 Anchorage Earthquake on November 30, 2018, Vine Road just outside of Wasilla was severely damaged due to lateral spread. Several other roads were significantly damaged, including Palmer-Wasilla Highway, one of the busiest roads in the Valley, as well as Pittman Road, and the Parks and Glenn highway interchange. Within City limits, some minor cracking, not structural, was reported at some facilities, foundations sunk at the sewer treatment plant, the Menard Center reported some broken windows with damages around $1,000.

Source: Washington Post 2018

Figure 3-12 Lateral Spread of Vine Road, November 30, 2018

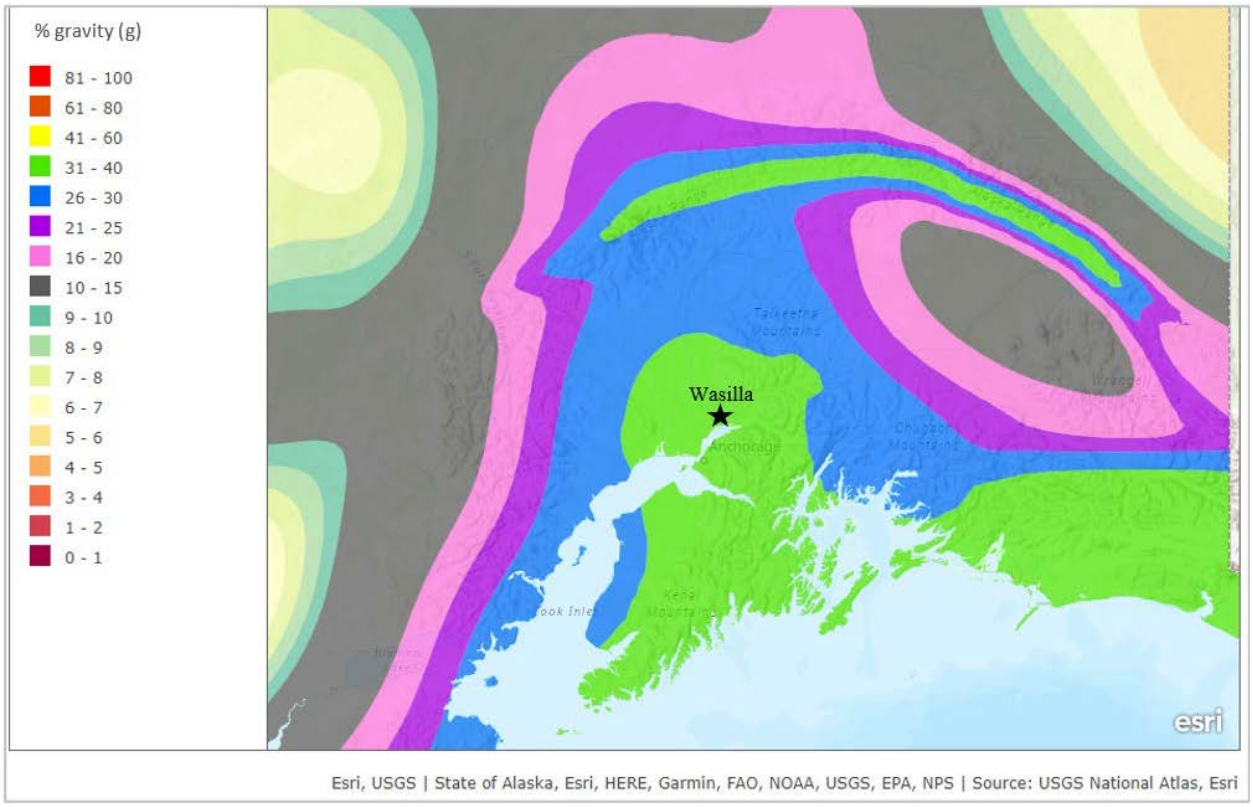
Wasilla has experienced shaking from numerous larger magnitude earthquakes, but no damage was reported within City limits.

3.3.1.6 PROBABILITY OF FUTURE EVENTS

While it is not possible to predict an earthquake, the USGS has developed earthquake probability maps that use the most recent earthquake rate and probability models. These models are derived from earthquake rate, location, and magnitude data from the USGS National Seismic Hazard Mapping Project.

Figure 3-13 shows the earthquake probability/risk for Wasilla. This map layer shows the potential ground shaking intensity from earthquakes and the value that is shown is an estimate of the worst amount of shaking due to earthquakes experienced at a specific location in a 50-year time frame (Esri, USGS 2022). For example, 1 g, or 100% g, is a horizontal acceleration of 9.81 m/s².

In Wasilla, the associated earthquake risk category is 40%, which equates to 0.4 g, or a potential horizontal acceleration of 3.924 m/s². On the MMI scale (Table 3-4), this is right on the cusp of very strong to severe shaking and moderate to moderate/heavy potential damage.



This layer shows the probability of a 10% chance of exceeding the displayed horizontal ground acceleration within 50 years.
Source: Esri, USGS- USA Earthquake Risk. Accessed May 24, 2023.

Figure 3-13 City of Wasilla's Earthquake Probability/Risk

Based on previous occurrences and the criteria identified in Table 3-3, it is Highly Likely that Wasilla will experience an earthquake event of any magnitude within the calendar year; there is a 1 in 1 year chance of occurring (1/1=100 percent); and the history of events is greater than 33 percent likely per year.

3.3.1.7 FUTURE CONDITIONS INCLUDING CLIMATE CHANGE

Due to climate change, the nature or location of earthquakes are not anticipated to change.

Changing Factor due to Climate Change	Description of Future Changes due to Climate Change
Extent (Magnitude/Severity)	Due to climate change, the secondary effects of earthquakes are expected to be more severe over larger areas with climate driven changes in soil conditions (sea level rise, permafrost degradation). Higher water tables caused by sea level rise will increase the saturation of soils and increase the risk of liquefaction during earthquakes, increasing their severity and risk to infrastructure (Dong et al. 2022; Quilter et al. 2015; Murakami et al. 2005). Wasilla is not threatened by permafrost thaw or sea level rise; therefore, climate change is not anticipated to influence the extent of earthquakes in the City.

Changing Factor due to Climate Change	Description of Future Changes due to Climate Change
Impact	Due to climate change, the impact of earthquakes may increase in regions experiencing permafrost melt and sea level rise. Several studies have indicated that rising sea levels due to climate change will also cause groundwater tables to rise, which will increase the saturation of soils that have previously been drier, and thus increase the probability of liquefaction during earthquakes (Dong et al. 2022; Quilter et al. 2015; Murakami et al. 2005). Lateral spread due to liquefaction was responsible for much of the damage to infrastructure and buildings across southcentral Alaska during the 1964 Good Friday earthquake (Bartlett and Youd 1995), releasing devastating landslides and destroying homes in areas such as the western edge of the Turnagain neighborhood (now Earthquake Park) in Anchorage. The impacts of future earthquakes have the potential to be far more widespread and devastating with a rising probability of liquefaction, including destruction of homes and critical facilities, infrastructure, and an increase in loss of life. Wasilla is not threatened by permafrost nor sea level rise; therefore, climate change is not anticipated to influence the impact of earthquakes in the City. Historically, impacts from earthquakes in Wasilla have caused damages to roads.
Probability	Due to climate change, more specifically, the injection or withdrawal of fluids in the crust, the frequency of micro-seismicity may increase, which may or may not influence the frequency of larger earthquakes. According to NASA, increases in precipitation or droughts are known to increase the probability of micro-seismicity due to the changing of stresses to fault lines, but the agency states that the data is not yet clear on whether it can increase the probability of larger earthquakes (Buis 2019). Buis (2019) further concludes that scientists are not close to being able to predict when an earthquake may occur as a result of climate processes and that even if they know a climate process is affecting a fault system, they don't know enough about any one fault's potential state of readiness to break.

3.3.2 SEVERE WEATHER

3.3.2.1 NATURE

Severe weather is any dangerous meteorological development that has the power to cause damage or disruption, including the loss of human life. Severe weather instances that occur throughout Alaska with extremes experienced by Wasilla's residences includes extreme cold, freezing rain/ice storm, heavy and drifting snow, blizzard, winter storm, heavy rain, high winds, dust storms, and drought. Wasilla experiences periodic severe weather events such as the following:

Severe Weather Event	Nature of the Event
Extreme Cold	Extreme cold is generally defined as a prolonged period of excessively cold weather. Extreme cold conditions are often, but not always, part of winter storms. In Alaska, extreme cold usually involves temperatures between -20 to -50°F or more.
Freezing Rain and Ice Storms	Freezing rain and ice storms occur when the layer of freezing air is so thin that the raindrops do not have enough time to freeze before reaching the ground. Instead, the water freezes on contact with the surface, creating a coating of ice on whatever the raindrops contact. These events are noted by accumulation of at least 12 inches in less than 24 hours.

<table>
<tr><th>Severe Weather Event</th><th>Nature of the Event</th></tr>
<tr><td>Heavy Snow</td><td>Heavy snow generally means snowfall accumulating to four inches or more in depth in 12 hours or less or six inches or more in depth in 24 hours or less.</td></tr>
<tr><td>Drifting Snow</td><td>Drifting snow is the uneven distribution of snowfall and snow depth caused by strong surface winds. Drifting snow may occur during or after a snowfall.</td></tr>
<tr><td>Blizzard</td><td>A blizzard as a specific type of snowstorm that consist of large amounts of snow or blowing snow, winds greater than 35 mph, and visibility of less than ¼ mile for at least three hours.</td></tr>
<tr><td>Winter Storm</td><td>A winter storm is a combination of heavy snow, blowing snow, and/or dangerous wind chills. A winter storm is life-threatening.
A snowstorm is an example of a winter storm. A snowstorm occurs when a mass of very cold air moves away from the polar region and collides with a warm air mass. The warm air rises quickly and the cold air cuts underneath it, causing huge cloud bank to form. As the ice crystals within the cloud collide, snow is formed. However, snow will only fall from the cloud if the temperature of the air between the bottom of the cloud and the ground is below 40 degrees Fahrenheit. A higher temperature will cause the snowflakes to melt as they fall through the air, turning them into rain or sleet. Similar to ice storms, the effects from a snowstorm can disturb a community for a prolonged period of time. Buildings and trees can collapse under the weight of heavy snow.</td></tr>
<tr><td>Heavy Rain</td><td>Heavy rain occurs when the precipitation rate is between 0.39 - 2.0 inches per hour.</td></tr>
<tr><td>High Winds</td><td>High winds pose a moderate threat to a community when they reach sustained speeds of 26 to 39 mph, or frequent wind gusts of 35 to 57 mph. High winds pose a high threat to a community when they reach sustained speeds of 40 to 57 mph. High winds pose an extreme threat to a community when they reach sustained speeds greater than 58 mph, or frequent wind gusts greater than 58 mph.
Various wind scales equate wind speed to expected damages. Two widely used wind scales are the Beaufort Scale of Wind Strength and the Saffir-Simpson Hurricane Wind Scale, further explained below in Table 3-7 and Table 3-8.
Table 3-7 Beaufort Scale of Wind Strength
<table>
<tr><th>Force</th><th>Wind Speed (mph)</th><th>Damages</th></tr>
<tr><td>9</td><td>47-54</td><td>Chimneys blown down; slate & tiles torn from roofs.</td></tr>
<tr><td>10</td><td>55-63</td><td>Trees broken or uprooted.</td></tr>
<tr><td>11</td><td>64-75</td><td>Trees uprooted; cars overturned.</td></tr>
<tr><td>12</td><td>75+</td><td>Wide-spread devastation, buildings damaged or destroyed.</td></tr>
</table></td></tr>
</table>

Table 3-8 Saffir-Simpson Hurricane Wind Scale

Category	Sustained Winds (mph)	Damages
1	74-95	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157+	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

The Matanuska Susitna Valley is very windy and has coined the terms “Matanuska wind” and “Knik wind” to describe the winds that occur in the region. A Matanuska wind is a strong, gusty, *northeast wind* that occasionally occurs during the winter in the vicinity of Palmer, Alaska, while a Knik wind is a strong *southeast wind* in the vicinity of Palmer, Alaska. The figures below, while dated (1956), show the Matanuska and Knik wind patterns over the region. Wasilla is more commonly affected by Matanuska winds than Knik winds, and recent windstorms in 2022 were caused by Matanuska winds.

Severe Weather Event	Nature of the Event

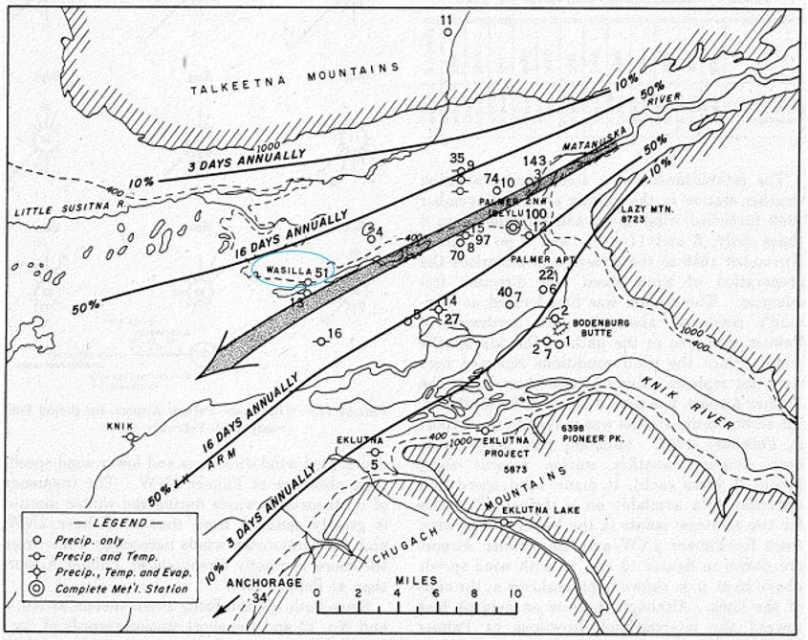


FIGURE 18.—Percentage of number of days of "Matanuska" winds reported at No. 12, and Matanuska wind path (July 1942–December 1948).

Source: NWS 1956

Figure 3-14 Matanuska Wind Pattern

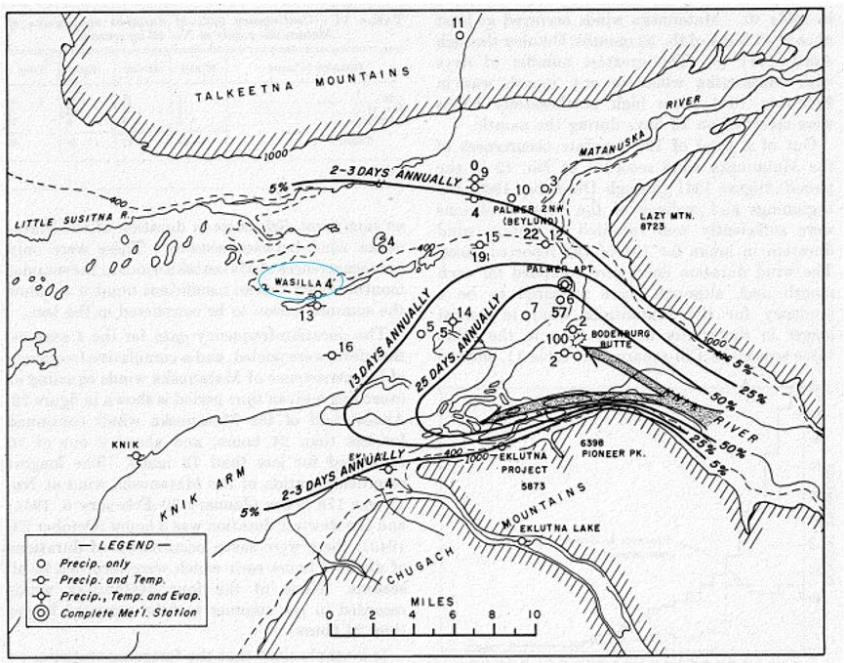
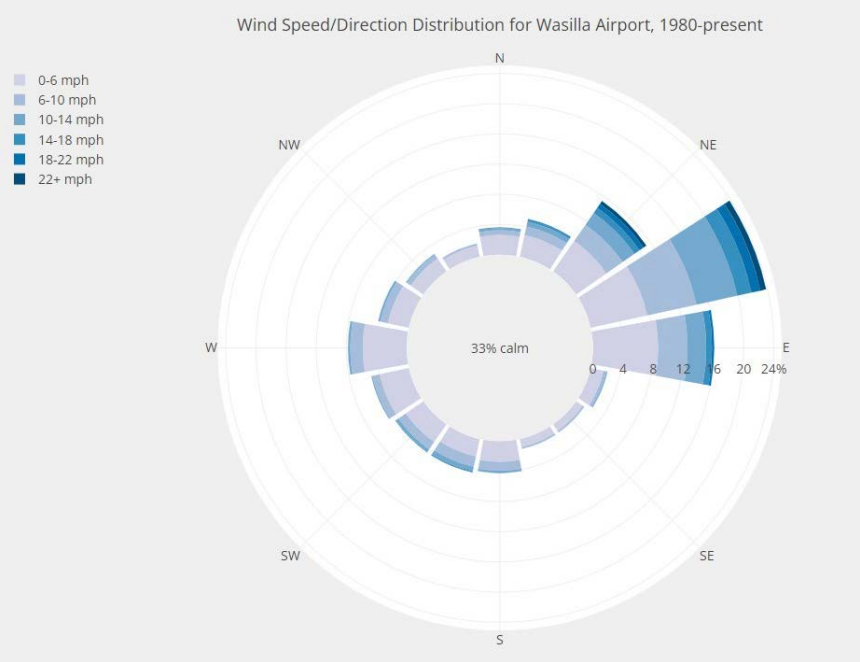


FIGURE 23.—Percentage of number of days of Knik winds reported at No. 2, and Knik wind path (July 1942–December 1948).

Source: NWS 1956

Figure 3-15 Knik Wind Pattern

<table>
<tr><th>Severe Weather Event</th><th>Nature of the Event</th></tr>
<tr><td></td><td>Figure 3-16 shows wind speed/direction distribution of winds recorded at the Wasilla Airport from 1980-present.
 

Source: UAF/SNAP 2023
Figure 3-16 Wind Speed/Direction Distribution for Wasilla Airport, 1980-Present</td></tr>
<tr><td>Dust Storms</td><td>A dust storm is a wall of dust and debris that is often blown into an area by strong winds. High winds can cause dust storms that greatly exceed national health-based standards.

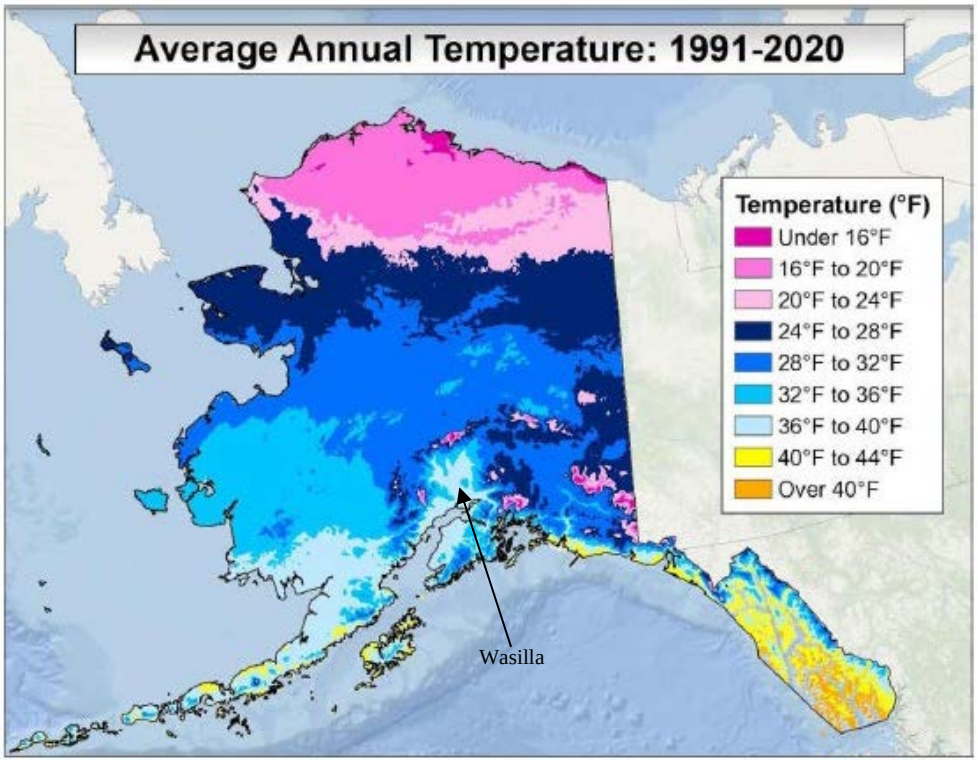
The National Ambient Air Quality Standards (NAAQS) are set by the U.S. EPA to protect public health and the environment. Particulate matter can clog lung sacs and may pass into bloodstream, often, they carry toxic and carcinogenic materials.

There are two sizes of particulate matter: PM2.5 (fine particulate matter) and PM10 (course particulate matter), which are outlined below.

Table 3-9 National Ambient Air Quality Standard for Particulate Matter
<table>
<tr><th>Particulate Matter Size</th><th>Particulate Matter Produced By:</th><th>National Ambient Air Quality Standard</th></tr>
<tr><td>PM2.5</td><td>Industrial processes, heating boilers and engines</td><td>4-hour standard: 35 micrograms per cubic meter of air (µg/m^3).
Annual standard:12.0 µg/m^3, averaged over three years.</td></tr>
<tr><td>PM10</td><td>Dust from construction sites, wildfires, and industrial sources.</td><td>24-hour standard: 150 µg/m^3</td></tr>
</table>
Source: Southwest Ohio Air Quality Agency 2023</td></tr>
</table>

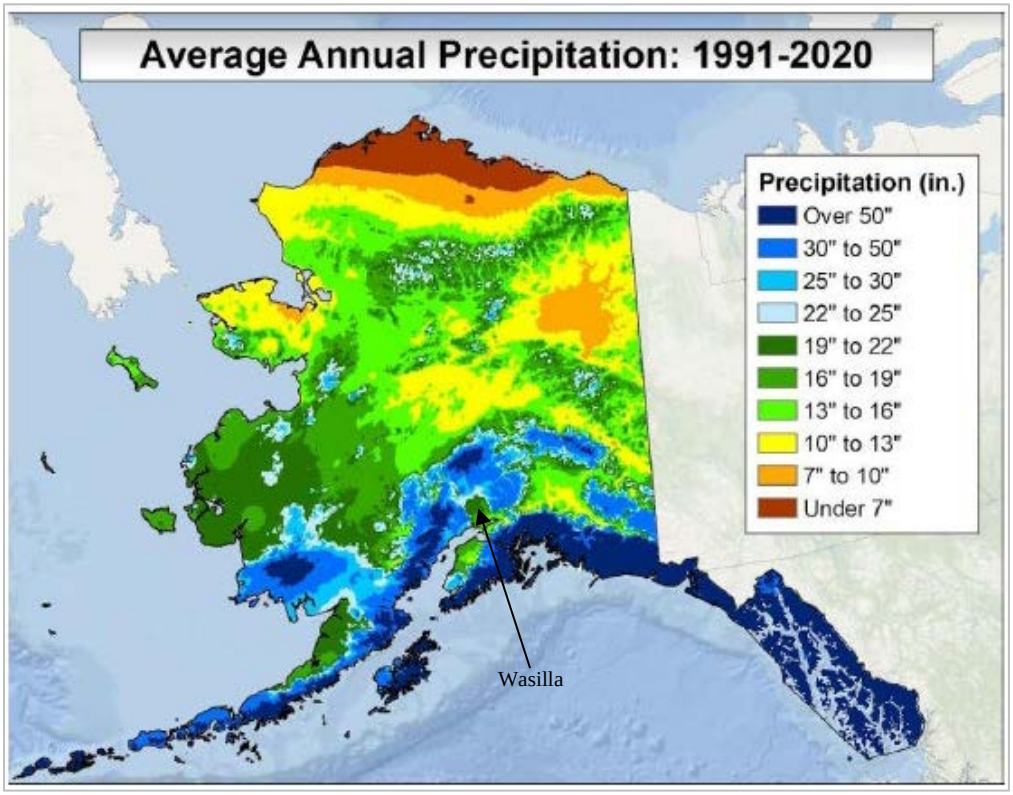
<table>
<tr><th>Severe Weather Event</th><th>Nature of the Event</th></tr>
<tr><td>Drought</td><td>
A drought is a period of time when an area or region experiences below-normal precipitation. Droughts may range in severity but have many effects on the surrounding land and weather conditions. Droughts threaten people's livelihoods and can result in a water shortage, poor quality drinking water, poor air quality, loss or destruction of aquatic habitat, loss of vegetation or crops, and an increase in infectious diseases. Droughts are a slow-onset hazard and can last weeks, months, or even years. Because of the possible long duration of droughts, the impacts last for years and can ripple through a community over time.
Drought conditions are classified in categories, which are described below:
Table 3-10 Classifications of Drought Conditions
<table>
<tr><th>Category</th><th>Description</th><th>Possible Impacts</th></tr>
<tr><td>D0</td><td>Abnormally Dry</td><td>Going into drought:
• short-term dryness slowing planting, growth of crops or pastures
Coming out of drought:
• some lingering water deficits
• pastures or crops not fully recovered</td></tr>
<tr><td>D1</td><td>Moderate Drought</td><td>• Some damage to crops, pastures
• Streams, reservoirs, or wells low, some water shortages developing or imminent
• Voluntary water-use restrictions requested</td></tr>
<tr><td>D2</td><td>Severe Drought</td><td>• Crop or pasture losses likely
• Water shortages common
• Water restrictions imposed</td></tr>
<tr><td>D3</td><td>Extreme Drought</td><td>• Major crop/pasture losses
• Widespread water shortages or restrictions</td></tr>
<tr><td>D4</td><td>Exceptional Drought</td><td>• Exceptional and widespread crop/pasture losses
• Shortages of water in reservoirs, streams, and wells creating water emergencies</td></tr>
</table>
Source: U.S. Drought Monitor (USDM) 2023
</td></tr>
</table>

Figure 3-18 shows Alaska's average annual temperature from 1991-2020 and Figure 3-18 shows Alaska's average annual precipitation from 1991-2020.



Source: NOAA NCEI Gridded Normals

Figure 3-17 Alaska Average Annual Temperature 1991-2020



Source: NOAA NCEI Gridded Normals

Figure 3-18 Alaska Average Annual Precipitation 1991-2020

3.3.2.2 HISTORY

High wind, blizzards, ice storms, winter storms, and extreme cold are all common severe weather events in affecting the people of Alaska. The history of severe weather events documented in Wasilla are described below.

Severe Weather Event	History of the Event
Extreme Cold	In 1999, temperatures in Wasilla reached -42°F and in 2003, sustained temperatures of 0ºF with a wind-chill -53ºF were recorded.
Freezing Rain and Ice Storms	During an ice storm in 2013, several school buses slid off the road and one flipped on its side as a result of ice accumulation on the roads. During other ice storms, police, emergency services, and tow trucks were unable to safely access certain stretches of roads in Wasilla.
Heavy Snow	Wasilla averages 47.7 inches of snow per year. Southcentral Alaska experienced unusually heavy snowfall during the winter of 2022. From November 3, 2022 to April 12, 2023, Wasilla received 88 inches of snow, of which, 46 inches fell between December 1 to December 15, 2022.
Drifting Snow	Wasilla experiences periodic drifting snow events that have caused schools to close. During the winter of 2022, a portion of the Parks Highway was closed due to snow drifts on the road.
Blizzard	Wasilla experiences periodic blizzard conditions that reduce visibility below one quarter mile.
Winter Storm	Numerous winter storms occur throughout Alaska every year. The most notable winter storms in Alaska's history are: • February 1966 in Fairbanks. Over 35 feet of snow. • March 2002 in Anchorage. Over 29 inches of snow with a rate of over 2 inches of snow per hour. • January 2012 in Valdez. Over 320 inches (27 feet) of snow in the span of a couple months. • January 2012 in Cordova. Over 18 feet of snow. • December 2017 in Thompson Pass. Over 40 inches of snow in 12 hours. Winter storms are fairly common in Wasilla.
Heavy Rain	The Southeast Alaska archipelago is a part of the world's largest temperate rain forest and has the highest rainfall amounts in the state of Alaska. Southeast Alaska receives more than 200 inches of rain per year, while totals drop to 60 inches south of the Alaska Range, 12 inches in the Interior, and less than 6 inches in the North Slope. In Alaska, the year of 2022 was the 17th wettest year to date over the last 98 years, and specifically, July 2022 was the 6th wettest July over the past 98 years (USDM 2023). Wasilla averages 15.27 inches of rainfall per year. In Wasilla, spring rainfall is projected to increase by 54% by the end of the century (UAF/SNAP 2023).
High Winds	Wasilla is located in the Matanuska-Susitna Valley and surrounded by the Chugach Mountains to the east, Talkeetna Mountains to the north, and Alaska Range to the west. This region is exceptionally windy and has coined the terms "Matanuska wind" and "Knik wind" to describe the winds that occur in the region. High winds occur rather frequently in Wasilla. Wind gusts of 93 mph have been recorded in Wasilla. Historical windstorms have severely impacted the community. During a windstorm on November 12, 2022, strong wind gusts flipped a plane at the Wasilla airport. See Table 3-12 for historical high wind events that have impacted Wasilla, some of which have resulted in disaster declarations.
Dust Storms	Dust from the Matanuska and Knik River drainage systems can cause dust storms that greatly exceed national health-based standards. Sources of particulate come from river drainages, volcanoes, wildfires

<table>
<tr><th>Severe Weather Event</th><th>History of the Event</th></tr>
<tr><td></td><td>(ash), burned-over areas (wildfires), gravel pits, agriculture plowing, road sanding, wood stoves, open burning, unpaved roads, and bare soil/erosion. April through June and August are the months most prevalent to dust storms.

On March 5, 2019, the Mat-Su Assembly approved Ordinance 19-032, an air quality proposal designed to minimize health impacts and possible federal regulatory burden from exceeding national air quality standards for fine particulate matter (PM2.5). The components of Ordinance 19-032 are described below (Source: MSB 2023).
1. Repeals outdated air quality code (8.30) and replaces it with updated code (8.75).
2. Implements an air quality management plan that details the who/what/why of air quality management in the Mat-Su Borough.
3. Creates a Greater Butte Area Air Quality District that is defined by the Butte Community Council boundaries.
4. Asks residents in the Greater Butte Air Quality District to delay open, outdoor burning (e.g., slash burning & burn barrels) during days when an air quality advisory has been issued based on readings from the Butte air quality monitor that exceed the 24-hour National Ambient Air Quality Standards (NAAQS) for PM2.5 (35.5 micrograms/cubic meter). The annual number of issued PM2.5 air quality advisories for exceeding the 24-hour NAAQS for the Greater Butte area have ranged from 0-8 annually, with an average of five per year. These advisories have been most commonly issued during cold, winter inversion days occurring in November through February.
5. Asks residents in the Borough to not do open burning of certain materials that produce black smoke, including plastic, asphalt, rubber, and oil wastes.
6. Proposes a new Memorandum of Understanding with the state Department of Environmental Conservation that allows this air quality program.</td></tr>
<tr><td>Drought</td><td>The U.S. Drought Monitor (USDM) started in 2000 and is a is an interactive tool/map that is updated each Thursday to show the location and intensity of drought conditions across the country.

Since the creation of the USDM, the longest duration of drought conditions (D1–D4) recorded in Alaska lasted for 79 weeks. This drought began on July 17, 2018 and ended on January 14, 2020. This drought intensified to a D3 during the week of August 27, 2019 and affected 1.5% of Alaskan land (USDM 2023).

On August 23, 2019 Alaska Governor Mike Dunleavy issued a disaster declaration for the Matanuska-Susitna Borough and Kenai Peninsula Borough, due to the wildfires that damaged public facilities, communication and utility lines, and consumed roughly 83 structures (USDM 2023). Drought conditions, exceedingly dry fuels, strong winds, and low humidity hindered firefighting efforts for these wildfires.

The National Drought Mitigation Center at the University of Nebraska provides the following historical droughts and impacts to the Mat-Su valley.

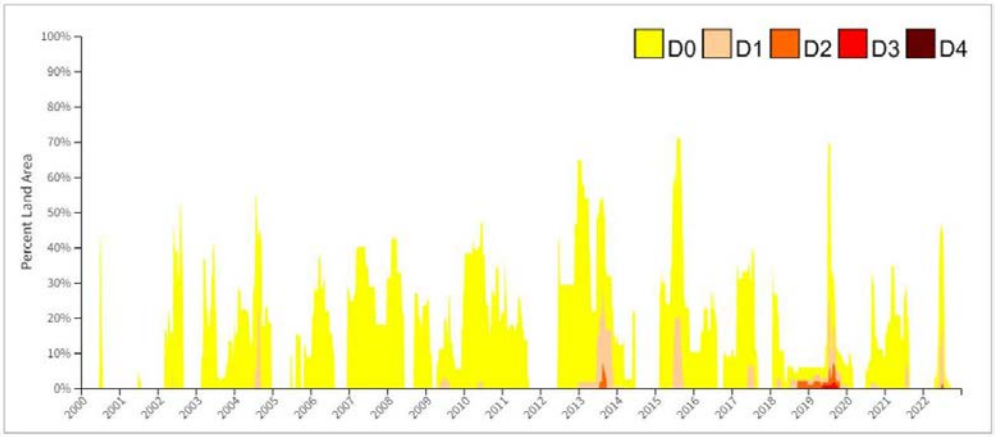
Table 3-11 Historical Droughts and Impacts to the Mat-Su Valley
<table><tr><th>Date</th><th>Description of Drought Event</th></tr><tr><td>07/28/2013-08/27/2013</td><td>A late, cool spring and a hot, dry summer have reduced hay production in Alaska. A hay grower near Palmer said that his first cutting was about half of usual and that his father’s hay crop produced roughly 25 percent of a usual cutting of hay. A neighbor attested that the heat hurt his hay crop, which</td></tr></table></td></tr>
</table>

Severe Weather Event	History of the Event
	yielded about one-quarter of a normal cutting. With low hay yields, farmers expect hay to be scarce and foresee the possible need for imported hay.
	10/15/2016 – 10/17/2016 — The Alaska Division of Forestry asked residents in Southcentral and Interior areas to avoid outdoor burning and the use of burn barrels until Oct. 18, due to high winds, no snow cover, and dry conditions. The combination of conditions increased the fire danger. Firefighters were battling a late-season wildfire burning in the Mat-Su Valley near Sutton.
	06/27/2019 – 07/27/2019 — Burn permits were suspended in Matanuska-Susitna Borough, due to the extreme fire danger and spate of wildfires in the state.
	06/27/2019 – 07/27/2019 — The purchase and use of fireworks was temporarily banned in Alaska by the Department of Public Safety, due to the "high to very high fire danger," as numerous fires burned in the state amid the hot, dry weather. If the suspension is not lifted before the Fourth of July, official fireworks shows will not be held. On June 27, there were 130 active wildfires burning 273,521 acres across the state.
	07/01/2019 – 07/31/2019 — The Glennallen field office of the Bureau of Land Management issued a fire prevention order on July 1 temporarily prohibiting open fires, fireworks, exploding targets and explosives on public lands it manages in east-central Alaska. The order will remain in effect until the fire danger lessens.
	08/23/2019 – 09/22/2019 — While insects have played a role in in the wildfires that have burned Alaska forests this summer, heat and drought have had a larger impact.
	08/23/2019 – 09/22/2019 — Alaska Gov. Mike Dunleavy issued a disaster declaration for the Matanuska-Susitna Borough and Kenai Peninsula Borough, due to the wildfires that have consumed roughly 83 structures and damaged public facilities, communications and utility lines. The McKinley, Deshka Landing. and Swan Lake wildfires caused the evacuations of about 400 people and disrupted travel along the Sterling and Parks highways and the Alaska Railroad. Drought, exceedingly dry fuels, strong winds and low humidity have hindered firefighting efforts.
	10/02/2019 – 11/01/2019 — Alaskan salmon were unable to enter many streams due to low flow conditions, according to Charlie Russell, seine area management biologist for ADF&G in Cordova. Drought conditions caused many pre-spawn mortality events. All species of salmon were affected by the drought conditions statewide, leading to widespread mortality.
	04/30/2020 – 05/30/2020 — Alaska was just one month into its fire season but has already faced nearly two dozen fires. Some of these fires were hot spots that smoldered through the winter after drought in 2019 contributed to an active fire season. Firefighters expect more holdover fires to emerge.

Source: National Drought Mitigation Center, University of Nebraska, Drought Impact Reporter Dashboard 2023

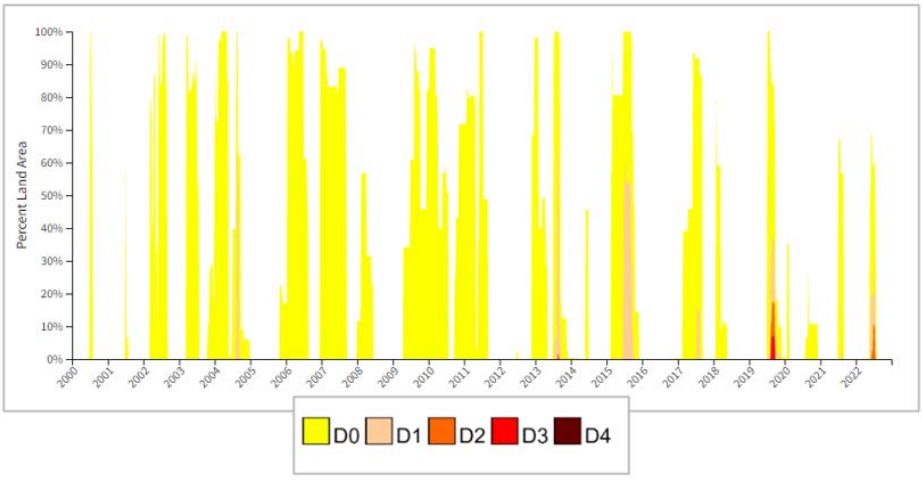
Figure 3-19 shows the historical drought conditions for the State of Alaska (2000-2022) and Figure 3-20 shows historical drought conditions for the Mat-Su Borough (2000-2022).

Severe Weather Event	History of the Event



Source: NIDIS 2023

Figure 3-19 Historical Drought Monitor Conditions for Alaska (2000-2022)



Source: NIDIS 2023

Figure 3-20 Historical Drought Monitor Conditions for the Mat-Su Borough (2000-2022)

Table 3-12 lists Wasilla's historical severe storm events the National Weather Service (NWS) identified for their Weather Zone (Zone 111- Matanuska Valley) from January 1996-February 2023. The NWS Storm Events Database has data dating back to January 1950 for many states, but it began collecting data for Alaska in January 1996. Severe weather events that affected Zone 111, but not Wasilla directly, were not included in this list. Any events dated before 1996 were carried forward from the 2018 HMP. Additionally, any events resulting in a flood are addressed in the flood hazard section. See Table 3-18 for a list of these flooding events.

Since the 2018 HMP, there have been 2 severe weather events in Wasilla.

Table 3-12 Historical Severe Weather Events in Wasilla

Date	Event Type	Magnitude
02/02/1979	Winter Storm/ Drifting Snow	Winter storm dropped 12 inches of snow. Winds blew down trees, clipping power lines and causing power outages for four days. Schools were closed due to snow drifts.
02/07/1979	High Wind	Heavy winds hit the Valley with gusts of more than 65 MPH. The Parks Highway was closed to travel in the Wasilla area. A large, metal "Road Closed" sign erected at Wasilla Lake on the Parks Highway was removed in an unexpected manner on Monday. A motorist reported witnessing the sign, weighted with truck tire chains, being picked up by the wind and blown across the railroad tracks paralleling the highway. (Frontiersman, Feb. 7, 1979). A truck camper was blown on top of a 10-foot snow pile in front of the Wasilla airport mall. The storm demolished two airplanes at the Wasilla Airport and heavily damaged six more.
11/29/1979	Winter Storm	10 inches of snow fell in parts of the Matanuska Valley.
02/05/1993	Ice Storm	A winter storm warning for ice (freezing rain) accumulations of one-quarter inch or more was issued for the Susitna Valley.
12/15/1998	Winter Storm	7-10 inches fell in the Core Area, 10-12 inches on Knik River Road.
12/23/1998	High Wind	Wind gusts reached 60 MPH at a new mesonet site near Colony High School in the Matanuska-Susitna Valley. Forecast zones affected: Susitna Valley.
12/27/1998	High Wind	Strong northeast wind, again set off by cold air moving into the area from the east and northeast behind a vigorous cold front, began across the Matanuska- Susitna Valley just after noon Sunday…finally diminishing Tuesday morning. Wind gusts reached 69 mph at Colony High School mesonet site. Gusts reached 53 MPH at Wasilla and 61 at Palmer airport early Monday. At the Tony Chevrolet Buick dealership, the cars had to be dug out of the snow. A few miles west, a metal frame was all that was left of the menu board by the drive-through lane at Wendy's.
01/21/1999	High Wind	A major storm brought high winds and snow to Cook Inlet and the Susitna Valley. 61 MPH winds were recorded in Wasilla.
01/21/1999	Winter Storm	A major storm brought high winds and snow to Cook Inlet, and the Susitna Valley. 28 inches of snow fell at the Palmer airport and 36 inches at Oilwell Road.
02/03/1999	Extreme Cold	Locations around Wasilla recorded air temperatures as low as -42°F.
03/05/1999	High Wind	63 MPH winds were reported at the Palmer airport and as high as 67 MPH early Saturday morning between 2 AM and 3 AM.
04/04/1999	Winter Storm	Heavy snow fell from Wasilla to Cantwell, picking up 4-6 inches in a 6-to-9-hour period.
11/15/1999	High Wind	Brisk northeast winds originating near the Matanuska Glacier, gusted to 58 mph briefly at the Wasilla fire station. Wind gusts around Palmer reached 68 mph just before, and then just after, midnight Monday.
01/21/2000	Winter Storm	12" of new snow fell in Wasilla. Snow machine death in Big Lake, primarily weather related. Property damage $6,000.
01/22/2000	High Wind	Southeast wind gusts were reported around the Matanuska-Susitna Valley. One report of 70 MPH winds and whiteout conditions was received on the Willow side of Hatcher Pass.
03/11/2000	High Wind	Gusty northeast winds reached 66 MPH at the Wasilla fire station. Wind gusts were less than 60 MPH in the afternoon.
03/13/2000	High Wind	Modified arctic air continued to move southeastward toward Cook Inlet Monday and Tuesday. Peak winds of 64 MPH recorded.
03/19/2000	High Wind	Locally brisk northeast winds gusted to 64 mph around the Wasilla Fire Station. These winds developed near the Little Susitna River headwaters and are known to be stronger around Sutton. Winds diminished below 60 mph just before 3 am Monday.
03/19/2000	High Wind	Locally brisk northeast winds gusted to 64 MPH around the Wasilla fire station.
03/28/2000	High Wind	Northeast wind gusts of 69 MPH were recorded at the Wasilla fire station between 6 AM and 6:30 AM Wednesday.
03/29/2000	Winter Storm	Northeast wind gusts of 69 MPH recorded at Wasilla Fire Station. Along and immediately behind the front, heavy snows were locally reported. Well behind the original front, arctic air began to move toward Cook Inlet and the Susitna Valley.

Date	Event Type	Magnitude
04/20/2000	High Wind	Strong 'Matanuska' winds began gusting above 60 MPH just after 2 PM Thursday. Winds peaked at 74 MPH between 2 PM and 2:30 PM Thursday… finally diminishing below 60 MPH at 3 AM Friday.
08/15/2000	High Wind	Strong northeast winds were observed in the Matanuska Valley Tuesday and Wednesday. Strongest winds were reported by a NWS system at the Wasilla Fire Station...co-located with the Emergency Manager's group. Wind gusts above 60 mph began just after 3 am ADT Tuesday at the Wasilla site and a high wind warning was issued an hour later. Wind gusts built to a peak of 98 mph between 11 am ADT and 11:30 am ADT Tuesday. On Wednesday, peak winds reached 79 mph between 2 am ADT and 2:15 am ADT. Directions were all from the northeast. Strong northeast winds were also observed at the Palmer airport, where gusts of 63 mph were reported just after noon Tuesday. The high winds downed trees and disrupted power to many areas. Repairs to power lines were slowed due to large distances between the outages, which were mainly along tap lines.
08/15/2000	High Wind	Strong northeast winds were observed in the Matanuska Valley on Tuesday and Wednesday. Strongest winds were reported by an NWS system at the Wasilla fire station…co-located with the emergency manager's group. Wind gusts above 60 MPH began just after 3 AM, Tuesday at the Wasilla site, and a high wind warning was issued an hour later. Wind gusts built to a peak of 98 MPH between 11 AM and 11:30 AM, Tuesday. On Wednesday, peak winds reached 79 MPH between 2 AM and 2:15 AM. The high winds downed trees and disrupted power to many areas. Repairs to power lines were slowed due to large distances between the outages, which were mainly along tap lines. Property damage $20,000.
10/04/2000	High Wind	Wind gusts at the Wasilla fire station of 60 MPH or higher and peaking at 67 MPH.
10/05/2000	Ice Storm	Wind gusts at the Wasilla Fire Station of 60 MPH or higher, peaking at 67 MPH. Additionally, freezing rain was reported prompting a travel advisory from the Department of Transportation, along the Parks Highway.
10/07/2000	High Wind	The strong pressure rises moved into the area from the east, bringing gusts above 60 MPH. Peak winds at the Wasilla fire station reached 71 MPH.
10/11/2000	High Wind	Brisk northeast winds were reported at the Wasilla Fire Station. Gusts reached 69 mph between 10:15 and 10:30 pm ADT Wednesday. Wind gusts at or above 59 mph were reported from 4pm ADT Wednesday to 7:30 am Thursday.
10/13/2000	High Wind	Winds at the Wasilla fire station peaked at 62 MPH. Forecast zones affected: Cook Inlet and Susitna Valley.
10/21/2000	High Wind	Strong northeast Matanuska winds reported at 60 MPH and peaking at 86 MPH on Saturday. Peak winds of 75 MPH reported on Sunday. Magnitude: 75 knots.
10/24/2000	High Wind	Wind gusts at the Wasilla fire station above 60 MPH on Tuesday. Peak wind Tuesday was 68 MPH gust, occurring between 10 PM and 10:30 PM. Wednesday, easterly wind gusts above 60 MPH were again recorded, peaked at 66 MPH.
10/24/2000	Winter Storm	Just to the south of the heavy snow area, easterly wind gusts at the Wasilla Fire Station at or above 60 MPH were reported from just after 10 pm Tuesday until 6:30 AM Wednesday. Peak wind Tuesday was a 68 MPH gust occurring between 10 PM and 10:30 PM. From 3 AM to 6:30 AM Wednesday, easterly wind gusts above 60 MPH were again recorded, peaking at 66 MPH just after 6 AM Wednesday.
10/30/2000	High Wind	Brisk northeast winds were reported at the Wasilla fire station remote sensor. Gusts reached 76 MPH between 7:45 AM and 8:00 AM on Monday.
11/02/2000	High Wind	Gusts of 61 MPH at the Wasilla fire station.
11/06/2000	High Wind	Northeast wind above 60 mph began around the Wasilla/Glenn Highway area early Monday. Peak wind reached 84 mph Monday between 4 and 4:15 pm. Gusts finally diminished below 60 mph at 5:45 am Tuesday. No damage or problems were reported.
11/12/2000	High Wind	Another strong low moved northeast out of the Pacific affecting Cook Inlet and the Susitna Valley. Wind gusts were channeled by terrain in the Matanuska Valley, where easterly gusts reached 73 MPH at the Wasilla fire station Monday ahead of the front.
11/16/2000	High Wind	Easterly wind gust reached 77 MPH at the Wasilla fire station just after 5:15 PM, Friday.
11/21/2000	High Wind	Brisk northeast winds gusted to 71 mph at the Wasilla Fire Station. Winds peaked between 10:15 and 10:30 am Tuesday.

Date	Event Type	Magnitude
11/24/2000	High Wind	Gusty northeast winds to 64 mph were observed at the Wasilla Fire Station Thursday ahead of a moderate east-west front approaching the Kenai Peninsula from the south southeast. Gusts above 60 mph were observed for a mere two hours at the site.
12/13/2000	High Wind	Brisk northeast wind gusts above 60 MPH began at the Wasilla Fire Station between 3:15 and 3:30 PM Wednesday.
12/17/2000	High Wind	Gusty northeast winds reached 62 MPH around 10 AM in the Matanuska Valley.
12/24/2000	High Wind	Gusty northeast winds to 64 MPH were observed at the Wasilla fire station Thursday ahead of a moderate east-west front approaching Kenai Peninsula from the south southeast.
01/02/2001	High Wind	Moderate to strong northeast wind gusts were briefly reported at very high elevation sites around the Anchorage area late Tuesday. Gusts reached 85 mph at the Site Summit location near Arctic Valley at close to 4,000' above sea level between 10 pm and 11 pm. Although not as strong, gusty northeast winds were also reported at Glen Alps, where gusts briefly reached 44 mph. Gusty northeasterly winds were also reported around Valdez, Whittier, and Wasilla at around the same time.
03/18/2001	High Wind	Locally strong winds were reported near the Matanuska River. These winds were caused by moderate to strong high-pressure in the eastern Alaskan interior and moderate low pressure in the Gulf of Alaska. Northeast wind gusts reached 71 MPH Sunday between 10 and 10:30 AM.
03/22/2001	High Wind	Another Matanuska wind event was set up by moderate, cold high pressure in the Copper River Basin and complex low pressure in the Gulf of Alaska. Modified arctic air spilled through the Matanuska Glacier/River toward Cook Inlet. Gusts reached 66 mph Friday and 69 mph Saturday. Although the last wind gust of 60+ mph at the Wasilla Fire Station was reported at 2 am Friday, winds at the site again gusted to 59 mph Saturday. With these Matanuska wind cases, it is known that higher winds blow further up-river (where there are no gauges to measure speeds).
03/22/2001	High Wind	Another Matanuska wind event was set up by moderate, cold high pressure in the Copper River Basin and complex low pressure in the Gulf of Alaska. Modified arctic air spilled through the Matanuska Glacier/River toward Cook Inlet. Gusts reached 66 MPH Friday and 69 MPH Saturday. Although the last wind gust of 60+ MPH at the Wasilla fire station was reported at 2 AM Friday, winds at the site again gusted to 59 MPH Saturday. With these Matanuska wind cases, it is known that higher winds blow further up-river (where there are no gauges to measure speeds).
11/17/2001	Ice Storm	A moderate ridge, building northwestward from Canadian British Columbia into Prince William Sound, accompanied by moderate pressure rises (2.5 – 4.5 mbs/hour) and a northwestward moving arctic front in the area, produced locally very gusty easterly winds around Turnagain Arm, along higher elevations of the mountains east of Anchorage and along much of the Matanuska River. Starting about 5 p.m. the northbound Glenn Highway backed up after motorists lost traction on the Eagle River hill. Scores of cars, with estimates ranging from 30 to 75, also got stuck on Eagle River Loop Road, further jamming the Glenn at the Hyland Road exit. Police struggled to get sanding trucks in place. Tow trucks got stuck. The National Weather Service issued a freezing rain warning at 5:30 pm after a meteorologist reported a quarter-inch of ice coating her car in Birchwood. Most of Anchorage got a thin coating of freezing rain, as did Palmer. Alaska State Troopers reported a few minor accidents in Palmer and Wasilla.
01/25/2002	Winter Storm/ Heavy Snow	29.61 inches of snow fell in Wasilla.
04/02/2002	High Wind	Gusty northeast "Matanuska" winds to 67 mph were recorded at the Wasilla Fire Station. Winds below 10 mph were reported just prior to the onset of 60+ mph gusts at 12:30 am ADT, however gusts approaching 60 mph were recorded early Wednesday evening. At 5 am Thursday, gusts briefly reached 68 mph.
04/03/2002	High Wind	Strong northeast "Matanuska" winds were observed around the Wasilla/Palmer area Wednesday and Thursday. Gusts peaked at 67 mph between midnight and 12:30 am AST Thursday. Strong northeast winds were also reported around Palmer. Visibilities at the Palmer airport were reported as low as 2 miles in blowing dust.
09/14/2002	Winter Storm/ Heavy Snow	25.59 inches of snow fell in Wasilla.

Date	Event Type	Magnitude
11/29/2002	High Wind	A Matanuska wind event began Saturday evening, continuing through the next day. Winds developed when pressure gradients built up between inland high pressure and a strong 954 mb low southwest of Kodiak Island. Winds of 60+ MPH, however, were very short-lived in the area.
03/14/2003	Extreme Cold	Hurricane force winds with gusts to 100 MPH wreaked havoc in the MSB. High winds were sustained for several days with temperatures at 0ºF; Wind-chill -53ºF.
03/14/2003	High Wind	Hurricane force winds with gusts to 100 MPH wreaked havoc in the MSB. High winds were sustained for several days with temperatures at 0°F making for a wind-chill factor of -53°F. The winds damaged buildings and forced relocation of the MSB EOC. Due to extreme dry conditions, the fire departments responded to over 80 calls in four days including several that threatened to become catastrophic.
11/23/2003	Winter Storm	A strong low in the northern Bering Sea had a trailing front that extended across the eastern Bering Sea and pushed into southwest Alaska Sunday. Cold air already in place over the Southcentral Region coupled with the inflow of moisture associated with this front and the formation of a low along the front resulted in localized areas of heavy snowfall in the Matanuska Valley. The Alaska and West Coast Tsunami Warning center reported a storm total of 20 inches over a 16-hour period.
12/01/2003	High Wind	Wind gusts up to 72 MPH were reported in Wasilla.
03/18/2004	High Wind	Wind gusts up to 75 MPH in Mat-Su Valley late Thursday and peak wind of 72 MPH at 11 AM in Wasilla.
03/19/2004	High Wind	Strong high pressure in the Bering Sea along with a developing low in the Gulf of Alaska increased the pressure gradient over much of the area during the period creating high winds over the North Gulf Coast. Wasilla reached a peak wind of 63 kts (72 mph) around 11 am Friday March 19th with estimated wind gusts to 75 mph across the Matanuska Valley late Thursday evening into the middle of the day Friday. Valdez Airport peaked at 40-45 mph during the event. The City of Valdez peaked at 59 mph during the event. Wind gusts of 80 mph were estimated in Zone 131 anytime from the middle of the morning Thursday March 18th until sometime Friday afternoon March 19th. Gradient winds estimated between 75 and 90 mph occurred in the Copper River Delta from the middle of the day Thursday March 18th into the morning hours on Saturday March 20th.
01/18/2005	High Wind	Wind peaked at 93 MPH in Wasilla, which caused a tractor trailer to blow onto its side on the northbound ramp of the Parks Highway to Trunk Road.
03/20/2005	High Wind	Wind peaked at 81 MPH in Wasilla and knocked down McDonald's sign and trees in the area.
02/10/2006	Winter Storm	Light freezing rain and moderate rainfall created treacherous driving conditions along the Glenn Highway, causing numerous vehicle accidents and $10,000 in property damage.
04/25/2008	Heavy Snow	Wasilla reported 12 inches, Eagle River reported 14.3 inches, and the Anchorage area reported from 17.2 to 22 inches of storm total snow.
03/08/2010	Winter Storm	Heavy snow with no damage reported.
09/24/2010	High Wind	A strong low moved into the Gulf of Alaska. This storm, coupled with high-pressure over interior Alaska produced strong north winds across the region and through the channeled terrain of south-central Alaska. Over 10,000 people lost electric power in the southcentral region as a result of the high wind. The strongest wind observed was a 78-MPH gust in the Palmer-Wasilla area. This strong wind event occurred early in the fall while trees still had leaves on them. This resulted in an uncharacteristically high number of trees being blown down, some of which fell across power lines causing the unusually high number of power outages. Based upon insurance company information, it is estimated that $500,000 of damage occurred from this storm in the Matanuska Valley to the Anchorage area.
10/15/2010	High Wind	A strong storm in the Gulf of Alaska combined with deep cold arctic air and high-pressure over interior Alaska and resulted in strong north gap winds across south central Alaska. Along with the strong wind, low temperatures resulted in low wind chills across much of the south central and southeast mainland regions of Alaska. The peak measured wind was 87 MPH in the Wasilla area. Gusts very likely reached around 100 MPH during this event based upon the damage and power outages associated with this event in the Palmer-Wasilla area.

Date	Event Type	Magnitude
11/22/2010	Ice Storm	A storm in the Bering Sea resulted in strong warm and moist southerly winds off the North Pacific. This warm moist air flowed over entrenched cold air over Southcentral Alaska and resulted in freezing rain that deposited over one quarter inch of ice across portions of south-central Alaska.
12/15/2010	High Wind	Wasilla Airport observed a peak gust of 87 mph.
03/12/2013	High Wind	A large area of high-pressure centered near the Arctic Coast combined with a low in the Gulf of Alaska and produced a strong pressure gradient over Southern Alaska on March 12. This strong pressure gradient produced warning level winds in the Matanuska Valley and in various places along the north coast of the Gulf of Alaska.
10/24/2013	High Wind	A 188 ft cell phone tower near Willow toppled over on October 25th due to a combination of factors, including weather. The tower was originally built in 1974 and according to the south-central Mat-Su Borough: high winds combined with rain-soaked ground likely caused the collapse. The nearest observation locations that reported any winds only measured at maximum gust of 44 MPH at a Wasilla fire station (WSLA2). None of the observation stations near Willow showed any strong wind gusts at all. The channeled terrain near Willow where the tower was located may have received higher gusts than any of the observation locations, but anything over 60 mph appears unlikely.
11/22/2013	Ice Storm	A storm produced snow and blowing snow across the Chugach Mountains, freezing rain over the Kenai Peninsula to the southern Susitna Valley, and areas of snow and freezing rain across southwest Alaska. The freezing rain resulted in school closures from Anchorage to the Palmer and Wasilla area. Wasilla school district transportation department reported significant ice accumulation. Several buses slid off the road and one flipped on its side.
02/05/2015	High Wind	Locations around the Mat-Su Valley experienced wind gusts of up to 75 MPH. A plane parked at the Palmer Airport was damaged as a result of the event.
08/18/2015	Hail	Severe thunderstorms developed over the Matanuska and Susitna Valleys before moving over Cook Inlet and dying out. One storm over some populated areas produced large hail. Another thunderstorm appeared severe on radar but was not in a populated area and did not produce any local storm reports.
01/01/2022	High Wind	Of significance was the longevity and extremes recorded during the event. First, the strongest winds recorded were at the Palmer Airport with a peak wind gust of 88 mph at 5:36 PM January 2nd, and a gust to 91 mph at the Glenn-Parks Highway Interchange at about the same time. This event rivals the strongest gusts reached at the Palmer Airport since recording began in 1972, becoming the 5th strongest wind gust recorded at the Palmer Airport, though the four strongest gusts only occurred over two separate days, December 23, 1996, and January 17, 2005, ranging between 90 and 112 mph (see graph below). The Wasilla Airport peaked at 74 mph on January 2nd at 10:16 PM. Second, the longevity of the event was pronounced. Not only was there about 40 hours of hurricane force winds (74 mph or greater) noted at the Palmer Airport, but there were about 51 hours of wind gusts 50 mph or greater between January 1st and 3rd. Taking a regional perspective and including Anchorage in the picture, this Bora Wind event ranks 5th for longevity since records began, though is likely the strongest wind event associated with a Bora Windstorm for Palmer on record. The final aspect of note was the extreme cold associated with the event and longevity to which the cold lingered. While temperatures dropped into the single digits by January 2nd, temperatures dropped below zero January 4th and remained frigid through January 7th, before increasing back into the teens. This proved to be quite impactful as winds took down many power lines, causing difficulties for many in the extreme cold and causing pipes and water mains to break. We received reports of blown-over trucks, toppled Cessna airplanes at the Palmer Airport, downed trees and power lines (with power outages across the valley causing pipes to burst and people to seek shelter elsewhere due to the prolonged cold), windows broken, cars damaged due to flying debris, and siding ripped off homes and businesses. Emergency Management reported multiple CO poisoning calls, requests to be transported to the hospital, along with cases of frostbite.
02/15/2022	Winter Storm	Snowfall reports of 6 to 8 inches were received between Willow to Houston to Big Lake area. Also 6 inches was reported 11 miles NNW of Palmer. Multiple reports of 3 to 8 inches

Date	Event Type	Magnitude
		through the Matanuska Valley with the highest report to the NNE of Willow where 8 inches of snow was reported. 7 inches was reported in Big Lake, 4.8 inches near Chickaloon, 8 inches 6 miles SSE of Houston, 3 inches near Wasilla, 6 inches 11-mile NNW of Palmer. There was also one report by an NWS employee of 16 inches 4-mile NNE of Knik.

Source: NWS 2023- Storm Events Database and Storm Prediction Center Product

Additionally, the DHS&EM October 2022 DCI lists the following severe weather disaster events which may have affected the area:

4. Matanuska-Susitna Borough, February 9, 1979: As a result of a winter storm generating high winds and drifting snow, many roads in the Matanuska-Susitna Borough were rendered impassable to all traffic, including emergency vehicles. DOT was tasked by DHS&EM and public assistance was provided to clear the roads; the Alaska National Guard conducted rescue operations to provide to isolated and stranded individuals. Subsequent to the Governor's request, the Small Business Administration made disaster loans available to some 44 residents and 24 businesses which suffered damage as a result of the storm. The State did not make any direct grants to individuals or families.

9. Anchorage Windstorm, April 4, 1980: The Governor proclaimed a Disaster Emergency subsequent to a hurricane force windstorm which caused damage to over 5,000 residences and businesses in the Anchorage area and parts of the Matanuska-Susitna Borough. Though most of the residents were insured against their losses, the State provided a number of Individual and Family Grants and temporary housing, as well as public assistance to the Municipality. In addition, the SBA made disaster loans available to affected individuals.

96-180 Southcentral Fall Floods declared September 21, 1995 by Governor Knowles then FEMA declared (DR-1072) on October 13, 1996: On September 21, 1995, the Governor declared a disaster as a result of heavy rainfall in Southcentral Alaska an as a result the Kenai Peninsula Borough, Matanuska-Susitna Borough, and the Municipality of Anchorage were initially affected. On September 29, 1995, the Governor amended the original declaration to include Chugach, and the Copper River Regional Education Attendance areas, including the communities of Whittier and Cordova, and the Richardson, Copper River and Edgerton Highway areas which suffered severe damage to numerous personal residences, flooding, eroding of public roadways, destruction & significant damage to bridges, flood control dikes and levees, water and sewer facilities, power, and harbor facilities. On October 13, 1995, the President declared this event as a major disaster (AK-1072-DR) under the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Individual Assistance totaled $699K for 190 applicants. Public Assistance totaled $7.97 million for 21 applicants with 140 DSR's. Hazard Mitigation totaled $1.2 million. The total for this disaster is $10.5 million.

00-191 Central Gulf Coast Storm declared February 4, 2000 by Governor Murkowski then FEMA declared (DR-1316) on February 17, 2000: On Feb 4 2000, the Governor declared a disaster due to high impact weather events throughout an extensive area of the state. The State began responding to the incident since the beginning of December 21, 1999. The declaration was expanded on February 8 to include City of Whittier, City of Valdez, Kenai Peninsula Borough, Matanuska-Susitna Borough, and the Municipality of Anchorage. On February 17, 2000, President Bill Clinton determined the event disaster warranted a major disaster declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288 as amended ("the Stafford Act). On March 17, 2000, the Governor again expanded the disaster area and declared that a condition of disaster exists in Aleutians East, Bristol Bay, Denali, Fairbanks North Star, Kodiak Island, and Lake and Peninsula Boroughs and the census areas of Dillingham, Bethel, Wade Hampton, and Southeast Fairbanks, which is of sufficient severity and magnitude to warrant a disaster declaration. Effective on April 4, 2000, Amendment No. 2 to the Notice of a Major Disaster Declaration, the Director of FEMA included the expanded area in the presidential declaration. Public Assistance, for 64 applicants with 251 PW's, totaled $12.8 million. Hazard Mitigation totaled $2 million. The total for this disaster is $15.66 million.

01-194 Identified as YKN: dated prior to Kake: On July 19, 2000 Governor Knowles declared a disaster due to failure of salmon returns to the Yukon, Kuskokwim, and Norton Sound fishing districts. In some areas the return was significantly less than 50% of the long-term average. This catastrophic decline resulted in food shortages for subsistence fishermen and economic injury to businesses and individuals. The Governor initiated a coordination group named Operation Renew Hope (ORH) to manage this disaster. ORH was led by DCED Deputy Commissioner Bernice Joseph. DHS&EM provided a full time Public Information Officer (Kerre Fisher) and Department liaison (Michael Bird) in support of this operation. The group was charged with securing basic needs such as heating fuel, essential

utilities, USDA commodities and chum salmon from the Kotzebue fishery. At Governor Knowles request, the federal commerce Department issued a declaration of a fishery disaster under the Magnuson-Stevens Act. On October 24, 2000 the U.S. Small Business Administration issued a Declaration of Economic Injury Disaster #9J35. SBA tied this event to the 1995 Fall Flood Disaster. The Kenai Peninsula borough was the primary declaration area. The contiguous Boroughs of Mat-Su, Lake and Peninsula and the Regional Education Attendance Area #10 and the Municipality of Anchorage were eligible. The total for this disaster is $747K (mainly from Admin. Allowance). (closed after Jan 03)

03-204 Southcentral Windstorm (AK-DR-1461) Declared March 28, 2003 by Governor Murkowski then FEMA declared April 26, 2003: A major windstorm with sustained and severe winds that exceeded 100 mph occurred between March 6 and March 14, 2003. The windstorm affected the Matanuska-Susitna Borough, the Municipality of Anchorage, and the Kenai Peninsula Borough. Severe damage occurred to numerous personal residences and local businesses; extensive damage occurred to public facilities (i.e., schools, libraries, community centers, airports, buildings, and utilities) in the Matanuska-Susitna Borough, Municipality of Anchorage and the Kenai Peninsula Borough. Although damages were widespread, Anchorage facilities received the most damages. Federal Disaster Assistance for Debris Removal, Emergency Protective Measures and all Permanent Work categories were approved under the Public Assistance Program. FEMA also authorized 404 Mitigation funding and individual assistance under the Individual and Household Program. Individual Assistance totaled $48K. Public Assistance totaled $2.5 million for 24 potential applicants with 87 PW's. Hazard Mitigation totaled $532K. The total for this disaster is $3.47 million. (closeout data: $2.8 million total paid out (includes $220,000 mitigation and $47,600 State IA///posted 7/29/08 rbs).

12-240 2012 September Storm declared by Governor Parnell on October 17, 2012 then FEMA declared November 27, 2012 (DR-4094): Beginning on September 4, 2012, and continuing, a strong weather system produced high winds and heavy rains, resulting in severe and widespread wind damage and flooding throughout much of South-central and Interior Alaska. The series of storms created a threat to life and property in the Matanuska-Susitna Borough, Kenai Peninsula Borough, Alaska Gateway Regional Educational Attendance Area (REAA), and the Chugach area. The magnitude of the storm resulted in wind damages and flooding which necessitated debris clearance, emergency protective measures, damage to public facilities including roads, bridges, railroad, electrical distribution, and water systems; and damage to private residences to include losses of personal property.

AK-21-278 B 2022 January Mat-Su & Copper Windstorm declared by Governor Dunleavy on January 3, 2022 *This event is broken into two events for historical purposes within the DCI however, there was one declaration for both events*Then FEMA declared on March 14, 2022 DR-4646-AK: Beginning January 1, 2022, strong cold northerly air brought extreme cold weather and sustained strong winds to the Matanuska-Susitna (Mat-Su) Borough and Copper River Basin. Wind gusts over 80 miles per hour, with wind chills to 40 degrees below zero were recorded. Impacts from this storm included multi-day power disruption to over 18,000 Mat-Su residents, windblown storm debris, overturned vehicles on highways, downed trees, wind and freeze damage to homes, schools, government structures, commercial businesses, and other property. The Mat-Su Borough declared a local declaration of disaster emergency for this storm on January 3, 2022 and requested state disaster assistance.

The total estimated disaster-related response and recovery costs for this disaster have not been fully quantified; therefore, I am limiting expenditures for this disaster to $1 million from the Disaster Relief Fund pursuant to Alaska Statute (AS) 26.23.020(i) and (k), and per AS 26.23.025(a) this letter serves as the initial finance plan. The current balance of the Disaster Relief Fund is $3,435,998.60 and a supplemental appropriation is not required at this time.

3.3.2.3 LOCATION

The entire community of Wasilla experiences periodic severe weather impacts.

The Mat-Su Borough only has one Alaska Department of Environmental Conservation (ADEC) air quality monitor, which is located in Butte, on Harrison Court. The monitor collects real-time data on the air quality

conditions of PM2.5 and PM10 pollutants along with wind speed and direction. The data is uploaded every hour to the ADEC Air Quality Index (AQI) website for public view.

Source: ADEC AQI 2023

Figure 3-21 Butte Air Quality Monitoring Site

3.3.2.4 EXTENT (MAGNITUDE AND SEVERITY)

The entire area of Wasilla is vulnerable to the impacts from severe weather. The extent (magnitude and severity) of each severe weather event is listed below.

Severe Weather Event	Extent (Magnitude and Severity) of the Event
Extreme Cold	Wasilla experiences extreme low temperatures for multiple days in a row and can occur simultaneously with high wind events. In 1999, temperatures in Wasilla reached -42°F and in 2003, sustained temperatures of 0ºF with a wind-chill -53ºF were recorded.
Freezing Rain and Ice Storms	Wasilla experiences periodic freezing rain and ice storms that have caused roadway accidents and during a storm in 2013, several school buses slid off the road and one flipped on its side as a result of ice accumulation on the roads. During other ice storms, police, emergency services, and tow trucks were unable to safely access certain stretches of roads in Wasilla.
Heavy Snow	Wasilla experiences severe storm conditions accumulating over 10 inches of snowfall within several hours. In 2002, 29.61 inches of snow fell in Wasilla during a winter storm.
Drifting Snow	Wasilla experiences periodic drifting snow events that have caused school closures.
Blizzard	Wasilla experiences periodic blizzard conditions that reduce visibility below one quarter mile.

<table>
<tr><th>Severe Weather Event</th><th>Extent (Magnitude and Severity) of the Event</th></tr>
<tr><td>Winter Storm</td><td>Wasilla experiences periodic winter storms that have caused blizzard conditions, heavy snowfall, high winds, and flooding.</td></tr>
<tr><td>Heavy Rain</td><td>Wasilla experiences periodic severe weather storms that include heavy rain, which have led to flooding and road washouts.</td></tr>
<tr><td>High Winds</td><td>Wasilla experiences high wind events with wind speeds and gusts exceeding 93 mph. Wind gusts over 60 mph is common in Wasilla during high wind events.</td></tr>
<tr><td>Dust Storms</td><td>Dust from the Matanuska and Knik River drainage systems can cause dust storms that greatly exceed national health-based standards. Sources of particulate come from river drainages, volcanoes, wildfires (ash), burned-over areas (wildfires), gravel pits, agriculture plowing, road sanding, wood stoves, open burning, unpaved roads, and bare soil/erosion.

Below is a snapshot from the ADEC AQI website showing the Butte air quality report on May 26, 2023.

Location
Latitude: 61.534163
Longitude: -149.031655
Region: DEC Permanent Monitor

Monitored Pollutants
Pollutant | Concentration | Units of Measure
PM10 393 ug/m3 L
PM10S 385 ug/m3 S
PM2.5 29 ug/m3 L
Wind Direction, 3m 138 DEG
Wind Speed, 3m 7.9 M/SEC

Historical Data Concentration
<table>
<tr><th>Hour</th><th>AQI</th><th>Class</th><th>Program</th><th>Responsible Pollutant</th><th>Activity Caution</th><th>Risk Groups</th></tr>
<tr><td>12:00</td><td>37</td><td>Good</td><td>PM10</td><td>PM10</td><td>None</td><td>Air quality is satisfactory, and air pollution poses little or no risk.</td></tr>
<tr><td>12:00</td><td>87</td><td>Moderate</td><td>PM2.5</td><td>PM2.5</td><td>Respiratory symptoms possible in unusually sensitive individuals, possible aggravation of heart or lung disease in people with cardiopulmonary disease and older adults.</td><td>Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.</td></tr>
<tr><td>11:00</td><td>20</td><td>Good</td><td>PM10</td><td>PM10</td><td>None</td><td>Air quality is satisfactory, and air pollution poses little or no risk.</td></tr>
<tr><td>11:00</td><td>57</td><td>Moderate</td><td>PM2.5</td><td>PM2.5</td><td>Respiratory symptoms possible in unusually sensitive individuals, possible aggravation of heart or lung disease in people with cardiopulmonary disease and older adults.</td><td>Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.</td></tr>
<tr><td>10:00</td><td>6</td><td>Good</td><td>PM10</td><td>PM10</td><td>None</td><td>Air quality is satisfactory, and air pollution poses little or no risk.</td></tr>
<tr><td>10:00</td><td>3</td><td>Good</td><td>PM2.5</td><td>PM2.5</td><td>None</td><td>Air quality is satisfactory, and air pollution poses little or no risk.</td></tr>
<tr><td>09:00</td><td>4</td><td>Good</td><td>PM10</td><td>PM10</td><td>None</td><td>Air quality is satisfactory, and air pollution poses little or no risk.</td></tr>
<tr><td>09:00</td><td>5</td><td>Good</td><td>PM2.5</td><td>PM2.5</td><td>None</td><td>Air quality is satisfactory, and air pollution poses little or no risk.</td></tr>
</table>
Source: ADEC AQI 2023

Figure 3-22 Butte Air Quality Report- May 26, 2023</td></tr>
<tr><td>Drought</td><td>Wasilla experiences localized droughts that have affected local fish populations. Droughts have also increased the magnitude and severity of wildfire events as a result of drier fuel (vegetation) surrounding the community.</td></tr>
</table>

Based on past severe weather events and the criteria identified in Table 3-2, the extent of overall severe weather in Wasilla is considered Limited to Critical, where injuries and/or illnesses could result in temporary to permanent disability; with potential for critical facilities to be shut down for more than a week, and 10-25 percent of property would be severely damaged.

3.3.2.5 IMPACT

The location, land topography, and intensity influence the severity of a severe weather event impact within a community. Below are the impacts of various severe weather events on the community of Wasilla.

Severe Weather Event	Impact of the Event
Extreme Cold	Extreme cold may also impact a community by disrupting the flow of transportation within the community. With extreme cold temperatures, comes ice fog, which may ground an aircraft carrying supplies until conditions improve. Prolonged periods of cold can cause large bodies of water to freeze, disrupting shipping and increasing the likelihood of ice jams and associated flooding. While Alaskans have engineered ways to stay warm during extreme cold, infrastructure can only withstand and function within a certain temperature range. Extreme cold can cause electric generation to malfunction or cause fuel to congeal in supply lines and storage tanks. Without electricity, heaters and furnaces do not work, and water/sewage pipes can freeze or rupture. A combination of extreme cold and little to no snow cover, increases the ground's frost depth, which can disturb pipes beneath the ground. While extreme cold can impact a community's infrastructure, the greatest danger from extreme cold is its impact on humans. Prolonged exposure to extreme cold can cause frostbite or hypothermia and become life-threatening very quickly. Infants and elderly people are most susceptible to these conditions. Carbon monoxide poisoning is another threat as people use supplemental heating devices without proper ventilation. Extreme cold accompanied by wind intensifies life-threatening exposure injuries such as hypothermia and frostbite. Impacts from extreme cold in Wasilla have included loss of utilities.
Freezing Rain and Ice Storms	Ice accumulations can damage trees, utility poles, and communication towers. Ice on communication towers can disrupt transportation, power, and communications within the community. Ice storms are often the cause of automobile accidents, power outages, and personal injury. Impacts from freezing rain and ice storms in Wasilla have included loss of utilities, roadway backups and accidents, and damage to school buses that slid off the road.
Heavy Snow	Heavy snow can impact a community by halting transportation in and out of a community. Until the snow can be removed, roadways and airports are impacted, even closed completely. With these services out of commission, supplies are not able to be brought into the community, and emergency and medical services are halted. Excess weight from accumulated snow on roofs, trees, and powerlines can cause them to collapse. Heavy snow can also damage light aircraft and cause small boats to sink. Once temperatures reach above freezing, the heavy snow will begin to thaw, and can cause substantial flooding. The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on the community. Heavy snow can lead to injury or death as a result of vehicle and or snow machine accidents. Other causalities can occur due to hypothermia caused by prolonged exposure to cold weather or overexertion while shoveling snow. Impacts from heavy snow in Wasilla have included property damage, vehicular accidents, and fatalities. From November 3, 2022 to April 12, 2023, Wasilla received 88 inches of snow, of which, 46 inches fell between December 1 to December 15, 2022.
Drifting Snow	The most common hazard caused by blowing and drifting snow is quickly reduced visibility while driving. The combination of near-zero visibility and drifting snow can cause unexpected travel difficulties and accidents in remote areas during dangerously cold winter weather situations. Impacts from drifting snow in Wasilla have included road blockages, and the school being shut down due to drifts.

Severe Weather Event	Impact of the Event
Blizzard	Conditions during a blizzard can be extreme, resulting in severe impacts to community. During a blizzard, heavy or blowing snow can cause whiteout conditions, making travel difficult and unsafe. Roads can become partially or fully blocked by snowdrift. Cold temperatures associated with blizzards can last for days after the storm has ended, increasing the potential for hypothermia or frostbit. High winds during a blizzard may disrupt utilities, potentially leaving homes without heat and power until after the storm has ended and utilities are restored. Impacts from blizzards in Wasilla have included loss of visibility which hindered travel.
Winter Storm	A winter storm can last a few hours or several days, cut off utilities, and put older adults, children, sick individuals, and pets are at greater risk. Winter storms create a higher risk of car accidents, hypothermia, frostbite, carbon monoxide poisoning, and heart attacks from overexertion. Winter storms can also cause property damage. Some impacts to homes and other infrastructure may include roof damage or collapse, water damage from frozen or busted pipes, cracks in caulking due to extreme cold, damage to building foundations. Winter storms and cold temperatures can also impact vehicles (cars, snowmachines) that the community relies upon for transportation. These impacts may include slowing the battery, hurting the cooling system, thickening fluids, damaging the engine, and increasing the potential for vehicular accidents. Impacts from winter storms in Wasilla have included property damage, vehicular accidents, and fatalities.
Heavy Rain	The potential impacts of heavy rain include crop damage, erosion, and an increased flood risk. Floods onset from heavy rain can result in road washouts, injuries/loss of life, or drowning. Impacts from heavy rain in Wasilla have included localized flooding.
High Winds	High winds can result in downed trees and power lines, flying debris, building collapses, transportation disruptions, damage to buildings, damage to vehicles, and injury or death. High winds can cause power outages, resulting in lack of heating, running water, refrigeration loss, and damage to electronics and/or medical equipment. Impacts from high winds in Wasilla have included loss of utilities, damage to airplanes and other vehicles, downed trees, and downed roadway and restaurant signs. During a high wind event in 2022, there were reports of blown-over trucks, toppled Cessna airplanes at the Wasilla Airport, downed trees and power lines (with power outages across the Valley causing pipes to burst and people to seek shelter elsewhere due to the prolonged cold), windows broken, cars damaged due to flying debris, and siding ripped off homes and businesses. Emergency Management reported multiple CO poisoning calls, requests to be transported to the hospital, along with cases of frostbite. High winds and damage due to wind gusting is considerable and widespread throughout the City. The Wasilla Airport and water towers are susceptible to damage from high wind events.
Dust Storms	Dust from the Matanuska and Knik River drainage systems can cause dust storms that greatly exceed national health-based standards. Sources of particulate come from river drainages, volcanoes, wildfires (ash), burned-over areas (wildfires), gravel pits, agriculture plowing, road sanding, wood stoves, open burning, unpaved roads, and bare soil/erosion. April through June and August are the months that are most prevalent to dust storms. Impacts from dust storms in Wasilla have included reduced visibility and reduced air quality.
Drought	Droughts can severely impact a community by causing shortages in safe drinking water, reducing air quality by increasing the risk of wildfires and dust storms, increasing the potential of illness and disease, and increasing economic burdens.

Severe Weather Event	Impact of the Event
	Droughts can also impact the environment by reducing soil quality for vegetation, reduction or degradation of fish and wildlife habitat, and lowering the water level of lakes, ponds, or reservoirs. Specific examples of how droughts have impacted the State of Alaska have included: On June 27, 2019, there was a statewide ban of purchasing fireworks due to the high to very high fire danger as a result of hot, dry weather. At the time, there were 130 active wildfires burning 273,521 acres across the state (USDM 2023). For 64 weeks, starting on October 2, 2019, Alaskan salmon were unable to enter many streams due to low flow conditions and drought conditions throughout Alaska caused many pre-spawn mortality events of salmon. All species of salmon were affected by the drought conditions statewide, leading to widespread mortality (USDM 2023). Impacts from droughts in Wasilla have included: loss of crops such as hay, burn bans, firework bans, hindered firefighting efforts, increased wildland fire events, and impacted salmon runs, and widespread salmon mortality.

The following images show damage in Wasilla from a windstorm in January 2022. This was a significant high wind event in the community. There was about 40 hours of hurricane force winds (74 mph or greater) noted at the Palmer Airport, and about 51 hours of wind gusts 50 mph or greater between January 1st and 3rd. There were property damage reports for homes, vehicles, airplanes, and commercial businesses. Power was knocked out for nearly 15,000 people in the area. Due to extreme cold temperatures at the time, there were also reports of frostbite and carbon monoxide poisoning.

Source: ADN 2022

Figure 3-23 Overturned Truck and Trailer in Wasilla from a Windstorm, 01/03/2022

Source: ADN 2022

Figure 3-24 Damage to KFC and A&W Restaurant in Wasilla from a Windstorm, 01/03/2022

Source: ADN 2022

Figure 3-25 Fallen Tree on Power Lines in Wasilla from a Windstorm, 01/03/2022

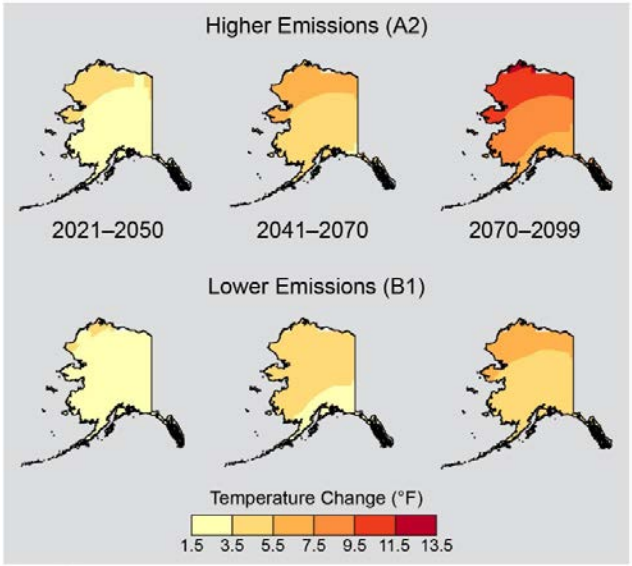
3.3.2.6 PROBABILITY OF FUTURE EVENTS

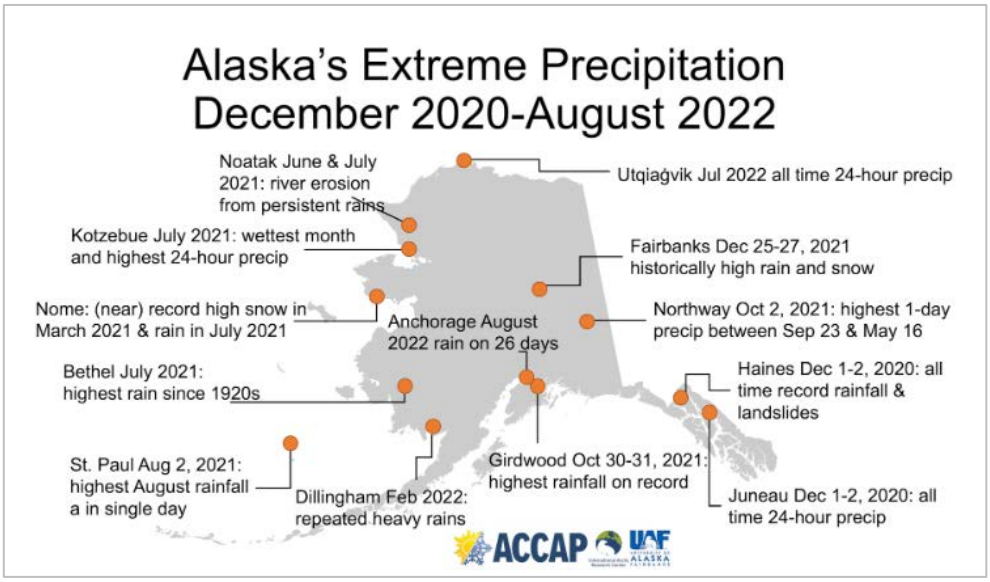
The probability of future events for each severe weather event is outlined below.

Severe Weather Event	Probability of the Event
Extreme Cold	Based on previous occurrences and the criteria identified in Table 3-3, it is Likely that Wasilla will experience an extreme cold event in the next three years; there is a 1 in 3 years chance of occurring (1/3=33 percent); and the history of events is greater than 20 percent but less than or equal to 33 percent likely per year.
Freezing Rain and Ice Storms	Based on previous occurrences and the criteria identified in Table 3-3, it is Likely that Wasilla will experience a freezing rain/ice storm event in the next three years; there is a 1 in 3 years chance of occurring (1/3=33 percent); and the history of events is greater than 20 percent but less than or equal to 33 percent likely per year.
Heavy Snow	Based on previous occurrences and the criteria identified in Table 3-3, it is Likely that Wasilla will experience a heavy snow event in the next three years; there is a 1 in 3 years chance of occurring (1/3=33 percent); and the history of events is greater than 20 percent but less than or equal to 33 percent likely per year.
Drifting Snow	Based on previous occurrences and the criteria identified in Table 3-3, it is Likely that Wasilla will experience a drifting snow event in the next three years; there is a 1 in 3 years chance of occurring (1/3=33 percent); and the history of events is greater than 20 percent but less than or equal to 33 percent likely per year.
Blizzard	Based on previous occurrences and the criteria identified in Table 3-3, it is Likely that Wasilla will experience a blizzard event in the next three years; there is a 1 in 3 years chance of occurring (1/3=33 percent); and the history of events is greater than 20 percent but less than or equal to 33 percent likely per year.
Winter Storm	Based on previous occurrences and the criteria identified in Table 3-3, it is Likely that Wasilla will experience a winter storm event in the next three years; there is a 1 in 3 years chance of occurring (1/3=33 percent); and the history of events is greater than 20 percent but less than or equal to 33 percent likely per year.
Heavy Rain	Based on previous occurrences and the criteria identified in Table 3-3, it is Likely that Wasilla will experience a heavy rain event in the next three years; there is a 1 in 3 years chance of occurring (1/3=33 percent); and the history of events is greater than 20 percent but less than or equal to 33 percent likely per year.
High Winds	Based on previous occurrences and the criteria identified in Table 3-3, it is Likely that Wasilla will experience a high wind event in the next three years; there is a 1 in 3 years chance of occurring (1/3=33 percent); and the history of events is greater than 20 percent but less than or equal to 33 percent likely per year.
Dust Storms	Based on previous occurrences and the criteria identified in Table 3-3, it is Possible that Wasilla will experience a dust storm event in the next five years; there is a 1 in 5 years chance of occurring (1/5=20 percent); and the history of events is greater than 10 percent but less than or equal to 20 percent likely per year.
Drought	Based on previous occurrences and the criteria identified in Table 3-3, it is Possible that Wasilla will experience drought conditions in the next five years; there is a 1 in 5 years chance of occurring (1/5=20 percent); and the history of events is greater than 10 percent but less than or equal to 20 percent likely per year.

3.3.2.7 FUTURE CONDITIONS INCLUDING CLIMATE CHANGE

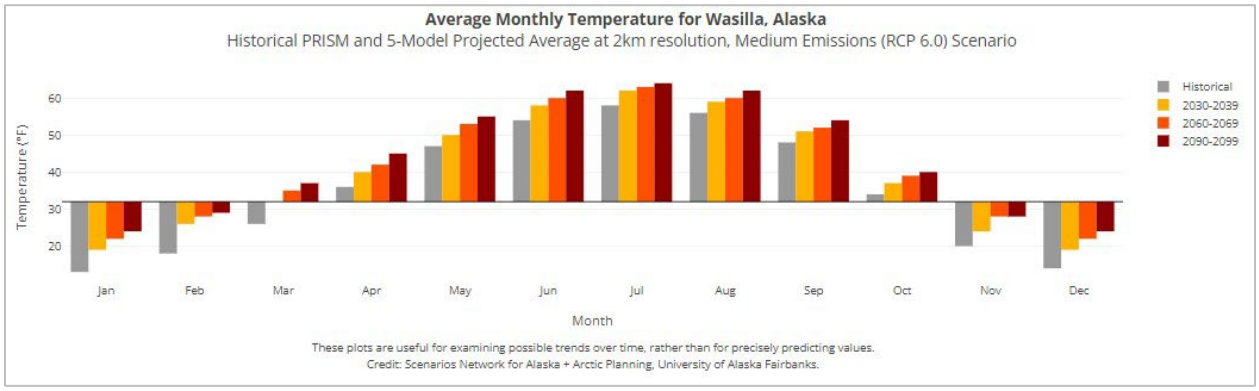
The nature or location of severe weather events in Wasilla are not anticipated to change due to climate change. However, the extent of severe weather events is expected to change due to climate change. The anticipated changes for each event are described below.

Severe Weather Event	Projected Changes in Extent (Magnitude and Severity) due to Climate Change
Extreme Cold	Average annual temperatures in Alaska are projected to rise by an additional 2°F to 4°F by 2050 (USGCRP 2018). If global emissions continue to increase during this century, temperatures can be expected to rise 10°F to 12°F in the north, 8°F to 10°F in the interior, and 6°F to 8°F in the rest of the state (USGCRP 2018). In Southeast Alaska, surface temperatures are projected to increase by 1-3°C depending on season and projection model (Lader et al. 2020). In Wasilla, average annual temperatures may increase by about 13°F by the end of the century (UAF/SNAP 2023). Winter temperatures are increasing the most (+16°F) (UAF/SNAP 2023). Figure 3-26 shows Alaska's predicted temperature changes under a higher emissions scenario and a lower emissions scenario through 2099. See Figure 3-28 for historical and projected temperatures for Wasilla.  Source: 2018 United States Fourth National Climate Assessment **Figure 3-26 Alaska's Predicted Temperature Changes Through 2099**
Freezing Rain and Ice Storms	Alaska has experienced an 11% increase in the amount of precipitation falling in very heavy events from 1958 to 2012 (EPA 2016). As global temperatures continue to rise, freezing rain and ice storm events may be less severe as historical storms.
Heavy Snow	In southern and coastal parts of Alaska, large decreases in spring snowpack are expected by the mid-21st century, even with more winter precipitation because temperatures warm to above freezing, causing a shift from snow to rain or more melt during the winter (National Park Service (NPS) 2020). Wasilla experiences severe storm conditions accumulating over 10 inches of snowfall within several hours.
Drifting Snow	Wasilla experiences periodic drifting snow events that have caused snow buildup and blockages on roads. Blowing and drifting snow in Wasilla have caused school delays and closures.

Severe Weather Event	Projected Changes in Extent (Magnitude and Severity) due to Climate Change
Blizzard	There are many studies on the effect of climate change on the extent of blizzards in the contiguous United States, particularly the Northeast region of US. However, there is little published information on the effect of climate change and blizzards in Alaska. Studies show that climate change could exacerbate the severity of blizzards (Dixon et al. 2018). A warmer atmosphere holds more moisture, and this moisture eventually falls as precipitation—either as rain or snow, which results in more frequent and intense storms.
Winter Storm	Climate scientists have suggested that warming temperatures, caused by the increase of greenhouse gases in the atmosphere, may be enabling longer and more intense cycles of droughts, floods, and winter storms (Dixon et al. 2018).
Heavy Rain	Alaska has experienced an 11% increase in the amount of precipitation falling in very heavy events from 1958 to 2012 (EPA 2016). Extreme precipitation events have occurred throughout Alaska with increasing frequency. Figure 3-27 shows examples of extreme precipitation statewide from December 2020-August 2022.  Source: USDA 2023, Credit: ACCAP **Figure 3-27 Alaska's Extreme Precipitation December 2020-August 2022** In Wasilla, spring rainfall may increase by 54% in the next century (UAF/SNAP 2023). Wasilla averages 15.24 inches of rainfall per year. See Figure 3-29 for historical and projected precipitation amounts for Wasilla.
High Winds	High-wind events are projected by models to become more frequent in Alaska, with changes most noticeable in the northern and western coastal regions of Alaska (Redilla et al. 2019).
Dust Storms	As high winds are projected to increase due to climate change (Redilla et al. 2019), the extent of dust storms may also increase.
Drought	Climate change is increasing the intensity and length of severe weather events including droughts. Increased exposure to extremes will surpass the resilience of ecological and human systems. Already vulnerable communities will be unable to adapt, laying bare systemic inequalities and requiring emergency assistance (IPCC 2019). The U.S. Drought Monitor started in 2000. Since 2000, the longest duration of drought (D1–D4) in Alaska lasted 79 weeks beginning on July 17, 2018 and ending on January 14, 2020. The most intense

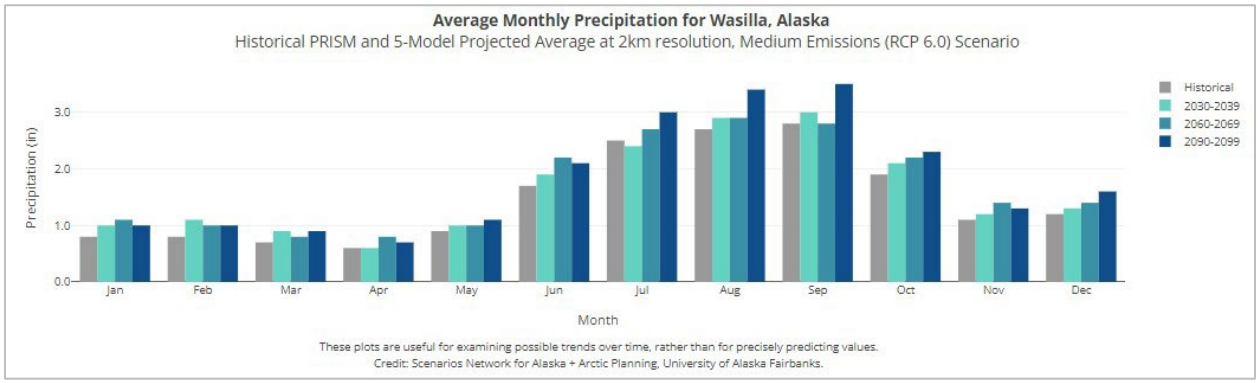
Severe Weather Event	Projected Changes in Extent (Magnitude and Severity) due to Climate Change
	period of drought occurred the week of August 27, 2019, where D3 affected 1.5% of Alaska land (USDM 2023). Historically, Wasilla has been impacted by droughts during summer months.

The University of Alaska Fairbanks's (UAF) Scenarios Network for Alaska and Arctic Planning (SNAP) depict the community's historical and future projected temperatures and precipitation amounts under a medium emissions scenario (Figure 3-28 and Figure 3-29).



Source: UAF/SNAP 2023

Figure 3-28 Historical and Projected Temperatures for Wasilla



Source: UAF/SNAP 2023

Figure 3-29 Historical and Projected Precipitation Amounts for Wasilla

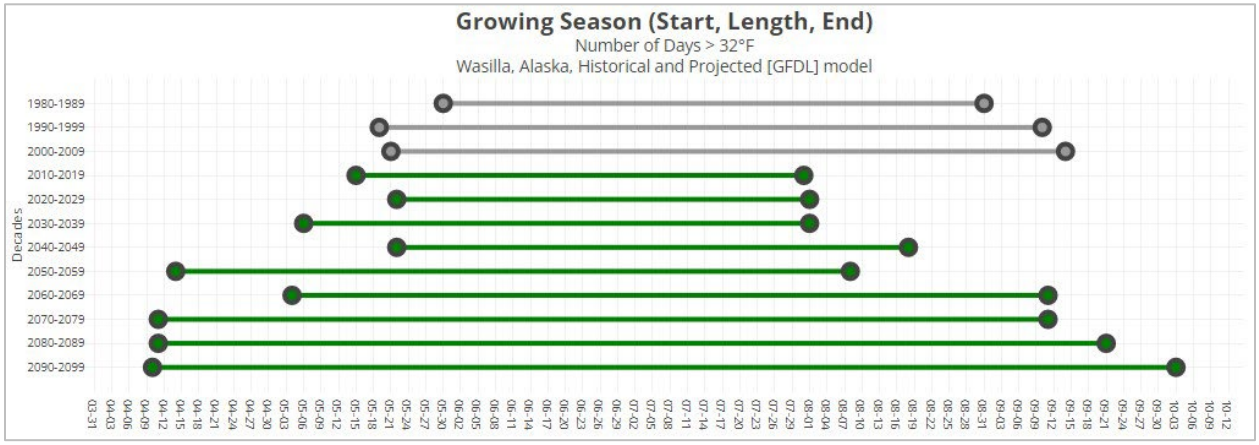
Due to climate change, the impacts of severe weather events to the community of Wasilla are expected to change. Projected impacts of each event are outlined below.

Severe Weather Event	Projected Changes in Impact due to Climate Change
Extreme Cold	Due to climate change, average annual temperatures in Alaska are projected to rise by an additional 2°F to 4°F by 2050 (USGCRP 2018). Extreme cold may also impact a community by disrupting the flow of transportation within the community. With extreme cold temperatures, comes ice fog, which may ground an aircraft carrying supplies until conditions improve. Prolonged periods of cold can cause large bodies of water to freeze, disrupting shipping and increasing the likelihood of ice jams and associated flooding.

Severe Weather Event	Projected Changes in Impact due to Climate Change
	While Alaskans have engineered ways to stay warm during extreme cold, infrastructure can only withstand and function within a certain temperature range. Extreme cold can cause electric generation to malfunction or cause fuel to congeal in supply lines and storage tanks. Without electricity, heaters and furnaces do not work, and water/sewage pipes can freeze or rupture. A combination of extreme cold and little to no snow cover, increases the ground's frost depth, which can disturb pipes beneath the ground. While extreme cold can impact a community's infrastructure, the greatest danger from extreme cold is its impact on humans. Prolonged exposure to extreme cold can cause frostbite or hypothermia and become life-threatening very quickly. Infants and elderly people are most susceptible to these conditions. Carbon monoxide poisoning is another threat as people use supplemental heating devices without proper ventilation. Extreme cold accompanied by wind intensifies life-threatening exposure injuries such as hypothermia and frostbite. Reduced snow cover and winter precipitation in the form of snow, along with increased air temperature, are expected to increase stream water temperature (NPS 2020). During winter and spring, warmer waters could hasten development and growth of salmon eggs and fry, possibly leading to earlier life stage transitions (NPS 2020). Additionally, ecological impacts to spawning salmon from rising temperatures may be seen. During summer, warmer waters could increase physiological stress on adult salmon migrating to spawning grounds, potentially reducing spawning rates (NPS 2020). Higher temperatures in spring and fall could also result in longer growing season (UAF/SNAP 2023). See Figure 3-30 below for the historical and projected length of the growing season in Wasilla. Direct impacts from extreme cold in Wasilla have included loss of utilities.
Freezing Rain and Ice Storms	Due to climate change, average annual temperatures in Alaska are projected to rise by an additional 2°F to 4°F by 2050 (USGCRP 2018), while the intensity and frequency of winter storms and other storm events is projected to increase (Dixon et al. 2018). How these factors will affect the impact of freezing rain and ice storm events in Wasilla is unknown. Impacts from freezing rain and ice storms in Wasilla have included loss of utilities, roadway backups and accidents, and damage to school buses that slid off the road.
Heavy Snow	Within the next century, climatically-driven changes in snow characteristics (decreasing snowfall, snowpack, and snowmelt) will affect hydrologic and ecological systems in Alaska (Littell et al. 2018). Impacts from reduced snowpack and less frequent snowfall will directly affect the spawning habitats for salmon. Reduced snow cover and winter precipitation in the form of snow, along with increased air temperature, are expected to increase stream water temperature (NPS 2020). During winter and spring, warmer waters could hasten development and growth of salmon eggs and fry, possibly leading to earlier life stage transitions (NPS 2020). Additionally, ecological impacts to spawning salmon from rising temperatures may be seen. During summer, warmer waters could increase physiological stress on adult salmon migrating to spawning grounds, potentially reducing spawning rates (NPS 2020). A shift from snow to rain impacts water storage capacity and surface water availability (UAF/SNAP 2023). Impacts from heavy snow in Wasilla have included property damage, vehicular accidents, and fatalities.
Drifting Snow	Projected climate change impacts are expected to reduce snowpack (NPS 2020), while high-wind events are projected to become more frequent, with the highest increases in the northern and western Alaska coastal regions (Redilla et al. 2019). How these competing factors will affect the impact of drifting snow events in Wasilla is unknown.

Severe Weather Event	Projected Changes in Impact due to Climate Change
	Impacts from drifting snow in Wasilla have included road blockages, and the school being shut down due to drifts.
Blizzard	Studies show that climate change could exacerbate the severity of blizzards (Dixon et al. 2018), potentially resulting in worsening impacts to the community. Conditions during a blizzard can be extreme, resulting in severe impacts to community. During a blizzard, heavy or blowing snow can cause whiteout conditions, making travel difficult and unsafe. Roads can become partially or fully blocked by snowdrift. Cold temperatures associated with blizzards can last for days after the storm has ended, increasing the potential for hypothermia or frostbit. High winds during a blizzard may disrupt utilities, potentially leaving homes without heat and power until after the storm has ended and utilities are restored. Impacts from blizzards in Wasilla have included loss of visibility which hindered travel.
Winter Storm	Climate scientists have suggested that warming global temperatures may be enabling longer and more intense cycles of winter storms (Dixon et al. 2018) resulting in worsening impacts to the community. A winter storm can last a few hours or several days, cut off utilities, and put older adults, children, sick individuals, and pets are at greater risk. Winter storms create a higher risk of car accidents, hypothermia, frostbite, carbon monoxide poisoning, and heart attacks from overexertion. Winter storms can also cause property damage. Some impacts to homes and other infrastructure may include roof damage or collapse, water damage from frozen or broken pipes, cracks in caulking due to extreme cold, damage to building foundations. Winter storms and cold temperatures can also impact vehicles by draining the battery, damaging the cooling system, thickening fluids, damaging the engine, and increasing the potential for vehicular accidents. Impacts from winter storms in Wasilla have included property damage, vehicular accidents, and fatalities.
Heavy Rain	In Wasilla, spring rainfall is projected to increase by 54% in the next century (UAF/SNAP 2023). With increased precipitation, the impact of heavy rain in Wasilla may increase. These impacts may include increased flooding and road washouts throughout the community. Impacts from heavy rain in Wasilla have included localized flooding.
High Winds	As high wind events are projected to increase (Redilla et al. 2019), impacts from high wind events may increase. Impacts from high winds in Wasilla have included loss of utilities, damage to airplanes and other vehicles, downed trees, and downed roadway and restaurant signs. During a high wind event in 2022, there were reports of blown-over trucks, toppled Cessna airplanes at the Palmer Airport, downed trees and power lines (with power outages across the Valley causing pipes to burst and people to seek shelter elsewhere due to the prolonged cold), windows broken, cars damaged due to flying debris, and siding ripped off homes and businesses. Emergency Management reported multiple CO poisoning calls, requests to be transported to the hospital, along with cases of frostbite.
Dust Storms	As the frequency of high winds increase due to climate change, the frequency of dust storms may also increase, increasing potential impacts to Wasilla. Impacts from dust storms in Wasilla have included reduced visibility and reduced air quality.
Drought	Climate change-driven effects upon hydrology, seasonal snowpack, and days above freezing temperatures will alter the water supply in snowmelt/glacier runoff fed streams and rivers in turn affecting the water supply for Alaskan communities, wildlife, and landscapes. In conjunction with lower ground-water levels, droughts can drive salinization in soil, estuaries, and wetlands along coastlines as sea-water fills voids formerly occupied by fresh water. Indirect effects of climate

Severe Weather Event	Projected Changes in Impact due to Climate Change
	change-induced droughts include threats to the tourism industry, food insecurity, and threats to the Alaskan subsistence lifestyle (IPCC 2019). Impacts from droughts in Wasilla have included: loss of crops such as hay, burn bans, firework bans, hindered firefighting efforts, increased wildland fire events, and impacted salmon runs, and widespread salmon mortality.



Source: UAF/SNAP 2023

Figure 3-30 Historical and Projected Length of Growing Season in Wasilla

The frequency of severe weather events is dependent on the event and climate change will impact each differently. The projected changes in event frequency are outlined below.

Severe Weather Event	Projected Changes in Probability of Future Events due to Climate Change
Extreme Cold	Due to climate change, average annual temperatures in Alaska are projected to rise by an additional 2°F to 4°F by 2050 (USGCRP 2018; UAF/SNAP 2023). In Wasilla, average annual temperatures are expected to increase (Figure 3-28). Statewide, by 2046, the number of nights with below freezing temperatures is expected to decrease by at least 20 nights per year, and by greater than 45 nights per year in coastal areas of the North Slope, Seward Peninsula, Yukon–Kuskokwim Delta, Alaska Peninsula, and Southcentral Alaska (USGRCP 2018).
Freezing Rain and Ice Storms	Freezing rain and ice storm events are dependent on the ambient air mass temperature. Average annual temperatures in Alaska are projected to rise by an additional 2°F to 4°F by 2050 (USGCRP 2018; UAF/SNAP 2023). As global temperatures continue to rise, freezing rain and ice storm events may become less frequent as in previous decades.
Heavy Snow	The amount of precipitation that falls as snow and the length of the snow-cover season both decrease as temperatures exceed 32°F more frequently (NPS 2020). Projected climate change impacts are expected to reduce snowpack and promote glacial melt, reducing salmon habitat quality and diversity (NPS 2020). Models indicate a broad switch from snow-dominated to transitional annual hydrology across most of Southern and Coastal Alaska (Littell et al. 2018). Therefore, as winter temperatures continue to increase, the amount of snowfall will decrease and precipitation in the form of rain will be more common in winter months.

Severe Weather Event	Projected Changes in Probability of Future Events due to Climate Change
Drifting Snow	Projected climate change impacts are expected to reduce snowpack (NPS 2020), while high-wind events are projected to become more frequent, especially in northern and western Alaska coastal regions (Redilla et al. 2019). How these competing factors will affect the probability of drifting snow events in Wasilla is unknown. While unknown, the probability of drifting snow events will depend on the geography of the area and predisposition for snowfall.
Blizzard	Climate scientists have suggested that warming global temperatures may be enabling longer, more frequent, and more intense cycles of winter storms and blizzards (Dixon et al. 2018).
Winter Storm	Climate scientists have suggested that warming global temperatures may be enabling longer, more frequent, and more intense cycles of winter storms and blizzards (Dixon et al. 2018).
Heavy Rain	In Wasilla, spring rainfall may increase by 54% in the next century (UAF/SNAP 2023).
High Winds	High-wind events are projected to become more frequent (Redilla et al. 2019).
Dust Storms	As the frequency of high winds is projected to increase due to climate change (Redilla et al. 2019), the frequency of dust storms may also increase.
Drought	Climate change within Alaska is likely to result in increased frequency of drought conditions (IPCC 2019). Drought risks will increase globally throughout the end of the 21st century, scaling upwards with emissions projections/additional degrees of heating. In the high latitudes of North America, droughts will be 150-200% more likely at 2°C warming and over 200% more likely at 4°C warming (IPCC 2019).

3.3.3 WILDLAND FIRE AND COMMUNITY FIRE

Fires can be divided into the following categories:

- Prescribed fires: ignited under predetermined conditions to meet specific objectives, to mitigate risks to people and their communities, and/or to restore and maintain healthy, diverse ecological systems.
- Wildland fire: any non-structure fire, other than prescribed fire, that occurs in the wildland.
- Wildland Fire Use: a wildland fire functioning in its natural ecological role and fulfilling land management objectives.
- Wildland-Urban Interface Fires (Urban/Community Fire): fires that burn within the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. The potential exists in areas of wildland-urban interface for extremely dangerous and complex fire burning conditions which pose a tremendous threat to public and firefighter safety.

Both wildland and community fires pose a risk to the residents and infrastructure in Wasilla.

3.3.3.1 NATURE OF WILDLAND FIRE

Wildland fires are types of fires which spread via the consumption of vegetation, and they often spread very quickly due to amount of vegetation available. They begin sometimes unnoticed and cause dense smoke that is usually visible from several miles or tens of miles around. Two principal causes for them are natural (e.g., lightning) and by human activity (campfires, cigarettes, unattended burns). They more usually happen in forests or other areas with sufficient vegetation (e.g., prairies). Wildland fires are usually classified as to a specific type or locale such as: urban, tundra, interface or intermix fires, as well as prescribed fires.

There are four significant variables which contribute to the behavior and extent of wildland fires, and these can be used to identify potential areas that are more susceptible to wildland fires. These are:

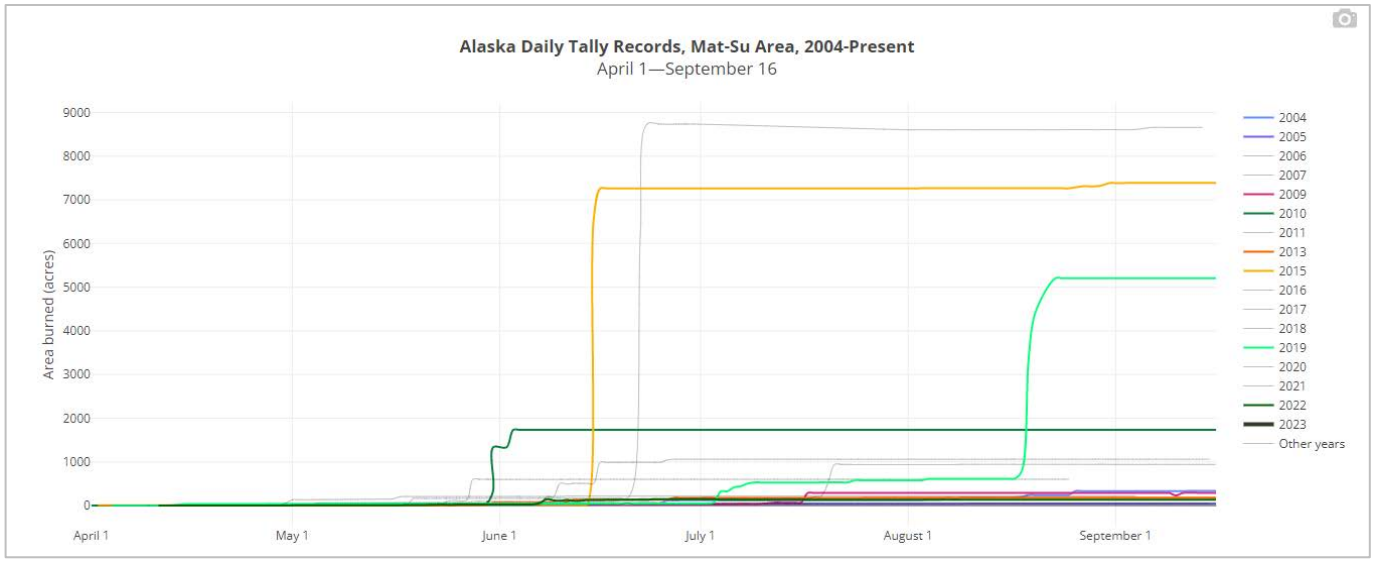
- **Topography**: the amount and aspect of slopes influence how wildland fires spread and how quickly. Slopes that face south are subject to more solar radiation which makes them generally drier and more prone for wildfires. Sometimes ridge lines or ridge tops become a natural barrier to wildfires as fires spread more slowly downhill.
- **Fuel**: Wildland fires are heavily dependent on the type and extent of fuel, i.e., vegetation, present for their spread and occurrence. Certain species of plants are much more ignitable and will burn with greater intensity. The amount of combustible material available is referred to as the fuel load, and the denser the vegetation the more intense the wildland fire can become. The amount of dead matter, e.g., leaf litter, compared to living matter also considerably effects the nature of these fires. Periods of prolonged droughts cause a decrease in the moisture of both living and dead matter and significantly increase the odds of wildland fire occurrence and extent. Climate change is now a factor as well. Lastly, the continuity of the fuel load is a main factor in both horizontal and vertical planes. The more continuous the fuel, the easier a fire will spread.
- **Weather**: Of all the factors which affect wildfires, weather is the most variable. The ignition and spread of a wildfire are dependent on humidity, temperature, winds, and lightning. Extreme bouts of weather, such as heat waves or droughts, can lead to extensive wildfire activity. Dry seasons are generally becoming longer due to climate change, and this has led to an increase in wildfires. Conversely, periods of increased rain and cooling decrease the odds of wildland fires and ease their containment as well.
- **Season**: The seasons with more vulnerability for wildfires are late summer and early autumn. This is generally the time when the fuel (vegetation) dries out. The moisture content drops sharply and the ratio to dead to living material increases. Though there are many factors which contribute to the extent and intensity if wildfires such as: wind speed and direction, fuel load and type, humidity, and topography. The most common causes of wildfires in Alaska, historically, have been lightning or human negligence.

Other hazards do have an effect on the extent and frequency of wildland fires. These are, for example: infestations, lightning, and drought. If a wildland fire is not quickly and properly controlled, it can grow rapidly into a disaster or emergency. The smallest of wildfires can even threaten lives, resources, and destroy properties. Livestock and pets are also susceptible to wildfires. Some wildfires can precipitate the need for emergency food and water, evacuation, and temporary shelters.

Sometimes the effects of wildland fires can be catastrophic. They can destroy large swathes of forest and other vegetation, damage the soil, waterways, and the land itself. Some soils may lose their capacity to keep moisture and support life for years after an intense wildfire.

3.3.3.2 HISTORY OF WILDLAND FIRE

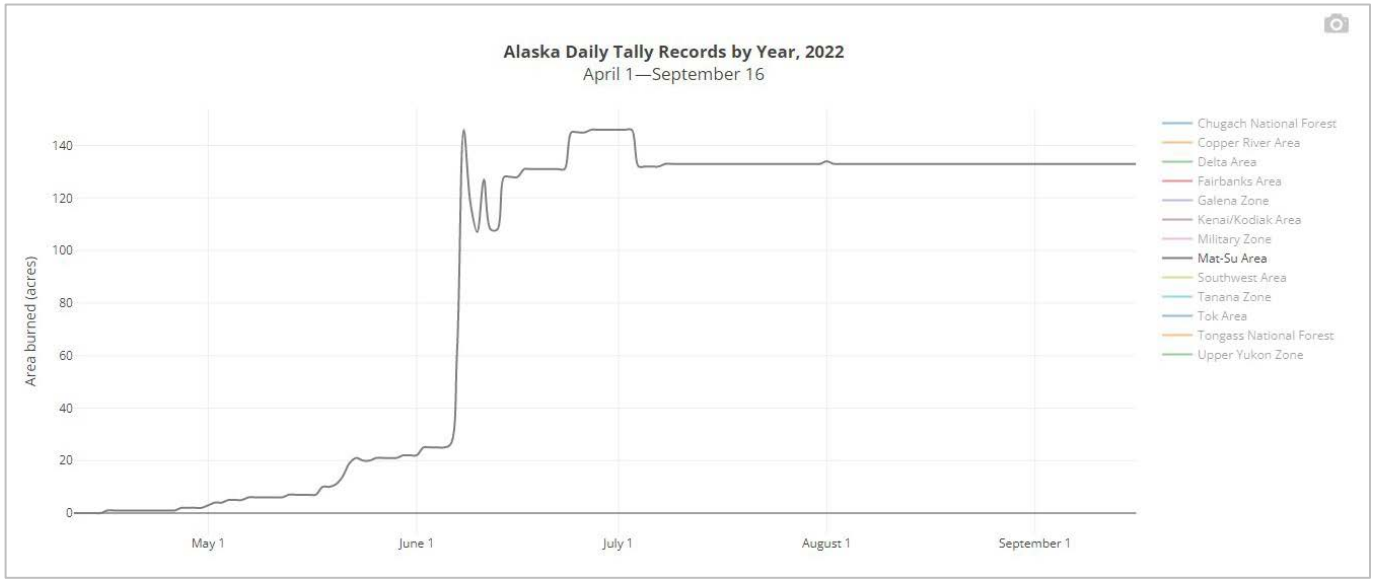
The State of Alaska, Division of Forestry responds to wildland fires within the MSB; 80% of the wildland fires that they respond to in the MSB are located within the cities of Houston, Palmer, and Wasilla, or the "Core Area". Figure 3-31 shows the historical daily fire tally records in the Mat-Su area since 2004.



Source: UAF/SNAP 2023

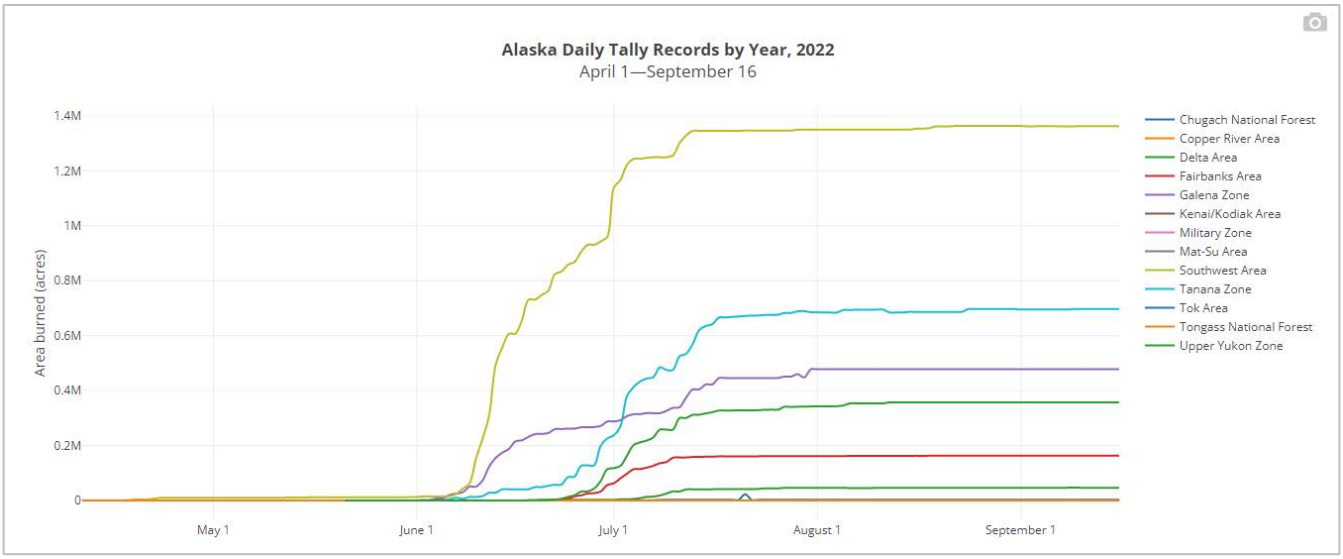
Figure 3-31 Mat-Su Area Daily Fire Tally Records (2004- April 2023)

Figure 3-32 shows the total number of acres burned in the Mat-Su for the 2022 fire season. Compared to the entire state, the Mat-Su Area had very little total acreage burned in 2022 as this area is not visible on the graph (Figure 3-33).



Source: UAF/SNAP 2023

Figure 3-32 Total Acres Burned in the Mat-Su Area in 2022



Source: UAF/SNAP 2023

Figure 3-33 Total Acres Burned Statewide in 2022

According to the AICC, 8,507 wildland fires occurred within 100 miles of Wasilla in an 83-year period (1939-2022). Of the 8,507 total wildfires, 77 were prescribed fires. Since 1939, 263 wildland fires burned 0.5 acres or more, of which, 41 were prescribed fires.

Since 1939 and within 100 miles of Wasilla, there have been 18 fires that exceeded 500 acres, of which, 6 were prescribed fires. The largest natural fire burned a total of 196,610 acres in 2014 (Funny River Fire) and was caused by humans. The second largest natural fire that occurred within 100 miles of Wasilla occurred in 2019 (Swan Lake Fire), which burned 167,182.9 acres, and was caused by lightning. The largest prescribed fires both burned 1,554 acres in 2016 and 2019.

Since the 2018 HMP, there have been 87 wildland fire events within 100 miles of Wasilla. Of the 87 events, 7 were prescribed fires.

A list of wildland fires that burned 0.5 acres or more within 100 miles of Wasilla is in Table 3-13.

Table 3-13 Historical Wildfires (0.5 acres or greater) within 100 miles of Wasilla (1939-2022)

*Blue highlighted events are prescribed fires

Discovery Date	Fire Name	Latitude	Longitude	Total Acres Burned	Cause
4/17/2011	Peterzell	61.65995	-149.11292	2	Debris Burning
4/17/2011	Point Mac Road	61.29290	-149.99215	3.2	Human
4/20/2011	Colony	61.61225	-149.20908	1	Children
4/24/2011	Swiftwater River Island	60.48063	-151.03142	0.5	Human
5/6/2011	Kalwies	61.56533	-149.11533	0.5	Debris Burning
5/11/2011	Leota	61.55597	-149.46653	0.5	Campfire
5/11/2011	Cedar Hills	61.62465	-149.12310	6.6	Human
5/12/2011	Chester	61.20889	-149.72861	0.5	Human
5/13/2011	Soldotna Airport	60.47463	-151.01483	0.9	Miscellaneous
5/16/2011	13.7 KGB	61.45817	-149.71912	0.5	Human
5/18/2011	Dogwood Complex	61.60182	-149.12618	0.7	Incendiary

Table 3-13 Historical Wildfires (0.5 acres or greater) within 100 miles of Wasilla (1939-2022)

*Blue highlighted events are prescribed fires

Discovery Date	Fire Name	Latitude	Longitude	Total Acres Burned	Cause
5/20/2011	154th	61.07567	-149.82619	2.5	Human
5/21/2011	Deshka	61.71978	-150.21878	4	Equipment
5/22/2011	Sidorof	61.13957	-149.71073	0.6	Incendiary
5/23/2011	Buffalo Mine Coal Seam	61.73257	-149.02845	0.5	Miscellaneous
5/27/2011	Sunrise	61.64667	-149.55230	7.1	Human
5/29/2011	Mae Loop 2	61.80492	-150.10143	7	Debris Burning
5/29/2011	Caribou Island	60.41633	-150.42417	0.8	Structure
6/2/2011	Pack Saddle Gulch	61.78355	-148.00077	1.5	Campfire
6/8/2011	Ruby Lake	61.76913	-148.68628	2.5	Campfire
6/26/2011	Mile 91.5 Parks	62.03505	-150.05415	0.6	Campfire
7/4/2011	Flat Lake	61.50733	-149.99517	1	Human
8/18/2011	Hope RX units	60.88862	-149.60612	9	Prescribed
9/15/2011	Hope Highway RX	60.91667	-149.47667	148	Prescribed
9/15/2011	Cooper Unit # 2	60.43195	-149.84583	200	Prescribed
9/16/2011	Cooper Unit 3	60.44972	-149.85945	100	Prescribed
10/14/2011	Hart Lake	61.64467	-149.30828	1	Human
5/15/2012	A Street	61.16110	-149.87717	1.6	Children
6/10/2012	TYONEK	61.15300	-151.19617	0.7	Human
6/23/2012	Suva St.	60.69818	-151.36887	2.3	Debris Burning
9/18/2012	UNIT #4 TERN LAKE	60.52900	-149.53900	40	Prescribed
9/19/2012	Hope RX Project Unit #23 & 22	60.85072	-149.53260	21	Prescribed
9/19/2012	Hope RX Project Unit #16	60.87128	-149.58600	6	Prescribed
9/19/2012	Tern Lake RX Unit #8	60.52738	-149.56327	10	Prescribed
9/20/2012	Hope Project Unit # 21	60.85732	-149.53793	14	Prescribed
9/20/2012	Hope Hwy Unit #29	60.92975	-149.54213	8	Prescribed
9/21/2012	Hope Project Unit#17	60.87080	-149.56483	9	Prescribed
9/21/2012	Hope Project Unit #18	60.86583	-149.55200	6	Prescribed
9/21/2012	Hope Hwy Unit #28	60.93037	-149.55213	22	Prescribed
9/21/2012	Hope Hwy Unit # 27	60.93125	-149.57867	32	Prescribed
9/21/2012	Hope project Unit #19	60.86110	-149.54412	15	Prescribed
9/22/2012	Hope Project Unit #7	60.88615	-149.60300	6	Prescribed
9/22/2012	Hope Project Unit #3	60.91542	-149.59880	9	Prescribed
9/24/2012	Hope Project Unit #15	60.86917	-149.63000	20	Prescribed
10/24/2012	Spruce	61.60227	-149.31093	0.5	Debris Burning
10/28/2012	Little Granite VFD	61.74073	-148.80572	1.5	Debris Burning
11/29/2012	Chinook	61.61912	-149.29203	1	Debris Burning

Table 3-13 Historical Wildfires (0.5 acres or greater) within 100 miles of Wasilla (1939-2022)

*Blue highlighted events are prescribed fires

Discovery Date	Fire Name	Latitude	Longitude	Total Acres Burned	Cause
11/29/2012	Wilmington	61.62748	-149.46482	4.3	Human
11/29/2012	Cedar Hills	61.62782	-149.12398	76.2	Equipment
11/29/2012	Sandpoint	61.66910	-149.28910	0.7	Structure
11/30/2012	Palmer Wasilla Extension	61.57355	-149.42950	3.5	Campfire
11/30/2012	Soapstone VFD	61.67065	-149.12638	1.5	Structure
12/3/2012	Cottrell Campus	61.57553	-149.25278	0.8	Powerline
12/4/2012	Babcock	61.63847	-149.19443	4.6	Debris Burning
5/25/2013	McCombs	61.54735	-149.08238	1.3	Debris Burning
5/26/2013	Maggie Road	61.77917	-148.57100	0.5	Debris Burning
5/27/2013	Maud	61.56208	-148.93105	2	Firearms Use
5/29/2013	Red	62.05590	-151.61687	7.7	Debris Burning
5/29/2013	Lupine	61.51498	-149.59140	1.3	Debris Burning
5/30/2013	Point MacKenzie	61.41167	-149.95638	45	Campfire
6/10/2013	Nakochna River	62.18105	-151.95770	67	Lightning
6/22/2013	Upper Trail Lake	60.46823	-149.35957	0.7	Campfire
6/25/2013	Kashwitna	61.95958	-149.86473	1.3	Debris Burning
6/26/2013	Wantana	62.82242	-148.37452	39	Lightning
6/27/2013	Baking	62.69867	-149.78900	0.5	Lightning
7/31/2013	Tabert Lake	62.29555	-146.82343	1,489	Lightning
9/16/2013	Tern Lake	60.52794	-149.57598	129	Prescribed
9/21/2013	Hope Gate #1	60.89638	-149.60092	65	Prescribed
4/20/2014	Fetlock	61.55300	-149.30800	3.5	Debris Burning
4/26/2014	Darrington Village	61.61290	-149.35200	0.8	Children
5/2/2014	Helmaur	61.64510	-149.02200	6.4	Powerline
5/3/2014	Moon Princess	61.69670	-149.53500	0.7	Incendiary
5/4/2014	Spence	61.64000	-149.54000	0.5	Human
5/8/2014	Glenn Alps	61.10300	-149.66300	0.7	Under Investigation
5/14/2014	McRoberts Creek	61.56383	-148.99383	21.1	Human
5/18/2014	Jim Lake	61.54380	-148.87900	1	Equipment
5/19/2014	Willow Creek	61.75680	-150.09600	0.9	Powerline
5/19/2014	Funny River	60.43945	-150.96188	196,610	Human
5/19/2014	Tyonek	61.09932	-151.12863	1,906	Powerline
5/19/2014	North Fork Montana Creek	62.21310	-149.92700	3	Human
5/25/2014	Big Lake 2	61.56010	-150.01500	0.5	Equipment
5/25/2014	Clunie Lake	61.30150	-149.71000	9.6	Other
6/7/2014	Finally	61.52083	-149.66533	0.5	Human
8/20/2014	Victory	61.82000	-147.96000	3.5	Human

Table 3-13 Historical Wildfires (0.5 acres or greater) within 100 miles of Wasilla (1939-2022)

*Blue highlighted events are prescribed fires

Discovery Date	Fire Name	Latitude	Longitude	Total Acres Burned	Cause
9/8/2014	Hope Rx	60.91107	-149.60595	38	Prescribed
9/12/2014	2014 CGF Fall RX Pile Burn - Bean Creek	60.50139	-149.90139	40	Prescribed
11/18/2014	Pike Street	61.62002	-149.29335	0.6	Structure
1/8/2015	Werner Rd	61.63700	-149.14503	2	Debris Burning
4/24/2015	Diana	61.62347	-149.06195	1.6	Debris Burning
4/25/2015	Dalton	61.68100	-149.22650	0.7	Debris Burning
4/25/2015	Meyers Circle	61.50003	-149.63528	0.5	Human
5/2/2015	Brian Drive	61.54725	-149.08977	1.9	Debris Burning
5/3/2015	Springer	61.57402	-149.13608	7.6	Debris Burning
5/3/2015	JBER RX	61.27233	-149.60350	954	Prescribed
5/4/2015	Scott Road	61.60913	-149.14573	0.6	Debris Burning
5/7/2015	Sandvik	61.54468	-149.04570	1	Firearms Use
5/18/2015	Sunset	61.65960	-149.62730	1.5	Firearms Use
5/21/2015	Palmer Creek	60.82555	-149.53833	61.6	Under Investigation
5/24/2015	Robin Avenue	60.49102	-150.78088	0.5	Debris Burning
5/28/2015	Escape Route Road	60.63230	-151.18087	1	Firearms Use
6/14/2015	Sockeye	61.84485	-150.08543	7,264.9	Debris Burning
6/15/2015	Card Street	60.51027	-150.63580	8,876	Human
6/16/2015	Juneau Lake	60.57669	-149.83836	573.6	Lightning
6/16/2015	Canyon Creek	61.88668	-149.62535	4	Lightning
6/16/2015	Montana Creek West	62.08538	-149.97312	2.3	Lightning
6/16/2015	Stetson Creek	60.47428	-149.87556	129	Lightning
6/16/2015	Montana Creek East	62.10978	-149.91253	1.8	Lightning
6/19/2015	Caribou Creek	61.81757	-147.75713	8.2	Campfire
6/20/2015	Daisy Creek	62.39267	-147.32417	3	Lightning
6/20/2015	Shallow Lake	61.89833	-147.22300	1	Lightning
6/23/2015	Moore Lake	62.37230	-146.86650	25	Lightning
7/15/2015	Alexander	61.39625	-150.56950	0.6	Lightning
8/15/2015	Wood Bison Rx Piles	60.81833	-148.99000	100	Prescribed
8/29/2015	Sheep Creek	62.03000	-150.05000	22	Equipment
8/30/2015	Horseshoe Lake	61.60280	-149.90495	48	Equipment
9/2/2015	Johnson Creek	62.05500	-151.84700	2.5	Human
9/2/2015	West Lake	61.55570	-149.93445	0.5	Equipment
11/2/2015	2015 CGF RX Pile Burn -Seward	60.50833	-151.00000	200	Prescribed
1/25/2016	Pile Burn Seward	60.50000	-151.00000	38	Prescribed
4/1/2016	KNR RX Burn MRC	60.72400	-150.43300	12	Prescribed
4/7/2016	Homestead	61.02248	-149.71292	1	Campfire

Table 3-13 Historical Wildfires (0.5 acres or greater) within 100 miles of Wasilla (1939-2022)

*Blue highlighted events are prescribed fires

Discovery Date	Fire Name	Latitude	Longitude	Total Acres Burned	Cause
4/14/2016	Hornung	61.55855	-149.29634	0.5	Debris Burning
4/16/2016	Leaf Lake	61.52417	-148.81900	25	Human
4/23/2016	Chinulna	60.51613	-151.27883	0.9	Fireworks
4/27/2016	All Elks	61.70142	-149.01305	0.6	Children
4/29/2016	Harding	61.66837	-148.99882	0.5	Debris Burning
5/4/2016	Sunrise	61.66117	-149.63100	27.5	Firearms Use
5/4/2016	2016 JBER RX Burn	61.25391	-149.68293	1,554	Prescribed
5/10/2016	Sutton	61.70667	-148.90615	1.2	Fireworks
5/14/2016	Elmore	61.17495	-149.81635	2	Incendiary
5/16/2016	Matanuska Lake	61.55650	-149.22628	1.3	Campfire
5/21/2016	Barwood	61.52937	-149.05182	1.1	Debris Burning
5/27/2016	Hiland Road	61.29585	-149.48780	25	Human
5/31/2016	Porcupine Island	60.40127	-149.62675	2.9	Campfire
6/1/2016	Bonnie Lake	61.81413	-148.31450	1	Structure
6/10/2016	Briana	61.58317	-149.34911	1	Human
6/18/2016	Aspen Creek	62.38200	-148.50500	62.7	Human
6/26/2016	Sawmill	61.74867	-149.55917	1	Human
6/28/2016	Twin Island Lake	61.29850	-149.99467	3.2	Human
7/12/2016	Willow Mountain	61.85703	-149.76142	0.5	Lightning
7/16/2016	McHugh	61.02058	-149.72200	777.5	Campfire
9/12/2016	2016 CGF Seward Pile RX Burn	60.41667	-149.41667	100	Prescribed
10/15/2016	Moose Creek	61.68087	-149.01862	303	Debris Burning
10/16/2016	Wolverine Creek	61.66077	-149.04341	0.5	Powerline
10/16/2016	Plumley	61.55282	-148.99660	15	Debris Burning
10/16/2016	Wolverine	61.66023	-149.03875	1	Powerline
10/16/2016	Lossing	61.64733	-149.12492	0.5	Powerline
10/17/2016	Groshan	61.55953	-149.39698	0.5	Powerline
10/17/2016	King	61.73392	-148.70243	1.6	Powerline
10/17/2016	Collier	61.66045	-149.11164	1.2	Powerline
3/17/2017	RX-CGF-SRD Pile Burn	60.51667	-149.60000	100	Prescribed
4/19/2017	Farm Loop	61.64632	-149.11968	1.8	Debris Burning
4/20/2017	Beluga	60.98453	-149.56740	2	Equipment
4/30/2017	Little Willow Creek	61.81025	-150.09835	0.5	Campfire
4/30/2017	JBER RX	61.27233	-149.60350	1,222	Prescribed
5/3/2017	Willow Fishhook	61.76430	-149.95955	1	Debris Burning
5/5/2017	Eagle Glenn	61.23697	-149.79175	7.2	Human
5/6/2017	Teresa	61.64078	-149.06218	1.2	Campfire

Table 3-13 Historical Wildfires (0.5 acres or greater) within 100 miles of Wasilla (1939-2022)

*Blue highlighted events are prescribed fires

Discovery Date	Fire Name	Latitude	Longitude	Total Acres Burned	Cause
6/3/2017	King River	61.73362	-148.74457	0.5	Human
6/6/2017	Talkeetna River	62.50287	-148.71450	979.5	Lightning
6/15/2017	East Fork	60.59633	-150.52117	1,016	Lightning
6/17/2017	Call of the Wild	61.53978	-149.96580	3.8	Human
6/25/2017	Kahiltna	62.42643	-151.13915	56	Lightning
6/25/2017	Sharen	61.79532	-150.11285	0.5	Human
2/23/2018	MRC Pen 4 Piles Rx	60.70569	-150.43025	56	Prescribed
3/19/2018	Chugach Piles	60.55052	-149.58888	70	Prescribed
4/18/2018	JBER RX	61.27397	-149.76475	405	Prescribed
5/6/2018	Chickaloon	61.79728	-148.50411	3.4	Debris Burning
5/25/2018	Oilwell Road	62.22817	-150.45083	2.5	Undetermined
5/26/2018	Marth	61.54927	-149.02647	0.5	Debris Burning
6/2/2018	Talkeetna	62.52308	-150.25935	1.1	Undetermined
6/4/2018	Prairie	62.64318	-148.96282	32.5	Lightning
7/7/2018	Maud	61.56338	-148.93290	0.9	Firearms Use
7/16/2018	Phoenicia	61.44767	-148.79873	5.7	Undetermined
7/31/2018	Friday Creek	61.46933	-148.62917	1.3	Campfire
8/10/2018	Pallet	60.65343	-151.34630	0.5	Debris Burning
4/13/2019	Harding	61.66478	-149.03228	34	Debris Burning
4/19/2019	JBER RX 2019	61.25450	-149.69335	1,554	Prescribed
4/27/2019	Pipeline	60.69993	-151.28005	0.9	Debris Burning
4/27/2019	Lawalter	61.58180	-149.07767	0.5	Debris Burning
5/5/2019	Clare	61.47828	-148.89250	2.2	Powerline
6/5/2019	Swan Lake	60.63056	-150.43778	167,182.9	Lightning
6/6/2019	Tyonek	61.08192	-151.25730	0.5	Lightning
6/6/2019	Crooked Creek	61.49180	-150.14617	3.5	Lightning
6/7/2019	Coal Creek	60.36263	-151.07558	14.2	Lightning
6/14/2019	Karluk	61.20058	-149.85895	0.5	Campfire
6/24/2019	Liberty	61.84477	-149.92335	1.1	Lightning
6/27/2019	Laura	61.52870	-149.06810	1.3	Outdoor Burning Devices
6/30/2019	Killey River	60.47467	-150.64183	0.5	Investigated, Undetermined
7/2/2019	M.L.K	61.17500	-149.81528	25.3	Investigated, Undetermined
7/3/2019	Montana Creek	62.12250	-149.98694	367.6	Lightning
7/7/2019	Malaspina	62.14814	-149.92814	84.5	Lightning
7/9/2019	Robin Ave	60.49132	-150.77920	1	Structure
7/9/2019	BLM Drive	61.15848	-149.80431	5	Investigated, Undetermined
7/19/2019	Point Mac	61.43082	-149.79990	1	Spontaneous Combustion
7/21/2019	Pipe Creek	60.37442	-150.18889	13	Lightning

Table 3-13 Historical Wildfires (0.5 acres or greater) within 100 miles of Wasilla (1939-2022)

*Blue highlighted events are prescribed fires

Discovery Date	Fire Name	Latitude	Longitude	Total Acres Burned	Cause
8/5/2019	South Fork Trail	61.23250	-149.46183	0.5	Investigated, Undetermined
8/10/2019	Upper Trail Lake	60.46637	-149.36483	2	Unknown
8/10/2019	Redoubt	60.57805	-151.27500	1.4	Investigated, Undetermined
8/11/2019	Crow Pass	61.18328	-149.18815	8.7	Investigated, Undetermined
8/12/2019	Steeple	61.32433	-149.49867	1	Campfire
8/17/2019	McKinley	62.01975	-150.07000	3,288.8	Powerline
8/17/2019	Deshka Landing	61.71155	-150.17584	1,314.2	Equipment
8/17/2019	Pittman	61.60088	-149.63583	1	Investigated, Undetermined
8/17/2019	Lucky Shot	61.76007	-150.07388	2.5	Powerline
8/18/2019	Mile 72.9 Glenn	61.76317	-148.55767	0.6	Powerline
10/28/2019	Cemetery	61.55982	-149.04357	0.8	Powerline
4/28/2020	Point Mac	61.42647	-149.92472	0.9	Debris Burning
4/29/2020	Trumpeter	61.44678	-149.91300	139.5	Firearms Use
5/2/2020	Kings Bay	60.49225	-148.57981	1.7	Unknown
5/3/2020	Country	61.53831	-149.56633	0.5	Unknown
5/6/2020	Grazelka	61.27494	-149.59981	3	Firearms Use
5/8/2020	Settlers Bay Golf Course	61.50986	-149.60075	0.8	Investigated, Undetermined
5/8/2020	Leota	61.55650	-149.44450	2.2	Debris Burning
5/10/2020	Malaspina	62.16222	-149.93539	3.8	Debris Burning
5/13/2020	Leaf Lake	61.53583	-148.90844	1.5	Campfire
5/15/2020	Little Su	61.43750	-150.12167	5.8	Investigated, Undetermined
5/16/2020	Seclusion	60.49414	-150.77564	0.5	Debris Burning
5/16/2020	Moose Meadows	61.67006	-149.42811	54.1	Debris Burning
5/28/2020	Penny	60.50611	-150.91717	1	Equipment
6/25/2020	Swan Lake Overwinter #2	60.53314	-150.38753	7.2	Lightning
7/3/2020	Lucy	61.49931	-149.59758	0.5	Fireworks
Not listed	Chugach Programmatic Piles	60.56098	-149.57620	40	Prescribed
4/22/2021	Lindsey	61.53748	-148.97576	1.1	Debris Burning
4/25/2021	Doc McKinley	61.54297	-149.09489	0.5	Debris Burning
4/28/2021	Marley	61.59036	-148.98772	2.2	Investigated, Undetermined
5/3/2021	Glade	61.62231	-149.25447	0.5	Debris Burning
5/3/2021	Clarion	61.54456	-149.57794	0.5	Debris Burning
5/6/2021	Millers Reach	61.61633	-149.81834	1.3	Debris Burning
5/6/2021	JBER RX	61.25450	-149.69335	1,292	Prescribed
5/7/2021	Gunnysack	61.57406	-149.07517	0.5	Debris Burning
5/8/2021	Maud Road	61.56389	-148.93225	0.8	Firearms Use
5/8/2021	Epic Circle	61.54937	-149.30112	1.5	Debris Burning

Table 3-13 Historical Wildfires (0.5 acres or greater) within 100 miles of Wasilla (1939-2022)

*Blue highlighted events are prescribed fires

Discovery Date	Fire Name	Latitude	Longitude	Total Acres Burned	Cause
5/9/2021	Champion	61.66157	-149.36362	1.9	Debris Burning
5/25/2021	Ruth	61.58067	-149.35656	1.7	Debris Burning
6/12/2021	Loon Lake	60.65756	-150.55717	102.2	Lightning
6/15/2021	John`s Way	61.36447	-149.95953	0.6	Structure
6/26/2021	Experimental	61.56842	-149.25786	0.5	Investigated, Undetermined
7/4/2021	Lichen	62.03917	-150.05167	2.4	Fireworks
7/14/2021	Kincaid Motocross	61.14257	-150.02022	1	Investigated, Undetermined
8/5/2021	Ringler	61.84803	-150.10692	0.5	Structure
10/19/2021	Devils 108 piles	60.56769	-149.56750	22	Prescribed
3/16/2022	RX Chugach Programmatic Piles	60.48031	-149.72939	18	Prescribed
4/19/2022	Maud rd RX	61.56267	-148.93125	5	Prescribed
5/1/2022	Upper Lowland	61.31278	-149.49467	0.6	Debris Burning
5/6/2022	JBER RX	61.28348	-149.60618	566	Prescribed
5/8/2022	West Juneau	60.49244	-149.98739	0.5	Unknown
5/10/2022	Kenai Lake Overlook	60.49639	-149.78850	4.3	Unknown
5/17/2022	North Fork Talkeetna	62.38306	-149.80056	2.1	Debris Burning
5/20/2022	Caswell Lakes	62.00833	-149.96250	3.2	Investigated, Undetermined
5/21/2022	All Elks Road	61.70192	-149.01528	5.1	Debris Burning
5/22/2022	Zircon	61.08587	-149.76980	0.8	Structure
6/1/2022	Johnson Creek	62.09650	-151.50967	2.8	Firearms Use
6/6/2022	Kichatna	62.15639	-151.71306	65.5	Spontaneous Combustion
6/6/2022	Treasure Creek	62.25050	-150.35683	0.5	Structure
6/6/2022	Chelatna One	62.22286	-150.92514	5	Outdoor Burning Devices
6/8/2022	ORA Lake	62.47600	-149.71467	10.5	Powerline
6/16/2022	Armstrong	61.63300	-149.79050	2.4	Structure
6/23/2022	Rawhide	61.59483	-149.25919	0.7	Equipment
6/23/2022	Elmore	61.16811	-149.81717	13.7	Investigated, Undetermined
7/2/2022	Kings Bay	60.45994	-148.71469	0.8	Unknown
7/10/2022	Trap Line	60.49494	-150.72122	1.7	Campfire
11/15/2022	Test Fire	60.46384	-151.16773	1	Unknown

Source: AICC 2023

Additionally, the DHS&EM October 2022 DCI lists the following wildfire disaster events which may have affected the area:

AK-15-249 2015 Sockeye Wildfire declared by Governor Walker on June 15, 2015: Beginning on June 14, 2015 and continuing, a large urban interface wildfire exacerbated by record high temperatures caused widespread damage to the community of Willow and surrounding areas of the Matanuska Susitna Borough. The response to the wildfire is hampered by red flag warnings for record warm temperatures, strong winds, low humidity, and dry thunderstorms this month that affects the entire central portion of the state, including the Matanuska Susitna Borough. The wildfire has damaged or destroyed at least 50 private homes and/or secondary structures and damaged several more and

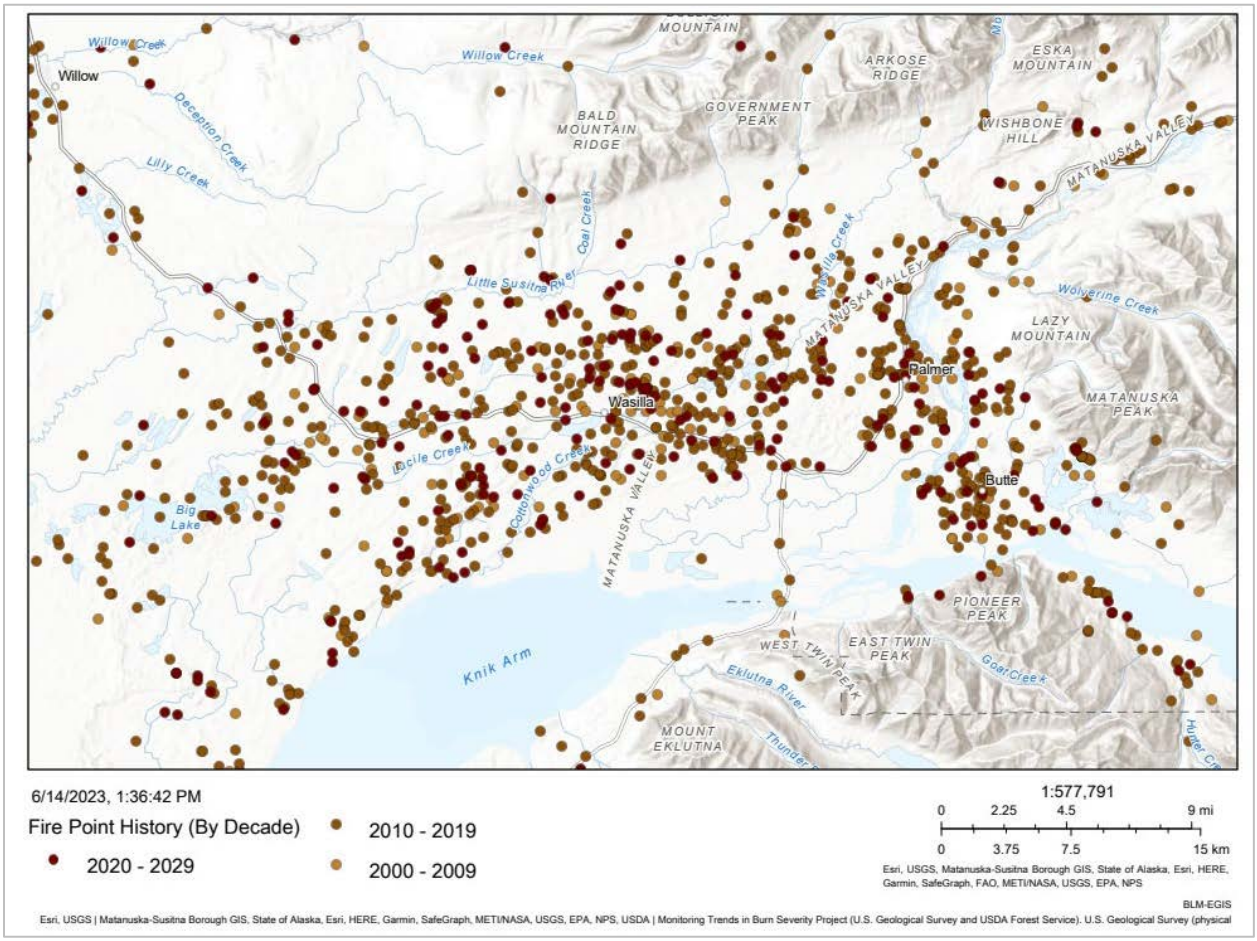
resulted in 175 residents seeking refuge in temporary shelters, although these numbers are expected to rise. The following conditions exist as a result of this disaster: a robust emergency response and management operation requiring substantial additional labor, equipment, and support costs to combat the fire; activation of the emergency operations center; damage or destruction of at least 50 homes and other structures; evacuation and sheltering of 175 residents and hundreds of pets/work animals to date; severe damage to personal and real property; disruption of power, natural gas, communications, and other utility infrastructure requiring temporary and permanent repairs. A federal Fire Management Grant (FMAG) has been authorized to assist in the cost of suppression.

AK-19-266 2019 August Southern Wildfires declared by Governor Dunleavy on August 23, 2019: Beginning on August 17, 2019 and continuing, multiple large wildland fires, exacerbated by extreme drought, caused widespread damage to the communities of Willow, Caswell, and surrounding areas of the Matanuska Susitna Borough. The Swan Lake Fire, burning since June 5, 2019, escaped containment lines and crossed portions of the Sterling Highway, threatening the communities of Sterling and Cooper Landing in the Kenai Peninsula Borough. Two additional wildland fires near Homer ignited on August 17-18, 2019 and continue to threaten structures in the vicinity of Anchor Point and Homer in the Kenai Peninsula Borough.

The response to the wildland fires is hampered by drought and record dry fuels, strong winds, and low humidity that affect the entire southcentral portion of the state, including the Matanuska Susitna Borough. The wildland fires in the Matanuska Susitna Borough have damaged or destroyed multiple homes and structures, resulting in the mandatory evacuation of approximately 400 residents, many who have sought refuge in temporary shelters. The scope of the damage is not yet fully realized due to active fire suppression efforts and substantial damage to private homes, public facilities, and communications and utility lines are anticipated.

The following conditions exist as a result of this disaster: a robust emergency response and management operation requiring substantial additional labor, equipment, and support costs to combat the fire; damage or destruction of multiple homes and other structures; evacuation of hundreds of residents and hundreds of pets/work animals; the sheltering of 84 residents in temporary shelters; severe damage to personal and real property; significant delays and closures of major highways roads, disruption of power, natural gas, communications, and other utility infrastructure requiring temporary and permanent repairs.

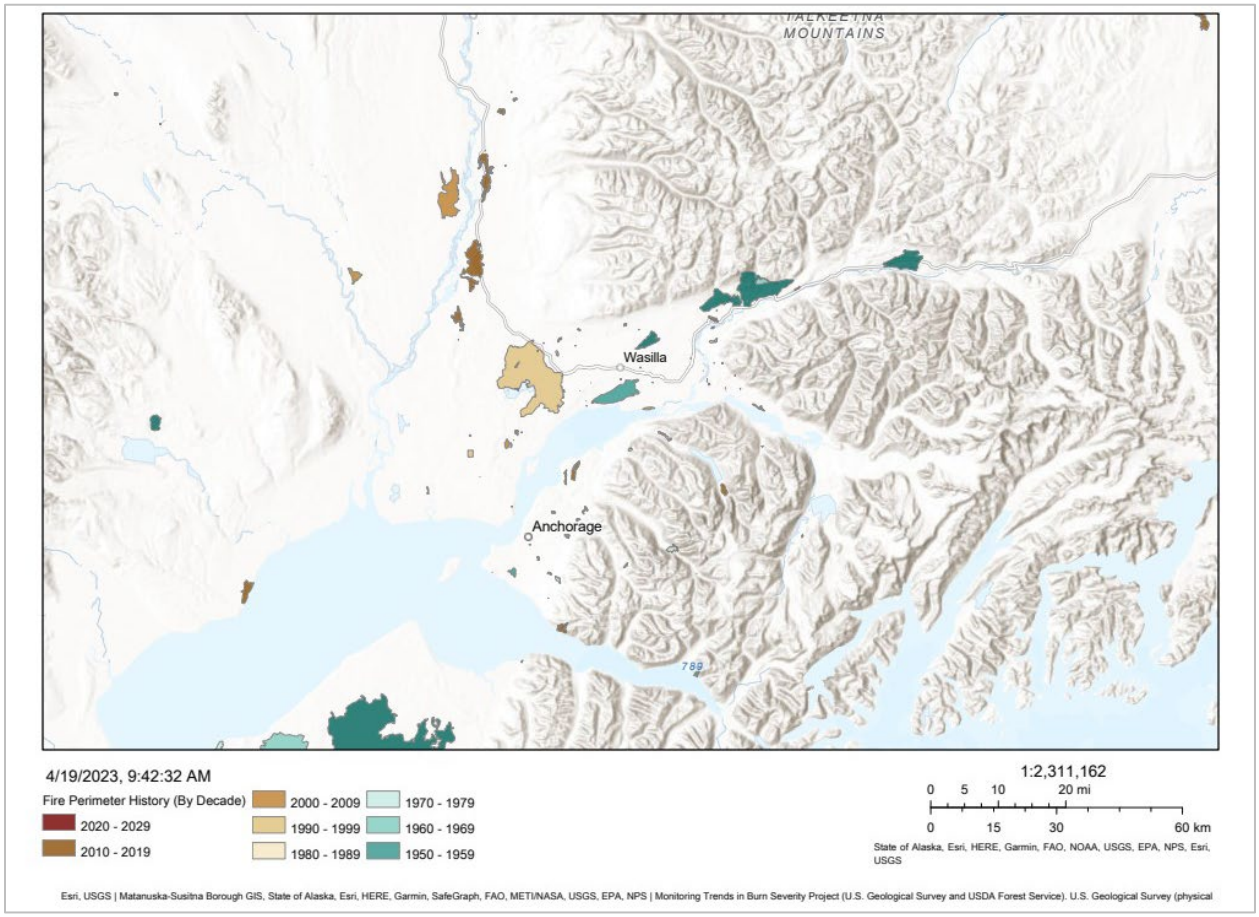
Figure 3-34 depicts the locations of historic wildfire fires within ~20 miles of Wasilla (2008-2022).



Note: Fire point data exists prior to 2008, but is less accurate than more recent data. For this analysis, fire point data from 2008-2022 will be used.
Source: AICC 2023

Figure 3-34 Historical Wildfire Locations near Wasilla (2008-2022)

Figure 3-35 depicts the perimeters of historic wildfire fires within ~50 miles of Wasilla.



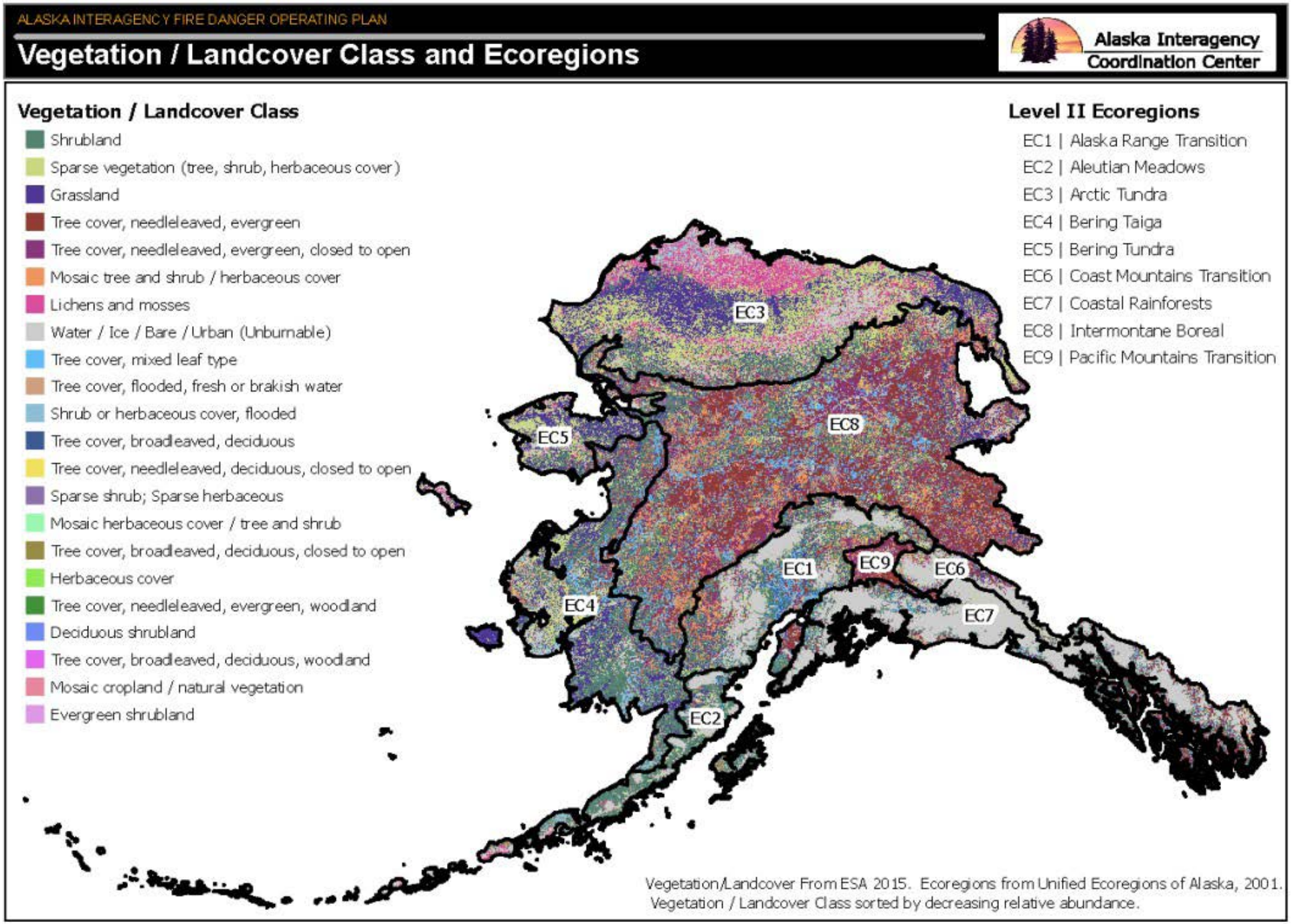
For this analysis, historical wildfire perimeter data is accurate dating back to 1940.
Source: AICC 2023

Figure 3-35 Historical Wildfire Perimeters near Wasilla (1940-2022)

3.3.3.3 LOCATION OF WILDLAND FIRE

Wasilla is within an area designated as *Critical Protection Level*- the highest level of suppression action provided for a wildland fire in the Alaska Interagency Fire Management Plan. Suppression activity is provided on wildland fires that threaten human life, inhabited property, designated physical developments and structural resources such as multiple buildings designated on the National Register of Historic Places. The objective in this category is to provide complete protection to identify sites and to control the fire to the smallest acreage reasonably possible. The allocation of resources to fires threatening critical sites in this category is given the highest priority.

Figure 3-36 depicts the Level II Ecoregion classifications for the State of Alaska as well as the vegetation/landcover classes found throughout the State. Wasilla is located in the EC1 Level II Ecoregion which is classified as Alaska Range Transition. Much of the Alaska Range Transition region is in the high elevations of the Alaska Range and Talkeetna Mountains. It contains mainly black spruce, standing dead white spruce due to recent bark beetle infestation, and mixed hardwoods. Fire load on the Kenai Peninsula is significantly higher than the Mat-Su Valley (BLM 2020).



Source: BLM 2020

Figure 3-36 Vegetation/Landcover Class and Ecoregions of Alaska

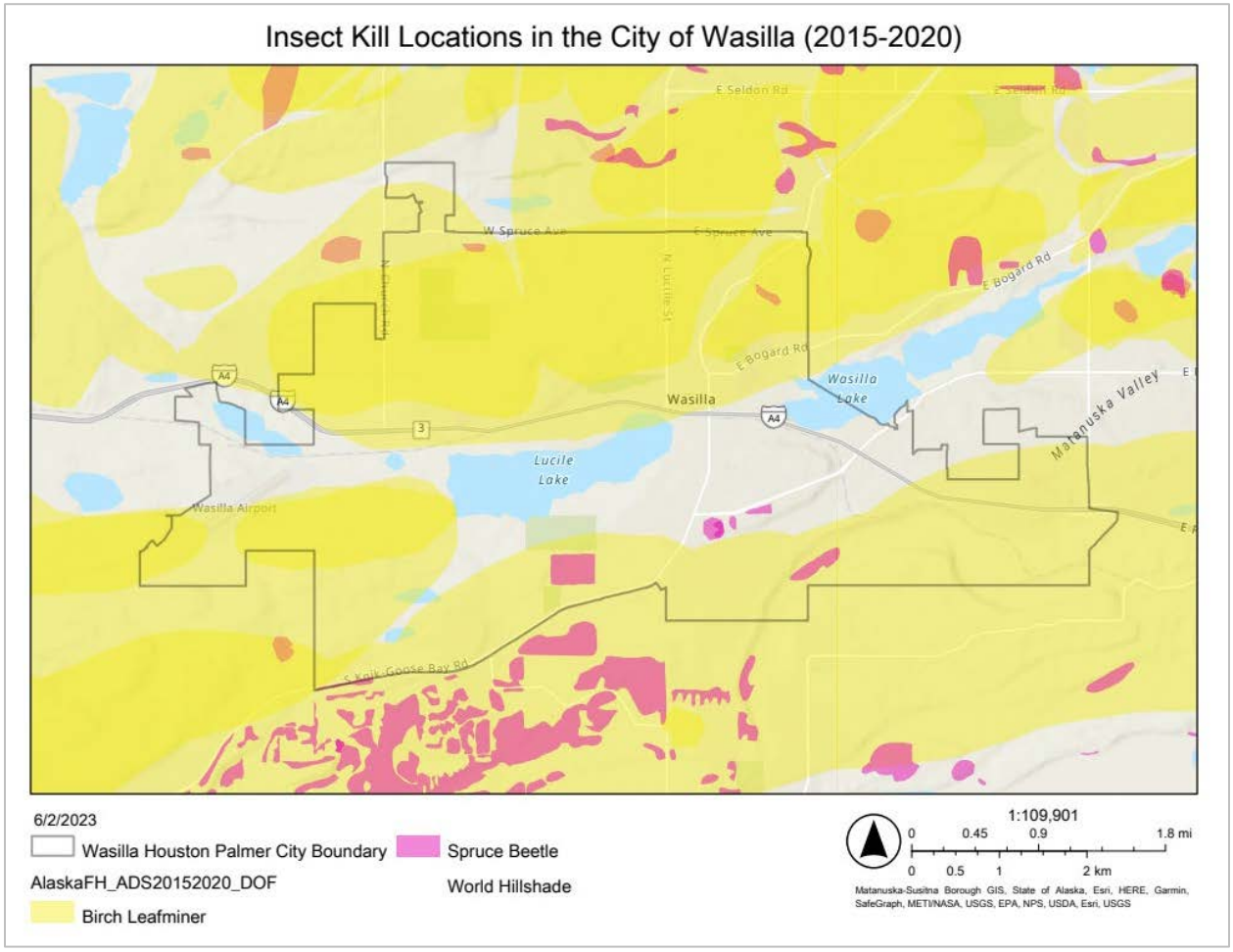
Wasilla's 2011 Comprehensive Plan describes the vegetation in the community as:

> *"Vegetation in the City is diverse and characteristic of a boreal forest. White spruce provides canopy along with birch, aspen and cottonwood in drier areas. Black spruce is a common overstory species in wetland areas. Understory plants are diverse, particularly on undisturbed sites."*

Trees in the City have historically been impacted by insects that damage or kill the trees. The two insects that impact trees in the City of Wasilla are the spruce beetle (*Dendroctonus rufipennis*) and birch leafminer (amber-marked birch leafminer: *Profenusa thompsoni* and late birch edgeminer: *Heterarthrus nemoratus*). Information on each species is below.

Species	Background
Spruce beetle	Spruce beetles are approximately ¼ inch long with dark brown to black bodies with reddish brown to black wing covers. In Alaska, spruce beetles can take one or two years to complete their life cycle, with temperature playing a major role in how fast they develop. Adult beetles emerge from infested trees in mid-May or when temperatures reach ~60°F and continue flying through mid-July (USDA 2022). In Alaska, common hosts for the spruce beetle include white spruce (*Piceae glauca*), Sitka spruce (*P. sitchensis*), Lutz spruce (P. glauca x sitchensis), and at times, black spruce (*P. mariana*) (UAF 2018). Key identifiers of spruce beetles affecting trees include: ▪ Needle discoloration- The most noticeable symptom of a spruce beetle infestation is the change in needle color of impacted spruce. Following a successful spruce beetle attack, needles will change from healthy green, to faded yellow, and finally to red before the needles eventually drop. ▪ Boring dust- Boring dust is a brown sawdust like material that collects at the base of a tree and in bark crevices. It is pushed out of beetle entrance holes as adults excavate and clear their galleries (tunnels) beneath the bark. ▪ Pitch tubes- Pitch tubes appear as reddish globules on the bark's surface and are the tree's attempt to push out invaders. ▪ Woodpecker damage- Woodpeckers are attracted to the beetle attacked trees and will peck and scrape at the bark to find the beetles beneath it. ▪ Loose bark on a dead tree- After beetle attacks, the trees will dry out and the bark will become loose and fall off. ▪ Live beetles beneath bark- Live spruce beetles may be visible when sections of loose bark are peeled back. (Source: UAF 2018)
Birch leafminer	Birch leafminers are leaf-mining sawflies, roughly 1/8 inches long, black, and fly-like. They overwinter in soil cocoons, pupate in summer, and emerge in late June early July. In Alaska, common hosts for birch leafminer include all native species of birch in Alaska *(Betula spp.*); Alaska paper birch, dwarf arctic birch, Kenai birch, paper birch, resin birch, western paper birch, and Alders (*Alnus spp.*) (USDA 2022). Key identifiers of birch leafminers affecting trees include: ▪ Affected leaves will appear a sickly yellowish-brown compared to the vibrant gold naturally exhibited by birch in autumn. ▪ Leaf epidermal layers will have become detached due to larval feeding, and the leaf will take on the appearance of a flattened or collapsed blister filled with frass (insect feces) ▪ If the leaf is examined prior to larval emergence, the flattened yellowish larvae (6 mm in length) can be observed within affected leaves. (Source: USDA 2022)

Figure 3-37 shows the locations of tree damage from spruce beetle and birch leafminer in the City limits. This map layer contains public data obtained from AK Department of Forestry and consists of tree damage analysis from 2015-2020.



Source: ArcGIS Online- Mat-Su Borough, Accessed June 2, 2023

Figure 3-37 Tree Damage/Insect Kill Locations in the City of Wasilla (2015-2020)

Insect killed trees are a concern for the Planning Team because dead trees/vegetation act as fuel for wildland fires and can facilitate the quick spread of a fire in the community.

The City of Wasilla is one of 6 cities in Alaska that participates in the Tree City USA program, which is a community improvement initiative from the Arbor Day Foundation in cooperation with the National Association of State Foresters and the USDA Forest Service. Tree City USA provides a basic framework for community forestry management for cities and towns across America. The City of Wasilla has participated in the Tree City USA program for 21 years (since 2002).

3.3.3.4 EXTENT (MAGNITUDE AND SEVERITY) OF WILDLAND FIRE

A notable wildfire that burned near Wasilla was the 2015 Sockeye Fire that originated in the community of Willow. By the time the fire was contained, it burned 7,220 acres, and closed portions of the Parks Highway, cutting the City of Wasilla off from Fairbanks. Mandatory evacuations were ordered for residents and visitors between Milepost 69 and 77 of the Parks Highway, and 175 people were sheltered at the Menard Sports Center in Wasilla.

Due to the number of recorded historical wildland fire events as well as the criteria listed in Table 3-2, the risk and magnitude of fire impacts in Wasilla are considered to be Critical, where injuries and/or illnesses could result in permanent disability; a complete shutdown of critical facilities may last for at least two weeks; and more than 25 percent of property would be severely damaged.

3.3.3.5 IMPACT OF WILDLAND FIRE

If wildfires are not adequately controlled, the impacts from them could become an emergency or considerable disaster. Even smaller wildfires can threaten lives, resources, and destroy properties. Livestock and pets are susceptible to wildfires as well. Wildfires can precipitate the need for emergency food and water, evacuation, and temporary shelters.

The effects of wildland fires can become catastrophic. They can destroy large swathes of forest and other vegetation, damage the soil, waterways, and the land itself. Some soils may lose their capacity to keep moisture and support life for years after an intense wildfire.

For many ecosystems, wildfires are actually critical features of the natural history. They can serve to help maintain renewal, biodiversity, and the ecological health of the land in general. This essential role which they serve for the local ecology has been incorporated into the planning process for fire management. Hence, the full range of fire management activities has been implemented in Alaska. This helps achieve the sustainability and health of the ecosystem. This includes the social consequences on firefighters in addition to ecological and economic factors. The natural and cultural resources that are potentially threatened, and other important values, all dictate the level and nature of the management response during a wildfire.

Since 1939 and within 100 miles of Wasilla, there have been 18 fires that exceeded 500 acres, of which, 6 were prescribed fires. While wildland fires have not directly affected the City, the threat still remains for Wasilla and the surrounding area. Wasilla experienced smoke from the Miller's Reach fire in 1996, sheltered many of the people who were evacuated, and hosted the incident command center at the Creekside Plaza Mall. The Miller's Reach fire took almost two weeks to be contained and, during this time, it burned 37,336 acres and destroyed 344 structures. This fire demonstrates the vulnerability of the Wasilla area to wildfire.

3.3.3.6 PROBABILITY OF FUTURE WILDLAND FIRE EVENTS

Based on previous occurrences and the criteria identified in Table 3-3, it is Highly Likely that there will be a wildland fire event within 100 miles of Wasilla in the calendar year; there is a 1 in 1 year chance of occurring (1/1=100 percent); and the history of events is greater than 33 percent likely per year.

3.3.3.7 NATURE OF COMMUNITY FIRE

A community fire is a large destructive fire that is widespread throughout a community and involves one or more developed areas in the community. Community fires are different from individual property fires as community fires involves a larger portion of the community's-built environment. However, structure fires can quickly spread and result in a community fire.

A community fire is quick-moving and can become out of control in less than 30 seconds and can engulf a house within minutes. The heat alone from fire is deadlier than the actual flames with temperatures ranging from 100ºF at the floor to 600ºF at eye level. The heat can burn one's lungs and can melt one's clothes to their skin. If a room becomes hot enough from fire, it can create a flashover in which everything in the room ignites at once. Smoke and toxic gases, both products of fire, kill more people than the flames themselves. Oxygen is consumed, creating an atmosphere of colorless and odorless fumes that can cause drowsiness, disorientation, and shortness of breath and can lull a person into a deeper sleep without allowing enough time to escape. Fire itself may be bright, but the smoke that it produces can make evacuation from a building difficult or impossible.

The ignitability and spread ability of structure fires is largely dependent on the type of construction the building and surrounding builds are. There are five basic groups of building construction used throughout the United States and are outlined below (Table 3-14).

Table 3-14 Types of Building Construction

Construction Type	Description
Type I (fire resistive) - Least combustible	Fire-resistive construction was originally designed to contain fire inside the building to one floor. This concrete and steel structure, called "fire resistive" when first built at the turn of the century, was supposed to confine a fire with its construction. Faults in modern construction allow fire to spread over several floors in a fire-resistive building despite its steel-and-concrete structure by spreading through air-conditioning and heating ducts as well as from lower windows to windows above in a multi-story building.
Type II (non-combustible)	Non-combustible buildings have steel or concrete walls, floors, and structural framework. When a fire occurs inside a type II building, flames rising to the underside of the steel roof deck may conduct heat through the metal and ignite the combustible roof.
Type III (ordinary)	Ordinary construction is also called brick-and-joist construction. It has masonry bearing walls, but the floors, structural framework and roof are made of wood or other combustible material. Ordinary construction has been described by some firefighters as a "lumberyard enclosed by four brick walls."
Type IV (heavy timber)	Heavy-timber construction is sometimes called "mill construction" because it was the type of structure used at the turn of the century to house textile mills. These buildings have masonry walls like type III buildings, but the interior wood consists of large timbers that can create large, radiated heat waves after the windows break during a blaze. A fire in a heavy-timber building can produce a tremendous conflagration with flames coming out of the windows, spreading fire to adjoining buildings.
Type V (wood frame) - Most combustible	Wood-frame construction is the most combustible of the five building types. The interior framing and exterior walls may be wood. A wood-frame building is the only one of the five types of construction that has combustible exterior walls.

Source: Vincent Dunn, Deputy Chief FDNY (retired)- Structural Fire Spread

3.3.3.8 HISTORY OF COMMUNITY FIRES

The Alaska State Fire Marshal's office tracks statewide top dollar loss by year and the following top dollar events occurred in Wasilla.

Table 3-15 Historical Top Dollar Losses in Wasilla from Structure Fires

Year	Location	Structure	Loss Estimation
2008	Wasilla	Church	$750,000
2018	Wasilla	1 or 2 Residential Dwelling	$750,000

Source: Alaska State Fire Marshal's Office 2023

The Alaska State Fire Marshal's office provides a record of fatalities due to community fires from 2018-2022.

Table 3-16 List of Fatalities due to Structure Fires in Wasilla (2018-2022)

Date of Discovery	Community	Fire Cause	*Drugs/Alcohol Involved?
7/18/2018	Wasilla	Careless Smoking	Yes
10/26/2021	Wasilla	Cooking	No
12/15/2021	Wasilla	Inappropriate woodstove installed indoors	Yes

*Alcohol and/or Drugs is answered "yes" if it was a contributing factor to the fire and/or victims' inability to escape.

Source: Alaska State Fire Marshal's Office 2023

3.3.3.9 LOCATION OF COMMUNITY FIRE

Community fires can occur in areas where a community interfaces with the surrounding forest or vegetation or as a result of a spreading structure fire. Wasilla is surrounded by mountains and forest and a community fire may occur at in location in the community and spread quickly. Additionally, Wasilla is the 4th most populated city in Alaska, and personal structure fires are more likely to occur in an area with a higher and densely compacted population. All structures in the City are vulnerable to community fires, including multiple buildings designated on the National Register of Historic Places.

Figure 3-40 shows the flammability of the surrounding areas of Wasilla, and based on selected emission scenario and location, there is a Very Low to Very High probability of flammability.

3.3.3.10 EXTENT (MAGNITUDE/SEVERITY) OF COMMUNITY FIRE

Historical structure fires in Wasilla have resulted in building destruction and fatalities.

Like wildland fires, the risk and magnitude of fire impacts in Wasilla are considered to be Critical, where injuries and/or illnesses could result in permanent disability; a complete shutdown of critical facilities may last for at least two weeks; and more than 25 percent of property would be severely damaged.

3.3.3.11 IMPACT OF COMMUNITY FIRE

All structures in the City are vulnerable to community fires. Wasilla firefighters respond to calls for structure fires and for natural vegetation fires in relatively proportional numbers. The City has aggressively installed fire hydrants as part of its water system improvements program.

Insurance Services Office (ISO)'s audit teams analyze the relevant data and assign a Public Protection Classification (PPC) rating from 1 to 10. Class 1 represents exemplary public protection, and Class 10 indicates that the area's fire-suppression program doesn't meet the minimum criteria. Most, but not all U.S. insurance companies use this rating to assign the annual homeowner and commercial insurance premiums charged to residents and businesses within a given fire protection district.

The Central Mat-Su Fire Department has an ISO rating of 4 within five road miles of the responding fire station and an ISO rating of 10 beyond five road miles of the fire station (Matanuska-Susitna Borough 2023).

3.3.3.12 PROBABILITY OF FUTURE COMMUNITY FIRE EVENTS

Based on previous occurrences and the criteria identified in Table 3-3, it is Possible that Wasilla will experience a community/structure fire event in the next five years; there is a 1 in 5 years chance of occurring (1/5=20 percent); and the history of events is greater than 10 percent but less than or equal to 20 percent likely per year.

3.3.3.13 FUTURE CONDITIONS INCLUDING CLIMATE CHANGE

Due to climate change, the nature or location of future wildland or community fires in Wasilla are not anticipated to change, but risk to the City will remain high.

Changing Factor due to Climate Change	Description of Future Changes due to Climate Change
Extent (Magnitude and Severity)	Due to climate change, the extent (magnitude and severity) of wildland fires is expected to increase. Large wildfires have consumed more boreal forest in Alaska in the last ten years than in any other decade recorded, and the area burned annually is projected to double by 2050 (EPA 2022).
Impact	Due to climate change, the impact of wildland fires to the community is expected to increase. Climate change and increasing fire frequency will result in shifts in forest species composition as projections suggest that deciduous vegetation will soon be as abundant in the Alaskan boreal forest as spruce vegetation (IPCC 2019). Additionally, a warmer, drier spring weather may increase fire risk and resulting impacts (UAF/SNAP 2023). Wildland fires occur every year within 100 miles of Wasilla and occasionally result in impacts to the community such as decreased air quality and impacts to the local ecosystem.
Probability of Future Events	Large wildfires have consumed more boreal forest in Alaska in the last ten years than in any other decade recorded, and the area burned annually is projected to double by 2050 (EPA 2022). Warmer temperatures are also expected to worsen insect damage to forests across much of the state, which may increase the area of standing dead, highly flammable trees that are especially vulnerable to wildfire (EPA 2022). Climate change within Alaska is likely to result in increased drought and longer fire seasons and shifts in vegetation will influence the intensity and frequency of fires (IPCC 2019). A warming climate is also projected to increase the frequency and size of wildfires, potentially changing the type and extent of wildlife habitat favorable for some important subsistence species (USGCRP 2018). In Interior Alaska, wildfires and increased temperatures have caused changes in forest types, and these changes are projected to continue with increased warming and increased wildfire (USGCRP 2018).

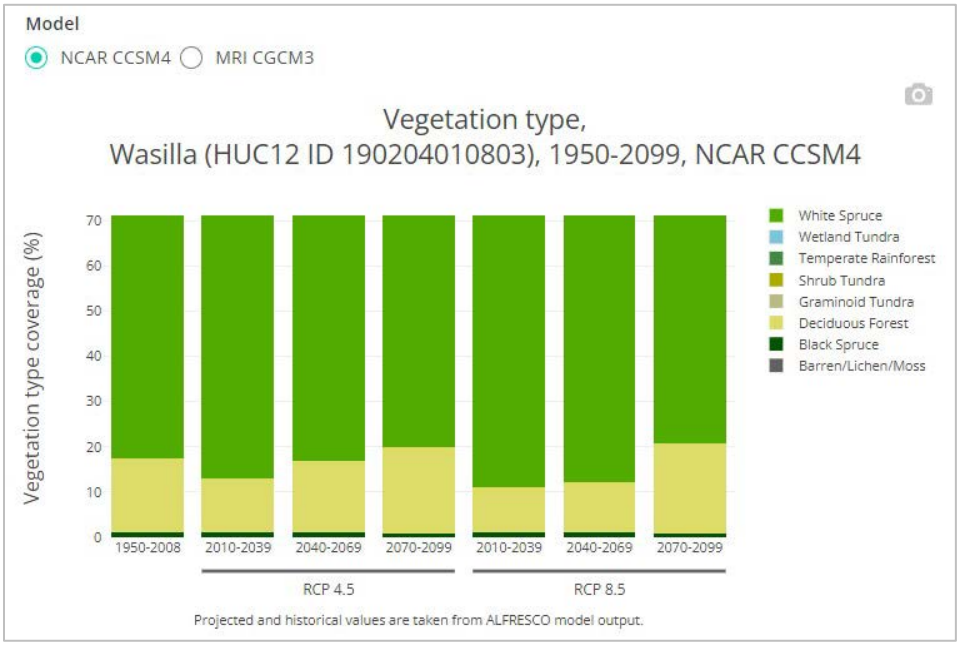
In Wasilla, the predominant vegetation types are currently White Spruce, Deciduous Forest, and Black Spruce (UAF/SNAP 2023). Figure 3-38 shows the projected changes in vegetation in Wasilla from 2010 through year 2099 using the NCAR CCSM4 model. Future projections (2010-2099) are shown under two different scenarios of differing Representative Concentration Pathways (RCP), which is the trajectory of greenhouse gas concentrations in the atmosphere (UAF/SNAP 2023). Compared to current emissions, RCP 4.5 is a scenario representing a reduction in global emissions, while RCP 8.5 represents a scenario similar to, or possibly higher than, current global emissions trajectories (UAF/SNAP 2023).

These models predict a change in current vegetation types (White Spruce, Deciduous Forest, and Black Spruce) to a higher concentration of Deciduous Forest by as early as 2040.

Source: UAF/SNAP 2023

Figure 3-38 Projected Changes in Vegetation in Wasilla

Figure 3-39 shows historical and projected changes in vegetation type coverage in Wasilla from 1950 through year 2099 using the NCAR CCSM4 model.

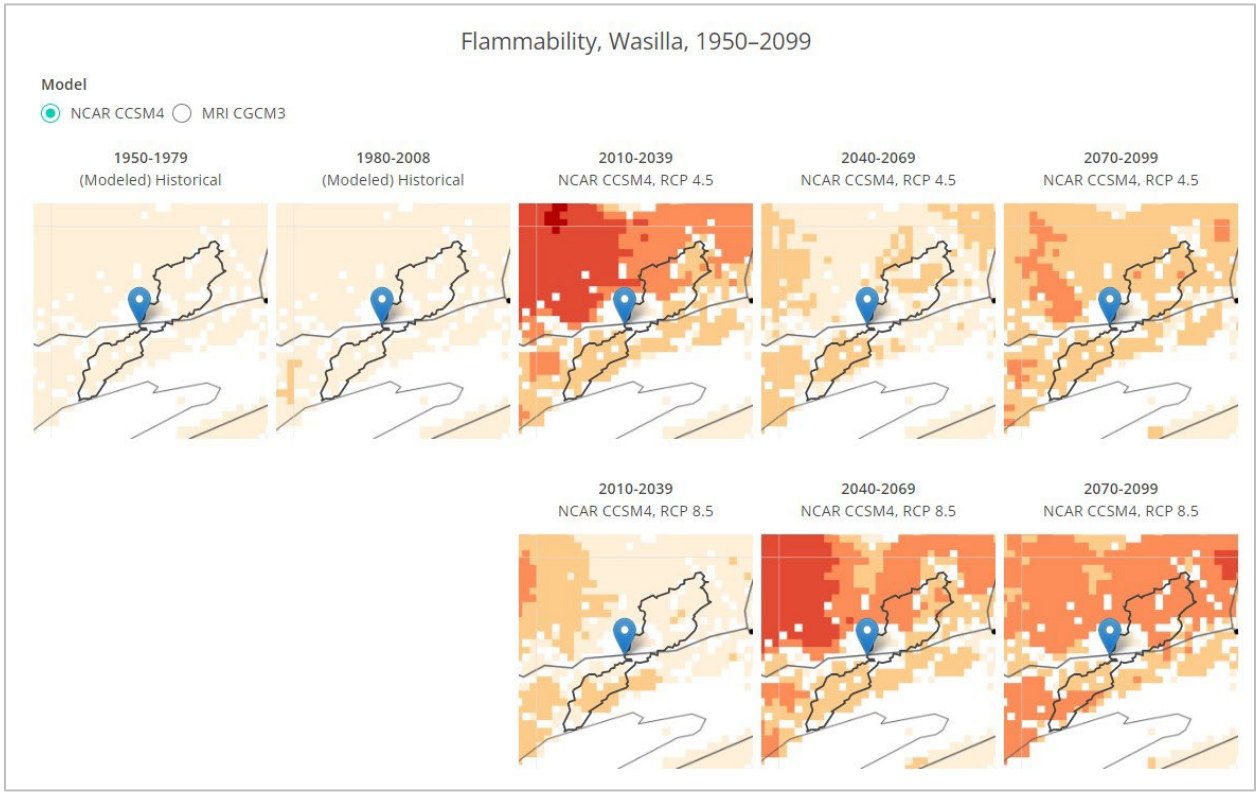


Source: UAF/SNAP 2023

Figure 3-39 Historical and Projected Changes in Vegetation Type Coverage in Wasilla

Figure 3-40 depicts historical and future projections of the flammability in Wasilla using the NCAR CCSM4 model. The accompanying legend for this figure is below.

Category	Flammability	Interpretation
Not modeled or no data	-	This pixel was not modeled or is not included in the dataset
Very Low	<0.2%	Fire is absent or very rare
Low	≥0.2%, <0.5%	Fire is rare, and unlikely to be the primary driver of vegetation patterns on this landscape
Moderate	≥0.5%, <1%	Fire is frequent enough to partially define the vegetation patterns on this landscape
High	≥1%, <2%	Fire is more frequent and more dominant in determining vegetation patterns on this landscape
Very High	≥2%	Fire is highly frequent and dominates the vegetation patterns on this landscape



Source: UAF/SNAP 2023

Figure 3-40 Historical and Projected Flammability Conditions for Wasilla

In the past, this area had very low flammability. By the mid–century, flammability may increase to low. By the late–century, flammability may increase to moderate compared with historical flammability (UAF/SNAP 2023).

3.3.4 VOLCANIC ASHFALL

3.3.4.1 NATURE

A volcano is a vent or opening in the earth's crust from which molten lava (magma), pyroclastic materials, and volcanic gases escape and erupt. Volcanoes can unleash cataclysmic destructive power greater than nuclear bombs and can pose serious hazards if they erupt near populated regions.

The various types of volcanoes are described below.

Volcano Type	Characteristics
Fissure	Fissure volcanoes are produced by eruptions that occur along elongated fissures rather than at a central vent, thus releasing large volumes of fluid basaltic lava. Fissure eruptions frequently occur in monogenetic volcanic fields and may also occur in rift zones on shield volcanoes (NPS 2022a). Fissure eruptions typically produce liquid flows, but pyroclastics may also be ejected (AVO 2023). Fissure volcanoes are most often associated with oceanic ridges on diverging plate boundaries, can occur on land as well.
Shield	Shield volcanoes are gently sloping, convex shaped volcanic cones that are flatter near the summit (NPS 2022a). They are built over vast periods of time (up to a million years or longer) and with repeated eruptions. These volcanoes are much wider than they are tall and are the largest volcanoes on Earth- typically encompassing several tens to hundreds of square miles. In Alaska, shield volcanoes can be found at Wrangell-St. Elias National Park and Preserve and Bering Land Bridge National Preserve.
Dome	Dome volcanoes, sometimes referred to as lava domes, are formed by viscous magma being erupted effusively onto the surface and then piling up around the vent (NPS 2022a). These volcanoes are steep-sided and typically form in clusters. Most dome volcanoes are relatively small and have a limited volume of viscous lava. Dome eruptions are usually non-explosive but growing domes may collapse to produce explosive eruptions and pyroclastic flows (NPS 2022a). They may collapse when they become over-pressured from gases trapped inside or become over-steepened. In Alaska, dome volcanoes can be found at Katmai National Park, Lake Clark National Park and Preserve, Wrangell-St. Elias National Park and Preserve, and Aniakchak National Monument.
Cinder Cone	Cinder cone volcanoes, sometimes called Ash-cinder, are the most common type of volcanoes in the world. Cinder cones that form over a linear fissure vent are elongated, and ones that form in areas with strong prevailing winds may be much taller on the downwind side. Elongated cinder cones may also form when the location of the vent shifts during the eruption (NPS 2022a). These volcanoes frequently have an asymmetric shape and are typically a few hundred feet tall but are rarely get taller than 600 to 900 feet. Because cinder cones are usually monogenetic, there should not be a risk of eruption at an existing cinder cone. However, a new cinder cone may form nearby during an eruption (NPS 2022a). Precursors to cinder cone eruptions include earthquakes and rumblings near the volcano. In Alaska, cinder cone volcanoes can be found at Katmai National Park, Wrangell-St. Elias National Park and Preserve, Bering Land Bridge National Preserve, and Aniakchak National Monument.
Composite (Strato-volcano)	A composite volcano, commonly referred to as a stratovolcano, is conical with a concave shape that is steeper near the top. These mountains commonly have snow-covered peaks and stand high above the surrounding mountainous terrain (NPS 2022a). These volcanoes are complex because experience multiple eruptions that can vary in eruption type and erupt lavas with a range of compositions. They may have multiple vents, but most composite volcanoes have a main vent at the summit (NPS 2022a). Like mountains, composite volcanoes are subject to the forces of erosion.

Volcano Type	Characteristics
	In Alaska, composite (strato) volcanoes can be found at Katmai National Park, Lake Clark National Park and Preserve, Wrangell-St. Elias National Park and Preserve, and Aniakchak National Monument.
Caldera	Caldera volcanoes are formed during large-volume volcanic eruptions when the underlying magma chamber is partially emptied and the ground above it subsides into it (NPS 2022a). Calderas are large volcanoes, typically larger than 0.6 miles in diameter, and their diameters are much wider than their included vents. Caldera volcanoes can be either explosive or nonexplosive (NPS 2022a). • Explosive calderas form during eruptions of silicic magmas that emit large-volume ash-flow tuffs and form Ultra-Plinian eruptive columns. The different types of explosive calderas vary in size, eruption magnitude, diameter, age, and whether they formed at summit of a preexisting volcano. • Nonexplosive calderas form on the summit of shield volcanoes during especially large eruptions of lava flows at either the summit or along flank rift zones. Shield volcanoes can experience several cycles of caldera collapse and subsequent infilling by lava flows. In Alaska, caldera volcanoes can be found at Katmai National Park, Wrangell-St. Elias National Park and Preserve, Bering Land Bridge National Preserve, and Aniakchak National Monument.

Figure 3-41 depicts each of these volcano types.

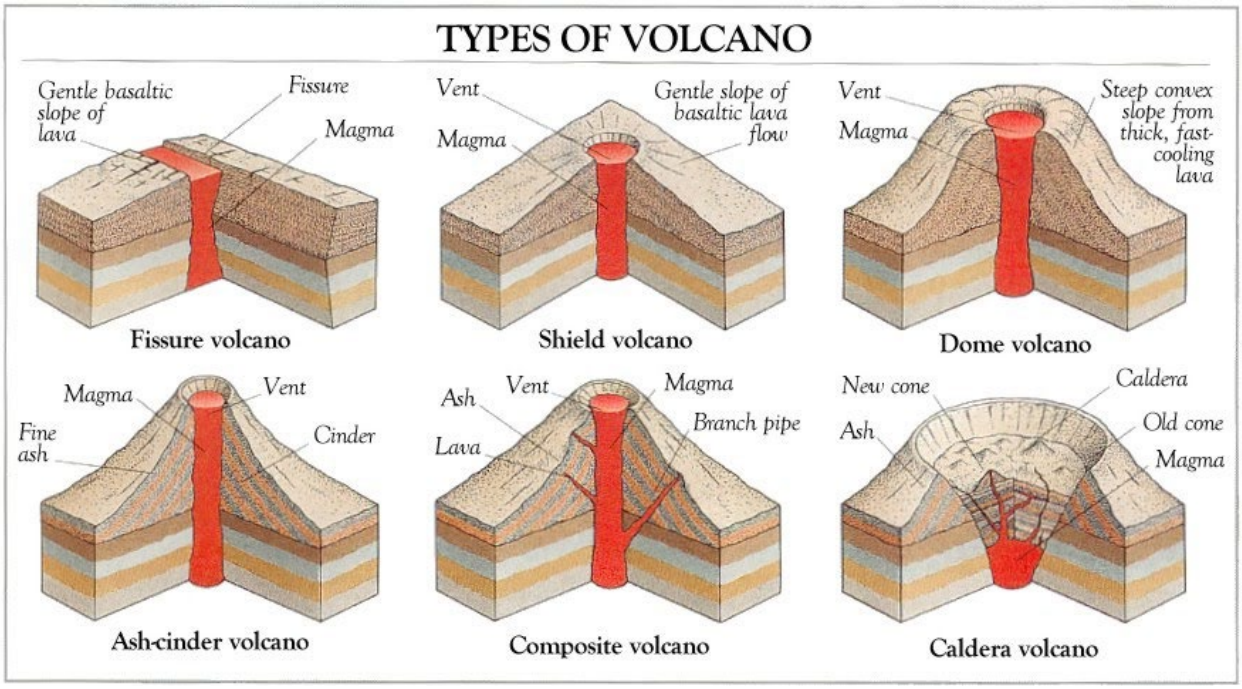


Figure 3-41 Types of Volcanoes

As there are many types of volcanoes, there are different types of volcanic eruptions. Some volcanoes may exhibit only one type of eruption during an event, while others may display an entire sequence of all three types in one event. These eruption classifications are described below.

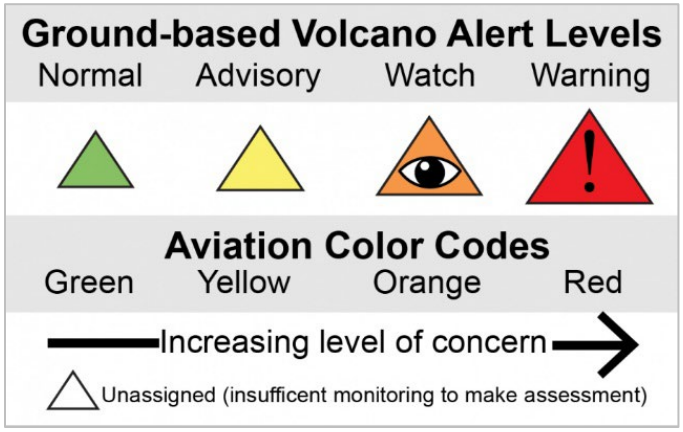
Type of Volcanic Eruption	Characteristics
Magmatic	Magmatic eruptions are the most well-observed eruptions. Magmatic eruptions include the ejection of lava or tephra from a magma source within the earth. There is a significant range in

Type of Volcanic Eruption	Characteristics
	the intensity, magnitude, explosivity, eruption rate, and amount of magma erupted during magmatic eruptions (NPS 2022b). Magmatic eruptions are generally described as being effusive or explosive. • Effusive eruptions are dominated by passive emission of lava. • Explosive eruptions are dominated by eruption of fragmental (pyroclastic) material.
Phreatomagmatic (Hydrovolcanic)	Phreatomagmatic eruptions are volcanic eruptions resulting from the interaction between magma and water. These eruptions are violently-explosive and driven by steam explosions produced by the interaction of hot magma with surface water or shallow groundwater (NPS 2022b). Hydrovolcanic eruptions include tephra derived from juvenile magma.
Phreatic	Phreatic eruptions are driven by steam explosions due to the superheating of groundwater by a magmatic source. These eruptions blast out steam, water, ash, volcanic bombs, and volcanic blocks, but no new magma (NPS 2022b). The 2006 phreatic eruption of the Fourpeaked Volcano in Katmai National Park and Preserve sent an ash cloud 20,000 feet into the atmosphere (NPS 2022b).

Volcanoes are also categorized according to the age of their eruptive activity. Active volcanoes are those that are currently erupting or showing signs of unrest, such as unusual earthquake activity or significant new gas emissions. Dormant volcanoes are those that are not currently active but could become restless or erupt again. Extinct volcanoes are those that are considered unlikely to erupt again. This can be difficult to determine as a volcano could go tens of thousands of years, or longer, between eruptions.

Table 3-17 Volcano Alert Levels

Volcano Alert Level	Description
Normal/Green	Non-erupting volcano is exhibiting typical background activity (including steaming, seismic events, thermal feature, or degassing), as long as such activity is within the range of typical non-eruptive phenomena seen at the volcano.
Advisory/Yellow	Volcano is exhibiting signs of elevated unrest above known background activity.
Watch/Orange	Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain OR an eruption is underway that poses limited hazards including no or minor volcanic-ash emissions.
Warning/Orange	Major volcanic eruption is imminent, underway, or suspected but it poses limited hazards to aviation because of no or minor volcanic-ash emissions (e.g., an eruption with only substantial lava flows and no risk of ash production).
Watch/Red	Volcanic eruption is underway that poses limited hazards to ground-based communities but includes significant emission of ash into the atmosphere that could affect aviation (e.g. an ash plume that does not yield significant ashfall onto ground communities but does drift into air routes).
Warning/Red	Major volcanic eruption is imminent, underway, or suspected with hazardous activity both on the ground and in the air.
Unassigned	Volcanoes where ground-based instrumentation is insufficient to establish that a volcano is in a typical background level (GREEN / NORMAL). When activity at such a volcano increases to the point of being detected by remote sensing, distant seismic networks, or eyewitness reports, an alert level and color code are then assigned accordingly. When

Volcano Alert Level	Description
	activity decreases, the volcano goes back to UNASSIGNED without going through GREEN / NORMAL.
	

Source: USGS 2023b

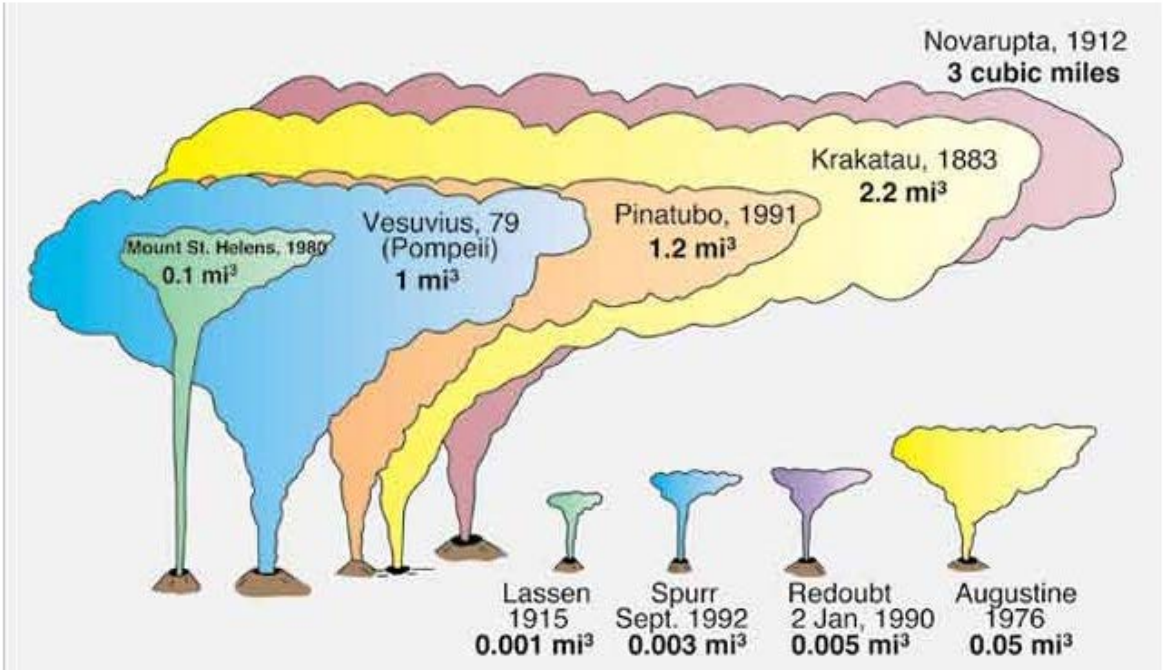
According to the Alaska Volcano Observatory (AVO), Alaska has over 130 volcanoes and volcanic fields which have been active within the last two million years. Of these 130 volcanoes and volcanic fields, about 90 of them have been active within the last 10,000 years and may erupt again. More than 50 volcanoes out of the total 130 have been active since year 1760 (AVO 2023). There are over 80 volcanic centers in Alaska, but only 41 are considered active. Alaska's volcanoes make up over three-quarters of U.S. volcanoes that have erupted in the last two hundred years.

3.3.4.2 HISTORY

On June 6, 1912, the largest volcanic eruption of the 12th century exploded from a new volcano, Novarupta, which is located on the Alaska Peninsula on a slope of Trident Volcano in Katmai National Park and Preserve, about 290 miles southwest of Anchorage. The eruption lasted 3 days and created the Katmai caldera and the Valley of Ten Thousand Smokes in the process (NPS 2021). This event fueled early USGS and National Geographic Society scientific investigations and helped shape thinking and research about volcanoes and magmas and future eruptions (NPS 2021).

There were no reported deaths from this event and increased seismic activity days before the eruption led Natives in the Katmai region to completely abandon their villages and seek shelter in Cold Bay and along the Bristol Bay coast (NPS 2017).

Figure 3-42 shows a comparisons of erupted magma volumes from historical volcanic eruptions. The magnitude and volume of the eruption at Novarupta in 1912 were exceptional.



Source: NPS 2021

Figure 3-42 Comparisons of Erupted Magma Volumes from Historical Volcanic Eruptions

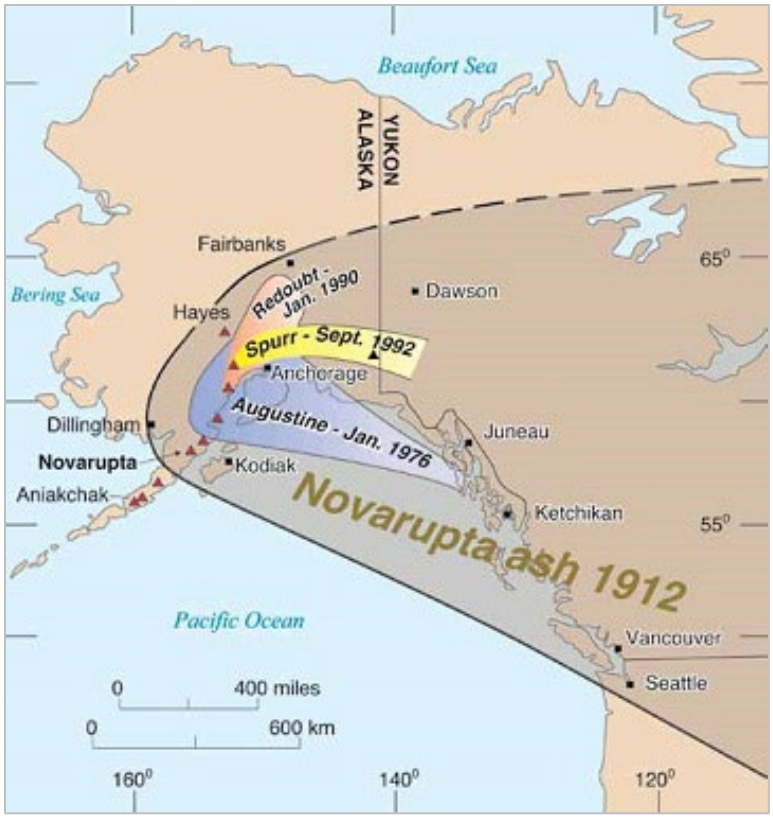
The October 2022 DCI lists the following volcanic eruption disaster events that have occurred in Alaska:

103. Mt. Redoubt Volcano, December 20, 1989: When Mt. Redoubt erupted in December 1989, posing a threat to the Kenai Peninsula Borough, Mat-Su Borough, and the Municipality of Anchorage, and interrupting air travel, the Governor declared a Disaster Emergency. The Declaration provided funding to upgrade and operate a 24-hr. monitoring and warning capability.

104. KPB-Mt. Redoubt, January 11, 1990: The Kenai Peninsula Borough, most directly affected by Mt. Redoubt, experienced extraordinary costs in upgrading air quality in schools and other public facilities throughout successive volcanic eruptions. The Borough also sustained costs of maintaining 24-hr. operations during critical periods. The Governor's declaration of Disaster Emergency supported these activities.

161. Mt. Spurr, September 21, 1992: Frequent eruptions and the possibility of further eruptions has caused health hazards and property damage within the local governments of the Municipality of Anchorage, Kenai Peninsula Borough, and Mat-Su Borough. These eruptions caused physical damage to observation and warning equipment. Funds to replace equipment for AVO.

Wasilla experienced volcanic ashfall in 1989 and 1990 from Mt. Redoubt, and in 1992 from Mt. Spurr. These eruptions disrupted transportation and industry, particularly jet aircraft. The following figure shows the ashfall comparison from multiple eruption events.



Source: NPS 2016

Figure 3-43 Areas Impacted by Historical Alaska Volcanic Ashfall Events

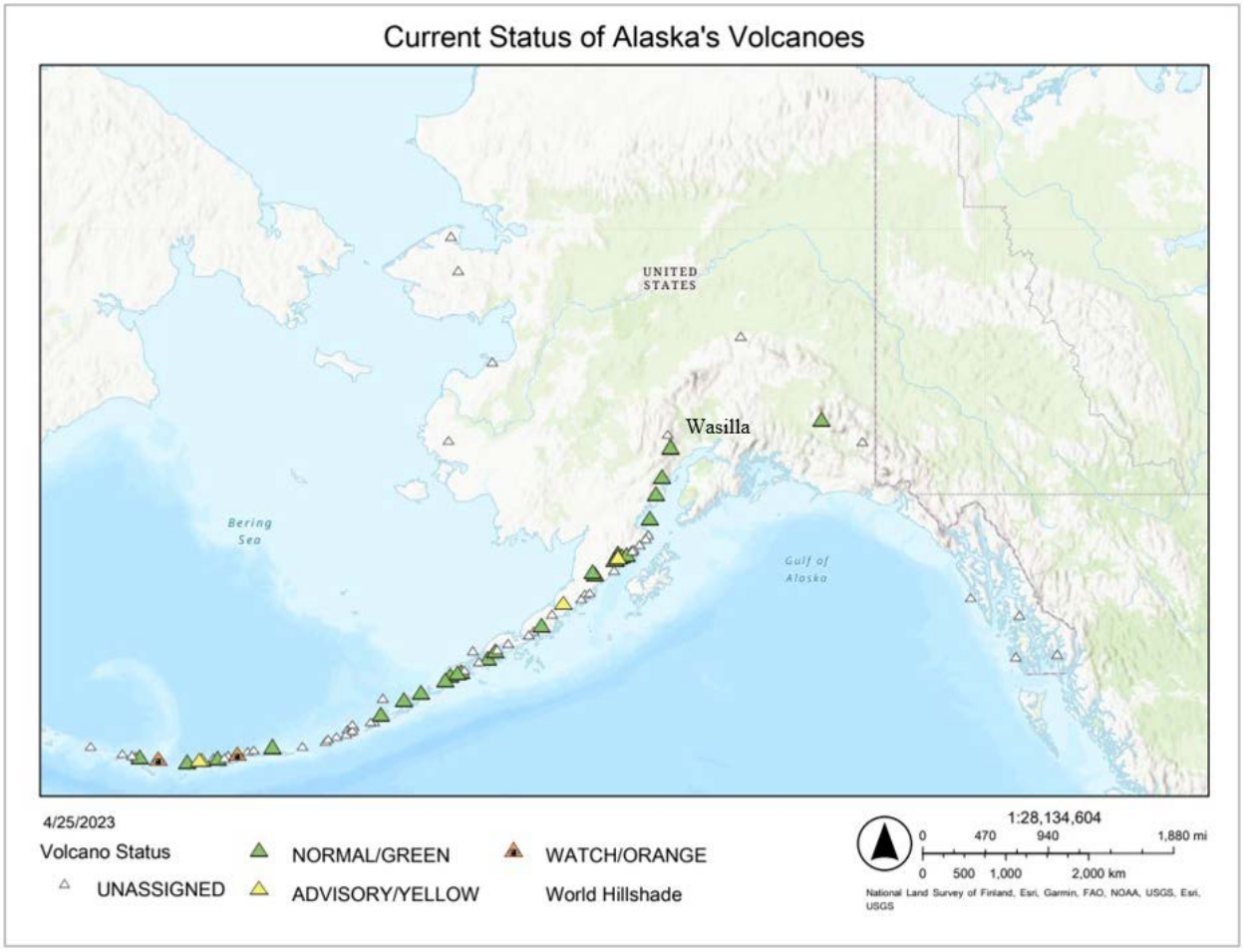
3.3.4.3 LOCATION

Most of Alaska's volcanoes are in the Aleutian Island Chain, which extends westward to the Kamchatka Peninsula in eastern Russia. Other volcanoes that have been active in the last few thousand years exist in southeastern Alaska and in the Wrangell Mountains. Smaller volcanoes, some active within the last 10,000 years, are found in interior Alaska and in western Alaska as far north as the Seward Peninsula (AVO 2023).

The volcanoes closest to Wasilla with a Normal/Green activity level are Mt. Spurr (95 miles SW), Mt. Redoubt (135 miles SW), Mt. Iliamna (164 miles SW), Mt. Wrangell (180 miles NE), and Mt. Saint Augustine (205 miles SW). The volcano closest to Wasilla with an unassigned activity level is the Hayes Volcano (97 miles W). Both Hayes and Spurr are within the rugged, glacier-clad Tordrillo Mountains on the northwest side of Cook Inlet.

The primary hazard to Wasilla from these volcanoes is volcanic ashfall.

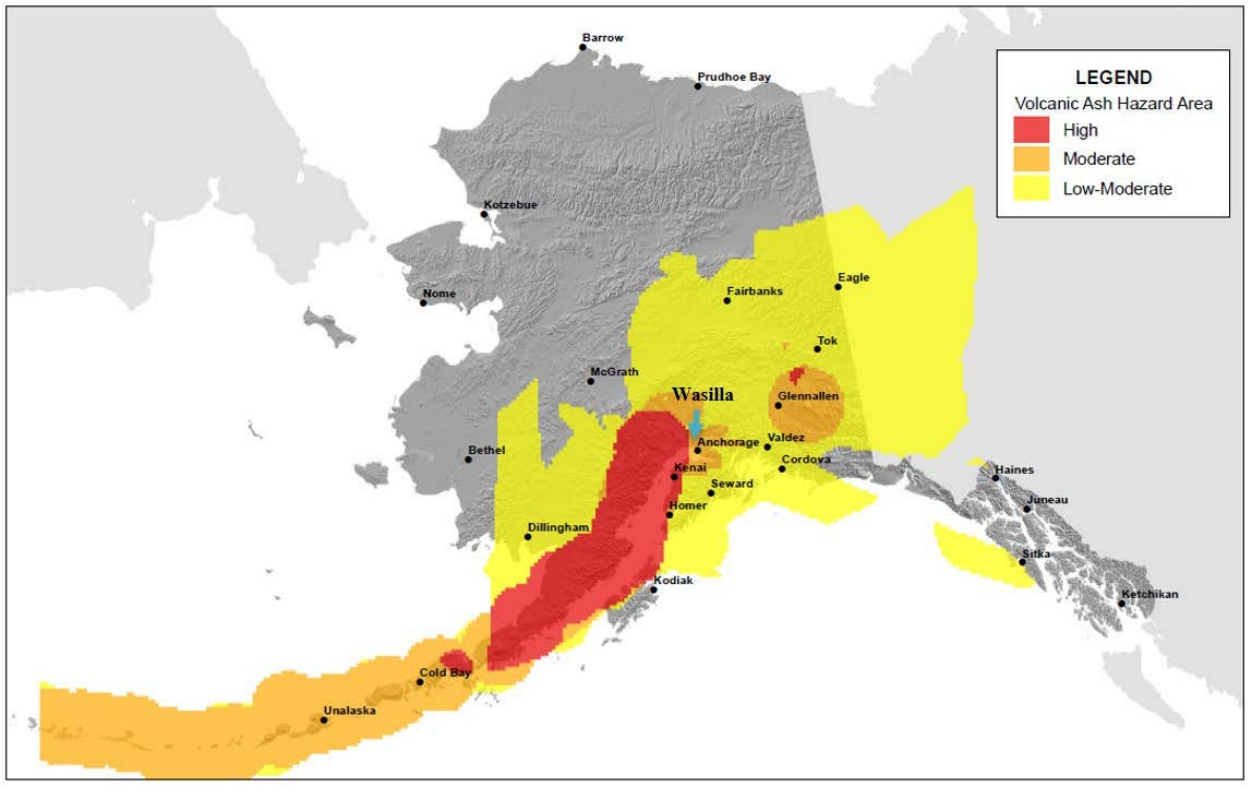
Figure 3-44 shows a map of Alaska's volcanoes and their alert level. There are 160 volcanoes included in this figure and of the total, 98 have an alert level of "Unassigned", 56 "Normal", 4 "Advisory", and 2 "Watch". The 4 volcanoes with the "Advisory" alert level are Trident and Aniakchak (Alaska Peninsula), and Tanga and Takawangha (Aleutians). The 2 volcanoes under "Watch" alert level are Great Sitkin and Semisopochnoi (Aleutians).



Source: Volcano Status- Oregon ArcGIS Online, Updated 03/06/2023

Figure 3-44 Alaska's Volcanoes and Associated Alert Level

The 2018 State of Alaska HMP provides the following map for volcanic ash hazard areas. The City of Wasilla is in an area with Moderate risk to volcanic ashfall.



Source: 2018 State of Alaska HMP

Figure 3-45 Volcanic Ash Hazard Areas in Alaska

3.3.4.4 EXTENT (MAGNITUDE AND SEVERITY)

After a volcanic eruption, secondary hazards may pose a threat to surrounding communities. Below are a sample of post-eruption hazards that may occur and the extent (magnitude and severity) of each.

Secondary Eruption Hazard	Extent of the Secondary Hazard
Lahars	Lahars are usually created by eruptions of shield volcanoes and stratovolcanoes. Lahar is a hot or cold mixture of rock fragments that flows down the slopes of a volcano, typically into a river valley. They can act as a mudflow or a debris flow. Lahars may occur with or without a volcanic eruption- when high-volume or long-duration rainfall occurs. Lahars pick up materials as they travel and can grow up to 10 times their original size.
Landslides	Landslides are common during eruptions of stratovolcanoes because their massive cones typically rise thousands of feet above the surrounding terrain. If the moving rock debris is large enough and contains a large content of water and soil material, the landslide may transform into a lahar and flow down valley more than 50 miles from the volcano.
Lava Flows	Lava flows are streams of molten rock that pour or ooze from an erupting vent. Lava flows move slowly enough that people can typically outrun them, but they are extremely dangerous and will destroy everything in its path.
Pyroclastic Flows	Pyroclastic flows are the deadliest of the volcanic hazards. Pyroclastic flows are made up of a mixture of rock fragments, gases, and ash that travel quickly away from the volcanic vent. These pyroclastic flows are typically greater than 1,500 ºF and can travel at speeds up to 50 mph. Pyroclastic flows can be extremely destructive and deadly because of their high temperature and rate of speed that they travel.

Secondary Eruption Hazard	Extent of the Secondary Hazard
Volcanic Gases	Volcanic gases are made up of water vapor (steam), carbon dioxide, ammonia, as well as sulfur, chlorine, fluorine, and boron compounds, and several other compounds. Wind is the primary source of dispersion for volcanic gases. Life, health, and property can be endangered from volcanic gases within about 6 miles of a volcano. Acids, ammonia, and other compounds present in volcanic gases can damage eyes and respiratory systems of people and animals, and heavier-than-air gases, such as carbon dioxide, can accumulate in closed depressions and suffocate people or animals.
Volcanic Ash	Volcanic ashfall is the most common and widespread volcanic hazard. Volcanic ash is a mixture of rock, mineral, and glass particles that are expelled from a volcano during an eruption. These particles are very small and have low density, which allows them to travel long distances, typically by wind. These small particles can have jagged edges, which pose a hazard when breathed in or land on the skin. Ashfall can travel thousands of miles from the eruption site. While in the air, ash can cause problems for jet engines, forcing airlines to cancel flights. An ashfall that leaves a thick layer of ash may collect on homes, causing roof collapse, clogged gutters, or damage to other machinery. Animals may also be affected by volcanic ash by having difficulty finding food, or water and food sources are contaminated.

Based previous occurrences and the criteria identified in Table 3-2, the impacts to Wasilla have been Negligible with minor injuries, the potential for critical facilities to be shut down for less than 24 hours, less than 10 percent of property or critical infrastructure being severely damaged, and little to no permanent damage to transportation or infrastructure or the economy.

3.3.4.5 IMPACT

Eruption types are a major determinant of the physical impacts a volcanic event will create, and the particular hazards it poses to a community. Volcanic ashfall is the secondary hazard that may impact Wasilla.

Ashfall is a general event that may affect all residents of Wasilla. The elderly, the chronically ill, and the very young would experience the most severe respiratory distress. Poor visibility would endanger anyone having to travel, walk, or operate equipment during an ashfall event. It can also cause slippery roadway conditions, if wet, and may cause power outages.

Wasilla has experienced volcanic ash in 1989, 1990, and 1992 from Mt. Redoubt and Mt. Spurr. These eruptions disrupted transportation services and industry, particularly jet aircraft.

If another eruption of the same magnitude as Novarupta occurred, Wasilla would likely be impacted by another volcanic ashfall event. Another event of this magnitude would severely impact transportation and halt the air travel for many days to weeks.

3.3.4.6 PROBABILITY OF FUTURE EVENTS

The 2018 State of Alaska Hazard Mitigation Plan states the following regarding predicting volcanic eruptions:

> *"Geologists can make general long-term forecasts associated with individual volcano activities by carefully analyzing past activity, but these are on the order of trends and likelihood, rather than specific events or timelines. Short-range forecasts are often possible with greater accuracy.*

Several signs of increasing activity can indicate that an eruption will follow within weeks or months. Magma moving upward into a volcano often causes a significant increase in small, localized earthquakes, and measurable carbon dioxide and compounds of sulfur and chlorine emissions increases. Shifts in magma depth and location can cause ground level elevation changes that can be detected through ground instrumentation or remote sensing."

Based on the 2018 State of Alaska Hazard Mitigation Plan, previous occurrences, proximity of nearby volcanoes, and the criteria identified in Table 3-3, it is Possible that Wasilla will experience a volcanic ashfall event in the next five years; there is a 1 in 5 years chance of occurring (1/5=20 percent); and the history of events is greater than 10 percent but less than or equal to 20 percent likely per year.

3.3.4.7 FUTURE CONDITIONS INCLUDING CLIMATE CHANGE

Due to climate change, the nature or location of volcanic ashfall events in Wasilla are not anticipated to change.

Changing Factor due to Climate Change	Description of Future Changes due to Climate Change
Extent (Magnitude/Severity)	Climate change is not anticipated to affect the extent (severity and magnitude) of future volcanic eruptions in Alaska.
Impact	Climate change is not anticipated to influence the impact of future volcanic eruptions in Alaska.
Probability of Future Events	Climate change is not anticipated to affect the frequency of future volcanic eruptions in Alaska.

3.3.5 FLOOD

3.3.5.1 NATURE

Flooding is the accumulation of water in areas that typically do not hold water, or it can result from surplus water from streams, rivers, lakes, reservoirs, glaciers, or coastal water bodies overflowing onto the surrounding floodplains. Floodplains are the adjacent low-lying grounds adjacent to water bodies, formed mainly of sediment deposits from past flooding events.

Though floods are natural events, they can be considered hazardous when people and property are affected. Sediment transport is another damaging aspect of flooding that can impact infrastructure, barges, and other river vessel access.

Wasilla periodically experiences the following types of flooding: rainfall-runoff flood, snowmelt flood, groundwater flood, ice-jam flood, flash flood, and fluctuating lake level floods.

Rainfall-Runoff Flooding: The most common type of flood, rainfall runoff magnitude is determined by rainfall intensity, duration, distribution, and geomorphic characteristics of the watershed. Weather systems that bring strong persistent rainfall differentiate rainfall runoff from the other categories of flooding. Rainfall runoff flooding is more likely to occur in late summer to early fall.

Snowmelt Floods: Spring weather patterns and snowpack depths determine the immensity of this flooding occurrence. Snowmelt takes place in the spring, usually between the months of April through June.

Groundwater Floods: Groundwater flooding occurs when water accumulates and saturates the soil. The water-table rises and floods low-lying areas, including homes, septic tanks, and other facilities. When high

water is impounded, the water table rises and floods low-lying areas. Groundwater flooding also occurs in basements of structures when a stream stage remains high for more than a few days.

Ice-Jam Floods: Ice breaking away from the levee occurs with rising temperatures and increased water flows, the resulting dislodged ice blocks run down the river. Ice jams may rapidly break apart but at times persist and build pressure creating a natural dam. Flooding can occur when water levels build and overflow the embankments.

Ice jams eventually break and if there has been a build up of water pressure, the water will rush downstream sending destructive ice blocks in its wake. Ice blocks will destroy anything in their path resulting in the devastation of community infrastructure.

Flash Floods: These floods are characterized by a rapid rise in water. They are often caused by heavy rain on small stream basins, ice jam formation, or by dam failure. They are usually swift moving and debris filled, causing them to be very powerful and destructive.

Fluctuating Lake Level Floods: Generally, lakes buffer downstream flooding due to the storage capacity of the lake; however, when lake inflow is excessive, flooding of the area around the lake can occur.

3.3.5.2 HISTORY

Flooding is a minor concern in the City as the City has a moderate to low FEMA flood hazard rating, with concerns primarily along Cottonwood Creek. Additionally, there are three properties west of N. Ashford Blvd that flood annually due to spring breakup and freeze-thaw events during the winter.

The City participates in the NFIP, and the MSB acts as the Floodplain Manager for the City. To date, the City of Wasilla has experienced **1 repetitive loss** due to flooding (single family home in 2012). Details of this loss are in Table 4-4.

The National Weather Service's Storm Events and River Notes Databases provides details of historic flood events (January 1996-February 2023) and their impacts to Wasilla or surrounding area (Table 3-18). The NWS Storm Events Database has data dating back to January 1950 for many states, but it began collecting data for Alaska in January 1996. Events prior to 1996 were carried over from the 2018 HMP.

Since the 2018 HMP, there have been 3 flooding events in Wasilla, but none occurred within City limits.

Table 3-18 Historic Flood Events in Wasilla

Date	Location/Event Type	Description/Magnitude of Event
04/11/1979	Snowmelt Flood	Valley area streams flowed high according to the U.S. Department of Agriculture Soil Conservation snow surveyors. The course near Independence Mine had 105 inches of snow containing 33 inches of water as of March 28.
07/12/1979	Flood	There was a power outage from Wasilla to Knik River when high water swept a main transmission tower from its pilings in the Matanuska River, causing the lines to fall and short out.
07/01/1981	Rainfall Flood	Three weeks of rain created flooding and mini lakes in parking lots and various other areas. Roads were closed, and culverts were damaged.
07/23/1981	Rainfall Flood	Three weeks of intermittent rain caused local flooding in low-lying areas of Wasilla.
10/12/1986	Rainfall Flood	Record rainfall in Southcentral Alaska caused widespread flooding in the MSB. The President declared a major disaster implementing all public and individual assistance programs, including SBA disaster loans, and disaster unemployment insurance benefits.
08/12/1999	Rainfall Flood	Several reports of more than two inches of rainfall (much of which occurred in a 12 to 18-hour period) were recorded in the Susitna Basin.

Date	Location/Event Type	Description/Magnitude of Event
04/13/2004	Snowmelt Flood	Flooding caused by spring breakup led to the cancellation of a Wasilla High School Track and Field event when snow drifts as high as eight feet were suddenly melted by warm winds.
04/24/2005	Wasilla Creek	Creek is running bank to bank - phone call taken by Dan Peterson from Dave Macfarland ~ noon.
08/18-24/2006	Rainfall Flood	Heavy rains up to six inches on gauged and ungauged rivers caused flooding and road wash outs throughout the Mat-Su Valley area. Little Susitna River crested at almost 14 feet (tentative flood of record for this river.)
04/29/2012	Wasilla Creek	Received via e-mail: Wasilla Creek upstream of Bogard Road is bankfull and between Bogard and Palmer Wasilla Highway is overbanks. Running muddy, and completely ice free
09/16/2012	Flood	A series of strong, wet storm systems hit Southcentral Alaska in mid- September. This resulted in widespread flood damage over a large area. Storm total precipitation ranged from 21 to 27 inches along the eastern Kenai Peninsula, while further inland between 6-12 inches of rain fell along the Talkeetna Mountains north to the headwaters of the Nenana River. A large number of roads and bridges were affected; damage to the Alaska Railroad was severe enough to shut down the rail service for several days. Almost 60 homes were either severely damaged or destroyed and over 700 other homes were either affected or sustained minor damage; most of the damage occurred along the Little Susitna River and Willow Creek. State estimates of damage to individual property approached $3.5 million, public infrastructure exceeded $19 million statewide, and the military base in Anchorage sustained an addition $3.5 million in flood damages. There was one fatality associated with the flooding. On September 24, a 51- year-old man died while attempting to cross a swollen creek on his ATV.
09/21/2012	Wasilla Creek	EMERGENCY OPERATIONS CENTER: Wasilla Creek is pushing water into a large subdivision called Meadow Brook Subdivision right now down Tiffany Drive. Culverts are plugged with debris, so the water is running over driveways at 6 inches, approaching some 17 homes.
01/01/2021	Cottonwood Lake	Ice Thickness: 15”; Air temperature: 12°F; 1.5” of new snow on ice surface.
04/27-05/30/2022	Snowmelt Flood	A presidential disaster declaration was used in response to spring breakup flooding in the MSB. Funds were provided to pay 75% of eligible costs of repairing or replacing damaged public facilities. The declaration also made cost shared funds available to the State for approved projects that reduce future disaster risks.
08/08/2022	Flood	The set up was a broad longwave trough in place over much of the Bering Sea through southern Alaska. Embedded in this broad longwave trough was an upper-level low meandering over the Yukon-Kuskokwim Delta. Multiple upper-level shortwaves rotated around this upper level low along with a jet stream aimed right up Cook Inlet into Southcentral. The southwesterly flow at 700 millibars was also very moist with all this moisture being advected northeastward into the Cook Inlet region and Mat-Su Valleys. As a result, heavy rain occurred throughout the region resulting in flooding for some areas. Flooding was verified by Alaska State Troopers in Wasilla. The Regional Operations Center and the State Emergency Operations Center reported on August 8th, 2022 at approximately 22:09 hours, Alaska State Troopers (AST) began receiving multiple 911 calls reporting flooding in the area of Schrock Road and Sitze Road in Wasilla. AST responded to the area discovering the road has been washed out and is impassible just past the Little Susitna River Bridge due to a culvert failing. Mat-Su Borough along with DOT is on scene working to repair the culvert and roadway. It has also been advised there is a bridge farther down Sitze Road that may be compromised and is being assessed. At this time, residences past this washout are un accessible. Additional patrols of the area also discovered North Sushana Drive is impassible due to the Little Susitna River flooding the road. These neighborhoods are also un accessible at this time. There were pictures posted on social media from the Alaska State Department of

Date	Location/Event Type	Description/Magnitude of Event
		Transportation. SEOC also forwarded maps & pics of flooding in Houston. A news article with pictures can be seen here: https://www.adn.com/alaska-news/mat-su/2022/08/09/mat-su-flooding-closes-roads-threatens-homes-after-deluge-soaks-talkeetna-mountains/.
11/09/2022	Wasilla Creek/ Snowmelt Flood	Local resident who lives about 1 mi south of Old Trunk Rd/Palmer-Wasilla Highway intersection reports Wasilla Creek is flooding. Water is up to his foundation which is normally about 100 ft away from the creek. Likely overflow from freeze up ice jam flooding.
11/10/2022	Wasilla Creek	An APRFC forecaster visited the area of concern this morning and talked with several residents. A low bridge built over the creek near Little Brook road has ice that has built up around it, and, combined with anchor ice buildup on the creek, is causing water to backup and come out of the bank upstream. Locals state the bridge is typically 8 ft above the creek but water is now up to the low cord of the bridge Water has not impacted any structures yet and is about 50-75 ft away from the nearest home. It is estimated that a 1-2' water level rise would cause structures to start to become impacted.
12/02/2022	Wasilla Creek	A stable ice cover has formed, and water levels have dropped.

Source: River Notes Database (NWS 2023a) and Storm Events Database- Storm Prediction Center Product (NWS 2023b), City of Wasilla 2018 HMP

Additionally, the October 2022 DHS&EM DCI delineates historical flood events that may have impacted Wasilla. The index lists the following events:

56. Southcentral Alaska Flood (Major Disaster), October 12, 1986 FEMA declared (DR-0782) on October 27, 1986: Record rainfall in South-central Alaska caused widespread flooding in Seward, Matanuska-Susitna Borough, and Cordova. The President declared a Major disaster implementing all public and individual assistance programs, including SBA disaster loans and disaster unemployment insurance benefits.

97. Mat-Su Borough, August 4, 1989: The Governor declared a disaster to mitigate a flood threat caused by high water in the Matanuska River and placed the Old Glenn Highway and private residences along the river at risk. Funding was applied towards construction of an earthen/gravel dike.

96-180 Southcentral Fall Floods declared September 21, 1995 by Governor Knowles then FEMA declared (DR-1072) on October 13, 1996: On September 21, 1995, the Governor declared a disaster as a result of heavy rainfall in South-central Alaska an as a result the Kenai Peninsula Borough, Matanuska-Susitna Borough, and the Municipality of Anchorage were initially affected. On September 29, 1995, the Governor amended the original declaration to include Chugach, and the Copper River Regional Education Attendance areas, including the communities of Whittier and Cordova, and the Richardson, Copper River and Edgerton Highway areas which suffered severe damage to numerous personal residences, flooding, eroding of public roadways, destruction & significant damage to bridges, flood control dikes and levees, water and sewer facilities, power, and harbor facilities. On October 13, 1995, the President declared this event as a major disaster (AK-1072-DR) under the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Individual Assistance totaled $699K for 190 applicants. Public Assistance totaled $7.97 million for 21 applicants with 140 DSR's. Hazard Mitigation totaled $1.2 million. The total for this disaster is $10.5 million.

07-220 2006 August Southcentral Flooding (AK-07-220) declared August 29,2006 by Governor Murkowski then FEMA declared (DR-1663) on October 16,2006: Beginning on August 18, 2006 and continuing through August 24, 2006, a strong weather system centered causing severe flooding resulting in severe damage and threats to life and property, in the Southcentral part of the State including the Matanuska-Susitna Borough, the City of Cordova and the Copper River Highway area in the Chugach Rural Education Attendance Area (REAA), the Richardson Highway area in the Copper River REAA and Delta/Greely REAA, the Denali Highway area, and the Alaska Railroad and Parks Highway areas in the Matanuska-Susitna Borough and the Denali Borough. Damage cost estimates are near $21 million in Public Assistance primarily for damage to roads, bridges, and rail lines. Individual Assistance estimates are near $2 million.

09-227 2009 Spring Flood declared by Governor Palin on May 6, 2009 then FEMA declared under DR-1843 on June 11, 2009: Extensive widespread flooding due to snow melt and destructive river ice jams caused by rapid spring

warming combined with excessive snow pack and river ice thickness beginning April 28, 2009 and continuing. The ice jams and resultant water backup along with flood waters from snow melt left a path of destruction along 3,000 miles of interior rivers, destroying the Native Village of Eagle and forcing the evacuation of multiple communities. The following jurisdictions and communities in Alaska have been impacted: Alaska Gateway Rural Regional Educational Attendance Area (REAA) including the City of Eagle and Village of Eagle; the Copper River REAA including the Village Community of Chisotchina; the Matanuska-Susitna Borough; the Yukon Flats REAA including the City Community of Circle, and City of Fort Yukon, the Villages Communities of Chalkyistik, Beaver, Stevens Village, and Rampart; the Yukon-Koyukuk REAA including the Cities of Tanana, Ruby, Galena, Koyukuk, Nulato, and Kaltag; the Iditarod Area REAA including the Cities of McGrath, Grayling, Anvik, and Holy Cross; the Northwest Arctic Borough including the Cities of Kobuk, and Buckland; the Lower Yukon REAA including the Cities of Russian Mission, Marshall, Saint Mary's, Mountain Village, Emmonak, Alakanuk and Pilot Station and the Community of Ohogamiut; the Lower Kuskokwim REAA including the Cities of Bethel, Kwethluk, Napakiak, Napaskiak, and the Village Community of Oscarville; the Yupiit REAA including the City of Akiak, and the Villages of Akiachak, and Tuluksak; the Kuspuk REAA including the Cities of Aniak, Upper Kalskag, Lower Kalskag, and the Villages Communities of Stony River, Sleetmute, Red Devil, Crooked Creek, and Napaimute; the Fairbanks North Star Borough including the City of North Pole and Community of Salcha; the Bering Strait REAA including the City of Nome area.

12-240 2012 September Storm declared by Governor Parnell on October 17, 2012 then FEMA declared November 27, 2012 (DR-4094): Beginning on September 4, 2012, and continuing, a strong weather system produced high winds and heavy rains, resulting in severe and widespread wind damage and flooding throughout much of South-central and Interior Alaska. The series of storms created a threat to life and property in the Matanuska-Susitna Borough, Kenai Peninsula Borough, Alaska Gateway Regional Educational Attendance Area (REAA), and the Chugach area. The magnitude of the storm resulted in wind damages and flooding which necessitated debris clearance, emergency protective measures, damage to public facilities including roads, bridges, railroad, electrical distribution, and water systems; and damage to private residences to include losses of personal property.

AK-16-258 2016 Mat-Su River Erosion declared by Governor Walker on August 22, 2016: During the week of August 22, 2016, there was imminent threat of flooding in the Matanuska-Susitna Borough from the Matanuska River along the Old Glenn Highway from mile 12 through mile 15. Flooding in this area had the potential to cause substantial damage to the highway, infrastructure, and local homes. The Alaska Department of Transportation and Public Facilities (DOT&PF) was immediately called to accomplish the necessary emergency protective measures to prevent damaging flooding from public and private infrastructure.

3.3.5.3 LOCATION

There are no river systems within the City boundaries, but Cottonwood Creek, Lucille Creek, and several smaller streams traverse the area. The most prominent water features in the City are Wasilla Lake and Lucille Lake. The Little Susitna River is just north of the City, with Cottonwood Creek to the west, which are anadromous streams with sportfishing and recreational opportunities. These waterways are connected to Wasilla's wetland systems; and altogether, provide value to the area in terms of a clean water source, regenerating groundwater, flood control, groundwater recharge and purification, and wildlife habitat for moose, salmon, and waterfowl (2011 Wasilla Comprehensive Plan).

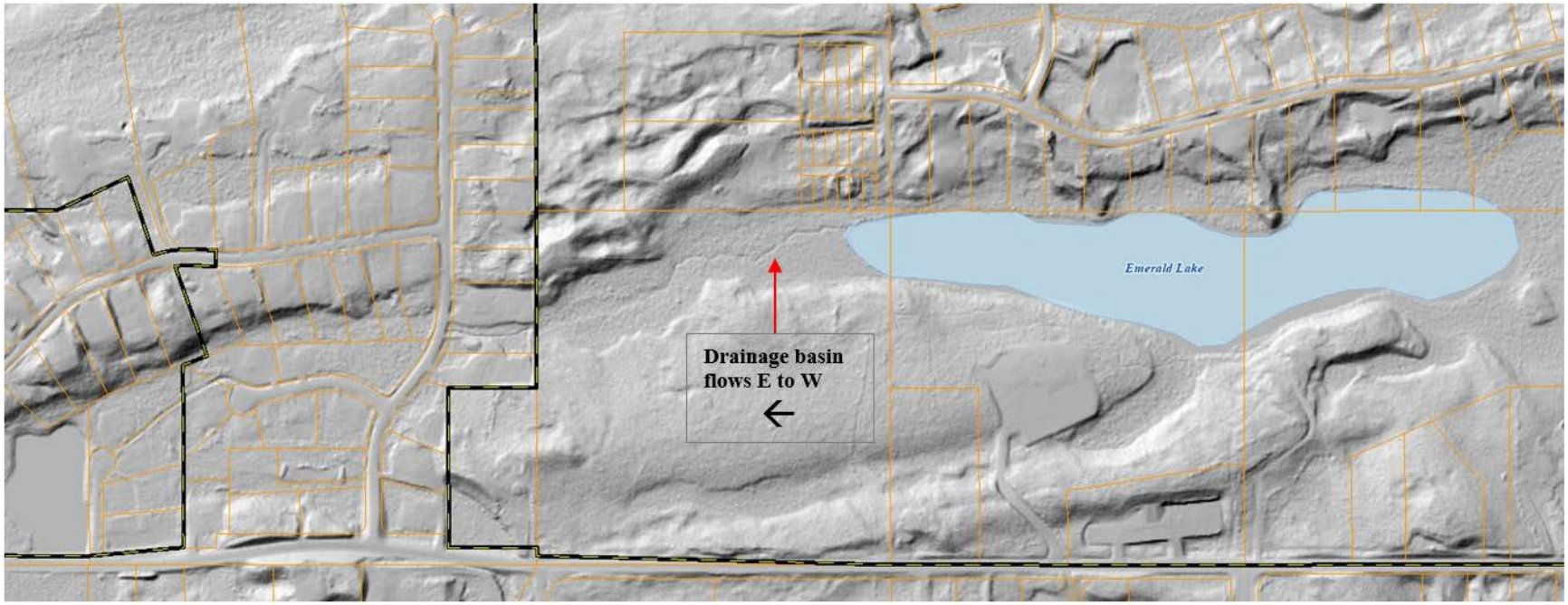
Local flooding in low-lying areas of Wasilla due to spring breakup affects less than 1% of the property in the City. Roads and utilities are the systems generally impacted by this hazard event.

In 2016, the Mat-Su Borough's floodplain maps were updated for the first time since 1985. The updated data follows contours and ground features more accurately than the previous data, depicting what an actual flooded area would look like.

There are five residential properties, one commercial retail store, and one restaurant located in the 100-year flood zone.

There are three City parcels west of N. Ashford Blvd that flood annually due to spring breakup and freeze-thaw events during the winter. These properties will not be identified for privacy reasons, and for the remainder of this HMP, they will be referred to as the "Snowmelt Flood Area". As shown in Figure 3-46, Emerald Lake's drainage basin flows east to west, under N. Ashford Blvd towards the Snowmelt Flood Area. Based on a nearby well log, the static water depth in this area is 78 feet, indicating that this flooding is not due to natural groundwater.

The Public Works Department states that this location is a marshy/boggy area that was previously a creek bottom. The ditch was filled in and houses were built on top, which is why this location is susceptible to snowmelt flooding. There are culverts in the area, but water floods the properties from the drainage basin/ditch.



Source: MSB Parcel Viewer 2023. Layer: 2019 Hillshade

Figure 3-46 Emerald Lake Drainage Basin Hillshade

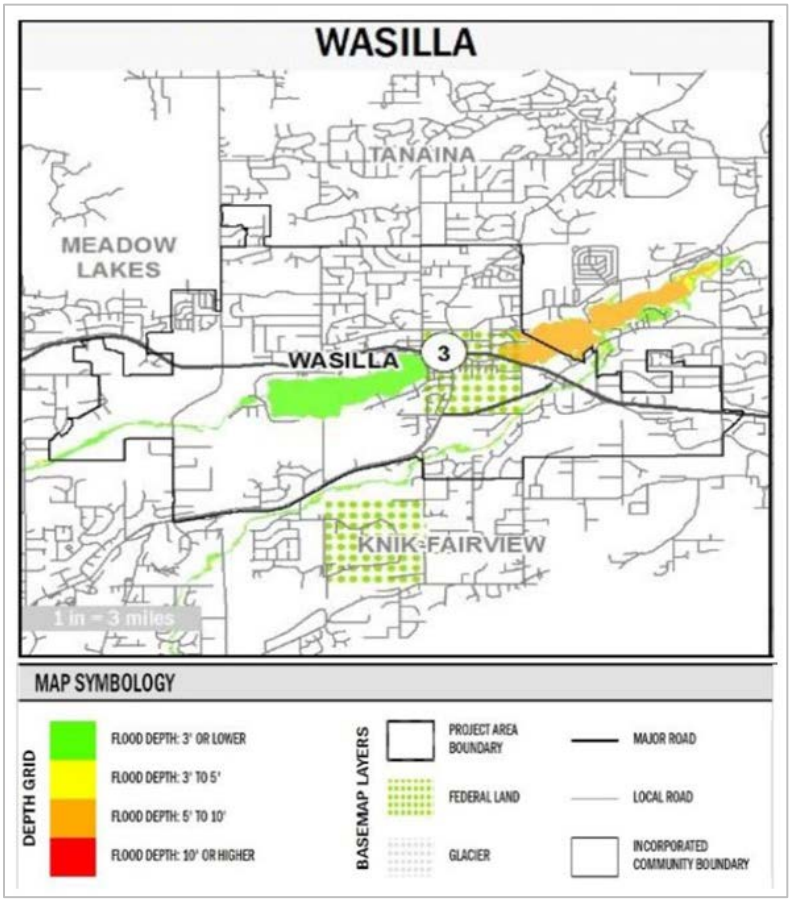
Additionally, the Public Works Department is concerned with potential future flooding of Cottonwood Creek at the East Glenwood Avenue crossing. There have been no documented flooding events in the past, and there is a culvert there to direct water underneath the road, but the Public Works Department is concerned there may be potential flooding there in the future due to rising creek levels from heavy rainfall. The Public Works Department aims to install water level monitoring sensors at this location.

3.3.5.4 EXTENT (MAGNITUDE AND SEVERITY)

Based on the MSB 100-year floodplain map, there are residences and other facilities in the 100-year flood zone, but no critical facilities or infrastructure are located in the 100-year flood zone. The properties in the Snowmelt Flood Area that are impacted by annual floods are not identified on the 100-year floodplain map or the FIRMS map.

Additionally, properties in the Snowmelt Flood Area that flood annually have had waters flood the crawl space and septic system, and the homeowners are concerned that the water may contaminate their residential water wells (City water ends roughly 1.5 miles from the properties).

Figure 3-47 shows the estimated flood depths for a 1% annual chance flood event in Wasilla.



Source: 2016 FEMA Risk Report- MSB

Figure 3-47 Estimated Flood Depths for a 1% Annual Chance (100-year) Flood Event

The images below show the ditch that runs along the Snowmelt Flood Area during the spring and winter. The water fills the drainage basin that flows behind the properties and freezes. During freeze-thaw cycles in the winter, water flows onto the properties and then refreezes, encrusting any structures it surrounds.

Source: City of Wasilla Public Works Department

Figure 3-48 Snowmelt Flood Area Ditch Full of Water in the Spring

Source: City of Wasilla Public Works Department

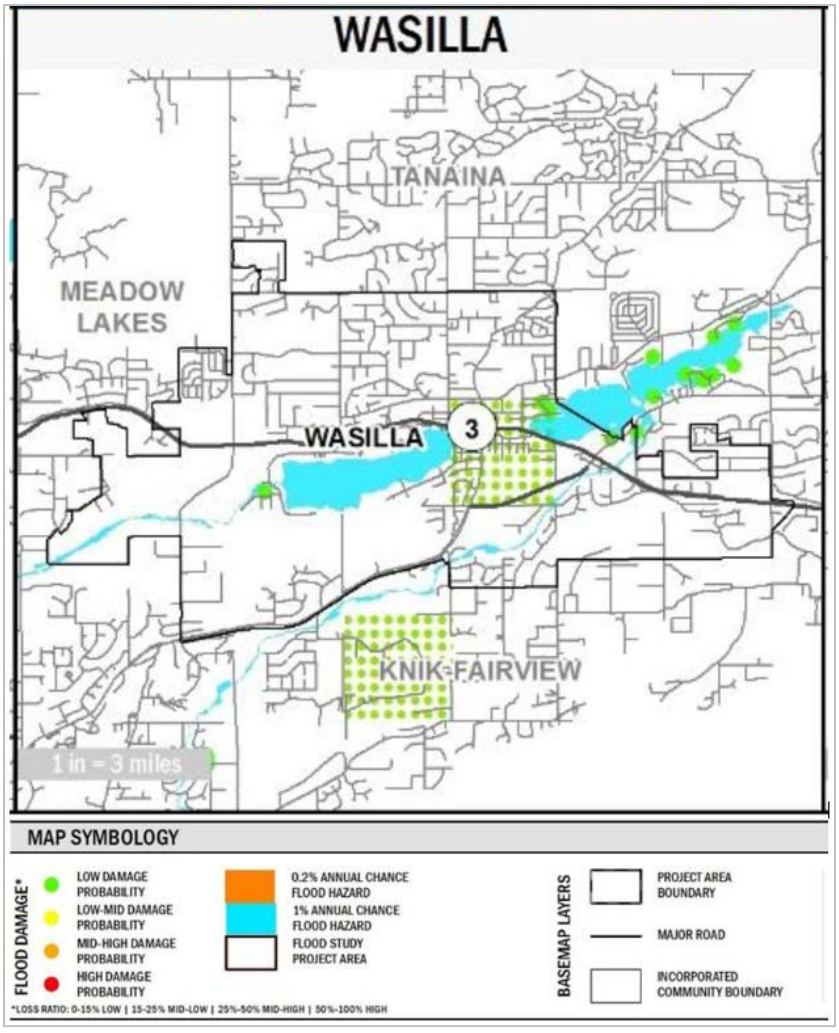
Figure 3-49 Snowmelt Flood Area Ditch Frozen in the Winter

The extent (magnitude/severity) of the flood hazard is measured in this HMP by using statistics from the NFIP, floodplain mapping, historical past events, the 2018 State HMP, and 2020 MSB HMP. Based on these factors and using the criteria established in Table 3-2, the magnitude and severity of flood impacts in the City are considered Limited, with potential for critical facilities to be shut down for more than a week, and more than 10 percent of property or critical infrastructure being severely damaged.

3.3.5.5 IMPACT

Floods may disrupt the normal function of a community by placing excessive pressure on emergency response and can bring a heavy economic burden to communities through the closure of vital infrastructure, communications, utilities, and transportation services. Flooding can destroy roads and homes that residents of the community rely upon.

The following figure shows potential annualized loss of building damage caused by flooding in the City of Wasilla.



Source: 2016 FEMA Risk Report- MSB

Figure 3-50 Potential Flood Damage- Annualized Loss

3.3.5.6 PROBABILITY OF FUTURE EVENTS

The Public Works Department states that flooding of the properties in the Snowmelt Flood Area is more common now that it has been historically due to rising winter temperatures increasing the number of freeze-thaw cycles in the winter.

Based on the FIRMs Map, 2018 State HMP, previous occurrences, and the criteria identified in Table 3-3, it is Possible that Wasilla will experience a flood event in the next five years; there is a 1 in 5 years chance of occurring (1/5=20 percent); and the history of events is greater than 10 percent but less than or equal to 20 percent likely per year.

3.3.5.7 FUTURE CONDITIONS INCLUDING CLIMATE CHANGE

Due to climate change, the nature or location of flooding events in Wasilla are not anticipated to change.

Changing Factor due to Climate Change	Description of Future Changes due to Climate Change
Extent (Magnitude/Severity)	The influence of climate change on the extent of riverine flooding events is complex. Climate change induced reductions in snowpack volume, decreased groundwater recharge, and extended and warmer summers will have complex and potentially compounding of effects upon ice jam and spring break-up flooding, for example (IPCC 2019).
Impact	Local flooding in low-lying areas of Wasilla due to spring breakup affects less than one percent of the property in the City. The City of Wasilla has not been historically impacted by flooding events.
Probability of Future Events	Breakup of the Tanana, Yukon, and Kuskokwim Rivers now occurs 7–9 days earlier on average than 120 years ago (USDA 2023). Early ice breakup affects many Alaskan communities that depend on the predictability of frozen or unfrozen rivers for wild-harvest hunting, fishing, and community connection. Early or rapid breakup can also cause severe flooding and damage to infrastructure.

3.3.6 SIGNIFICANT HAZARD POTENTIAL DAM: LAKE LUCILE DAM

As of June 2023, FEMA does not require that dams with Significant hazard ratings be profiled in HMPs. New FEMA guidelines require that High Hazard Potential Dam (HHPDs) are profiled in HMPs, so this new hazard profile will be the framework for the City to update if future guidelines require Significant hazard potential dams to be profiled, or the rating of the Lake Lucile Dam changes to High Hazard.

Losses from a potential failure of the Lake Lucile Dam will not be assessed in this HMP Update.

3.3.6.1 NATURE

Alaska Statute 46.17.900(3) defines a dam as, "an artificial barrier and its appurtenant works, which may impound or divert water." To be regulated as a dam under state jurisdiction, a barrier must meet at least one of the following three descriptions listed in the statute:

1. Have an impounding capacity at maximum water storage elevation of 50 acre-feet and be at least 10 feet tall measured from the lowest point at either the upstream or downstream toe of the dam to the crest of the dam; or
2. Be at least 20 feet tall measured from the lowest point at either upstream or downstream toe of the dam to the crest of the dam regardless of its storage capacity; or
3. Pose a threat to lives and property in the event of a failure or improper operation of the dam or barrier

Alaska dams exist for many purposes that include:

- Recreation
- Fish and wildlife habitat
- Flood control and storm water management
- Water supply
- Wastewater containment and treatment
- Hydroelectric
- Fire protection
- Mine tailings and contact water storage

The Lake Lucile Dam is used for fish and wildlife habitat as well as recreation.

Dams are categorized into classes based on hazard potential. Table 3-19 provides details for each classification of dams. The Lake Lucile Dam is classified as Class II or having Significant hazard potential.

Table 3-19 Classifications of Dam Hazard Potential

Classification	Hazard Potential	Explanation
Class I	High	If the department determines that the failure or improper operation of the barrier will result in probable loss of human life.
Class II	Significant	If the department determines that the failure or improper operation of the barrier will result in A. A significant danger to public health B. The probable loss or significant damage to homes, occupied structures, commercial property, high-value property, major highways, primary roads, railroads, or public utilities, other than losses or damage limited to the owner of the barrier; or C. Other probable significant property losses or damage, other than losses or damage limited to the owner of the barrier; or D. Probable loss of or significant damage to waters identified under 11 AAC 195.010(a) as important for the spawning, rearing, or migration of anadromous fish
Class III	Low	If the department determines that the failure or improper operation of the barrier will result in A. Limited impacts to rural or undeveloped land, rural or secondary roads, and structures; B. Property losses or damage limited to the owner of the barrier; or C. Insignificant danger to public health.

Dams are periodically inspected and given condition ratings, outlined below. The Lake Lucile Dam was last inspected on October 9, 2019 and was given a Satisfactory rating on January 28, 2020.

Table 3-20 Dam Condition Ratings and Descriptions

Condition Rating	Rating Description
Satisfactory	No existing or potential dam safety deficiencies are recognized.
Fair	No existing or potential dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in dam safety deficiency.
Poor	A dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary. Poor may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficient. Further investigations and studies are necessary.
Unsatisfactory	A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.
Not Rated	The dam has not been inspected or has been inspected but, for unknown reasons, has not been rated.

3.3.6.2 HISTORY

There have been several dam failure and non-failure events in Alaska's history, but only one has resulted in a fatality (Lake o' the Hills Dam, Anchorage, 1972). There have been no historical dam failure events of the Lake Lucile Dam.

The original dam was built by the ADF&G in 1955. The original purpose of the dam was to prevent stocked fingerling rainbow trout from leaving the lake, and to prevent wild fish from entering the lake. Construction of the dam raised the lake level by approximately 1.5 feet. Drawings dated 1966 show a dam modification which raised the lake level an additional 9.5 inches. The dam was primarily constructed of lumber treated with creosote (HDR 2013).

The dam was partially rehabilitated, and a fish passage structure was added in 1992. Also in 1992, ADF&G changed the stocking program, and starting in 1997, introduced only sterile fish of catchable size in the lake. Once the stocking program was changed, the original purpose of the dam was no longer applicable. The sole purpose of the dam became to maintain the water level of a recreational lake (HDR 2013).

In 2011, the Alaska Department of Natural Resources (ADNR), Dam Safety and Construction Unit conducted a field inspection at Lake Lucile dam and documented the dam to be in poor condition with rotten wood throughout the dam. The report recommended rehabilitation of the Lucile Lake dam to withstand expected hydrologic, ice and seismic loading. In 2011, as a result of new residential construction downstream of the dam, ADNR exerted regulatory jurisdiction over the dam and raised the hazard potential classification to Class II (significant) (HDR 2013).

In 2012, because of concerns about failure of the wood dam, gabion baskets were installed just downstream of the wood dam. Figure 3-51 shows the old dam, fish passage, and gabion baskets.

Source: HDR 2013

Figure 3-51 Old Lake Lucile Dam (August 10, 2012)

In 2012, the City of Wasilla proposed to rehabilitate the Lucile Lake Dam because the structure had reached the end of its useful life and was in poor condition. A new fish passage structure was not proposed as part of the dam rehabilitation, as ADF&G stated that the existing fish passage impeded Lake Lucile for decades and creating a new fish passage could allow invasive northern pike to enter the lake.

Construction of the new dam began in December 2012 and was completed in June 2013 (HDR 2013). In the reconstruction, a more robust spillway was added, and ownership of the dam was transferred from ADF&G to the City of Wasilla. Figure 3-52 shows the reconstructed dam, which is made from steel sheet pile.

Source: HDR 2013

Figure 3-52 Reconstructed Lake Lucile Dam (June 27, 2013)

3.3.6.3 LOCATION

Lucile Lake is located in the heart of the City of Wasilla. It is approximately 360 acres with a maximum depth of 20 feet. The north and east shores are continuously developed residential areas. There is a hotel, restaurant, and flight service on the north shore. The south and west shores are less developed, but there are extensive recreational activities throughout the lake. The entire lake shore is private land except for a park on the south shore owned by the Mat-Su Borough that contains a campground and public boat launch (HDR 2013).

Table 3-21 lists specifications for the Lake Lucile Dam.

Table 3-21 Lake Lucile Dam Specifications

Name	Lake Lucile Dam
NID ID	AK00182
Year Completed	1955, reconstructed in 2013
Hazard Classification	Significant
Location	61.573334, -149.4958
Owner	City of Wasilla
Dam Regulator	State of Alaska, DNR
Primary Purpose	Fish and Wildlife Pond, Recreation
Dam Height	6 feet
Dam Length	60 feet
Surface Area	362 acres
Max Storage	2051.0 acre-foot (~668,320,401 gallons)
Max Discharge	45 cubic feet/second
Spillway Type	Uncontrolled
Spillway Width	23 feet
Last Inspection Date	10/09/2019 (will be reassessed in Fall 2023)
Inspection Frequency	3 years
Condition Assessment	Satisfactory
Condition Assessment Date	01/28/2020 (will be reassessed in Fall 2023)
Emergency Action Plan (EAP) available?	Yes. Last revised 03/31/2017

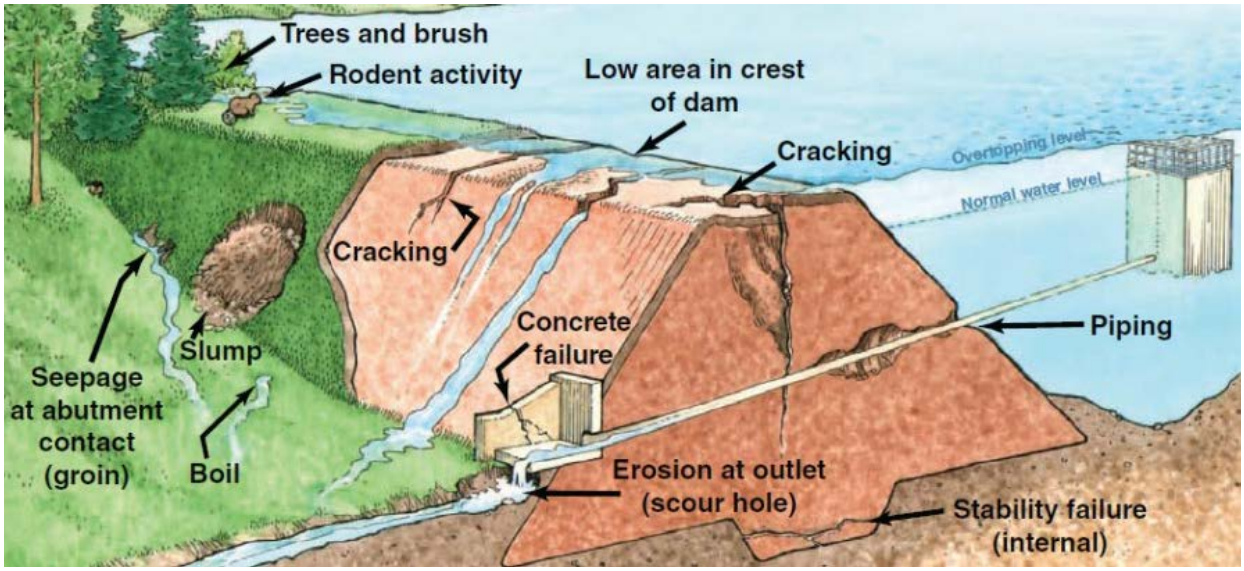
Source: National Inventory of Dams (NID) 2023

3.3.6.4 EXTENT (MAGNITUDE AND SEVERITY)

Common causes of dam failure include overtopping, foundation defects, cracking, inadequate maintenance and upkeep, and piping (Figure 3-53). Additionally, dams may fail due to natural hazards such as landslides or earthquakes.

- **Overtopping** is often a precursor of dam failure and is caused by water spilling over the top of a dam.

- **Foundation defects** include settlement and slope instability.
- **Cracking** is caused by movements such as natural settling of the dam or from earthquakes.
- **Piping** occurs when seepage through a dam is not properly filtered, and soil particles continue to progress, and form sink holes in the dam.
- **Inadequate maintenance and upkeep** may lead to dam failure if structural defects are not detected and quickly resolved.



Source: FEMA 2016- Pocket Safety Guide for Dams and Impoundments

Figure 3-53 Causes of Dam Failure

Based previous occurrences and the criteria identified in Table 3-2, the impacts from dam failure events in the City of Wasilla have been Negligible with minor injuries, the potential for critical facilities to be shut down for less than 24 hours, less than 10 percent of property or critical infrastructure being severely damaged, and little to no permanent damage to transportation or infrastructure or the economy.

3.3.6.5 IMPACT

Impacts from dam failure may include severe flash flooding, property damage, and potential loss of life.

The Lake Lucile Dam has never failed, and therefore, there have been no historical impacts from dam failure events in the City of Wasilla.

3.3.6.6 PROBABILITY OF FUTURE DAM FAILURE EVENTS

Modern dam engineering and regular safety inspections may be able to predict if/when a dam will fail. Early detection through periodic safety inspections and regular maintenance can help dam owners identify and resolve an issue before it leads to a partial or complete failure.

A quantitative dam failure analysis for the Lake Lucile Dam has not been conducted. A limited dam failure analysis has been conducted and indicated that the “sunny day” failure of the dam (a failure of the dam with the water level at the normal pool elevation and no rainfall) would exceed the expected flows for a 100-year flood and therefore, flow outside of the delineated flood plain.

Based on current dam condition assessments and the criteria identified in Table 3-3, it is Unlikely that the Lake Lucile Dam will experience a dam failure event in the next ten years; there is a 1 in 10 years chance of occurring (1/10=10 percent); and the history of events is less than or equal to 10 percent likely per year.

3.3.6.7 FUTURE CONDITIONS INCLUDING CLIMATE CHANGE

Climate change is not anticipated to influence the nature or location of future dam failure events for the Lake Lucile Dam.

Changing Factor due to Climate Change	Description of Future Changes due to Climate Change
Extent (Magnitude/Severity)	Due to climate change, spring rainfall in Wasilla may increase by 54% in the next century (UAF/SNAP 2023). This increase of rainfall may lead to future overtopping events as a heavy rainfall event may exceed the capacity of a dam's spillway. In addition to overtopping, heavy rainfall may increase events of slope failure, seepage, and piping, potentially increasing the potential for a dam failure event. Heavy rainfall nearly caused a dam failure event of the Lake Lucile Dam in 2011 (prior to the reconstruction).
Impact	As rainfall increases due to climate change, overtopping events may increase, leading to potential impacts from a dam failure event of the Lake Lucile Dam.
Probability of Future Dam Failure Events	Due to climate change, spring rainfall in Wasilla may increase by 54% in the next century (UAF/SNAP 2023). This increase of rainfall may lead to future overtopping events as a heavy rainfall event may exceed the capacity of a dam's spillway. In addition to overtopping, heavy rainfall may increase events of slope failure, seepage, and piping, potentially increasing the potential for a dam failure event. These increased factors may be able to be mitigated by regular and thorough inspections, proper and timely maintenance, and practicing implementing the EAP before a failure event.

3.4 SUMMARY OF VULNERABILITY

This section outlines the risk and vulnerability processes from various hazard impacts in determining potential losses for the community.

This section addresses the remaining portion of Element B the Local Mitigation Plan regulation checklist.

Regulation Checklist- 44 CFR § 201.6 Local Mitigation Plans
ELEMENT B. Risk Assessment
B2. Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP-insured structures that have been repetitively damaged by floods? (Requirement 44 CFR § 201.6(c)(2)(ii)) B2-a. Does the plan provide an overall summary of each jurisdiction's vulnerability to the identified hazards? B2-b. For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction? B2-c. Does the plan address NFIP-insured structures within each jurisdiction that have been repetitively damaged by floods?
Source: FEMA 2022 (Local)

3.4.1 OVERVIEW

A vulnerability analysis estimates the exposure extent that may result from a hazard event, within a given area and with a given intensity. This analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures. This then allows the communities to focus their efforts and attention on areas with the greatest risk of damage.

Table 3-22 shows the overview of the City of Wasilla's infrastructure hazard vulnerability.

Table 3-22 Vulnerability Overview

Hazard	Area's Hazard Vulnerability			
	Percent of Jurisdiction's Geographic Area	Percent of Population	Percent of Building Stock	Percent of Critical Facilities and Utilities
Earthquake	100	100	100	100
Severe Weather	100	100	100	100
Wildland and Community Fire	100	100	100	100
Volcanic Ashfall	100	100	100	100
Flood	5	5	5	0

3.4.2 POPULATION AND BUILDING STOCK

Population data for the City of Wasilla was obtained from the 2021 US Census and the DCCED. The 2021 US Census reports that the City of Wasilla's 2021 population for was 9,098 individuals, while the DCCED estimated the 2021 population to be 9,227 (Table 3-23). For the remainder of the vulnerability assessment, the larger population estimate will be used (DCCED: 9,227 individuals).

Table 3-23 Estimated Population and Building Inventory

Population		Residential Buildings	
2021 Census	DCCED 2021 Data	Total Housing Units	Total Value of Buildings*
9,098	**9,227** (used for analysis)	4,264	US Census: $1,161,940,000 HUD: **$2,625,647,544** (used for analysis)

Sources: US Census 2021 Wasilla-city population data, HUD.
*The 2021 US Census estimates median house value at $272,500. However, the United States Department of Housing and Urban Development (HUD) determined that the average structural replacement value of a 3-bedroom residential building in the nearby Village of Eklutna is $615,771 per structure.

Estimated replacement values for residential building structures were obtained from the 2021 US Census, which estimated the median home value per structure was $272,500. Replacement costs in Alaska typically exceed US Census structure estimates due to material purchasing, barge or airplane delivery, and construction in Alaska, therefore, residential replacement values are generally understated. The United States Department of Housing and Urban Development (HUD) estimates an average 3-bedroom residential structure in the nearby Village of Eklutna (17 road miles away from Wasilla) has a replacement value of $615,771 (HUD 2022). The more conservative HUD approximation for replacement value was used for this analysis. A total of 4,264 housing units were considered in this analysis. This analysis recognizes that the MSB Tax Assessments will provide the most accurate information on an individual basis.

3.4.3 VULNERABILITY ASSESSMENT METHODOLOGY

To complete this analysis, the Planning Team, along with Fairweather Science, used the State's Critical Facility Inventory and locally obtained GPS coordinate data to identify critical facility locations in the City of Wasilla. The Planning Team provided information on newly constructed facilities and these critical facilities were then mapped in relation to a potential hazard's threat exposure and vulnerability.

An analysis was conducted to assess the risks of each identified hazard. This analysis looked at the potential effects of each hazard on values of critical facilities at risk without considering the probability or level of

damage. The analysis also represents the number of people at risk from each hazard but does not estimate the number of potential injuries or deaths.

3.4.4 DATA LIMITATIONS

The provided vulnerability estimates use the best data currently available, and the methodologies used result in a risk approximation. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inevitable in any loss estimation. This is due in part from incomplete scientific knowledge or data concerning hazards and their effects on the built environment. As well as the use of approximations and simplifications, when necessary, for a comprehensive analysis.

It should be noted that the results from the quantitative vulnerability assessment are limited to the exposure of people, buildings, and critical facilities and infrastructure to the identified hazards. It was beyond the scope of this HMP Update to develop a more detailed or comprehensive assessment of risk. A more comprehensive assessment may include loss of facility/system function, annualized losses, people injured or killed, shelter requirements, and/or economic losses. Such impacts may be addressed with future updates of this HMP Update.

3.4.5 ASSET INVENTORY

Assets that may be affected by hazard events include population, residential buildings, and critical facilities and infrastructure.

A critical facility is defined as a facility that provides essential products and services to the public. Critical facilities assist in preserving the quality of life in the City of Wasilla and fulfilling important public safety, emergency response, and disaster recovery functions.

The critical facilities profiled in this plan include the following:

- Government facilities
- Emergency response services
- Medical facilities
- Emergency shelters
- Transportation facilities
- Utilities and communication
- Vulnerable populations
- National Register of Historic Places

Wasilla's critical facilities and infrastructure are listed in Table 3-24.

Table 3-24 Wasilla's Critical Facilities and Infrastructure

Facilities	No. of Staff	Facilities	Address	Estimated Value	Role During Emergency/Disaster	Facility Owner	Earthquake	Severe Weather	Wildland and Community Fire	Volcanic Ashfall	Flood
Government	33	Wasilla City Hall	290 E. Herning Ave.	$16,768,410	Coordination of emergency resources, information to the public	City	X	X	X	X	
	10	U.S. Post Office	401 N. Main St.	$3,023,600	Communication with areas outside the City will need to continue following hazard event.	Federal	X	X	X	X	
	8	Wasilla Public Works Shop/Parks Building	835 E. Blind Nick Dr.	$2,470,030	Ability to repair/service equipment will be necessary to recovery following hazard event.	City	X	X	X	X	
	6	Wasilla Roads Shop	191 E. Centaur Ave.	$2,136,640	Ability to repair/service equipment will be necessary to recovery following hazard event.	City	X	X	X	X	

Facilities	No. of Staff	Facilities	Address	Estimated Value	Role During Emergency/Disaster	Facility Owner	Earthquake	Severe Weather	Wildland and Community Fire	Volcanic Ashfall	Flood
	5	Wasilla Airport Shop	701 S. Beacon St.	$701,570	Ability to repair/service equipment will be necessary to recovery following hazard event.	City	X	X	X	X	
Emergency Services	30	Wasilla Police Department	801 N. Wasilla-Fishook Rd.	$12,071,464	Emergency response services.	MSB	X	X	X	X	
	16	Central Mat-Su Fire Department (Station 6-1)	101 W. Swanson St.	$7,404,000	Building houses emergency response equipment and MSB EOC.	MSB	X	X	X	X	
	24	MATCOM Dispatch Center	1800 E. Parks Hwy.	$6,159,690	Emergency Dispatch Center.	MSB	X	X	X	X	
Medical Facilities	7	Mat-Su Regional Urgent Care	950 E. Bogard Rd.	$9,227,300	Treat injuries and life-threatening illnesses following hazard emergency.	MSB	X	X	X	X	
	6	Wasilla Medical Clinic	1700 E. Parks Hwy.	$1,173,600	Treat injuries and life-threatening illnesses following hazard emergency.	City	X	X	X	X	
	44	Benteh Nuutah Valley Native Primary Care Center	1001 S. Knik-Goose Bay Rd.	$43,499,200	Treat injuries and life-threatening illnesses following hazard emergency.	Southcentral Foundation	X	X	X	X	
Shelters	84	Wasilla High School	701 E. Bogard Rd.	$44,998,100	Building able to provide emergency shelter for evacuees or victims of hazard event.	MSB	X	X	X	X	
	55	Wasilla Middle School	650 E. Bogard Rd.	$33,195,400	Building able to provide emergency shelter for evacuees or victims of hazard event.	MSB	X	X	X	X	
	51	Iditarod Elementary School	455 E. Carpenter Cir.	$19,331,000	Building able to provide emergency shelter for evacuees or victims of hazard event.	MSB	X	X	X	X	
	23	Burchell High School	1775 W. Parks Hwy.	$7,776,900	Building able to provide emergency shelter for evacuees or victims of hazard event.	MSB	X	X	X	X	
	7	Menard Sports Complex	1001 S. Clapp St.	$51,509,570	Building able to provide emergency shelter for evacuees or victims of hazard event.	City	X	X	X	X	
	12	City of Wasilla Library	500 N Crusey St.	$18,524,170	Building able to provide emergency shelter for evacuees or victims of hazard event.	City	X	X	X	X	
	3	Wasilla Museum & Visitors Center	391 Main St.	$5,450,390	Building able to provide emergency shelter for evacuees or victims of hazard event.	City	X	X	X	X	
	3	Museum Townsite Buildings	Multiple locations	$1,863,380	Building able to provide emergency shelter for evacuees or victims of hazard event.	City	X	X	X	X	
	3	Dorothy G. Page Museum	323 N. Main St.	$2,132,830	Building able to provide emergency shelter for evacuees or victims of hazard event.	City	X	X	X	X	

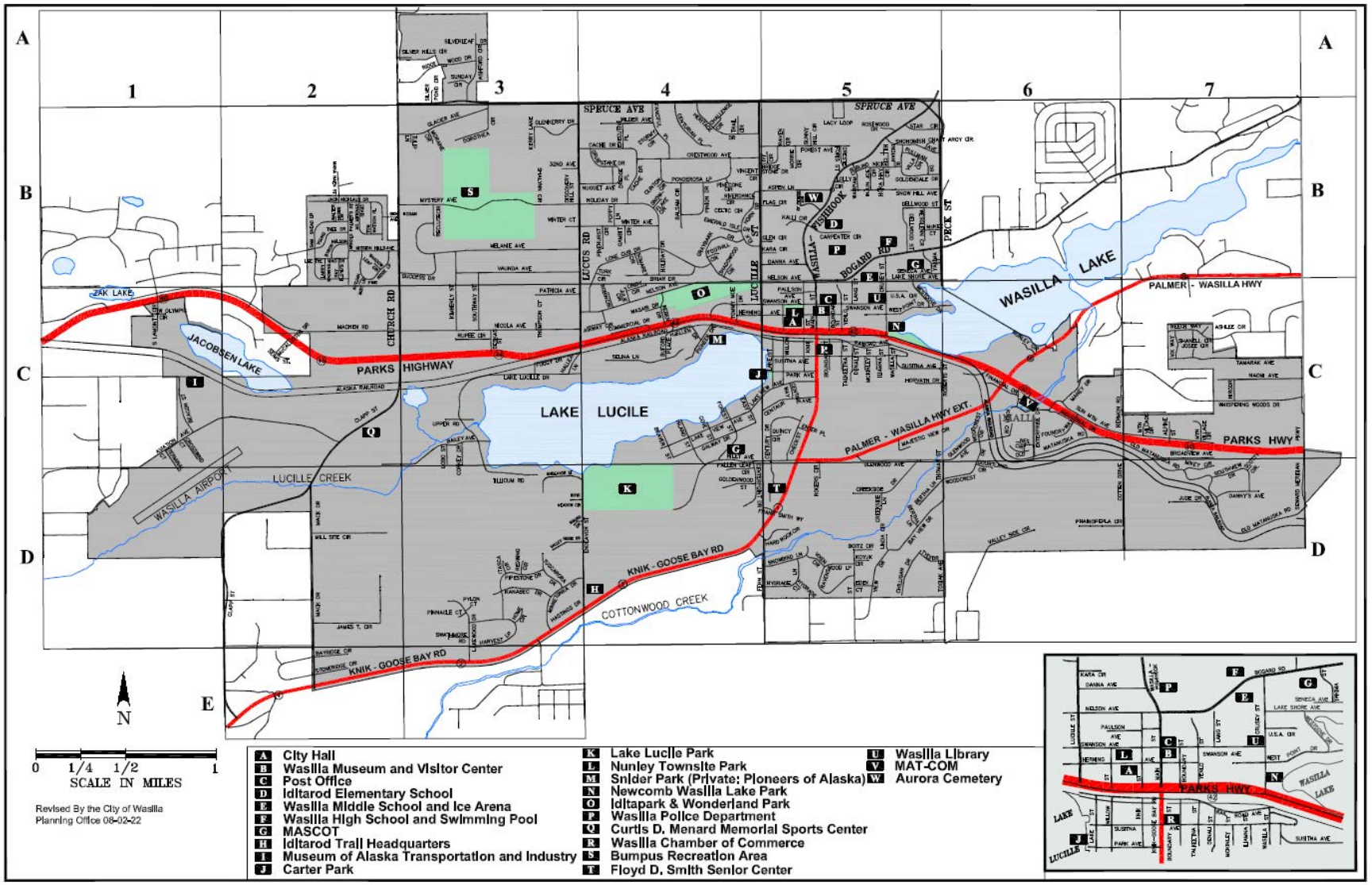
Facilities	No. of Staff	Facilities	Address	Estimated Value	Role During Emergency/Disaster	Facility Owner	Earthquake	Severe Weather	Wildland and Community Fire	Volcanic Ashfall	Flood
Transportation Facilities	1	Wasilla Airport	900 S. Beacon St.	$1,040,000	Airlifting supplies & emergency personnel and evacuating injured.	City	X	X	X	X	
	0	Mat-Su Community Transit (MASCOT)	225 W. Riley Ave.	$2,661,920	Evacuation transportation.	MSB	X	X	X	X	
	0	Alaska Railroad	7 miles in City limits	Estimated at $10 million per mile $70,000,000	Transport of supplies, equipment, and emergency personnel.	AKRR	X	X	X	X	
Utilities & Communication	1	Wastewater Treatment	2880 E. Jude St.	$7,033,710	Prevent contamination of water supply and to prevent spread of illnesses.	City	X	X	X	X	
	0	Spruce Well & Reservoir	190 E. Spruce Ave	$2,438,120	Provide potable water supply is critical to human existence.	City	X	X	X	X	
	0	Bumpus Well & Reservoir	2050 W. Mystery Ave.	$109,100	Provide potable water supply is critical to human existence.	City	X	X	X	X	
	0	Iditarod Well & Reservoir	603 E. Carpenter Cir.	$1,891,190	Provide potable water supply is critical to human existence.	City	X	X	X	X	
	0	Susitna Well & Reservoir	1150 E Susitna Ave	$2,622,840	Provide potable water supply is critical to human existence.	City	X	X	X	X	
	0	Richmond Hills Booster Station	930 S. Enterprise St.	$606,480	Provide potable water supply is critical to human existence.	City	X	X	X	X	
	0	Water Pressure Reducing Valve Building	3680 E Old Matanuska Rd	$896,200	Provide potable water supply is critical to human existence.	City	X	X	X	X	
	0	Wasilla Downtown Bulk Water Station	550 N Weber Dr	$1,241,840	Provide potable water supply is critical to human existence.	City	X	X	X	X	
	0	MTS Sub-station	477 E. Susitna Ave.	$324,400	Communication with areas outside Wasilla will need to continue following hazard event.	MEA	X	X	X	X	
	0	MEA Herning Sub-station	South end of Denali St.	$425,900	Provide electrical power to vital service operations.	MEA	X	X	X	X	
Vulnerable Populations	272	Wasilla Area Seniors, Inc. (WASI) (assisted living)	1301 S. Century Cir.	$930,200	Vulnerable populations	WASI	X	X	X	X	
	131	Primrose Retirement Community of Alaska (nursing home, assisted living, independent living, townhome villas)	889 Elkhorn Dr.	$17,388,200		Primrose Senior Holdings	X	X	X	X	
	16	Briar Rose Assisted Living Facility	174 W. Spruce Ave.	$262,300		Private	X	X	X	X	
	11	Comfort Rose Assisted Living Facility	1450 Grubstake Trail.	$492,200		Private	X	X	X	X	

Facilities	No. of Staff	Facilities	Address	Estimated Value	Role During Emergency/Disaster	Facility Owner	Earthquake	Severe Weather	Wildland and Community Fire	Volcanic Ashfall	Flood
National Registerof Historic Places	4	Teeland Country Store (now Krazy Moose Subs)	405 E Herning Ave	$630,510*	National Register of Historic Places	City	X	X	X	X	
	0	Oscar and Blanche Tryck House	291 E Parks Hwy	$94,100		Tryck Joint Revicable	X	X	X	X	
	3	Wasilla Depot (now Chamber of Commerce)	1155 E Depot Rd	$1,023,700		City	X	X	X	X	
	80	Wasilla's First School House (now in historic townsite behind museum)	323 Main St	$177,100*		City	X	X	X	X	
	5	Whitney Section House (now located at the Museum of Transportation and Industry (MATI))	3800 W Museum Dr	$315,000		Museum AK Trans & Ind, Inc.	X	X	X	X	
Total	**954**			**$402,022,254**							

Source: City of Wasilla 2023, MSB Tax Records (2023 Appraised Value)

*Indicates when the more conservative insured value was used over appraised value.

Figure 3-54 shows the location of the majority of Wasilla's critical facilities. Some identified facilities/locations are not critical facilities.



Source: City of Wasilla 2022

Figure 3-54 Map of Wasilla's Critical Facilities

3.4.6 VULNERABILITY EXPOSURE ANALYSIS

Table 3-25 summarizes the results of the vulnerability exposure analysis for loss estimations in the City of Wasilla. Section 3.4.6.1 contains a narrative regarding risk and potential losses in the City of Wasilla.

Table 3-25 City of Wasilla's Vulnerability Exposure Analysis

	Earthquake	Severe Weather	Wildland and Community Fire	Volcanic Ashfall	Flood
Government Facilities	Bldgs: 5 Occ: 62 Value: $25,100,250	Bldgs: 5 Occ: 62 Value: $25,100,250	Bldgs: 5 Occ: 62 Value: $25,100,250	Bldgs: 5 Occ: 62 Value: $25,100,250	Bldgs: 0 Occ: 0 Value: $0
Emergency Services	Bldgs: 3 Occ: 70 Value: $25,635,154	Bldgs: 3 Occ: 70 Value: $25,635,154	Bldgs: 3 Occ: 70 Value: $25,635,154	Bldgs: 3 Occ: 70 Value: $25,635,154	Bldgs: 0 Occ: 0 Value: $0
Medical Facilities	Bldgs: 3 Occ: 57 Value: $53,900,100	Bldgs: 3 Occ: 57 Value: $53,900,100	Bldgs: 3 Occ: 57 Value: $53,900,100	Bldgs: 3 Occ: 57 Value: $53,900,100	Bldgs: 0 Occ: 0 Value: $0
Shelters	Bldgs: 9 Occ: 241 Value: $184,781,740	Bldgs: 9 Occ: 241 Value: $184,781,740	Bldgs: 9 Occ: 241 Value: $184,781,740	Bldgs: 9 Occ: 241 Value: $184,781,740	Bldgs: 0 Occ: 0 Value: $0
Transportation Facilities	Bldgs: 3 Occ: 1 Value: $73,701,920	Bldgs: 3 Occ: 1 Value: $73,701,920	Bldgs: 3 Occ: 1 Value: $73,701,920	Bldgs: 3 Occ: 1 Value: $73,701,920	Bldgs: 0 Occ: 0 Value: $0
Utilities & Communication	Bldgs: 10 Occ: 1 Value: $17,589,780	Bldgs: 10 Occ: 1 Value: $17,589,780	Bldgs: 10 Occ: 1 Value: $17,589,780	Bldgs: 10 Occ: 1 Value: $17,589,780	Bldgs: 0 Occ: 0 Value: $0
Vulnerable Populations	Bldgs: 4 Occ: 430 Value: $19,072,900	Bldgs: 4 Occ: 430 Value: $19,072,900	Bldgs: 4 Occ: 430 Value: $19,072,900	Bldgs: 4 Occ: 430 Value: $19,072,900	Bldgs: 0 Occ: 0 Value: $0
National Register of Historic Places	Bldgs: 5 Occ: 92 Value: $2,240,410	Bldgs: 5 Occ: 92 Value: $2,240,410	Bldgs: 5 Occ: 92 Value: $2,240,410	Bldgs: 5 Occ: 92 Value: $2,240,410	Bldgs: 0 Occ: 0 Value: $0

3.4.6.1 EXPOSURE ANALYSIS – NARRATIVE SUMMARIES

Earthquake

Impacts from earthquakes include structural damage to buildings, damage to roadways, loss of utilities, ground failure leading to subsidence, fault displacement, and liquefication.

The City of Wasilla is in the Cook Inlet basin, which is a northeast-trending fore arc basin located between the Chugach and Kenai Mountains to the south and the Alaska Range and the Aleutian volcanic arc to the north and west. Major fault zones are close to the margin of the basin. In relation to Wasilla, the Castle Mountain fault is to the north, the Bruin Bay fault is to the southwest, and the Border Ranges fault is to the south/southeast.

The City of Wasilla has not been severely impacted by historical earthquakes, but shaking has been felt from earthquakes generates hundreds of miles away. Roads outside of the City limits were severely

damaged due to lateral spread during the November 30, 2018, M7.1 Anchorage earthquake. It was determined in the 2016 FEMA Risk Report that numerous critical facilities in Wasilla would be affected by the M7.5 Castle Mountain earthquake scenario (see Section 3.3.1.4).

The entire existing and future population of the City of Wasilla, residences, and critical facilities and infrastructure could be exposed to the effects of an earthquake.

This includes approximately:

- 9,227 people in 4,264 residences (approximate value $2,625,647,544)
- 62 people in 5 government facilities (approximate value $25,100,250)
- 70 people in 3 emergency service facilities (approximate value $25,635,154)
- 57 people in 3 medical facilities (approximate value $53,900,100)
- 241 people in 9 emergency shelters (approximate value $184,781,740)
- 1 person in 3 transportation facilities, including 7 miles of Alaska Railroad tracks (approximate value $73,701,920)
- 1 person in 10 utility and communication facilities (approximate value $17,589,780)
- 430 people in 4 nursing homes/assisted living facilities (approximate value $19,072,900)
- 92 people in 5 national register of historic places (approximate value $2,240,410)

Impacts to residential structures, critical facilities and infrastructure, and future populations are not anticipated to increase due to the influence of climate change on earthquakes.

Severe Weather

The City of Wasilla experiences episodes of the following severe weather events: extreme cold, freezing rain/ice storms, heavy and drifting snow, blizzard, winter storm, heavy rain, high winds, dust storm, and drought.

Typical impacts associated with severe weather events may change depending on the event, but some impacts may include roof collapse, damage from falling trees and power lines, injury and/or death resulting from snow machine or vehicle accidents, and frostbite/hypothermia/overexertion while outside shoveling heavy snow in extreme cold temperatures. Heavy snow followed by a quick thaw may cause substantial flooding. Impacts from extreme cold include frostbite, hypothermia, congealed fuel, frozen pipes, utility disruptions, carbon monoxide poisoning, and halting transportation from fog and ice.

The City of Wasilla is very concerned with high wind events that have damaged critical facilities in the past.

The entire existing and future population of the City of Wasilla, residences, and critical facilities and infrastructure could be exposed to the effects of severe weather.

This includes approximately:

- 9,227 people in 4,264 residences (approximate value $2,625,647,544)
- 62 people in 5 government facilities (approximate value $25,100,250)
- 70 people in 3 emergency service facilities (approximate value $25,635,154)
- 57 people in 3 medical facilities (approximate value $53,900,100)
- 241 people in 9 emergency shelters (approximate value $184,781,740)
- 1 person in 3 transportation facilities, including 7 miles of Alaska Railroad tracks (approximate value $73,701,920)
- 1 person in 10 utility and communication facilities (approximate value $17,589,780)
- 430 people in 4 nursing homes/assisted living facilities (approximate value $19,072,900)

- 92 people in 5 national register of historic places (approximate value $2,240,410)

Impacts to residential structures, critical facilities and infrastructure, and future populations are anticipated to increase due to the influence of climate change and impacts are event-dependent.

Wildland and Community Fire

Both wildland and community fires pose a risk to the residents and infrastructure in the City of Wasilla. The State of Alaska, Division of Forestry responds to wildland fires within the MSB; 80% of the wildland fires that they respond to in the MSB are located within the cities of Houston, Palmer, and Wasilla, or the "Core Area".

Typical impacts associated with a wildland fire event include: the potential for loss of life and property, destruction of livestock and pets, the destruction of forest resources, and contaminated water supplies. Buildings are more vulnerable to the impacts of wildland fire if they closer to the outer edge of town, have a lot of vegetation surrounding the structure, and those constructed with wood.

According to the AICC, 8,507 wildland fires occurred within 100 miles of Wasilla in an 83-year period (1939-2022). Of the 8,507 total wildfires, 77 were prescribed fires. Since 1939, 263 wildland fires burned 0.5 acres or more, of which, 41 were prescribed fires.

Since 1939 and within 100 miles of Wasilla, there have been 18 fires that exceeded 500 acres, of which, 6 were prescribed fires. The largest natural fire burned a total of 196,610 acres in 2014 (Funny River Fire) and was caused by humans. The second largest natural fire that occurred within 100 miles of Wasilla occurred in 2019 (Swan Lake Fire), which burned 167,182.9 acres, and was caused by lightning. The largest prescribed fires both burned 1,554 acres in 2016 and 2019.

Since the 2018 HMP, there have been 87 wildland fire events within 100 miles of Wasilla. Of the 87 events, 7 were prescribed fires.

The entire existing and future population of the City of Wasilla, residences, and critical facilities and infrastructure could be exposed to the effects of a wildland or community fire.

This includes approximately:

- 9,227 people in 4,264 residences (approximate value $2,625,647,544)
- 62 people in 5 government facilities (approximate value $25,100,250)
- 70 people in 3 emergency service facilities (approximate value $25,635,154)
- 57 people in 3 medical facilities (approximate value $53,900,100)
- 241 people in 9 emergency shelters (approximate value $184,781,740)
- 1 person in 3 transportation facilities, including 7 miles of Alaska Railroad tracks (approximate value $73,701,920)
- 1 person in 10 utility and communication facilities (approximate value $17,589,780)
- 430 people in 4 nursing homes/assisted living facilities (approximate value $19,072,900)
- 92 people in 5 national register of historic places (approximate value $2,240,410)

Impacts to residential structures, critical facilities and infrastructure, and future populations are anticipated to increase due to the influence of climate change.

Volcanic Ashfall

Volcanic ashfall is the most common and widespread volcanic hazard. Volcanic ash is a mixture of rock, mineral, and glass particles that are expelled from a volcano during an eruption. These particles are very small and have low density, which allows them to travel long distances, typically by wind. These small particles can have jagged edges, which pose a hazard when breathed in or land on the skin. Ashfall can travel thousands of miles from the eruption site.

While in the air, ash can cause problems for jet engines, forcing airlines to cancel flights. An ashfall that leaves a thick layer of ash may collect on homes, causing roof collapse, clogged gutters, or damage to other machinery. Animals may also be affected by volcanic ash by having difficulty finding food, or water and food sources are contaminated.

Wasilla experienced volcanic ashfall in 1989 and 1990 from Mt. Redoubt, and in 1992 from Mt. Spurr. These eruptions disrupted transportation and industry, particularly jet aircraft. If another eruption of the same magnitude as Novarupta occurred, Wasilla would likely be impacted by another volcanic ashfall event. Another event of this magnitude would severely impact transportation and halt the air travel for many days to weeks.

The entire existing and future population of the City of Wasilla, residences, and critical facilities and infrastructure could be exposed to the effects of volcanic ashfall.

This includes approximately:

- 9,227 people in 4,264 residences (approximate value $2,625,647,544)
- 62 people in 5 government facilities (approximate value $25,100,250)
- 70 people in 3 emergency service facilities (approximate value $25,635,154)
- 57 people in 3 medical facilities (approximate value $53,900,100)
- 241 people in 9 emergency shelters (approximate value $184,781,740)
- 1 person in 3 transportation facilities, including 7 miles of Alaska Railroad tracks (approximate value $73,701,920)
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- 430 people in 4 nursing homes/assisted living facilities (approximate value $19,072,900)
- 92 people in 5 national register of historic places (approximate value $2,240,410)

It is unclear how climate change will influence future volcanic eruptions and how future volcanic ashfall events will impact residential structures, critical facilities and infrastructure, and future populations of the City of Wasilla.

Flood

The City of Wasilla experiences six primary types of flooding: rainfall-runoff flood, snowmelt flood, groundwater flood, ice-jam flood, flash flood, and fluctuating lake level floods.

Flooding is a minor concern in the City as the City has a moderate to low FEMA flood hazard rating, with concerns primarily along Cottonwood Creek. Local flooding in low-lying areas of Wasilla due to spring breakup affects less than one percent of the property in the City. Roads and utilities are the systems generally impacted by this hazard event.

The City participates in the NFIP, and the MSB acts as the Floodplain Manager for the City. To date, the City of Wasilla has experienced **1 repetitive loss** due to flooding (single family home in 2012). Details of this loss are in Table 4-4.

There are five residential properties, one commercial retail store, and one restaurant located in the 100-year flood zone. Additionally, there are three properties in the Snowmelt Flood Area that flood annually due to spring breakup and freeze-thaw events of Emerald Lake during the winter. The Public Works Department states that this location is a marshy/boggy area that was previously a creek bottom. The ditch was filled in and houses were built on top, which is why this location is susceptible to flooding. There are culverts in the area, but water floods the properties from below from the drainage basin. These properties are not identified on the 100-year flood zone map nor the FIRMs map.

A small portion (~5%) of the existing population of the City of Wasilla, residences, and facilities and could be exposed to the effects of a flood. There are no critical facilities in the 100-year flood zone.

This includes approximately:

- 15 people in 5 residences in the 100-year flood zone (approximate value $2,357,200)
- 1 restaurant (approximate value $417,000)
- 1 commercial retail store (approximate value $2,107,100)
- 9 people in 3 residences **not** in the 100-year flood zone (approximate value $1,017,900)

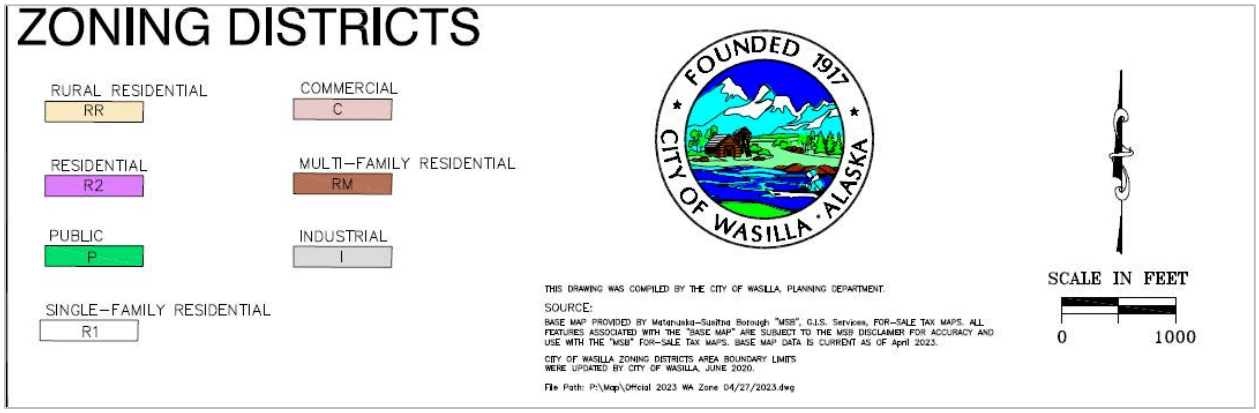
Impacts to residential structures and future populations are anticipated to increase due to the influence of climate change.

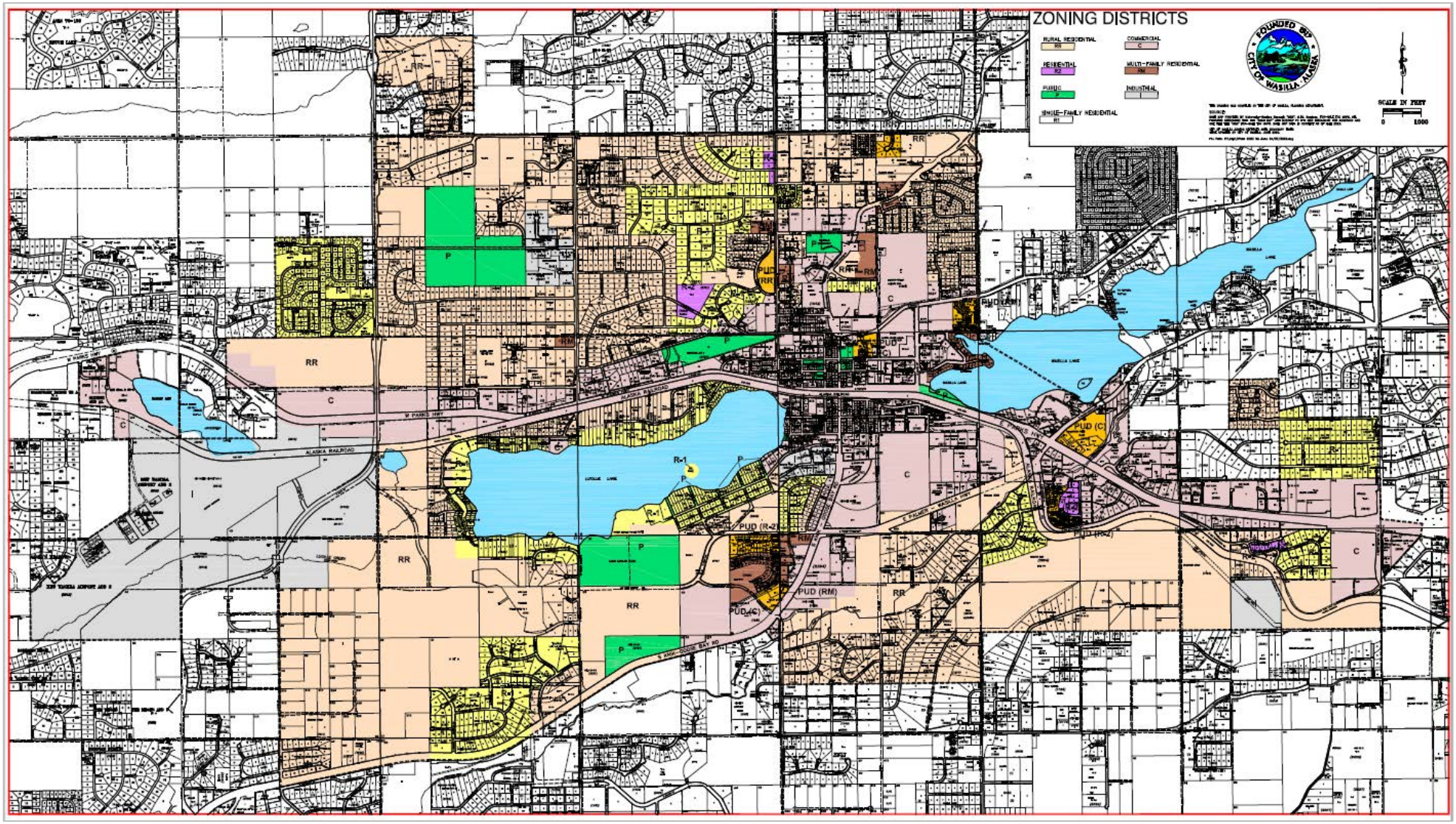
3.4.7 LAND USE IN THE CITY OF WASILLA

The City of Wasilla spans approximately 13 square miles, and the land area is dominated by private ownership. As of 2022, approximately 29.76% of the land within the City limits is undeveloped. Some of these lands include wetlands or other unsuitable and expensive areas to develop. The major land use in the City is residential at 33.9%, which includes a mix of low-density rural residential and single-family subdivisions. Approximately 6.6% contains more-dense residential including duplex and multifamily.

Commercial land use occupies a fairly limited land area at approximately 7.98%; although, because of its high visibility and linear development along major roadways, it is perceived as more dominant. Industrial uses comprise 2.45%, and remaining uses, including institutional, parks, and limited state and federal public parcels (developed and undeveloped), comprise 19.27% of overall land use (MSB 2022 Tax Records).

Figure 3-55 shows the 2023 zoning districts in Wasilla. The accompanying legend is below.



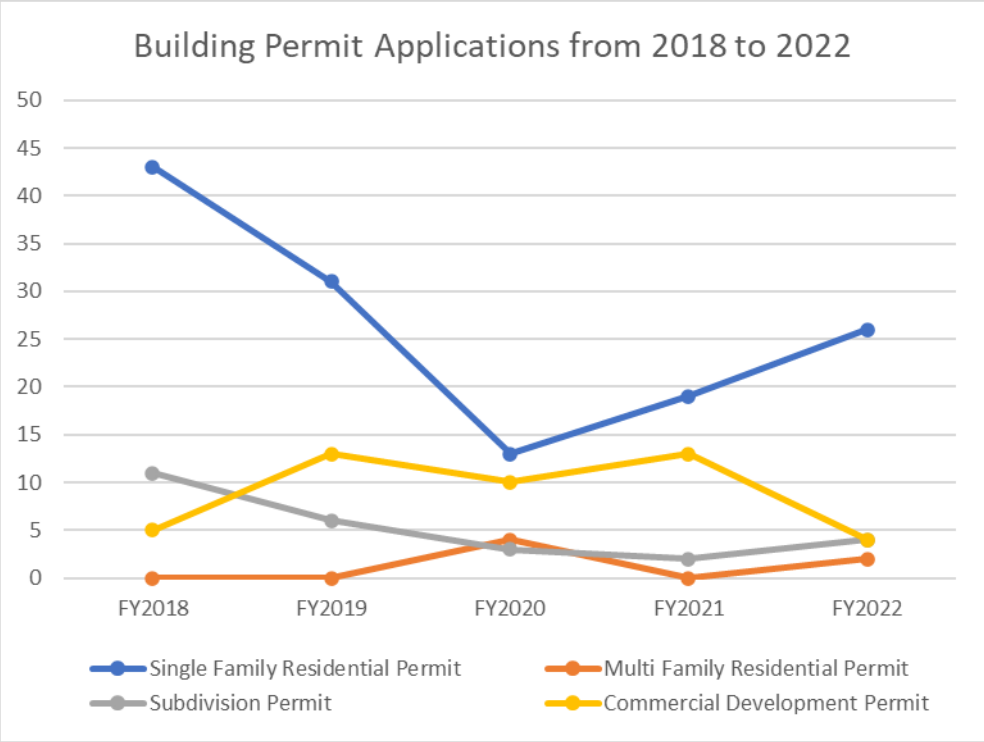


Source: City of Wasilla 2023

Figure 3-55 City of Wasilla 2023 Zoning Map

The population density for Wasilla in 2020 was 790.4 persons per square mile, up from 632.4 in 2010. The State of Alaska has a population density of 1.3 persons per square mile while MSB has approximately 4.3 persons per square mile. Between 2010 and 2020, the number of housing units in the City increased by 18.1% from 3,277 to 3,869 units. The 2021 Census revealed that 54.4% of the housing units in Wasilla were owner-occupied while 45.6% were renter-occupied. The overall MSB 2021 Census data revealed that 80.99% of housing units were owner-occupied and 19.01% of units were renter occupied.

Between 2018 and 2022, the City received an average of 26 single-family residential, 3 multifamily residential, 5 subdivision, and 9 commercial development building permit applications per year. Figure 3-56 illustrates the number of building permit applications received from 2018 to 2022.



Source: City of Wasilla 2023

Figure 3-56 Building Permit Applications Received (2018-2022)

The City is growing to the east along its two main transportation corridors: the Parks Highway and the Palmer-Wasilla Highway. Since this HMP was originally adopted in 2005, Wasilla has seen much new development. Wasilla's development history since 2005 is outlined below:

- 2005-2008:
  - New Lowe's Home Improvement Store
  - Demolition of the former Cottonwood Creek Mall with replacement by a Target store as an anchor, surrounded by Famous Footwear, GameStop, Walgreens Pharmacy, and other stores in the complex
  - Sportsman's Warehouse added (2007)
  - Wal-Mart Superstore addition (2007)
- 2009
  - Additions to both Fred Meyer and Alaska Industrial Hardware
- 2010
  - Red Robin and the Coming Attractions Theatres ("The Valley Cinema") 12-plex cinema were built.

- 2015
  - Valley Family Fun Center was built next to the cinema.
- 2018-current
  - The Parks Highway north of Wasilla was widened in a multi-phase project that was concluded in 2018, which includes improvements spanning from Lucus Road to the Big Lake cut-off. Phase 3 of this project was completed in 2022 which added a 2-lane divided highway with a traffic light at the intersection of Parks Highway and Big Lake Road.
  - The Shoppes at Sun Mountain 6,000 sq ft/32-acre shopping center opened with two stores: Alaska's first Sonic Drive-In restaurant (2019) and Planet Fitness (2020)
    - Krispy Kreme was added in 2020
    - The following stores and services are currently within the Shoppes at Sun Mountain (April 2023)
      - Fred Meyer fuel station, The Salvation Army, Six Roblee's Inc., Allen & Petersen Appliance Center, The Transmission Center, The Trout House, The Fish House, Windbreak Hotel, Tacos Cancun Mexican Grill, Cake Studio
- 2021
  - Wasilla saw over 160,000 square feet of new construction and it is actively working to market itself as an attractive business location to encourage national and regional businesses to open in local commercial space.
- 2022
  - Donut King opens 2nd location at the corner of Parks Highway and Palmer Wasilla Highway.

Parks Highway MP 48.8 to 52.3 Reconstruction Project is expected to resume in Spring 2023. The Alaska Department of Transportation, in cooperation with QAP, is upgrading the existing two-lane highway to a four-lane divided highway. Crews will be installing continuous highway lighting, new signs, and guardrail. There will be signalized intersections at Parks Highway and Meadow Lakes Loop, Parks Highway and Johnson Road, and Parks Highway and Big Lake Road. A multi-use pathway will also be constructed along the entire length of the corridor.

3.4.8 FUTURE DEVELOPMENT

The City of Wasilla aims to maintain and upgrade their aging infrastructure. Each year, local revenue is dedicated to the City's capital improvement project budget. Table 3-26 contains a list of the City's completed and approved capital improvement projects since FY2018.

Table 3-26 City of Wasilla's Completed, Ongoing, and Proposed Capital Improvement Projects (2018-2024)

Award Year	Project Description/Comments	AwardAmount
FY2018-2021	Expand airport apron and runway	$1.5 million
	Railroad transit center land acquisition	$1.2 million
FY2019-2023	Expand airport apron and runway	$1.5 million
	Railroad transit center land acquisition	$1.2 million
FY2021-2025	Train Station Improvements	$1.05 million
	Improve airport apron areas	$775,000

Award Year	Project Description/Comments		AwardAmount
	Bury overhead powerlines		$600,000
	Riley Ave extension		$300,000
	Road paving		$4.3 million
	Building improvements at historic townsite		$75,000
	Lake Lucile campground improvements		$100,000
	Iditapark Park improvements		$100,000
	Ongoing park improvements		$125,000
Proposed FY2024	Capital Projects Fund	Comprehensive Plans Implementation	$60,000
		Lobbyist	$60,000
		Electronic Records Management	$75,000
		Equipment Replacement	$100,000
		GIS Asset Mapping & Management System	$150,000
		MaintainX Upgrade	$15,000
		Metropolitan Planning Organization	$50,000
		Municipal Separated Storm Sewer System (MS4) Program	$100,000
		Stormwater Improvements	$125,000
		Street Vacuum & Sweeper Truck	$350,000
		Electronic Message Board	$40,000
		Street Lighting LED Improvements	$15,000
		KGB Phase l Utility Relocation	$60,000
		Townsite Restoration	$30,000
		Public Works Office Renovation	$75,000
		Train Station Improvements Phase II	$50,000
		Parking Lot Striping	$10,000
		City Hall Access Improvements	$100,000
		Park Improvements	$75,000
		Lake Lucile Campground Improvements	$25,000
		Newcomb Park Restroom	$250,000
		Trackless Sweeper & Blower	$240,000
		Equipment Replacement	$18,000
		Park Improvement Matching Funds	$30,000
		Cemetery Improvements	$30,000
		Maureen McCombs Trail	$25,000

Award Year	Project Description/Comments		AwardAmount
Proposed FY2024	Vehicle Replacement Fund	Vehicle Replacement- Public Works	$200,000
		Vehicle Replacement- Mayor	$50,000
		Vehicle Replacement- Public Safety	$400,000
	Easements & Right-of-Way Fund	Easements & Right-of-Way	$25,000
	Roads Fund	City Street Paving Project	$1,000,000
		Alaska Railroad Crossing Improvements	$20,000
		Fern Street Culvert Replacement	$175,000
		Riley Avenue Matching Funds	$50,000
	Information Technology Fund	Information Technology	$104,000
	Sewer Fund	Wastewater Treatment Plant Improvements Federal	$5.7 million
		Wastewater Treatment Plant Improvements-City	$1,140,000
		Wastewater Treatment Plant Expansion	$250,000
		Septic Tank Replacements	$275,000
		Sewer System Maintenance and Repairs	$150,000
		Pumper Truck Replacement	$350,000
		Forklift Replacement	$100,000
		Wastewater Treatment Plant Control System	$75,000
		Security Cameras/Repairs	$20,000
	Water Fund	Wasilla/Palmer Waterline Quick Connect Project	$6,668,638
		Lead and Copper Rule Program	$100,000
		Water System Repairs	$125,000
		New Water Towers	$1.0 million
		Remote Sensing and Security Cameras	$30,000
		Mission Hills Fire Hydrants	$50,000
		Fire Hydrant Protection Project	$25,000
		Oversize Water Mainline Fund	$30,000
	Airport Fund	Airport Maintenance Equipment	$100,000
		Airport Security Fence Repairs	$150,000
		Airport Gate Control Improvements	$50,000
		Airport Pay Station Upgrades	$25,000
		Runway and Security Camera Repairs	$45,000

Award Year	Project Description/Comments		AwardAmount
Proposed FY2024		Airport Markings Repairs	$65,000
		Airport Apron Improvements	$250,000
	Curtis D Menard Sports Center Fund	Refrigeration R-22 Conversion	$125,000
		Parking Lot- Phase II Paving	$300,000
		Building Improvements	$25,000
		Equipment Replacement	$25,000
	2024 Capital Improvement Budget by Funding Source - **Federal Grants:** $5,700,000 - **Matanuska-Susitna Borough Grant:** $6,668,638 - **Local Funding:** $9,112,000		

Source: City of Wasilla 2023

The City established five land-use goals in its Comprehensive Plan in 2011. These goals are to:

1) Provide balanced land use patterns that support the community's future growth.
2) Encourage development opportunities that support the City's role as a regional commercial center.
3) Encourage a variety of residential housing opportunities.
4) Promote positive neighborhood identities and build a strong civic base to enhance residents' quality of life.
5) Continue to expand the City's borders as needed to allow economic development and growth in the future.

In 2022, the City received a $70,000 grant, which the City then matched, to complete a Comprehensive Economic Development Study (CEDS). This study provides a strategy-driven plan for local economic development and is a prerequisite for designation by the EDA as an Economic Development District. In June 2023, the completed CEDS report was presented to the City Council to review and adopt.

The Wasilla CEDS Steering Committee Members established goals and objectives for this project, which are outlined in Table 3-27 below. These projects outline major actions the City and other partners plan to pursue to improve local economic development in Wasilla.

Table 3-27 2023 Economic Development Goals and Objectives from CEDS Report

Goal A: Improve Infrastructure to Support Economic Resilience					
Objective 1: Upgrade water, wastewater, and stormwater infrastructure					
Action	**Timeline**	**Lead**	**Partners**	**Cost**	**Funding Sources**
a. Inventory needs and current utility map online	2023	City of Wasilla	MSB, SOA	$75,000	SOA, EDA, FEMA
b. Conduct utility rate study	2024	City of Wasilla	MSB, ADEC	$50,000	SOA, EDA, FEMA, ADEC
c. Apply for grant funding to enhance and expand reliable water and wastewater	2023-2028	City of Wasilla	MSB, ADEC, EPA, SOA	$20,000,000	SOA, EDA, FEMA
d. Meet MS4 permit requirements to develop and implement a comprehensive Storm Water Management Program	2023-2028	ADEC	City of Wasilla, MSB, City of Palmer	$2,000,000	SOA, EDA, FEMA, EPA
Objective 2: Develop regional transportation infrastructure					
Action	**Timeline**	**Lead**	**Partners**	**Cost**	**Funding Sources**
a. Update Wasilla Comprehensive Plan	2024	City of Wasilla	MSB, USDOT, FAA, DOTPF, ARRC, EDA	$250,000	City of Wasilla, EDA
b. Conduct Land Use Study	2024	City of Wasilla	MSB, USDOT, ARRC, FAA, EDA, DOTPF	$100,000	City of Wasilla, EDA
c. Adopt airport master plan to expand cargo and passenger service	2024	City of Wasilla	DOTPF, FAA, EDA, DOT	$100,000	DOTPF, FAA, private businesses
d. Leverage engagement with the Metropolitan Planning Organization (MPO) process	2023 - 2028	City of Wasilla	MSB, DOTPF, City of Palmer, MPO	$25,000	MPO, ARPA

Goal A. Improve Infrastructure to Support Economic Resilience (continued)

Objective 3: Upgrade and improve broadband access

Action	Timeline	Lead	Partners	Cost	Funding Sources
a. Develop a strategy to upgrade and improve broadband access	2024	City of Wasilla	MSB, MTA, GCI Inc.	$25,000	SOA, EDA, FEMA, ARPA

Objective 4: Increase housing development within city limits

Action	Timeline	Lead	Partners	Cost	Funding Sources
a. Identify developable land and incorporate housing into Comprehensive Plan	2024	City of Wasilla	Housing developers, AHFC, CIHA, MSB, HUD, Realtors	$50,000	City of Wasilla, MSB
b. Provide planning for residential development within city limits	2024	City of Wasilla	MSB, SOA, Planning Department, Realtors, CIHA	$100,000	City of Wasilla
c. Complete a housing needs assessment, and market demand, financial feasibility, and incentives study for higher density / high rise residential development	2024	City of Wasilla	AHFC, CIHA, MSB, Realtors	$125,000	HUD programs

Objective 5: Develop initiatives around resiliency in emergency / food security / agriculture

Action	Timeline	Lead	Partners	Cost	Funding Sources
a. Study of food security needs and existing assets	2024	City of Wasilla	MSB, SOA, FEMA, U.S. Dept. of Agriculture, food banks, grocers, food growers and distributors	$75,000	SOA, EDA, FEMA
b. Develop and implement public awareness campaign about food security and emergency preparedness	2025	City of Wasilla	MSB, FEMA	$50,000	SOA, EDA, FEMA
c. Identify locations for food storage, preparation, and processing	2025	City of Wasilla	MSB	$50,000	SOA, EDA, FEMA

Goal B: Diversify Local Economy

Objective 1: Attract new industries, e.g., manufacturing, logistics, and "value-added"

Action	Timeline	Lead	Partners	Cost	Funding Sources
a. Explore potential for creation of an economic development district and ARDOR for GWEA	2023	City of Wasilla	EDA	$100,000	DCCED, MSB, EDA
b. Study available incentives to attract new business and industries	2024	City of Wasilla	DCCED, MSB	$100,000	DCCED, MSB, EDA
c. Streamline online permit process	2024	City of Wasilla	MSB	$100,000	City of Wasilla, MSB
d. Become an EDA-designated "Tech Hub"	2023	City of Wasilla	DCCED, MSB	$150,000	City of Wasilla, MSB
e. Conduct direct marketing and outreach efforts to logistics, manufacturing, value-add companies	2024 - 2025	City of Wasilla	MSB	$100,000	EDA, City of Wasilla
f. Conduct outreach and marketing for remote workers and entrepreneurs	2023 – 2025	City of Wasilla	MSB	$100,000	EDA, City of Wasilla
g. Support development of "food hub" business to manage the aggregation, distribution, and marketing of locally-producers	2023 – 2025	City of Wasilla	MSB, U.S. Dept. of Agriculture, State Division of Agriculture		Private investment, U.S. Dept. of Agriculture

Objective 2: Provide increased workforce training

Action	Timeline	Lead	Partners	Cost	Funding Sources
a. Leverage existing needs assessment and case study analyses for local applications	2024	City of Wasilla	MSB, DOLWD, MSBSD, Mat-Su College, Charter College	$75,000	DOLWD, EDA
b. Promote training programs to meet expected workforce needs	2024-2028	City of Wasilla	MSB, MSBSD, Mat-Su College, Job Corps, Charter College, NIT	$2,000,000	DOLWD, EDA, AFL-CIO, Mat-Su Health Foundation

Goal B: Diversify Local Economy (continued)

Objective 3: Become a visitor and recreation hub

Action	Timeline	Lead	Partners	Cost	Funding Sources
a. Complete new railroad depot and "tourist enhancement district"	2024	City of Wasilla	ARRC	$2,000,000	USDOT, MSB
b. Promote hotel and accommodation development	2023 - 2028	MSCVB	City of Wasilla, MSB	$150,000	EDA
c. Deploy strategic sustainability marketing campaign attracting visitors to Wasilla	2023 - 2028	MSCVB	City of Wasilla, MSB	$150,000	City of Wasilla, MSCVB

Goal C: Improve Community Connections to Promote Resident Well-Being

Objective 1: Build an attractive Main Street District

Action	Timeline	Lead	Partners	Cost	Funding Sources
a. Conduct an MSD study of walkability, connectivity, traffic, and parking	2024	City of Wasilla	MSB, AKRR, DOT	$150,000	City of Wasilla
b. Increase lighting and pedestrian safety in downtown area	2024-2025	City of Wasilla	MSB, DOT	$250,000	Dept. of Energy, FERC, DOT

Objective 2: Increase year-round events

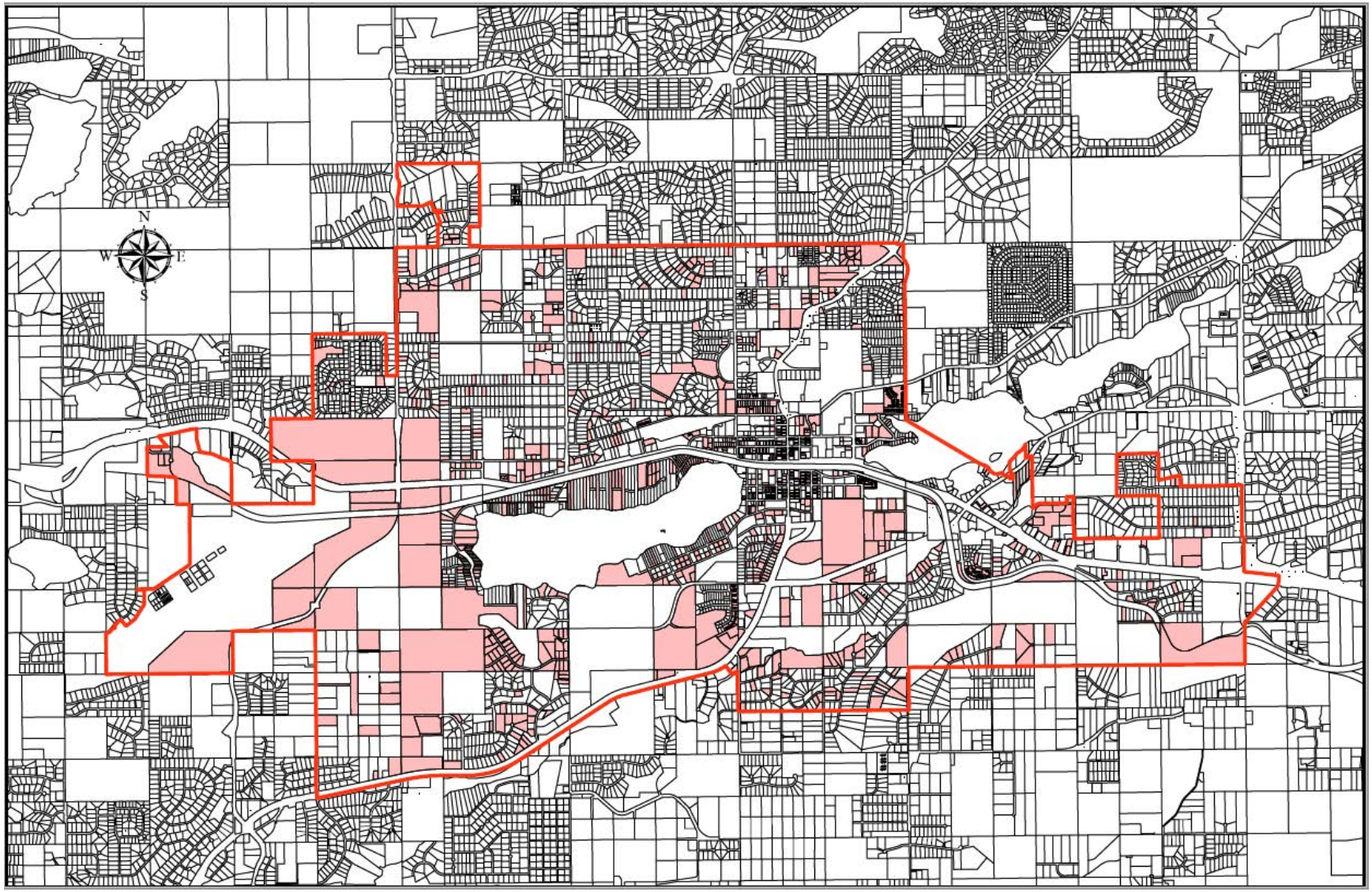
Action	Timeline	Lead	Partners	Cost	Funding Sources
a. Streamline permit process for events at public facilities	2023	City of Wasilla	MSB	$25,000	City of Wasilla, MSB
b. Support centralized events calendar	2024 -2025	City of Wasilla	MSB, MSCVB, Greater Wasilla Chamber of Commerce	$150,000	City of Wasilla
c. Establish one City-sponsored event per quarter	2025	City of Wasilla	City, Greater Wasilla Chamber of Commerce	$100,000	City of Wasilla

Goal C: Improve Community Connections to Promote Resident Well-Being (continued)					
Objective 3: Improve upon existing recreation assets					
Action	**Timeline**	**Lead**	**Partners**	**Cost**	**Funding Sources**
a. Examine opportunities to maximize usage and potential growth at Menard Center	2023-2025	City of Wasilla	MSB, MSCVB	$100,000	City of Wasilla, MSB
b. Execute CVB's Arctic Winter Games plan	2023 - 2024	City of Wasilla	MSB, MSCVB	$500,000	City of Wasilla, MSB
c. Improve connectivity to Mat-Su Borough trails systems	2024-2028	MSB	City of Wasilla, Alaska Trails, MSTPF	$2,000,000	SOA, EDA, USDOT

Source: McKinley Research Group 2023- Wasilla Comprehensive Economic Development Strategy (CEDS) Report

More information on the City's vision of where and how development will take place, can be found in the City's Comprehensive Plan, CEDS Report, and other ordinances, documents, and plans.

Figure 3-57 shows future development areas in Wasilla. Of the total 7,005.85 acres within City limits, undeveloped private parcels account for 2,084.74 acres, or 29.76% of land.

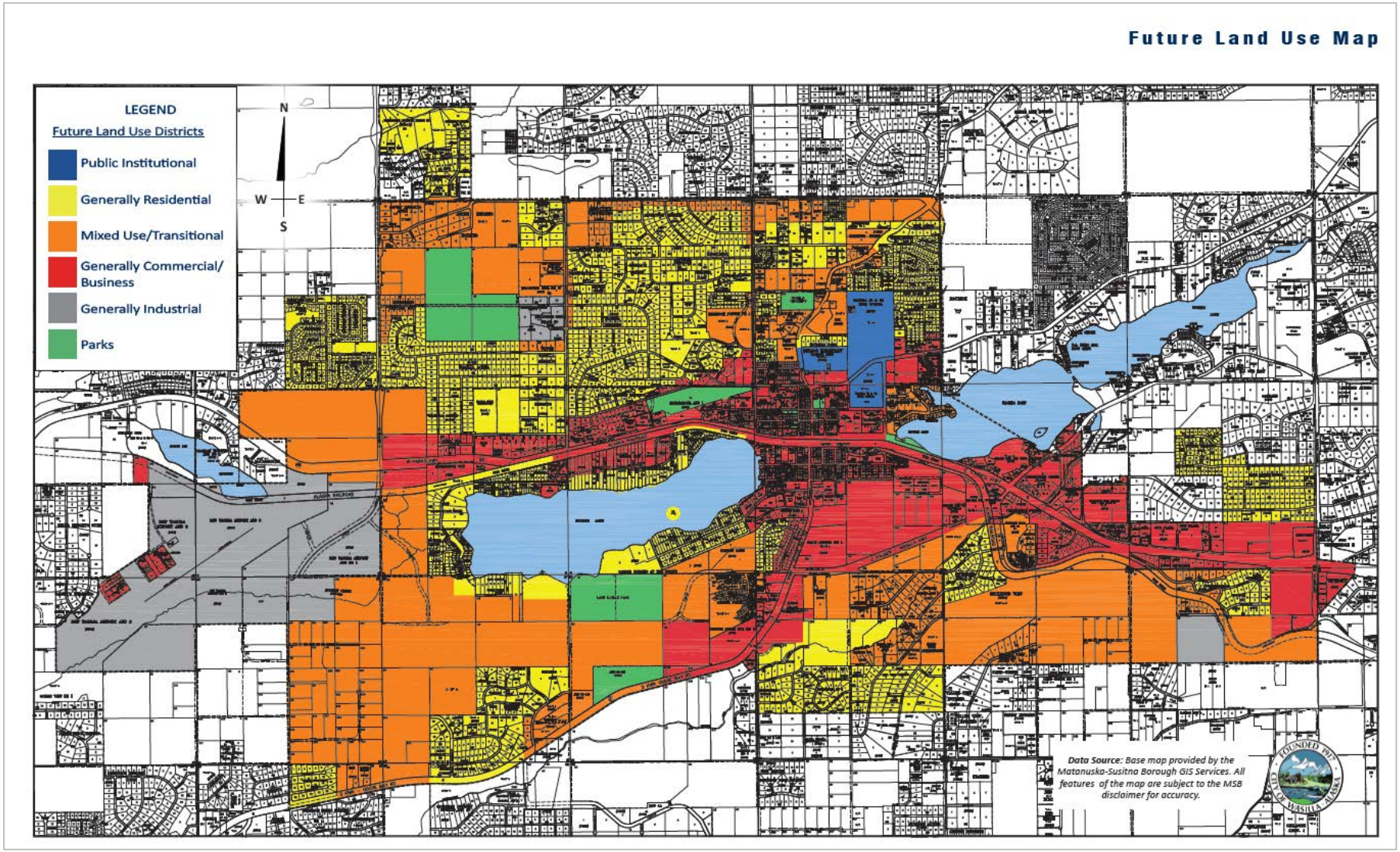


Undeveloped private parcels are highlighted in pink (2,084.74 acres)

Source: City of Wasilla Planning Department 2023

Figure 3-57 City of Wasilla Undeveloped Areas (2023)

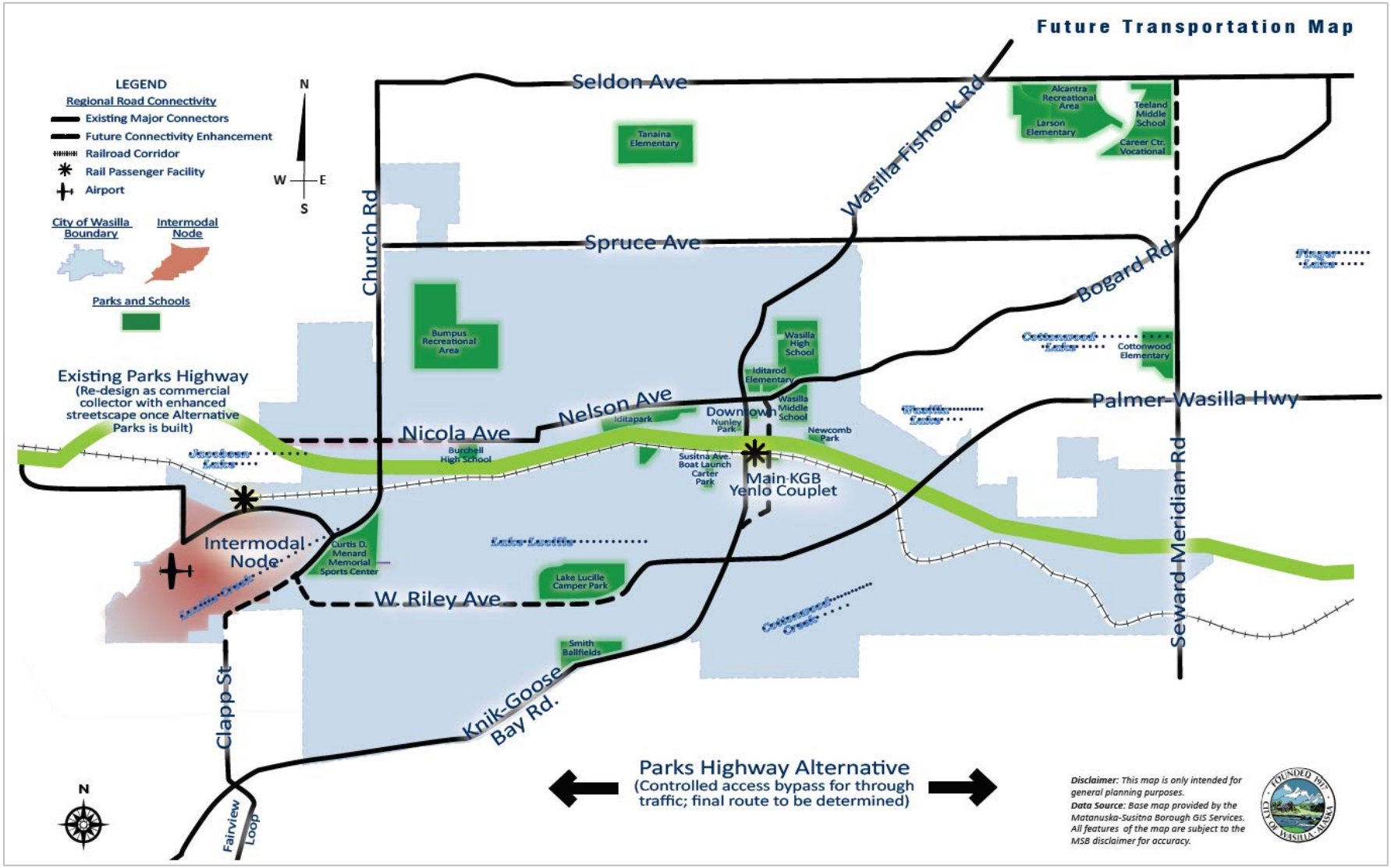
Figure 3-58 shows a map of future land use in Wasilla.



Source: 2011 Wasilla Comprehensive Plan

Figure 3-58 Future Land Use in the City of Wasilla

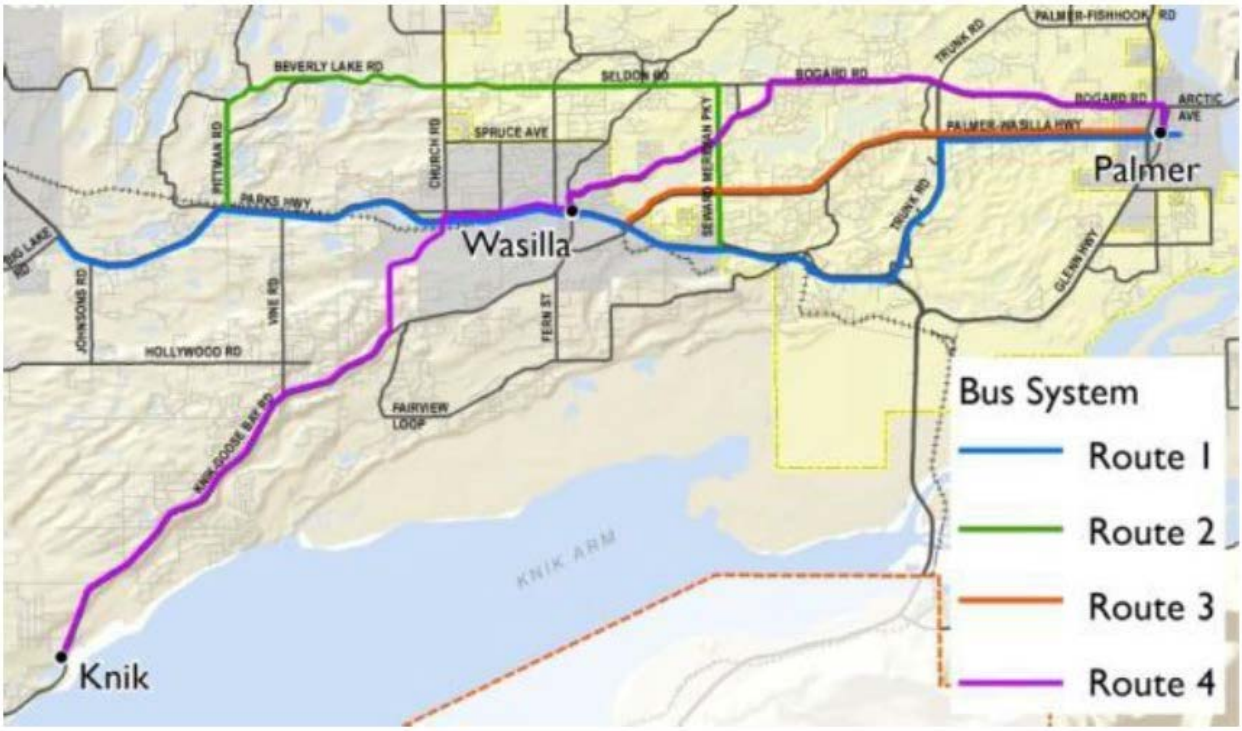
Figure 3-59 shows a map of future transportation routes in Wasilla.



Source: 2011 Wasilla Comprehensive Plan

Figure 3-59 City of Wasilla Future Transportation Map

Figure 3-60 shows a map of the potential expanded bus route system in the Palmer/Wasilla/Knik area.



Source: 2035 MSB Long Range Transportation Plan

Figure 3-60 Potential Expanded Bus Route System, Wasilla Area

The Wasilla Museum's Strategic Plan established the following vision, goals, and strategy (projects) for the Museum for fiscal years 2023-2028.

____ MUSEUM Vision

CITY OF WASILLA ALASKA

Vision: The Wasilla Museum and Visitor Center will amplify the power of personal stories to enrich our shared experiences. Being a …

- A home for collections, programs and staff that reflect and serve the varied experiences of our community.
- A partner in life-long learning allowing people to make connections between history and today's world.
- An advocate for and steward of historical resources and facilitator for compelling, meaningful and enjoyable learning experiences.
- A workplace that attracts, retains and develops talented people and enables them to do excellent work.
- A vibrant social, cultural and economic center for the community

Strategy:

- Contribute to the local economy by enhancing the quality of life through connectivity and innovation with our exhibits, buildings and greenspaces. Provide a space for events/activities in the downtown area.
- Empower citizen participation in government and civic duty through lifelong learning of our history and the city's vision for the future through archives, exhibits and events.
- Build a strong workforce by attracting, developing and retaining talented and motivated people through education and training.
- Develop Strategic partnerships with local and regional entities for economic development and funding. (Rotary, Mat-Su Salmon Basin Partnership, Rasmuson Foundation, etc.)

____ MUSEUM Goal 1 - Exhibits

Goal: Promote community and connectivity by installing one permanent and three temporary exhibits annually with strategic partners to include interactive and digital components, which will increase accessibility of Wasilla's broad history to visitors online and in person beginning in March 2023.

Strategy:

- Increase accessibility and understanding of our community to all museum patrons, and tourists to the region through interactive and online exhibits that are created and archived for future reference.
- Research, develop, and install permanent and temporary exhibits through grant funding and city funding to assist in purchasing collections and supplies that preserve and enhance exhibits. Funding to apply for include local, state, regional and national organizations including, Museums Alaska, Rasmuson Foundation, National Endowment for the Humanities, National Endowment for the Arts, etc.)
- Continue to modernize the process and procedures for collections. Ensure the proper documentation, ownership and copyright verification, condition reporting, photographing, cleaning, care, rehousing and/or exhibit display of 100 collection items annually.
- Develop partnerships with local, state and national organizations to rent or create exhibits that provide an understanding of the larger world story and incorporate our community experience within the larger context. (Interns, Mat-Su Salmon basin partnership, ExhibitsUSA, ExhibitsAK, etc.)

____ MUSEUM Goal 2 - Buildings

Goal: Promote community, connectivity, and commerce by upgrading two Museum and/or townsite buildings per year beginning by December 2023, to facilitate safe usage as a rental facility and small-scale emergency shelter/distribution/operations center for community members and organizations, through potential funding from BRIC and other FEMA grants and the Rasmuson foundation.

Strategy:

- Provide access to Dorothy G. Page Center and Townsite buildings for rental spaces based on local, fire marshal requirements and Secretary of the Interior standards.
- Construct and provide covered areas for outside events/pavilion/exhibits/displays. Apply for Rasmuson funding as well as Alaska community development grants. Work with the Public Works department on Infrastructure plan and grants as well as City Planning for Main Street couplet upgrades in 2023 – 2025. Install donation boxes for visitors to the townsite and museum buildings outdoors.
- Upgrade IT at the Dorothy G. Page Center with WIFI, generator and electrical wiring to support Red Cross Emergency Operations Center and/or distribution point. Work with Deputy Administrator and City Planning to apply for BRIC and other FEMA grants for upgrades. Work with Public Works Director to facilitate renovation of Dorothy G. Page Center to accommodate rentals, exhibits and emergency usage beginning in fall 2023/Spring 2024.
- Install two ADA accessible public restrooms in the townsite to facilitate community usage of the park and townsite building rentals. Present updated proposal to Mat-Su Health Foundation for funding assistance.

_____ MUSEUM Goal 3 - Partners

Goal: Develop a greenspace downtown in partnership with the city comprehensive plan, downtown overlay and main street couplet projects (2023-2026), which promotes community and connection through outdoor exhibits, interactive installations and art, that is attractive, accessible and supports the city's mission of providing a quality lifestyle, safe environment and promotes healthy living while encouraging economic development downtown.

Strategy:

- Create connectivity between Townsite, Museum and Dorothy G. Page Center through an accessible greenspace for public use and enjoyment. Work with Public Works, Planning and Finance to secure funding through Mat-Su Health Foundation and transportation infrastructure grants.
- Provide outdoor exhibits in the greenspace to encourage tour operators, tourism and locals throughout the year. Install outdoor donation boxes for visitors.
- Develop and reinforce community partnerships for funding of outdoor sculptures, exhibits and events in the green space as well as visitor center information and waypoints.
- Phase development of the greenspace over the next 5 years to incorporate funding sources, procuring services and producing the greenspace to meet main street project, downtown overlay requirements and the downtown comprehensive plan.

4. MITIGATION STRATEGY

This section outlines the process for preparing a mitigation strategy. The mitigation strategy provides the blueprint for the implementation of desired activities which will enable the community to continue to save lives and preserve infrastructure by systematically reducing hazard impacts, damages, and community disruption.

This section addresses Element C of the Local Mitigation Plan regulation checklist.

Regulation Checklist- 44 CFR § 201.6 Local Mitigation Plans
ELEMENT C. Mitigation Strategy
C1. Does the plan document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement 44 CFR § 201.6(c)(3))
C1-a. Does the plan describe how the existing capabilities of each participant are available to support the mitigation strategy? Does this include a discussion of the existing building codes and land use and development ordinances or regulations?
C1-b. Does the plan describe each participant's ability to expand and improve the identified capabilities to achieve mitigation?
C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))
C2-a. Does the plan contain a narrative description or a table/list of their participation activities?
C3. Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement 44 CFR § 201.6(c)(3)(i))
C3-a. Does the plan include goals to reduce the risk from the hazards identified in the plan?
C4. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement 44 CFR § 201.6(c)(3)(ii))
C4-a. Does the plan include an analysis of a comprehensive range of actions/projects that each jurisdiction considered to reduce the impacts of hazards identified in the risk assessment?
C4-b. Does the plan include one or more action(s) per jurisdiction for each of the hazards as identified within the plan's risk assessment?
C5. Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction? (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))
C5-a. Does the plan describe the criteria used for prioritizing actions?
C5-b. Does the plan provide the position, office, department, or agency responsible for implementing/administrating the identified mitigation actions, as well as potential funding sources and expected time frame?
Source: FEMA 2022 (Local)

4.1 EXISTING AUTHORITIES, POLICIES, PROGRAMS, AND RESOURCES

The City of Wasilla's existing authorities, policies, programs, and resources available for hazard mitigation are described in the tables below.

Table 4-1 describes the City of Wasilla's regulatory tools for hazard mitigation.

Table 4-1 City of Wasilla's Regulatory Tools

Regulatory Tools (ordinances, codes, plans)	Existing Yes/No?	Comments (Year of most recent update; problems administering it, etc.)
Building Codes	No	The MSB is responsible for commercial building codes and enforcement. The City requires contractors to use National Building Codes for

Regulatory Tools (ordinances, codes, plans)	Existing Yes/No?	Comments (Year of most recent update; problems administering it, etc.)
		City Procurements when building within City Limits.
Zoning ordinances	Yes	Wasilla Municipal Code (WMC) Title 16.20.
Land use ordinance	Yes	WMC Title 16.
Subdivision ordinances or regulations	No	The MSB is responsible for platting.
Special purpose ordinances	Yes	The City has this authority.
Wasilla Emergency Operations Plan (EOP)	Yes	Information pertaining to the deployment, mobilization, and tactical operations of City of Wasilla in response to emergencies
Continuity of Government/Continuity of Operations (COG/COOP)	Yes	The City COG/COOP was updated in 2022 and is regularly maintained.
Comprehensive Plan	Yes	Published in 2011. The City plans to update it in the next 3-5 years.
Long Range Transportation Plan (LRTP)	Yes- MSB	2013-2035. Mat-Su Borough LRTP that includes future transportation goals for Wasilla.
Wasilla Sewer Master Plan	Yes	1999. Includes goals through 2050.
Wasilla Water Master Plan	Yes	2001. Includes goals through 2015.
Wasilla Storm Water Master Plan	Yes	2001.
Wasilla Airport Master Plan	Yes	2013. Currently (2023) being updated.
Local Economic Development Plan (LEDP)	No- study is in progress	A Comprehensive Economic Development Strategy (CEDS) is currently underway and will eventually lead to the City developing a LEDP or a section regarding economic development in the updated version of the Comprehensive Plan.
Wildland Fire Protection Plan	No	Describes community's potential wildfire impacts and processes to mitigate future events.

Table 4-2 describes the City of Wasilla's available technical specialists for hazard mitigation.

Table 4-2 City of Wasilla's Technical Specialists

Staff/Personnel Resources	Yes / No	Department/Agency and Position
Planner or engineer with knowledge of land development and land management practices	Yes	Public Works and Planning Department
Engineer or professional trained in constriction practices related to buildings	Yes	Department of Public Works
Planner or engineer with an understanding of natural and/or human-caused hazards	Yes	Planning Department
Floodplain Manager	No	Floodplain management through MSB and State.
Surveyors	No	The City hires contractors as needed.
Staff with education or expertise to assess the jurisdiction's vulnerability to hazards	Yes	Multiple Departments
Personnel skilled in Geographic Information System (GIS) and/or Hazards U.S.-Multi Hazard (Hazus-MH) software	No	The City utilizes the MSB's resources for any GIS or Hazus-MH related needs.

Staff/Personnel Resources	Yes / No	Department/Agency and Position
Scientists familiar with the hazards of the jurisdiction	No	The City hires contractors as needed.
Emergency Manager	Yes	Mayor, Deputy Administrator, Public Works
Grant Writers	Yes	City Administration, Police Department (law enforcement related grants), Museum Curator
Public Information Officer	Yes	Deputy Administrator, Museum Curator

Table 4-3 describes the City of Wasilla's financial resources for hazard mitigation.

Table 4-3 City of Wasilla's Financial Resources

Financial Resource	Yes/No
Capital Improvement Project (CIP) Funding	Yes- Local revenue is dedicated to the City's CIP annually
Authority to levy taxes for special purposes	Yes
Fees for water, sewer, gas, or electric services	Yes- Water and Sewer
Impact fees for new development	Yes
Storm water utility fee	No
Incur debt through general obligation bonds and/or special tax bonds	Yes
Community Development Block Grant	Yes
Other federal funding programs	Yes
State funding programs	Yes

A list of federal agency programs available for implementing mitigation projects are listed in Appendix A.

The City of Wasilla considers the following as opportunities associated with their existing capabilities:

- Regular changes in administration and staffing provide diverse experience to support the community.
- Partnerships with the Matanuska-Susitna Borough provide technical expertise to support community development.

Challenges of existing capabilities include:

- Regular changes in administration and staffing can slow down progress towards projects important to the community due to lack of historic context.

4.1.1 ABILITY TO EXPAND AND IMPROVE RESOURCES

The City of Wasilla is continuously improving and expanding their technical and human resources through participation in this HMP update; training; and hiring subject matter expertise as needed. Specific areas that the Planning Team have identified to expand and improve resources include:

- Continued grant-writing training for City employees.
- Coordinate with the MSB to participate in future updates of the Community Wildfire Protection Plan (CWPP) to be prepared for future wildfire events.
- Pursue funding for development and update of existing community plans (land use plan, comprehensive plan, economic development plan, transportation plan, etc.).

4.2 NFIP PARTICIPATION

The function of the National Flood Insurance Program (NFIP) is to provide flood insurance at a reasonable cost to homes and businesses located in floodplains. In trade, the City regulates new development and substantial improvement to existing structures in the floodplain or requires developers to build safely above flood heights to reduce future damage to new construction. The program is based upon mapping areas of flood risk and requiring local implementation to reduce flood damage primarily through requiring the elevation of structures above the base (100-year) flood elevations.

The City of Wasilla participates in the NFIP, and the MSB acts as the Floodplain Manager for the City. To date, the City of Wasilla has experienced **1 repetitive loss** due to flooding (single family home in 2012). This home had NFIP insurance at the time of the loss, but no longer has coverage, as the policy lapsed in 2015. Details of this loss are in Table 4-4.

Flood Insurance Rate Maps (FIRMs) for Wasilla were revised on September 27, 2019. The City's limits spans across multiple maps and portions of the City of Wasilla are included in the flood maps listed below.

- 02170C8060F
- 02170C8070F
- 02170C8080F
- 02170C8085F
- 02170C8090F
- 02170C8105F

Table 4-4 shows the current NFIP statistics for the Mat-Su Borough.

Table 4-4 Current NFIP Statistics for the MSB

Emergency Program Date Identified	Regular Program Entry Date	Map Revision Date	NFIP Community Number
02/28/1978	05/01/1985	09/27/2019	020021
CRS Rating Number	Total # of Current Policies (04/30/2023)	Total Coverage	Mat-Su Average Premium*
The MSB does not participate in CRS.	114	$32,544,000	$308
Repetitive Loss Claims	Dates of Rep. Losses (City of Wasilla)	Rep. Loss Property Type (City of Wasilla)	Total Loss Dollars Paid (City of Wasilla)
4 total in MSB 1 in the City of Wasilla	04/22/2012 09/04/2012	Single Family Home	$12,802.22

*This number was determined by the following equation: $\frac{\text{Total Written Premium + FPF (federal policy fee)}}{\text{\# of policies}}$

The City of Wasilla participates in NFIP as part of the Matanuska-Susitna Borough's NFIP Floodplain Management program. The City's NFIP participation activities include:

- Identification of repetitively flood-damaged properties.
- Mitigation actions, including investigating buying out repetitively flood-damaged properties.
- Maintenance of records of elevations for all new construction or substantial improvements in flood plains or require developers to build safely above flood heights to reduce future damage to new construction.

Table 4-5 lists contact information for the floodplain coordinators for the MSB and State of Alaska.

Table 4-5 Floodplain/NFIP Coordinators for the MSB and State of Alaska

MSB Floodplain Administrator	**Taunnie Boothby** Planning Department 350 E. Dahlia Ave Palmer, AK 99645 Phone: (907) 861-8526 Email: taunnie.boothby@matsugov.us
State of Alaska NFIP Coordinator	**Harmony Curtis** Local Government Specialist National Flood Insurance Program Coordinator Division of Community and Regional Affairs Department of Commerce, Community, and Economic Development 550 W. 7th Avenue, Suite 1650 Anchorage, AK 99501 Phone: (907) 269-7904 FAX: (907) 269-4563 Email: harmony.curtis@alaska.gov

4.3 MITIGATION GOALS

The Planning Team developed their mitigation goals and potential mitigation actions to address current and future potential hazard impacts for the residents of the City of Wasilla and its critical facilities and infrastructure.

Mitigation goals are general guidelines that describe what a community wants to achieve in terms of hazard mitigation and loss prevention from future events. Community-wide visions are made into goal statements, which are typically long-range, policy-oriented statements. The Planning Team developed various mitigation goals and potential mitigation actions to address identified potential hazard impacts for the City of Wasilla. The results from the exposure analysis were used as a basis for updating the mitigation goals and actions.

Additionally, actions that are classified as Multi-Hazard (MH) seek to mitigate multiple hazards at once and align with the overarching goals listed in the Executive Summary.

1. Minimize loss of life and property from natural hazard events
2. Increase public awareness of risk from natural disasters
3. Protect public health and safety
4. Promote rapid hazard disaster recovery

In this HMP update, there were no new hazards identified by the Planning Team. High wind was previously identified as a standalone hazard, but in this HMP update, it is incorporated in the Severe Weather profile to mirror the State of Alaska HMP. Erosion was removed as a hazard as the Planning Team states the City of Wasilla has not historically been impacted by erosion. Climate change is not a main concern for the Planning Team, but its influence on each hazard is addressed within each individual hazard to meet new FEMA guidance. A profile for the significant hazard potential Lake Lucile Dam was added, but loss estimations from a potential dam failure will not be analyzed for this HMP Update.

The hazards of greatest concern to the Planning Team are severe weather, specifically high winds, wildland and community fire, and earthquake.

Table 4-6 lists the City of Wasilla's newly refined strategic mitigation goals which form the foundation for the following processes and culminate within the Mitigation Action Plan (MAP) depicted in Table 4-10.

Table 4-6 Mitigation Goals

ID	Goal Description
Multi-Hazards (MH)	
MH	Reduce damage and loss possibilities for multiple hazards (MH) at once and align with the overarching goals listed in the Executive Summary.
Natural Hazards	
EQ	Reduce earthquake (EQ) damage and loss possibilities.
SW	Reduce severe weather (SW) damage and loss possibilities.
WF/CF	Reduce wildland fire (WF)/community fire (CF) damage and loss possibilities.
VAF	Reduce volcanic ashfall (VAF) damage and loss possibilities.
FL	Reduce flood (FL) damage and loss possibilities.

4.4 MITIGATION ACTIONS

The FEMA Hazard Mitigation Assistance Guidance and Addendum (HMA) states the importance of considering, evaluating, and implementing the most effective mitigation actions, projects, activities, and potential alternatives:

> *"Reviewing and incorporating information from the State, tribal, or local mitigation plan can help an Applicant or sub-applicant facilitates the development of mitigation project alternatives. Linking the existing mitigation plan to project scoping can support the Applicant and sub applicant in selecting the most appropriate mitigation activity that best addresses the identified hazard(s), while taking into account community priorities, climate change, and resiliency. In particular, the mitigation strategy section of the plan identifies a range of specific mitigation activities that can reduce vulnerability and includes information on the process that was used to identify, prioritize, and implement the range of mitigation actions considered…*
>
> *It is important to reference the mitigation plan as potential project alternatives may have been considered during the planning process. If the project alternatives were not considered during the mitigation planning process, they should be considered in the next mitigation plan update."* (FEMA 2015)

The Planning Team assessed the 2018 HMP's existing mitigation actions status and provided an explanation as to any changes that have occurred. The Planning Team defined the existing HMP's mitigation projects status as: "Completed", "Ongoing", "Deferred" or "Deleted".

- **Completed**- projects that have been completed since the 2018 HMP.
- **Ongoing**- projects that have been started but not completed since the 2018 HMP.
- **Deferred**- projects that have not been started since the 2018 HMP, but the Planning Team aims to complete in the next 5 years with this HMP Update.
- **Deleted**- projects that have not been started since the 2018 HMP, and the Planning Team no longer wants to pursue.

Status updates from existing projects from the 2018 HMP are below (Table 4-7).

Table 4-7 Status of Mitigation Actions from 2018 HMP

Action Description	Status
Encourage new construction to use national building codes.	**Ongoing**- This previously identified action has been started and will be incorporated into the MAP. This action will be revised to include a requirement in future RFPs that contractors have to meet FORTIFIED Gold building standards, and to distribute FEMA pamphlets to educate homeowners concerning structural and non-structural retrofit benefits, mitigation, preparedness, and safety procedures for all natural hazards.
On an annual basis, confirm a list of private owners of heavy equipment that are willing to supply equipment during an emergency.	**Ongoing**- This previously identified action has been started and will be incorporated into the MAP.
Pursue consolidation of the City HMP into the MSB HMP.	**Deleted**- This previously identified action has not been started and is no longer a priority to the Planning Team. The Planning Team is willing to participate with the MSB on future updates of the MSB HMP, but still wishes to update their own City of Wasilla HMP.
Distribute building code information with permits for new buildings to encourage construction of structures that are designed to withstand tremors.	**Deferred-** This previously identified action has not been started and will be incorporated into the MAP, but will be combined into a MH project regarding building codes (MH5).
Analyze and strengthen public utility facilities as necessary to ensure public health through continuance of the ability to provide clean water and dispose of wastewater.	**Ongoing**- This previously identified action has been started and will be incorporated into the MAP.
Develop a system as part of the land use permit process to inform builders, homeowners, and businesses that building with additional bracing for roof tresses, reinforced columns, and bond beams, protected building openings, and securely mounted roof equipment, including cowlings and flashing, suffer fewer and less costly damages than other buildings	**Deleted**- This previously identified action has not been started and is no longer a priority to the Planning Team.
Encourage the installation of damage- resistant glass in vulnerable critical facilities.	**Deferred-** This previously identified action has not been started and will be incorporated into the MAP, and will be revised to include actions for encouragement.
Identify schools, medical facilities, senior centers, day care centers, and other public buildings vulnerable to loss from high winds and suggest measures that will lessen damage from windstorms.	**Deleted**- This previously identified action has not been started and is no longer a priority to the Planning Team, as the listed facilities are under the jurisdiction of the MSB.
Educate the public about construction standards to ensure that City utilities are available during times of severe weather.	**Ongoing**- This previously identified action has been started and will be incorporated into the MAP, but will be combined into a MH project regarding building codes (MH5).
Provide NOAA weather radios to all government buildings, schools, and medical facilities, and work with staff to develop a process to disseminate information to ensure an early warning of potential weather events.	**Ongoing**- This previously identified action has been started and will be incorporated into the MAP.
Seek ways to reduce or eliminate ice on public roads caused by wind blowing snow and/or ice storms. Specifically, reduce or eliminate glaciation on the Parks Highway caused by wind blowing across the frozen surface of Wasilla Lake by constructing a seasonal snow fence/wind screen.	**Deferred-** This previously identified action has not been started and will be incorporated into the MAP.

Action Description	Status
Review accident report information for roads and intersections with a high number of weather-related accidents to determine if change or enhancement of road design will reduce accidents or severity of accidents. Assign City Public Works Department to work with ADOT/PF to fund identified changes.	**Ongoing with ADOT**- This previously identified action has been started and will be incorporated into the MAP.
Notify absent landowners whose property is at high risk for fire due to weeds and trash and encourage them to remedy the problem.	**Ongoing**- This previously identified action has been started and will be incorporated into the MAP, but will be revised to notify all landowners.
Work with schools and the Fire Department to distribute educational material on fire prevention (i.e., FIREWISE pamphlets and website).	**Deleted**- This previously identified action has not been started and is no longer a priority to the Planning Team as the schools and fire department are under the jurisdiction of the MSB.
Include a link to local fire danger information on the City website.	**Ongoing**- This previously identified action has been started and will be incorporated into the MAP.
Coordinate with the emergency crews and the Senior Center to aid those with breathing problems (during a dust storm or volcanic ashfall event).	**Deleted**- This previously identified action has not been started and is no longer a priority to the Planning Team as emergency crews (police, fire, EMS) are under the jurisdiction of the MSB.
Provide information on where to access information about the wind direction and the amount of ash in the atmosphere.	**Ongoing**- This previously identified action has been started and will be incorporated into the MAP.
Identify buildings at risk from 100- and 500-year floods and inform owners/residents of flood-proofing alternatives.	**Completed**- The MSB has mapped 100-year and 500-year flood zones for the Borough and is easily accessible to the public on the MSB Parcel Viewer. The MSB has identified 100-year flood zones in the City of Wasilla, but there is not a 500-year flood hazard in the City of Wasilla.

The Planning Team then considered, reviewed, and selected new projects from a comprehensive list of potential actions identified during this HMP update process for each hazard type (Table 4-8). The Planning Team decided if they wanted to "Select" or "Consider [and remove]" each new project that they reviewed. The Planning Team only selected those actions that they intend to and are capable of implementing during the HMPs five-year lifecycle within the MAP.

- **Selected**- proposed new projects that the Planning Team did select to incorporate into the MAP.
- **Considered**- proposed new projects that the Planning Team did not select to incorporate into the MAP.

Table 4-8 Proposed New Mitigation Actions

Supports Goal	Action Description	Status
MH	Hold an annual or biennial "hazard meeting" to provide information to residents about recognizing and mitigating all natural hazards that affect Wasilla.	**Selected**- This new action will be incorporated into the MAP, but will be revised to state that the "hazard meeting" may be incorporated into another regular community meeting or to inform the public about specific hazards during

Supports Goal	Action Description	Status
		the hazard season (wildfires in the summer, winter storms in the winter, etc.).
	Identify and pursue funding opportunities to implement mitigation actions and to keep mitigation plan up to date (every 5 years).	**Selected-** This new action will be incorporated into the MAP.
	Establish a formal role for the Hazard Mitigation Planning Team to develop a sustainable process to implement, monitor, review, and evaluate community wide mitigation actions.	**Selected-** This new action will be incorporated into the MAP.
	Pursue funding for development and update of existing community plans (land use plan, comprehensive plan, economic development plan, transportation plan, etc.).	**Selected-** This new action will be incorporated into the MAP.
	Install a quick-connect to the City of Palmer's water system for redundancy/backup.	**Selected-** This new action will be incorporated into the MAP.
	Purchase and install monitoring sensors on utilities for all public facilities for remote monitoring.	**Selected-** This new action will be incorporated into the MAP.
	Purchase multiple 2,000-gallon fuel tanks and locate them throughout the City to have available resources after a disaster if transportation in/out of the City is not feasible.	**Selected-** This new action will be incorporated into the MAP.
	Develop and implement a Stormwater Management Program.	**Selected-** This new action will be incorporated into the MAP.
	Evaluate generators at all critical facilities to ensure they are all working and in good condition. Replace any old or broken generators to ensure reliability during a disaster.	**Selected-** This new action will be incorporated into the MAP.
	Pursue participation with the MSB on future community plans including the MSB HMP, MSB CWPP, etc.	**Selected-** This new action will be incorporated into the MAP.
EQ	Evaluate critical public and heritage facilities with significant seismic vulnerabilities and complete retrofit. (e.g., public works buildings, potable water systems, wastewater systems, electric power systems, heritage facilities (alternate EOC), etc.)	**Selected-** This new action will be incorporated into the MAP.
	Install non-structural seismic restraints for large furniture such as bookcases, filing cabinets, heavy televisions, and appliances in critical facilities to prevent toppling damage and resultant injuries to small children, elderly, and pets.	**Selected-** This new action will be incorporated into the MAP.
SW	No new projects were proposed as the Planning Team chose to carry forward projects from the 2018 HMP.	
WF/CF	Remove beetle killed trees within City limits.	**Selected-** This new action will be incorporated into the MAP.
	Develop a Community Wildfire Protection Plan (CWPP).	**Selected-** This new action will be incorporated into the MAP, but will be revised to pursue participation with the MSB in future updates of their CWPP.
	Develop, adopt, and enforce burn ordinances for burn permits, campfire restrictions, and outdoor burning controls to guide burning practices and potentially eliminate human caused wildland fires.	**Considered-** The Planning Team chose to not move forward with this project as the City follows MSB and State fire restrictions.
	Develop a spruce bark beetle trap log program within City limits.	**Selected-** This new action will be incorporated into the MAP.

Supports Goal	Action Description	Status
	Spray affected trees with environmentally safe pesticide to kill birch leafminer.	**Selected-** This new action will be incorporated into the MAP.
VAF	Assess critical facilities for appropriate ash loading capacity and ensure all roofs can withstand ash load and retrofit.	**Selected-** This new action will be incorporated into the MAP.
FL	Buyout three residential properties in the Snowmelt Flood Area that flood annually.	**Selected-** This new action will be incorporated into the MAP.
	Install water level monitoring sensors at the Cottonwood Creek and E. Glenwood Ave crossing.	**Selected-** This new action will be incorporated into the MAP.

Newly "Selected" projects and carried forward "Ongoing" or "Deferred" actions from the 2018 HMP were incorporated into the 2023 MAP (Table 4-10). "Deleted" or "Considered" actions were not incorporated into the 2023 MAP.

4.5 EVALUATING AND PRIORITIZING MITIGATION ACTIONS

To determine which actions would be included in the MAP, the Planning Team evaluated and prioritized each selected mitigation actions. The MAP represents the mitigation projects and programs to be implemented through the cooperation of multiple departments in the City of Wasilla.

To consider the opportunities and constraints of implementing each mitigation action, the Planning Team reviewed the simplified Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) evaluation criteria (Table 4-9). A qualitative statement is provided regarding the benefits and costs and, where available, the technical feasibility for each action considered for implementation.

Table 4-9 Evaluation Criteria for Mitigation Actions

Evaluation Category	Discussion "It is important to consider…"	Considerations
Social	The public support for the overall mitigation strategy and specific mitigation actions.	Community acceptance Adversely affects population
Technical	If the mitigation action is technically feasible and if it is the whole or partial solution.	Technical feasibility Long-term solutions Secondary impacts
Administrative	If the community has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary.	Staffing Funding allocation Maintenance/operations
Political	What the community and its members feel about issues related to the environment, economic development, safety, and emergency management.	Political support Local champion Public support
Legal	Whether the community has the legal authority to implement the action, or whether the community must pass new regulations.	Local, state, and federal authority Potential legal challenge
Economic	If the action can be funded with current or future internal and external sources, if the costs seem reasonable for the size of the project, and if enough information is available to complete a FEMA Benefit-Cost Analysis.	Benefit/cost of action Contributes to other economic goals Outside funding required FEMA Benefit-Cost Analysis
Environmental	The impact on the environment because of public desire for a sustainable and environmentally healthy community.	Effect on local flora and fauna Consistent with community environmental goals Consistent with local, state, and federal laws

On June 21, 2023, the Planning Team prioritized 30 natural hazard mitigation actions that were selected to carry forward into the Mitigation Action Plan (MAP).

The Planning Team considered the history, extent, impact, and probability of future events of each hazard to determine the priority for each selected mitigation action. The Planning Team defined their project rating categories with a high, medium, or low priority:

- **High priority** actions are associated with actions that the Planning Team deemed most important to the City.
- **Medium priority** actions are associated with actions that the Planning Team deemed important to the City.
- **Low priority** actions are associated with actions that the Planning Team deemed of less importance to the City.

Prioritizing the mitigation actions within the MAP was completed to provide the City with an implementation approach for completing the actions in the five-year lifecycle of this HMP.

4.6 MITIGATION ACTION PLAN (MAP)

The City of Wasilla's MAP, Table 4-10, depicts how each mitigation action will be implemented and administered by the Planning Team. The MAP details each selected mitigation action, its priorities, the responsible entity, the anticipated implementation timeline, and provides a brief explanation as to how the overall benefit/costs and technical feasibility were taken into consideration.

Table 4-10 City of Wasilla's 2023 MAP

Action ID	Action Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit-Costs / Technical Feasibility	*Other Plans to Include Development Action In
MH 1	Hold an annual or biennial "hazard meeting" to provide information to residents about recognizing and mitigating all natural hazards that affect Wasilla. This hazard meeting may be combined with another regular community meeting or occur on a seasonal basis (wildfires in the summer, winter storms in the winter, etc.)	H	City of Wasilla (City)	City	Ongoing	B/C: Sustained mitigation outreach program has minimal cost and will help build and support area-wide capacity. This type of activity enables the public to prepare for, respond to, and recover from disasters. Another benefit is this meeting could complete the annual HMP review questionnaire by reviewing hazard impacts and mitigation project status. TF: This low-cost activity can be combined with recurring community meetings where hazard specific information can be presented in small increments.	Comprehensive Plan, Community Plan, Economic Development Plan, Strategic Management Plan,
MH 2	Identify and pursue funding opportunities to implement mitigation actions and to keep mitigation plan up to date (every 5 years).	H	City	City, DHS&EM, FEMA BRIC, USDA, HUD	Ongoing	B/C: This ongoing activity is essential for the City to keep the HMP a living document and accomplish effective mitigation actions. TF: This activity is ongoing demonstrating its feasibility.	Comprehensive Plan, Community Plan, Strategic Management Plan, Economic Development Plan
MH 3	Establish a formal role for the Hazard Mitigation Planning Team to develop a sustainable process to implement, monitor, review, and evaluate community wide mitigation actions.	H	City	City	Ongoing	B/C: The existing team has gained experience throughout this process which can provide invaluable insight for ensuring a sustained effort toward mitigating natural hazard damages. TF: This is feasible to accomplish as no cost is associated with the action and only relies on member availability and willingness to serve their community.	Comprehensive Plan, Community Plan, Strategic Management Plan, Economic Development Plan
MH 4	Pursue funding for development and update of existing community plans (land use plan, comprehensive plan, economic development plan, transportation plan, etc.).	H	City	City, DHS&EM, DCRA, FEMA	Ongoing	B/C: Coordinated planning ensures consistent information and community needs are documented. TF: This is feasible to accomplish with funding and contractor support combined with local planning team involvement.	Land Use Plan, Comprehensive Plan, Community Plan, Strategic Management Plan, Economic Development Plan, Transportation Plan
MH 5	Encourage new construction to use national building codes by including	L	City	City	Ongoing	B/C: Building codes set common, minimum design and construction requirements across communities	Comprehensive Plan, Community Plan,

Action ID	Action Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit-Costs / Technical Feasibility	*Other Plans to Include Development Action In
	a requirement in future RFPs that contractors have to meet FORTIFIED Gold building standards and include code inspection by 3rd party inspector in bid cost. Distribute building code information with permits for new buildings to encourage construction of structures that are designed to withstand tremors and disseminate FEMA pamphlets to educate and encourage homeowners concerning structural and non-structural retrofit benefits, mitigation, preparedness, and safety procedures for all natural hazards.					that result in improved construction quality. Encouraging and enforcing newly constructed building to adhere to building codes would decrease damage potential due to natural hazard events. TF: This project may require an ordinance to be passed by the City Council to enforce building codes. Currently, any new building is required to meet structure Alaska code.	Strategic Management Plan
MH 6	On an annual basis, confirm a list of private owners of heavy equipment that are willing to supply equipment during an emergency.	L	City Public Works	City	Ongoing	B/C: Having a list of confirmed additional resources located in Wasilla will greatly aid the City during an emergency when extra resources are needed, and supplies cannot be imported in a timely manner from neighboring cities. TF: This project is ongoing, demonstrating its feasibility.	Comprehensive Plan, Community Plan, Strategic Management Plan
MH 7	Analyze and strengthen public utility facilities as necessary to ensure public health through continuance of the ability to provide clean water and dispose of wastewater.	H	City Public Works	City	Ongoing	B/C: This project would ensure that public utility facilities can withstand future hazard events and ensure public health during disasters. TF: This project is ongoing, demonstrating its feasibility.	Comprehensive Plan, Community Plan, Strategic Management Plan
MH 9	Install a quick-connect to the City of Palmer's water system for redundancy/backup.	H	City Public Works	MSB (this project is funded)	1-5 years	B/C: The Cities of Wasilla and Palmer mutually rely on one another for resources during/after emergencies. By establishing a quick-connect to Palmer's water system, Wasilla has a backup water supply during an emergency. TF: This project is feasible with proper equipment and is funded.	EOP/COOP, Land Use Plan, Comprehensive Plan, Community Plan, Strategic Management Plan, Economic Development Plan

Action ID	Action Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit-Costs / Technical Feasibility	*Other Plans to Include Development Action In
MH 10	Purchase and install monitoring sensors on utilities for all public facilities for remote monitoring.	H	City Public Works	City, FEMA BRIC	1-5 years	B/C: Sensors will allow the Public Works department to remotely monitor the status of utilities at public facilities at all times. The Public Works department will be notified of if utilities are disrupted/not functional following a severe weather or other hazard event and appropriately delegate resources to remedy the highest priority issue. Following the January 2022 windstorm, some generators in critical facilities were not fully functional and it was not detected by personnel because electricity was functional at most facilities but higher electrical functions such as heating were not functional. TF: This project is feasible with the proper equipment, technology, and training of personnel. The Wasilla Museum has already implemented sensors to monitor temperature, humidity levels, light levels, and pest monitoring (water bugs, moths, etc).	Comprehensive Plan, Community Plan, Economic Development Plan, Strategic Management Plan
MH 11	Purchase multiple 2,000-gallon fuel tanks and locate them throughout the City to have available resources after a disaster if transportation in/out of the City is not feasible.	H	City (multiple departments)	City, FEMA BRIC	1-5 years	B/C: Wasilla's fuel is transported in from Anchorage. In the instance of a major earthquake, the Glenn Highway may be unusable, and Wasilla would be cut off from Anchorage. Having bulk fuel stored throughout the City will allow Wasilla to be self-reliant in the event they are cut off from Anchorage or Fairbanks for extended periods of time. TF: This project is technically feasible with funding to purchase the fuel tanks. The City would need to establish a fuel quality program to regularly audit fuel levels and quality.	EOP/COOP, Land Use Plan, Comprehensive Plan, Community Plan, Strategic Management Plan, Economic Development Plan
MH 12	Develop and implement a Stormwater Management Program.	H	City	State of Alaska, FEMA BRIC, EPA	1-5 years	B/C: A Stormwater Management Program is required for the City to participate in the Municipal Separate Storm Sewer System (MS4) permit. TF: This project is technically feasible with proper funding for program development.	Economic Development, Comprehensive Plan, Community Plan, Strategic Management Plan
MH 13	Evaluate generators at all critical facilities to ensure they are all working and in good condition.	H	City (multiple departments)	City, FEMA BRIC	1-5 years	B/C: This project would ensure that all backup generators located in critical facilities are in good	Comprehensive Plan, Community Plan, Strategic Management Plan,

Action ID	Action Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit-Costs / Technical Feasibility	*Other Plans to Include Development Action In
	Replace any old or broken generators to ensure reliability during a disaster.					working condition to ensure reliability during a future disaster event. TF: This project is feasible with proper funding. Facility owner would be responsible for inspecting their generators.	EOP
MH 14	Pursue participation with the MSB on future community plans including the MSB HMP, MSB CWPP, etc.	H	City	City	Ongoing	B/C: The City utilizes the MSB as a resource for various projects, funding, partnerships, among other things. Ensuring the City is an active participant in future MSB planning resources will allow the City to be involved in the planning and decision making on future plans. TF: This project is feasible with support from the City and MSB.	Comprehensive Plan, Community Plan, Strategic Management Plan
EQ 1	Evaluate critical public and heritage facilities with significant seismic vulnerabilities and complete retrofit. (e.g., public works buildings, potable water systems, wastewater systems, electric power systems, heritage centers (alternate EOC), etc.)	H	City Public Works	City, NEHRP, FEMA BRIC	3-5 years	B/C: This project would ensure that Wasilla's infrastructure is prepared for a potential major earthquake. The facilities that will be most affected by a M7.5 Castle Mountain earthquake are identified in Section 3.3.1.4. TF: This project is feasible with proper funding.	Comprehensive Plan, Community Plan, Strategic Management Plan
EQ 2	Install non-structural seismic restraints for large furniture such as bookcases, filing cabinets, heavy televisions, and appliances in critical facilities to prevent toppling damage and resultant injuries to small children, elderly, and pets.	L	City Public Works	City, NEHRP, FEMA BRIC	1-3 years	B/C: This project would ensure that Wasilla's infrastructure is prepared for a potential major earthquake. The facilities that will be most affected by a M7.5 Castle Mountain earthquake are identified in Section 3.3.1.4. TF: This project is feasible with proper funding, but may require an additional employee or contractor to do an inventory of facilities that would require restraints.	Comprehensive Plan, Community Plan, Strategic Management Plan
SW 1	Encourage the installation of damage- resistant glass in vulnerable critical facilities by including a requirement in future RFPs for contractors to use damage-resistant glass. Existing critical	L	City Public Works	City, FEMA BRIC	1-5 years	B/C: This project would identify and retrofit critical facilities to have increased protection during high wind events in the case of blowing debris. TF: This project is technically feasible with the purchase of the materials and may require an outside contractor to assist with the installation.	Comprehensive Plan, Community Plan, Strategic Management Plan

Action ID	Action Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit-Costs / Technical Feasibility	*Other Plans to Include Development Action In
	facilities will be evaluated by the facility owner and retrofitted.						
SW 2	Reduce or eliminate glaciation on the Parks Highway caused by wind blowing across the frozen surface of Wasilla Lake by constructing a seasonal snow fence/wind screen.	M	City Public Works, ADOT	City, FEMA BRIC	1-3 years	B/C: This low-cost project would reduce the glaciation on the Parks Highway caused by wind blowing across the frozen surface of Wasilla Lake by blocking and redirecting the wind off the ice. This would in turn reduce dangerous road conditions. TF: This project is feasible with proper equipment and coordination with ADOT.	Land Use Plan, Comprehensive Plan, Community Plan, Strategic Management Plan
SW 3	Review accident report information for roads and intersections with a high number of weather-related accidents to determine if change or enhancement of road design will reduce accidents or severity of accidents. Assign City Public Works Department to work with ADOT/PF to fund identified changes.	M	City Public Works, ADOT, Police Department	City	Ongoing	B/C: This project would decrease injury/fatality potential on known accident-prone roads during a severe weather event by analyzing past accident history during past severe weather events. TF: This project is feasible with proper equipment and coordination with ADOT and the Police Department.	Land Use Plan, Comprehensive Plan, Community Plan, Strategic Management Plan
SW 4	Provide NOAA weather radios to all government buildings and medical facilities; work with staff to develop a process to disseminate information to ensure an early warning of potential weather events.	H	City	City	Ongoing	B/C: NOAA weather radios provide a single source for comprehensive weather and emergency information. Having all critical facilities equipped with this radio will allow all personnel to stay current with weather and emergency information even when internet communications are down. TF: This project is ongoing, demonstrating its feasibility. The only cost of this project is the purchase of the radio.	Comprehensive Plan, Community Plan, Strategic Management Plan
WF/CF 1	Notify all landowners whose property is at high risk for fire due to weeds and trash and encourage them to remedy the problem. The City intends to partner with the MSB to spread awareness of the FireWise program.	L	City (multiple departments)	City	Ongoing	B/C: Requesting that weeds/trash be removed from properties would reduce the fire potential of the property, which would ultimately reduce the fire potential for the entire City as fires can spread very quickly. TF: This project is low cost but does require a system for monitoring the status of weeds/trash in properties in the City, which could be achieved with partnering	Comprehensive Plan, Community Plan, Strategic Management Plan

Action ID	Action Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit-Costs / Technical Feasibility	*Other Plans to Include Development Action In
						with the department of Public Works or other agencies that canvas the City on a regular basis.	
WF/CF 2	Include a link to local fire danger information on the City website.	H	City	City	1 year	B/C: Having a designated location for fire danger information will allow residents to find pertinent information easily and quickly regarding fires that may pose a safety risk to them or their home. TF: This low-cost project would just require coordination with the City IT staff to place a link on the website and research the best source of information for local fire danger.	Comprehensive Plan, Community Plan, Strategic Management Plan
WF/CF 3	Remove beetle killed trees within City limits.	L	City Public Works	City, FEMA HMA HMGP Post Fire	Ongoing	B/C: Removing dead trees as a result of beetle kill will reduce ignitability and wildland fire interface/community fire potential in the City. TF: The City Public Works department actively clears beetle kill from the airport, and gives out free permits to the public each year for free cutting on City land. A larger-scale removal is feasible but will require special permits from DNR.	Land Use Plan, Comprehensive Plan, Community Plan, Strategic Management Plan
WF/CF 4	Coordinate with the MSB to participate in future updates of the Community Wildfire Protection Plan (CWPP).	L	City	City, USFS CWDG, BLM, MSB	1-3 years	B/C: This project will ensure the community looks closely at their wildland fire hazard to ensure they can safely address actions and needs during a wildland fire event. TF: This is technically feasible as the MSB has a CWPP in place and was last updated in September 2021. The City would need to express interest in participating in future updates of the plan.	CWPP, Comprehensive Plan, Community Plan, Strategic Management Plan
WF/CF 5	Develop a spruce bark beetle trap log program with City limits.	M	City Parks and Recreation	City, NSF	1-3 years Ongoing	B/C: This project aims to reduce spruce bark beetle kill by trapping and disposing of beetles in pre-determined and prepared logs that mimic suitable beetle habitat. TF: This project is technically feasible with local capabilities and education on best practices. Funding and potentially a partnership with a research institution will only increase project effectiveness.	Land Use Plan, Comprehensive Plan, Community Plan, Strategic Management Plan

Action ID	Action Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit-Costs / Technical Feasibility	*Other Plans to Include Development Action In
WF/CF 6	Spray affected trees with environmentally safe pesticide to kill birch leafminer.	L	City	City	1-3 years Ongoing	B/C: This project aims to reduce birch leafminer kill within City limits. TF: This project is technically feasible with proper materials and equipment, but may prove costly as a new program and employees for continual upkeep would need to be established.	Land Use Plan, Comprehensive Plan, Community Plan, Strategic Management Plan
VAF 1	Provide information on where to access information about the wind direction and the amount of ash in the atmosphere.	H	City	City	Ongoing	B/C: Having a designated location for wind direction/air quality/ash information will allow residents to find pertinent information easily and quickly about ashfall that may pose a safety risk to them or their home. TF: This low-cost project would just require coordination with the City IT staff to place a link on the website and research the best source of information for wind direction, air quality, ash amount.	Comprehensive Plan, Community Plan, Strategic Management Plan
VAF 2	Assess critical facilities for appropriate ash loading capacity and ensure all roofs can withstand ash load and retrofit.	M	City Public Works	City, FEMA BRIC	1-5 years	B/C: Having a list of known critical facilities that cannot withstand ash load will allow the City to know which roofs may collapse during a volcanic ash event and then apply for funding to improve roof ash load capacity for listed critical facilities. TF: This project is feasible, but may require an outside contractor to assess roof ash load capacity.	Comprehensive Plan, Community Plan, Strategic Management Plan
FL 1	Buyout three residential properties in the Snowmelt Flood Area that flood annually.	H	City	City, FEMA BRIC, FEMA FMA	1 year	B/C: Three properties in the Snowmelt Flood Area flood annually and City Public Works has to remedy the issues every year. With support from the homeowners, the City would buyout the properties and City resources would no longer be needed to fix the flooding issues every year. There are also affected parcels outside of the City limits that also flood annually from the same issue. This project could be a joint effort with the City Public Works Department and the MSB to buyout all the homes in the Snowmelt Flood Area impacted by this flooding. TF: This project is feasible with proper funds to acquire the properties and willingness from the current homeowners to sell their property.	Land Use Plan, Comprehensive Plan, Community Plan, Strategic Management Plan

Action ID	Action Description	Priority	Responsible Department	Potential Funding	Timeframe	Benefit-Costs / Technical Feasibility	*Other Plans to Include Development Action In
FL 2	Install water level monitoring sensors at the Cottonwood Creek and E. Glenwood Ave crossing.	H	City Public Works	City, FEMA BRIC, FEMA FMA	2 years	B/C: This project would allow the Public Works Department to monitor water levels at a location they are concerned may flood in the future. TF: This project is technically feasible with the proper equipment and training of staff to monitor the sensors.	Land Use Plan, Comprehensive Plan, Community Plan, Strategic Management Plan

*The planning mechanisms into which the ideas, information, and strategy from this HMP Update may be integrated.

4.7 PROJECT CLOSEOUTS AND IMPLEMENTATION SUCCESSES

Table 4-11 lists the City of Wasilla's new and ongoing successfully implemented and closed mitigation activities and initiatives. Many are ongoing annual activities due to their success.

Table 4-11 Project Closeouts and Implementation Successes

Responsible Agency or Office	Project or Activity Title	Progress
City of Wasilla	Encourage new construction to use national building codes.	Ongoing
Public Works	On an annual basis, confirm a list of private owners of heavy equipment that are willing to supply equipment during an emergency.	Ongoing
Public Works	Analyze and strengthen public utility facilities as necessary to ensure public health through continuance of the ability to provide clean water and dispose of wastewater.	Ongoing
Public Works	Educate the public about construction standards to ensure that City utilities are available during times of severe weather	Ongoing
City of Wasilla	Provide NOAA weather radios to all government buildings, schools, and medical facilities, and work with staff to develop a process to disseminate information to ensure an early warning of potential weather events.	Ongoing
Public Works, ADOT, Police Department	Review accident report information for roads and intersections with a high number of weather-related accidents to determine if change or enhancement of road design will reduce accidents or severity of accidents. Assign City Public Works Department to work with ADOT/PF to fund identified changes.	Ongoing with ADOT
Public Works	Notify absent landowners whose property is at high risk for fire due to weeds and trash and encourage them to remedy the problem.	Ongoing
City	Include a link to local fire danger information on the City website.	Ongoing
City	Provide information on where to access information about the wind direction and the amount of ash in the atmosphere.	Ongoing
City, MSB	Identify buildings at risk from 100- and 500-year floods and inform owners/residents of flood-proofing alternatives.	Completed through the MSB GIS Department.

5. PLAN MAINTENANCE

This section describes the formal Plan maintenance process to ensure that the HMP remains an active and applicable document. This section includes an explanation of how the City's Planning Team intends to organize their efforts to ensure that improvements and revisions to the HMP occur in an efficient, well-managed, and coordinated manner.

This section addresses Element D of the Local Mitigation Plan regulation checklist.

Regulation Checklist- 44 CFR § 201.6 Local Mitigation Plans
ELEMENT D. Plan Maintenance
D1. Is there discussion of how each community will continue public participation in the plan maintenance process? (Requirement 44 CFR § 201.6(c)(4)(iii))
D1-a. Does the plan describe how communities will continue to seek future public participation after the plan has been approved?
D2. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating, and updating the mitigation plan within a five-year cycle)? (Requirement 44 CFR § 201.6(c)(4)(i))
D2-a. Does the plan describe the process that will be followed to track the progress/status of the mitigation actions identified within the Mitigation Strategy, along with when this process will occur and who will be responsible for the process?
D2-b. Does the plan describe the process that will be followed to evaluate the plan for effectiveness? This process must identify the criteria that will be used to evaluate the information in the plan, along with when this process will occur and who will be responsible.
D2-c. Does the plan describe the process that will be followed to update the plan, along with when this process will occur and who will be responsible for the process?
D3. Does the plan describe a process by which each community will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement 44 CFR § 201.6(c)(4)(ii))
D3-a. Does the plan describe the process the community will follow to integrate the ideas, information, and strategy of the mitigation plan into other planning mechanisms?
D3-b. Does the plan identify the planning mechanisms for each plan participant into which the ideas, information and strategy from the mitigation plan may be integrated?
D3-c. For multi-jurisdictional plans, does the plan describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms?
Source: FEMA 2022 (Local)

5.1 PLANNING TEAM HMP MAINTENANCE COMMITMENT

The City of Wasilla is responsible for monitoring, evaluating, and updating the 2023 Hazard Mitigation Plan Update in accordance with 44 CFR §201.6. The City of Wasilla is committed to annually reviewing the Plan and City staff will work to complete their review responsibilities.

5.2 CONTINUED PUBLIC INVOLVEMENT

The City of Wasilla is dedicated to continued public involvement to update this HMP. In order to continue public involvement within the next 5 years, an electronic copy of the HMP will be available on the City of Wasilla's website along with contact information to direct comments or suggestions from the public.

In past versions of this HMP, the City planned to continue public involvement by including a natural hazard survey in its water bill every March that asks for residents' input into the planning process. However, the current Planning Team feels that this is not an effective method of capturing public feedback and no longer plans to implement this approach.

Instead, the City will continue public involvement by publishing a survey on their website (similar to the survey used in this HMP Update), after a significant hazard event. This "post-disaster" survey will ask the public for details of the event (how fast did the wind blow, total snowfall, how deep were flood waters, etc.), including how they were impacted, and suggestions for future mitigation activities.

The City will request public feedback of natural disasters and mitigation actions at the Annual Block Party. This may include another survey or a related natural hazard activity on the event passport similar to what was done during this HMP Update.

5.3 MONITORING, REVIEWING, AND EVALUATING THE HMP (ANNUAL REVIEW CHECKLIST)

This HMP was updated as a collaborative effort. To build upon previous hazard mitigation planning efforts and successes, the City of Wasilla will continue to use the Planning Team to monitor, review, evaluate, and update the HMP. Each authority identified in the Mitigation Action Plan (MAP) matrix (Table 4-10) will be responsible for implementing the Mitigation Action Plan and determining whether their respective actions were implemented effectively. The primary point of contact will be the hazard mitigation Planning Team leader (Crystal Nygard, or designee). The Planning Team leader will coordinate local efforts to monitor, evaluate, revise, and tabulate the HMP actions' status.

The City of Wasilla will review their successes in achieving the HMP's mitigation goals and implementing the Mitigation Action Plan's activities and projects during the annual review process.

The Annual Review Checklist below provides the basis for future HMP evaluations by guiding the Planning Team with identifying more or new threatening hazards, adjusting to changes to, or increases in, resource allocations, and garnering additional support for HMP implementation.

To ensure that all data is assembled for discussion with the Planning Team, the Planning Team leader will initiate the annual review two months prior to the scheduled planning meeting date. The findings from these reviews will be presented at the annual Planning Team meeting. Each review, as shown on the Annual Review Worksheet, will include an evaluation of the following:

- Determine City authorities, outside agencies, stakeholders, and resident's participation in HMP implementation success.
- Identify risk changes for each identified and newly considered hazards.
- Consider land development activities and related programs' impacts on hazard mitigation.
- Mitigation Action Plan implementation progress.
- Evaluate HMP local resource implementation.

The Planning Team will schedule a review of the HMP Annual Review Checklist and Status of Mitigation Actions in January of every year AND after elections or administration changes to bring new administration team members up to speed on the HMP. The Planning Team Leader will be responsible for scheduling the annual review, and to transition responsibilities and information to new future Planning Team Leaders.

The Planning Team will review the Annual Checklist also for plan effectiveness. The team will evaluate if the review of the checklist is providing useful information for the update; progress on mitigation actions; identification of new "wish list" actions; and if the plan is working as intended.

Table 5-1 below contains an annual review checklist to monitor successes and failures of the HMP.

Table 5-1 Annual Review Checklist

Year	2024	2025	2026	2027	2028
Disaster/significant hazard events					

Year	2024	2025	2026	2027	2028
• Injuries/fatalities					
Mitigation projects completed					
• Final project cost					
• Hazards mitigated					
• Lessons learned (success, benefits, outcomes)					
New infrastructure or critical facilities (and removed/replaced)					
New hazards, mapping, engineering, or planning documents to include in next update					
Community events that hazards or mitigation was discussed (identify upcoming events to discuss)					
New Planning Team/Stakeholder members					
New mitigation projects "wishlist"					
New land use development					
Ask Team – is the Plan working? (yes/no – if no, provide why, and ideas for improvement)					
Apply for grant funding to update HMP (24 months from expiration)			X		
Update HMP (start 12 months from expiration)				X	

5.4 PLAN INTEGRATION

This section describes the requirements for coordinating, implementing, or integrating the HMP into City planning mechanisms.

After the HMP is adopted and implemented, members of the Planning Team members will ensure that the HMP is integrated into updated City planning mechanisms. These mechanisms may include their EOP, COG/COOP, Comprehensive Plan, Capital Improvement Plan, etc., where appropriate. Integrating and implementing this philosophy and activities may require updating or amending specific planning mechanisms.

The Planning Team will achieve mitigation action and initiative integration by undertaking the following activities:

- Review the community-specific regulatory tools to determine where to integrate the mitigation philosophy and implementable initiatives. These regulatory tools are identified in Table 4-1.
- Work with relevant community departments to increase awareness for the implementation of HMP philosophies and identified initiatives. Aid with integrating the mitigation strategy (including the MAP) into relevant planning mechanisms (i.e., Comprehensive Plan, Capital Improvement Project List, Transportation Improvement Plan, etc.).

Past versions of this HMP have been integrated into the 2016 FEMA Risk Report for the Mat-Su Borough and incorporated Cities of Houston, Palmer, and Wasilla. In the 2016 FEMA Risk Report, the 2004 City of Wasilla HMP was referenced numerous times to discuss hazard history and recurrence probability for multiple hazards for the City of Wasilla. The 2013-2028 Downtown Wasilla Area Plan also lists the HMP as one of the reviewed documents prior to drafting the plan.

The 2018 HMP was integrated into the 2022 update of the City of Wasilla Continuity of Government/Continuity of Operations (COG/COOP). The COG/COOP used the HMP as the basis for information for natural hazards that impact the area, the probability of future events and magnitude/severity for each natural hazard to determine risk to the community, and used the list of critical facilities and infrastructure identified in the 2018 HMP for the foundation of critical facilities at risk of natural hazards.

6. PLAN UPDATE

This section provides an explanation of how the City of Wasilla Planning Team intends to organize their efforts to ensure that improvements and revisions to the 2023 HMP occur in an efficient, well-managed, and coordinated manner.

This section addresses Element E of the Local Mitigation Plan regulation checklist.

Regulation Checklist- 44 CFR § 201.6 Local Mitigation Plans
ELEMENT E. Plan Update
E1. Was the plan revised to reflect changes in development? (Requirement 44 CFR § 201.6(d)(3)) E1-a. Does the plan describe the changes in development that have occurred in hazard-prone areas that have increased or decreased each community's vulnerability since the previous plan was approved? E2. Was the plan revised to reflect changes in priorities and progress in local mitigation efforts? (Requirement 44 CFR § 201.6(d)(3)) E2-a. Does the plan describe how it was revised due to changes in community priorities? E2-b. Does the plan include a status update for all mitigation actions identified in the previous mitigation plan? E2-c. Does the plan describe how jurisdictions integrated the mitigation plan, when appropriate, into other planning mechanisms?
Source: FEMA 2022 (Local)

6.1 2023 HMP UPDATE SUMMARY

The 2023 City of Wasilla HMP Update included reviewing and revising the 2018 City of Wasilla HMP. There have been no major changes to risk and vulnerability; local development; or progress on mitigation actions since the 2018 HMP.

Erosion was removed as a hazard as there have been no historical or current natural erosion locations in the City. High wind was removed as a standalone hazard and incorporated into the severe weather hazard to mirror the State of Alaska HMP. There were no new hazards were identified in this HMP Update. The influence of climate change was addressed within each hazard profile as is a new component to the 2023 HMP Update.

The following table summarizes the updates to this plan.

Table 6-1 2023 Plan Update Summary

Section Updated	What Was Updated
Section 1 – Plan Introduction and Background	Describes the purpose of the HMP and full layout description. Updates the section to reflect current population, economy, land use, and demographics.
Section 2 – Planning Process	Updates the current Planning Team, documents the planning process (meetings held, public participation), new information and documents reviewed as part of the plan update.
Section 3 – Risk Assessment/Hazard Analysis	Reviews and updates the hazards to be profiled based on the previous plan and hazard events that have occurred since the last plan. In this HMP Update, erosion was removed as a hazard as there have been no historical or current natural erosion locations in the City. High wind was removed as a standalone hazard and incorporated into the severe weather hazard to mirror the State of Alaska HMP. Additionally, the significant hazard potential Lake Lucile Dam in the City was profiled for the first time. As of June 2023, FEMA does not require that dams with Significant hazard ratings be profiled in HMPs. New FEMA guidelines require that High Hazard Potential Dam (HHPDs) are profiled in HMPs. This new hazard profile will be the framework for the City to update if future guidelines require Significant hazard potential dams to be profiled, or the rating of the Lake Lucile Dam changes to High Hazard.

Table 6-1 2023 Plan Update Summary

Section Updated	What Was Updated
	Reviews and updates population, critical facilities and infrastructure since the last plan; development that has occurred since the last plan; damages from hazard events to evaluate changes in risk.
Section 4 – Mitigation Strategy	Reviews and updates mitigation actions completed since last plan; reviews and develops new mitigation actions based on current risk and goals.
Section 5- Plan Maintenance	Describes the Planning Team's commitment to review the plan annually. Describes the annual and five-year review process of the HMP. Outlines the timeline for review and annual review checklist.
Section 6- Plan Update	Describes changes in development and mitigation priorities. Describes the process the Planning Team will go through to update this HMP within its five-year life cycle.
Section 7- Plan Adoption	Includes the City's current adoption resolution.
Section 8- References	Updated references and supporting documentation.
Section 9- Appendices	Supporting documents.

6.2 CHANGES IN DEVELOPMENT IN HAZARD-PRONE AREAS

There has been development in hazard-prone areas in the City of Wasilla since the 2018 HMP.

The City of Wasilla is growing to the east along its two main transportation corridors: the Parks Highway and the Palmer-Wasilla Highway. Between 2018 and 2022, the City received a total of 132 single-family residential, 6 multifamily residential, 26 subdivision, and 45 commercial development building permit applications per year.

The Shoppes at Sun Mountain is a 6,000 sq ft/32-acre shopping center that opened in 2019. This shopping center is quickly developing and is a popular shopping and dining center in Wasilla. The Shoppes at Sun Mountain is not located in the 100-year flood zone, but is vulnerable to earthquakes, severe weather, wildland/community fire, and volcanic ashfall.

There has not been recent development in flood zones since 2018.

Since 2018, various City assets have been repaired and remodeled, or are currently undergoing remodel. See Table 3-26 for a list of completed, ongoing, and proposed capital improvement projects.

Since the 2018 HMP, the City of Wasilla's vulnerability to natural hazards has not changed.

6.3 CHANGES IN PRIORITIES IN MITIGATION EFFORTS

Since the 2018 HMP, erosion was removed as a hazard as there have been no historical or current natural erosion locations in the City. High wind was removed as a standalone hazard and incorporated into the severe weather hazard to mirror the State of Alaska HMP. The influence of climate change on identified natural hazards is a new element to this HMP Update, but the Planning Team states that climate change does not pose a significant threat to the City at this time.

The hazards of greatest concern to the Planning Team are severe weather, specifically high winds, wildland and community fire, and earthquake. The Planning Team's current priorities in mitigation efforts are focused on ensuring Wasilla is properly equipped for a future natural hazard event. Some mitigation efforts include installing monitoring sensors in all public facilities for remote monitoring, purchasing multiple 2,000-gallon fuel tanks, retrofitting critical facilities to be able to withstand high winds and seismic shaking,

installing water level monitoring sensors at the Cottonwood Creek and E. Glenwood Ave crossing, and building a quick-connect to Palmer's water system for redundancy/backup.

6.4 PLAN UPDATE METHOD AND SCHEDULE

The Planning Team will update the HMP every five years as well as conduct annual review. The following section explains how the HMP will be reviewed, evaluated, and describe implementation successes.

The City of Wasilla will annually review the HMP as described in Section 5.3 and update the HMP every five years (or when significant changes are made). The identified Planning Team will review the Annual Review Checklist (Table 5-1) to determine the success of implementing the HMP's Mitigation Action Plan.

During the HMP updating process, members from the Planning Team will determine how the goals fulfilled their community's needs, the status of each listed mitigation action, and indicate whether the actions were completed, deleted, deferred, or combined with other new or existing actions. The Planning Team will provide an explanation as to their respective status.

The Planning Team will begin by refocusing on new or more threatening hazards, resource availability, and acquiring stakeholder support for the HMP project implementation.

No later than the beginning of the fourth year following HMP adoption, the Planning Team will undertake the following activities:

- Request grant assistance from DHS&EM to update the HMP (this may take up to one year to obtain and one year to update the Plan).
- Ensure that each authority administering a mitigation project will submit a Progress Report to the Planning Team.
- Develop a chart to identify those HMP sections that need improvement, the section and page number of their location within the HMP and describe the proposed changes.
- Thoroughly analyze and update the natural hazard risks.
    - Determine the current status of the mitigation projects.
    - Identify the proposed Mitigation Plan Actions (projects) that were completed, delayed, or deleted. Each action should include a description of whether the project should remain on the list, reasons for a delay- if needed, or be deleted because the action is no longer feasible.
    - Describe how the priority of each action has changed since the HMP was originally developed and approved by FEMA.
    - Determine whether or not the project has helped achieve the appropriate identified goals.
    - Describe whether the community has experienced any barriers preventing them from implementing their mitigation actions. These barriers may include financial, legal, and/or political restrictions. The community will state appropriate strategies to overcome these barriers.
    - Update ongoing processes and change the proposed implementation date/duration timeline for delayed actions the City still desires to implement.
    - Prepare a new MAP matrix for the City.
- Prepare a new Draft Updated HMP.
- Submit the updated draft HMP to DHS&EM who will then submit to FEMA for formal review.

7. PLAN ADOPTION

This section fulfills the City of Wasilla's formal HMP adoption requirements.

This section addresses Element F of the Local Mitigation Plan regulation checklist.

Regulation Checklist- 44 CFR § 201.6 Local Mitigation Plans
ELEMENT F. Plan Adoption
F1. For single-jurisdictional plans, has the governing body of the jurisdiction formally adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))
F1-a. Does the participant include documentation of adoption?
F2. For multi-jurisdictional plans, has the governing body of each jurisdiction officially adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))
F2-a. Did each participant adopt the plan and provide documentation of that adoption?
Source: FEMA 2022 (Local)

Formal Adoption

The City of Wasilla Council formally adopted their 2023 Hazard Mitigation Plan Update on date, 2023, and submitted the final draft to DHS&EM and FEMA for formal approval. A scanned copy of the City of Wasilla's formal adoption is attached (Appendix C).

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9. APPENDICES

APPENDIX A – FEDERAL FUNDING RESOURCES FOR MITIGATION PROJECTS

Financial Resource	Accessible or Eligible to Use for Mitigation Activities
FEMA Hazard Mitigation Assistance (HMA) Grants	
Building Resilient Infrastructure and Communities (BRIC)- formerly (Pre-Disaster Mitigation (PDM))	BRIC is an annual competitive pass-through grant program that focuses on reducing the nation's risk by funding public infrastructure projects that increase a community's resilience before a disaster affects an area. BRIC was created in 2020 as part of the Disaster Recovery Reform Act of 2018 and replaces FEMA's legacy Pre-Disaster Mitigation grant program. BRIC funds a wide variety of mitigation activities, including microgrids, flood control, wetland restoration, community relocation/buyouts, seismic retrofits, and nature-based solutions. BRIC is available to state and local agencies and federally recognized tribal governments with a FEMA-approved and locally adopted HMP.
Hazard Mitigation Grant Program (HMGP)	HMGP is pass-through grant program that supports pre- and post-disaster mitigation plans and projects for state and local agencies and federally recognized Tribal governments. A Presidential Major Disaster Declaration is required to authorize HMGP funding.
HMGP Post Fire	HMGP–Post-Fire is a pass-through grant program that provides funding for state and local agencies and federally recognized Tribal governments to reduce wildfire risks. Funded projects include (but are not limited to) defensible space initiatives, ignition-resistant construction, hazardous fuels reduction, erosion control measures, slope failure prevention measures, and flash flooding prevention. HMGP–Post-Fire grants are available to eligible states and territories that receive Fire Management Assistance declarations and to federally recognized Tribal governments that have land burned within a designated area. A Post-Fire Presidential Disaster Declaration is not required to activate funding.
Flood Mitigation Assistance (FMA)	FMA is an annual competitive pass-through grant program to reduce or eliminate the risk of repetitive flood damage to buildings insured by the NFIP. FMA funds are available to state and local agencies and federally recognized Tribal governments with a FEMA-approved and adopted HMP. The City of Wasilla participates in NFIP and is eligible for this funding for NFIP-insured properties.
Safeguarding Tomorrow Revolving Loan Fund Program (Safeguarding Tomorrow RLF)	Funding will enable eligible state, local, and tribal jurisdictions to create a revolving loan fund for hazard mitigation projects, cost match, nature-based solutions, upfront project design costs, or for smaller projects that may not qualify for other Hazard Mitigation Assistance Grant Programs.
Other federal mitigation programs	
FEMA: Assistance to Firefighters Grant (AFG) Program	FEMA's AFG Program is a direct annual competitive grant program that focuses on enhancing the safety of the public and firefighters with respect to fire and fire-related hazards. Funding can be used to purchase equipment, protective gear, and emergency vehicles and provide training and other resources related to fire hazards. The AFG Program provides financial assistance directly to eligible fire departments, non-affiliated emergency medical service organizations, and state fire training academies.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national, or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors, and firefighters.
Natural Resources Conservation Service (NRCS) Watershed Programs: Emergency Watershed Protection (EWP) Program	The EWP Program offers technical and financial assistance to help relieve imminent threats to life and property caused by floods, fires, windstorms, and other natural disasters that impair a watershed. EWP grants are available to local agencies, conservation districts, federally recognized Tribal governments, and interested public and private landowners that have a sponsor.

Financial Resource	Accessible or Eligible to Use for Mitigation Activities
	EWP does not require a disaster declaration by the federal or state government.
NRCS Watershed Programs: Watershed Protection and Flood Prevention (WFPO) Program	The WFPO Program provides technical and financial assistance to help plan and implement watershed programs, including flood prevention. It is available to state and local agencies and federally recognized Tribal governments and for watersheds that are 250,000 acres and smaller.
Office of Wildland Fire: Burned Area Rehabilitation (BAR) Program	The BAR Program supports efforts to repair or improve burned landscapes unlikely to recover without human assistance. The program, which must be implemented within the first 5 years after a fire, "jump-starts" the landscape recovery process by spreading native plant seeds or planting native seedlings, applying herbicides to kill invasive plants, removing them by hand, or introducing bacteria to control them, and using heavy equipment to disrupt the growth of targeted plant species or contour landscapes to control runoff. This program also funds the repair or replacement of minor infrastructure damaged by a wildfire, such as small trail bridges, handrails, campgrounds, boat ramps, stock tanks, or informational kiosks. Although BAR's scope of work is limited to federally managed lands only, in Alaska approximately 65% of the land is owned and managed by the United States Federal Government as public lands.
United States Department of Housing and Urban Development (U.S. HUD): Community Development Block Grant–Disaster Recovery (CDBG-DR)	CDBG-DR grants helps state and local agencies and federally recognized Tribal governments recover from Presidentially declared disasters, especially in low-income areas, subject to availability of supplemental appropriations. CDBG-DR funds a broad range of recovery activities, but each activity must address a direct or indirect impact from the disaster in a most-impacted and distressed area, be a CDBG-eligible activity, and meet a national objective (combating climate crisis and advancing equity). Grantees must ensure that their activities align with the mitigation strategy of their State Hazard Mitigation Plan (SHMP).
U.S. HUD: Community Development Block Grant–Mitigation (CDBG-MIT)	CDBG-MIT provides funding for mitigation activities that "increase resilience to disasters and reduce or eliminate the long-term risk of loss of life, injury, damage to and loss of property, and suffering and hardship, by lessening the impact of future disasters." The CDBG-MIT program is operated under the oversight of DCRA.

APPENDIX B – FEMA REVIEW TOOL, LOCAL HAZARD MITIGATION PLAN

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APPENDIX C – ADOPTION RESOLUTION

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APPENDIX D – PUBLIC OUTREACH ACTIVITIES

Public community survey

City of Wasilla 2023 Hazard Mitigation Plan Update Survey

The City of Wasilla is updating their 2018 Hazard Mitigation Plan (HMP). Once completed, the HMP will be submitted to the State of Alaska and FEMA for review and approval, and then adopted by the City. Once the adopted plan is approved by FEMA, the City will be eligible to apply for grant funding to protect the City's assets from natural hazards. For more information about mitigation planning, please see FEMA guidance here: http://www.fema.gov/mitigation-planning-laws-regulations-guidance

The HMP will:
1. Describe natural hazards that occur in Wasilla.
2. Identify the assets (people and facilities {infrastructure}) within the City at risk from natural hazards.
3. Identify and prioritize projects to mitigate the potential damages to infrastructure.

The purpose of this plan is to inform communities of the vulnerabilities to natural hazards; better plan development within the communities; and enable the City of Wasilla to be eligible to apply for grant funding. Those projects prioritized will be pursued for implementation.

Documentation of the planning process and ongoing public participation is a crucial part of this project.

1. What natural hazards impact your community? Check all that apply

- [ ] Earthquake
- [ ] Flood
- [ ] Erosion
- [ ] Ground Failure (Landslide or Avalanche)
- [ ] Tsunami/Seiche
- [ ] Volcanic Ashfall
- [ ] Severe Weather
- [ ] Wildland Fire
- [ ] Climate Change
- [ ] Other Hazard (please specify hazard)

2. What is your level of concern for the hazards that impact your community?

	Very Concerned	Concerned	Somewhat Concerned	Not Concerned	This Hazard **Does Not** Impact My Community
Earthquake	○	○	○	○	○
Flood	○	○	○	○	○
Erosion	○	○	○	○	○
Ground Failure (Landslide or Avalanche)	○	○	○	○	○
Tsunami/Seiche	○	○	○	○	○
Volcanic Ashfall	○	○	○	○	○
Severe Weather (including high wind)	○	○	○	○	○
Wildland Fire	○	○	○	○	○
Climate Change	○	○	○	○	○

Other Hazard (please specify hazard and level of concern)

3. What critical facilities and infrastructure in Wasilla do you rely on?

* 4. Would you support an ordinance for establishing building codes within City limits (ensuring all new buildings and residences are built to code to withstand high winds, earthquakes, etc.)?

- ○ Yes
- ○ No

5. Do you carry flood insurance for your home?

- ○ Yes
- ○ No
- ○ Not Sure

6. How do you receive warnings regarding hazard events? Please check all that apply.

- [ ] Social Media (Facebook, Twitter, etc.)
- [ ] National Weather Service
- [ ] Television
- [ ] Radio
- [ ] Community warning system
- [ ] Word of mouth
- [ ] Other (please specify)

  _____
- [ ] None of the above

7. What actions have you taken to prepare you and your household for future hazard events?

- [ ] Developed and practiced a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a household emergency
- [ ] Prepared a "Disaster Supply Kit" (stored extra food, water, batteries, or other emergency supplies)
- [ ] Attended meetings discussing disaster preparedness
- [ ] Reinforced home with disaster-resistant materials (ex: installed non-structural seismic restraints for large furniture, secured roofing, etc.)
- [ ] Purchased backup power supply (generator, solar panels, etc.)
- [ ] Purchased specialty insurance (flood, earthquake, etc.)
- [ ] Elevated home above floodplain
- [ ] Other (please specify)

  _____
- [ ] None of the above

8. How prepared do you feel your household is for impacts of natural hazard events likely to occur in your community?

Not Prepared	Slightly Prepared	Somewhat Prepared	Very Prepared
○	○	○	○

9. What are your priorities for the following mitigation actions?

	Very Important	Important	Neutral	Not Important
Protecting critical facilities (police/fire department, school, clinic, etc.)	○	○	○	○
Protecting private property	○	○	○	○
Preventing development in hazard areas	○	○	○	○
Protecting natural environments	○	○	○	○
Protecting historical and cultural landmarks	○	○	○	○
Strengthening critical facilities and emergency services	○	○	○	○

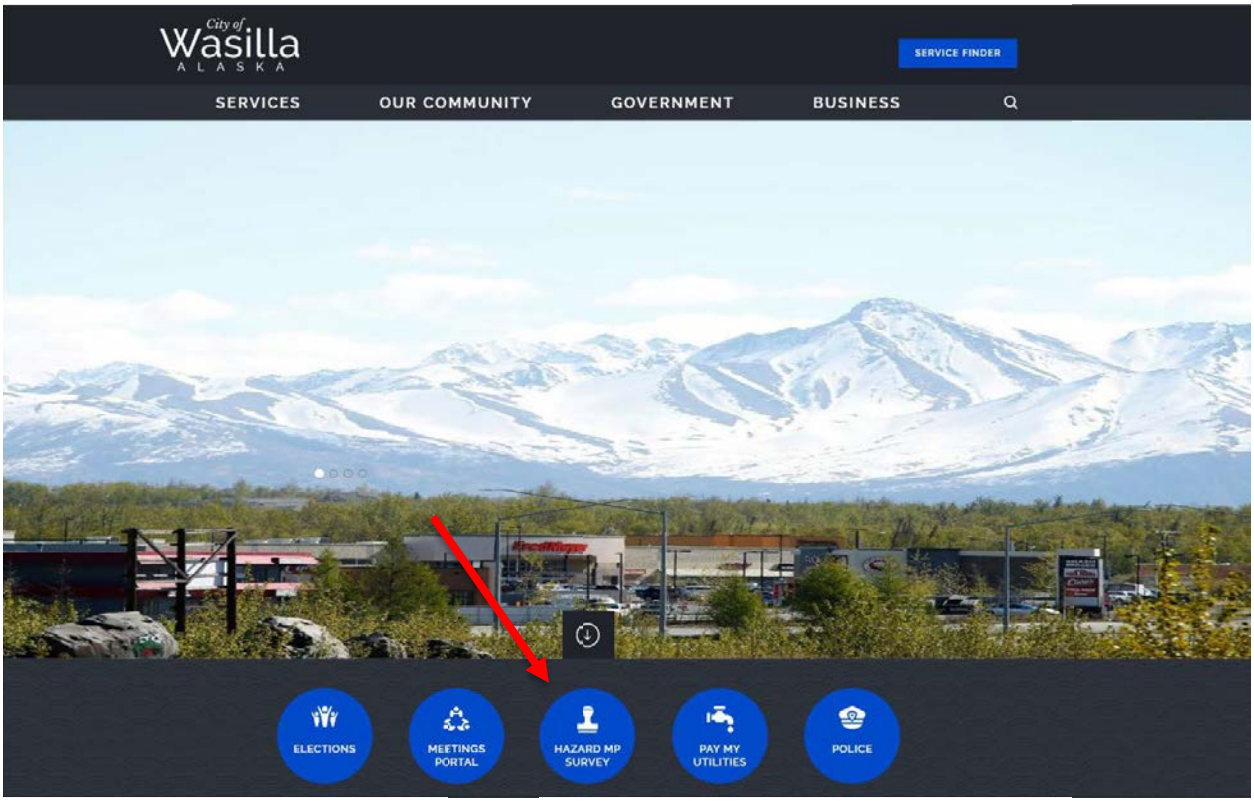
Other Hazard (please specify hazard and level of concern)

10. Do you have any specific ideas for mitigation projects associated with the identified hazards that you would like the City to consider?

11. If you have any images of your community that you would like to share, upload them here. (Please add your contact information below to get credit for your image if it is used in the Plan)

Choose File No file chosen

A link to the Survey Monkey survey was posted on the front page of the City of Wasilla website.



A memo about the HMP update was also published on the City website.

City News

Font Size: Share & Bookmark Feedback Print

HAZARD MITIGATION PLAN UPDATE UNDERWAY NOW!!

Post Date: 05/22/2023 1:00 PM

The City is in the process of updating our Hazard Mitigation Plan. The purpose of the plan is to inform communities of the vulnerabilities to natural hazards, encourage better design, and enable the City to apply for grant funding to implement projects to minimize and mitigate future impacts. Identified natural hazards include earthquake, severe weather, fire, flooding, volcanic ash, and erosion.

Two recent examples of events that impacted Wasilla were the windstorm events in early 2022 and 2023 and the earthquake in 2018. These events impacted residents, business owners, and the City. The 2022 windstorm affected the City water infrastructure and water towers, and the 2023 windstorm damaged several private airplanes at the City Airport.

It's important that we get your input to help us identify the people and facilities at risk from natural hazards and recommend and prioritize projects to mitigate damage to them. This includes personal property, businesses, and vulnerable populations such as the senior population, medically fragile, etc.). You can provide input via this link: Wasilla HMP Survey.

For additional information, please call Planning at 907-373-9020 or send an email to planning@cityofwasilla.gov.

We invite you to contact us:

City of Wasilla
Planning Department
290 E. Herning Avenue
Wasilla, AK 99654
Phone: 907-373-9020
Fax: 907-373-9021
Email: planning@cityofwasilla.gov

Office Hours:
Monday - Friday, 8 a.m. to 4 p.m.

2023 Annual Block Party flyer and event passport.

City of Wasilla 2023 Hazard Mitigation Plan Update

SURVEY

You are invited to help the City of Wasilla update its 2018 Hazard Mitigation Plan!

It's important that we get your input to help us identify the people and facilities at risk from natural hazards and recommend and prioritize projects to mitigate damage to them. Natural hazards include earthquake, severe weather, fire, flooding, etc.

Two recent examples of events that impacted Wasilla were the windstorm events in early 2022 and 2023 and the earthquake in 2018. Share your knowledge and experience through this survey by scanning the QR code below or visiting https://www.surveymonkey.com/r/HZBKW5E.

For more information, contact the City of Wasilla Planning Department at 907-373-9020 or Planning@cityofwasilla.gov.

WASILLA COMMUNITY BLOCK PARTY 2023 PASSPORT

Collect a sticker, stamp, or mark from **15** of the Block Party participants from both sides of this page, and turn in your passport at the Wasilla Museum to enter our prize drawings! **Entries are due at 2:15 pm.** The drawings will be announced at 2:45.

Name: Phone: Email:

1	2	3-4	5-6	7
8	9	10-11	12	13
14	15	16	17	18
19	20	21	25	31

Featured article in the Mat-Su Valley Frontiersman local newspaper.

FEATURED

Wasilla Hazard Mitigation Plan update underway

By Katie Stavick Frontiersman.com 20 hrs ago 0

The City of Wasilla Planning Division is seeking residents' assistance in indetifying hazards and vulnerabilities as it updates their Hazard Mitigation Plan
File Photo

The City of Wasilla has begun the process of updating its Hazard Mitigation Plan.

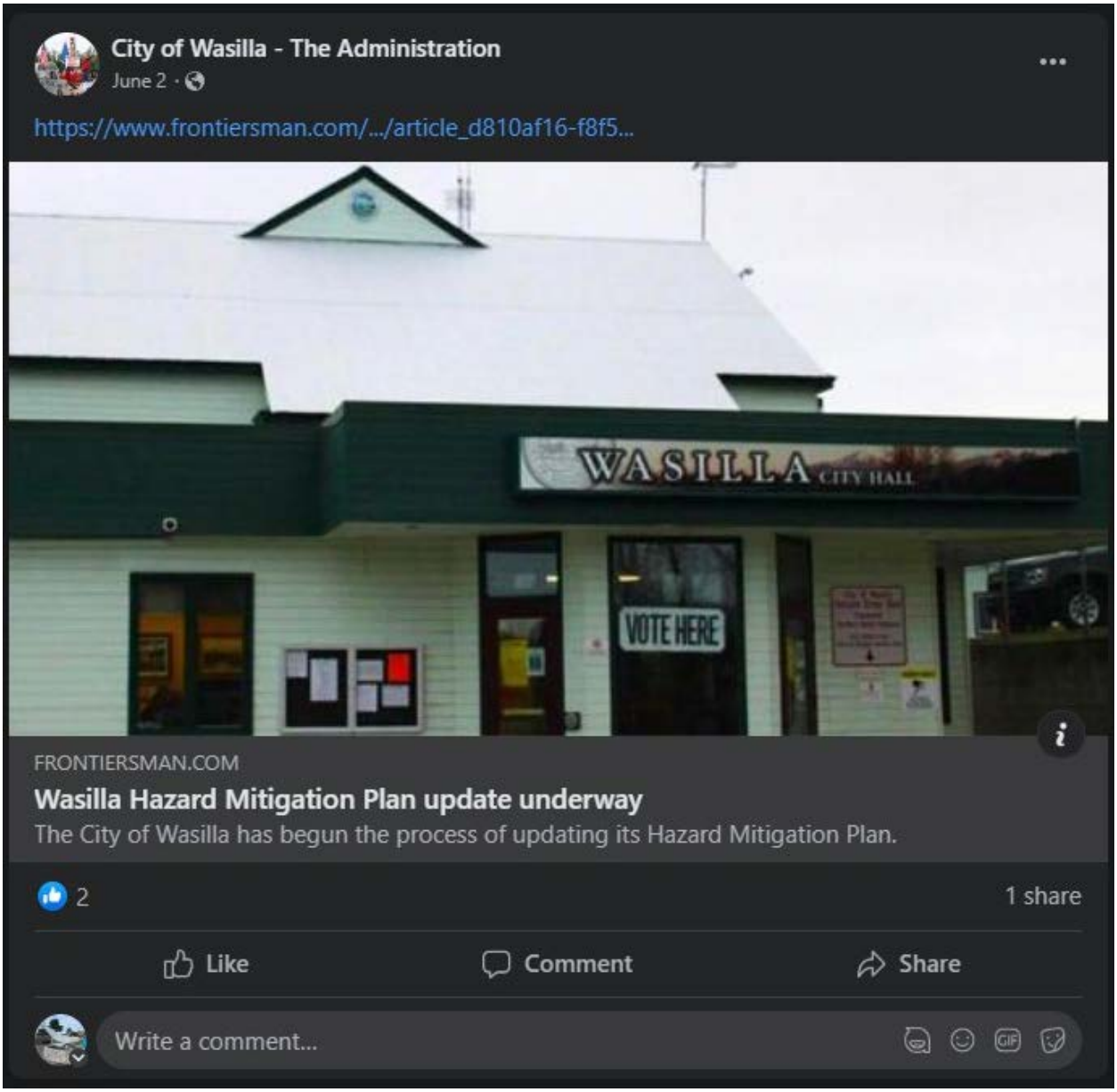
The purpose of a Hazard Mitigation Plan is to inform communities of the vulnerabilities to natural hazards, encourage better design, and enable the City to apply for grant funding to implement projects to minimize and mitigate future impacts.

Identified natural hazards include earthquake, severe weather, fire, flooding, volcanic ash, and erosion.

The city's planning division cites 2 recent examples of events that impacted Wasilla-the windstorm events in early 2022 and 2023, and the earthquake in 2018-as events that impacted residents, business owners, and the City.

The 2022 windstorm affected the City water infrastructure and water towers, while the 2023 windstorm damaged several private airplanes at the City Airport.

The Frontiersman article was shared on the City of Wasilla's Facebook page.



Newsletter #1- June 2023

CITY OF WASILLA
HAZARD MITIGATION PLAN UPDATE

Newsletter #1
June 2023

This newsletter describes project development processes to all interested agencies, stakeholders, and the public and to solicit comments for the City of Wasilla's Hazard Mitigation Plan Update.

The City of Wasilla is updating their 2018 Hazard Mitigation Plan.

Fairweather Science, LLC was contracted to assist the City with preparing a FEMA-approved hazard mitigation plan.

The purpose of the City of Wasilla's Hazard Mitigation Plan is to describe probable natural hazards, such as earthquake, severe weather, flood, volcanic ashfall, and wildland fire hazards, etc. People and facilities within the City limits at risk from future hazard impacts will be identified in this plan. Projects to mitigate the potential damages will be identified, and those prioritized by the City will be pursued for implementation. Documentation of the planning process and ongoing public participation is a crucial part of this project.

Why Are We Preparing A Hazard Mitigation Plan?

A Hazard Mitigation Plan better prepare the City from possible disaster and allow the City to receive outside funding for project implementation. To receive a project grant from FEMA's pre- and post- disaster grants, the City of Wasilla must have an approved and adopted mitigation plan (by Alaska Department of Homeland Security and Emergency Management (DHS&EM) and FEMA). FEMA identifies these grants in their Hazard Mitigation Assistance Guidance.

Hazard Mitigation Background

Hazards to the community can be natural or human caused, bringing destruction to property, infrastructure, and critical service interruptions. The greatest hazard is the potential for injury and/or death. Recovering from disasters can cause a heavy burden to individuals, families, and businesses requiring an unprecedented amount of time, money, and emotional strain. The recovery of a community also takes resources and focus away from other vital community needs.

A diverse set of natural hazards exist throughout the State of Alaska, bringing a wide variety of risks to life, property, or environmental harm. Though we cannot prevent all hazards from occurring, we can better prepare the tribal jurisdiction for their eventuality and prevent disaster.

Hazard mitigation projects offer a break in the cycle of community disaster that occurs as a result of these hazardous events. Projects may offer a solution to reduce or eliminate the enduring risk to life and property though on-going processes occurring before, during, and after disasters. Hazard mitigation activities may be short or long-term such as relocating or elevating buildings, replacing insufficiently sized culverts, using alternative construction techniques, or developing, implementing, or enforcing building codes, and education programs.

A FEMA approved and adopted HMP enables the City of Wasilla to apply for the Hazard Mitigation Grant Program (HMGP). HMGP is a disaster-related assistance program that provides funding for eligible mitigation measures that reduce disaster losses. This assistance can reduce community vulnerability, promote safety and adaptability, lessen response and recovery resources required, and overall, create a more resilient community. Applicants typically compete on a statewide basis.

Building Resilient Infrastructure and Communities (BRIC) grant funding is available through an annual competitive process for eligible mitigation activities to strengthen preparedness by reducing disaster losses and protecting life and property from future disaster damage.

FEMA's Flood Mitigation Assistance (FMA) grant program is a nationally competitive funding program. Funds can be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program (NFIP).

The City of Wasilla plans to apply for mitigation funds after the HMP update is complete.

How Do We Prepare a Hazard Mitigation Plan?

There are agency-specific federal requirements based on the Disaster Mitigation Act of 2000 (DMA 2000) to be followed when preparing a hazard mitigation plan. Information about the requirement criteria and other applicable laws and regulations may be found at: http://www.fema.gov/mitigation-planning-laws-regulations-guidance.

The following topics are required by DMA 2000 to be included in the documentation:

- ❑ Plan development process
- ❑ Identify hazards specific to the community
- ❑ Identify the risk to peoples and structures.
- ❑ Define the jurisdiction's mitigation goals
- ❑ List the community's mitigation strategy, selected actions, and implemented projects
- ❑ Provide a copy of the City's HMP Adoption Resolution

FEMA has prepared a Local Mitigation Planning Handbook (available at: FEMA Local Mitigation Planning Handbook-May 2023) that explains the planning process. The City of Wasilla Hazard Mitigation Plan will follow these updated guidelines.

What We Need From You

The first steps in this process include identifying who is participating in the planning process, what are the hazards that occur, and what critical facilities and infrastructure are vulnerable.

1. **What hazards impact the City of Wasilla?** Please use the following table to identify any natural hazards you have observed in your community AND any other natural hazards that may not be in the table. In the details column, please provide your recollection of when the event occurred, if there were damages to infrastructure, critical facilities, residences, and if there were injuries or loss of life. Details that include dollar value of infrastructure loss as well as how deep the flood/snow was, how fast the wind blew, or how many feet of shoreline was lost help inform the risk assessment.

Hazard	2018 City of Wasilla HMP	2023 City of Wasilla HMP	Details: Year, Damages to Critical Facilities/Infrastructure ($ and How (deep, speed, feet), Injuries, Loss of Life
Earthquake	Yes	Yes	
Erosion	Yes	No	
Flood	Yes	Yes	
Ground Failure (Avalanche, Landslide, Permafrost)	No	No	
Severe Weather	Yes	Yes	
Tsunami & Seiche	No	No	
Volcanic Ash	Yes	Yes	
Wildland / Tundra Fire	Yes	Yes	
Climate Change	No	Yes- Climate change does have to be addressed in this HMP Update per new FEMA guidelines.	
High Wind	Yes	No. High Wind will be incorporated into the Severe Weather hazard profile.	

2. **What Critical Facilities/Infrastructure do you rely on?** DHS&EM completed an Alaska Critical Facilities Inventory in 2009 and identified critical facilities within the City of Wasilla. Any updates will need to be added to the critical facilities table- specifically to the number and value of structures, location (latitude/longitude), and number of people occupying each structure.

This information will assist in determining which critical facilities, residences, and populations are vulnerable to specific hazards in Wasilla and differentiate critical facilities owned/used by other entities other than the City. Please add additional facilities if needed.

City of Wasilla's Critical Facilities			
Critical Facility	Owner	Critical Facility	Owner
Wasilla City Hall	City	Wasilla Museum & Visitors Center	City
U.S. Post Office	Federal	Museum Townsite Buildings	City
Wasilla Public Works Shop/Parks Building	City	Dorothy G. Page Museum	City
Wasilla Roads Shop	City	Wasilla Airport	City
Wasilla Airport Shop	City	Mat-Su Community Transit (MASCOT)	MSB
Wasilla Police Department	MSB	Alaska Railroad	AKRR
Central Mat-Su Fire Department (Station 6-1)	MSB	Wastewater Treatment	City
MATCOM Dispatch Center	MSB	Spruce Well & Reservoir	City
Mat-Su Regional Urgent Care	MSB	Bumpus Well & Reservoir	City
Wasilla Medical Clinic	City	Iditarod Well & Reservoir	City
Benteh Nuutah Valley Native Primary Care Center	Southcentral Foundation	Susitna Well & Reservoir	City
Wasilla High School	MSB	Richmond Hills Booster Station	City
Wasilla Middle School	MSB	Water Pressure Reducing Valve Building	City
Iditarod Elementary School	MSB	Wasilla Downtown Bulk Water Station	City
Burchell High School	MSB	MTS Sub-station	MEA
Menard Sports Complex	City	MEA Herning Sub-station	MEA
City of Wasilla Library	City		

Your Planning Team

The planning team is being led by Tina Crawford with assistance from Crystal Nygard, Bethany Buckingham Follett, Bill Rapson, Erich Schaal, Robert Walden, and Scott Bell.

Fairweather Science will be responsible for updating the HMP and will provide support and guidance to the planning team throughout the planning process.

Public Involvement

The involvement of the public is critical and a requirement by FEMA and will continue through the lifespan of the project. We hope to receive your comments, identify key issues or concerns, and improve ideas for mitigation. When the draft of the City of Wasilla Hazard Mitigation Plan update is complete, the results will be presented to the community before formal approval.

Scan QR code or follow this link to participate in the HMP survey:

https://www.surveymonkey.com/r/HZBKW5F

We encourage you to take an active part in contributing to the City of Wasilla Hazard Mitigation Plan update effort. The purpose of this newsletter is to keep you informed and to allow you every opportunity to voice your opinion regarding this important project.

Please contact your City HMP Planning Team Leader, Tina Crawford, or Laura Young (Fairweather Science) directly if you have any questions, comments, or requests for more information:

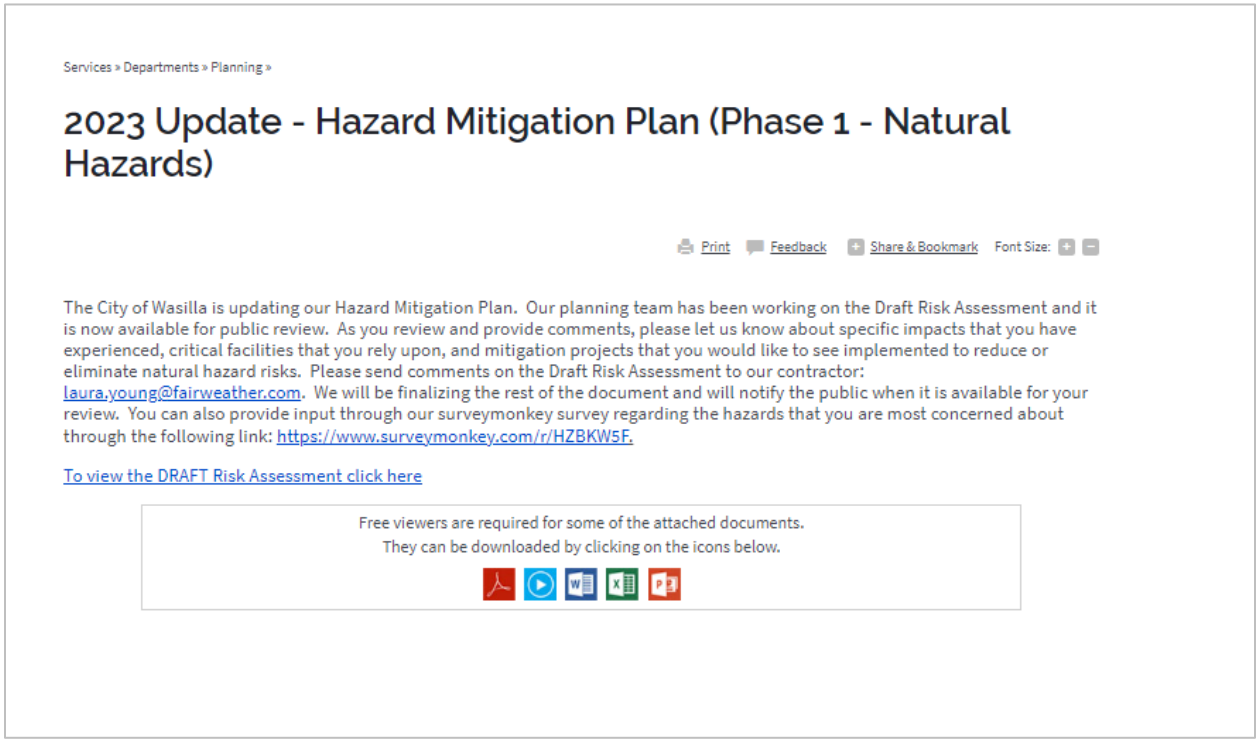
City of Wasilla
Planning Team Leader

Tina Crawford
290 E. Herning Avenue
Wasilla, AK 99654
(907) 373-9022
tcrawford@cityofwasilla.gov

Fairweather Science

Laura Young
301 Calista Ct.
Anchorage, AK 99518
(907) 351-8676
Laura.young@fairweather.com

A memo was published on the City website informing the public of the availability of the draft risk assessment and contact information for whom the public can send comments to.



Services » Departments » Planning »

2023 Update - Hazard Mitigation Plan (Phase 1 - Natural Hazards)

Print Feedback Share & Bookmark Font Size:

The City of Wasilla is updating our Hazard Mitigation Plan. Our planning team has been working on the Draft Risk Assessment and it is now available for public review. As you review and provide comments, please let us know about specific impacts that you have experienced, critical facilities that you rely upon, and mitigation projects that you would like to see implemented to reduce or eliminate natural hazard risks. Please send comments on the Draft Risk Assessment to our contractor: laura.young@fairweather.com. We will be finalizing the rest of the document and will notify the public when it is available for your review. You can also provide input through our surveymonkey survey regarding the hazards that you are most concerned about through the following link: https://www.surveymonkey.com/r/HZBKW5F.

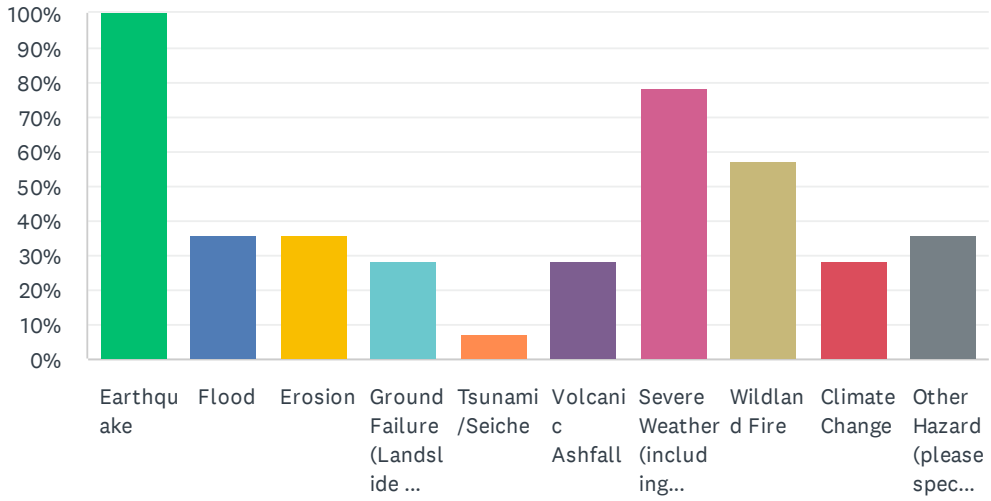
To view the DRAFT Risk Assessment click here

Free viewers are required for some of the attached documents.
They can be downloaded by clicking on the icons below.

Survey Results:

Q1 What natural hazards impact your community? Check all that apply

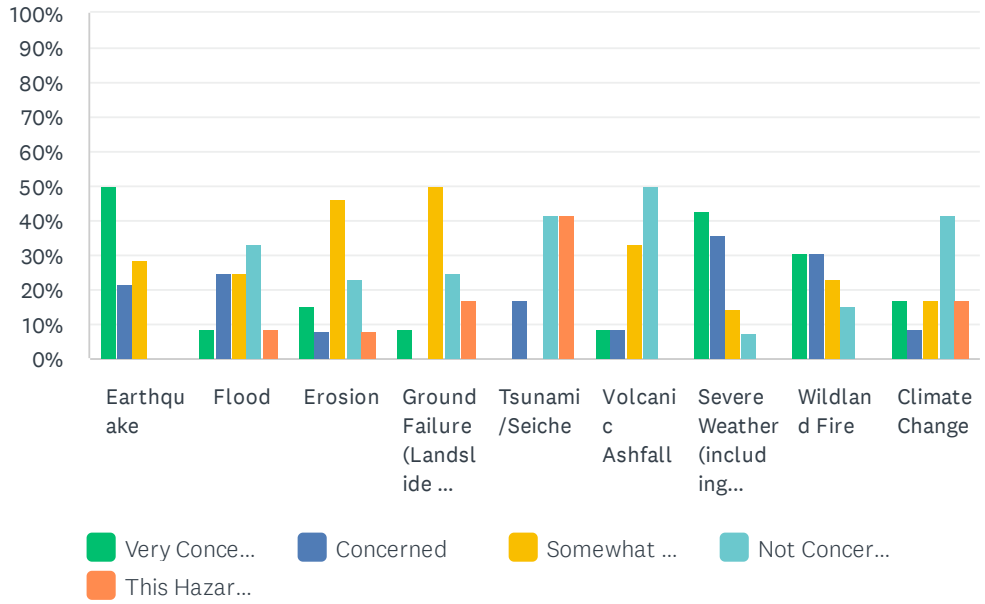
Answered: 14 Skipped: 0



ANSWER CHOICES	RESPONSES	
Earthquake	100.00%	14
Flood	35.71%	5
Erosion	35.71%	5
Ground Failure (Landslide or Avalanche)	28.57%	4
Tsunami/Seiche	7.14%	1
Volcanic Ashfall	28.57%	4
Severe Weather (including high winds)	78.57%	11
Wildland Fire	57.14%	8
Climate Change	28.57%	4
Other Hazard (please specify hazard)	35.71%	5
Total Respondents: 14		

Q2 What is your level of concern for the hazards that impact your community?

Answered: 14 Skipped: 0



	VERY CONCERNED	CONCERNED	SOMEWHAT CONCERNED	NOT CONCERNED	THIS HAZARD DOES NOT IMPACT MY COMMUNITY	TOTAL	WEIGHTED AVERAGE
Earthquake	50.00% 7	21.43% 3	28.57% 4	0.00% 0	0.00% 0	14	1.79
Flood	8.33% 1	25.00% 3	25.00% 3	33.33% 4	8.33% 1	12	2.91
Erosion	15.38% 2	7.69% 1	46.15% 6	23.08% 3	7.69% 1	13	2.83
Ground Failure (Landslide or Avalanche)	8.33% 1	0.00% 0	50.00% 6	25.00% 3	16.67% 2	12	3.10
Tsunami/Seiche	0.00% 0	16.67% 2	0.00% 0	41.67% 5	41.67% 5	12	3.43
Volcanic Ashfall	8.33% 1	8.33% 1	33.33% 4	50.00% 6	0.00% 0	12	3.25
Severe Weather (including high wind)	42.86% 6	35.71% 5	14.29% 2	7.14% 1	0.00% 0	14	1.86
Wildland Fire	30.77% 4	30.77% 4	23.08% 3	15.38% 2	0.00% 0	13	2.23
Climate Change	16.67% 2	8.33% 1	16.67% 2	41.67% 5	16.67% 2	12	3.00

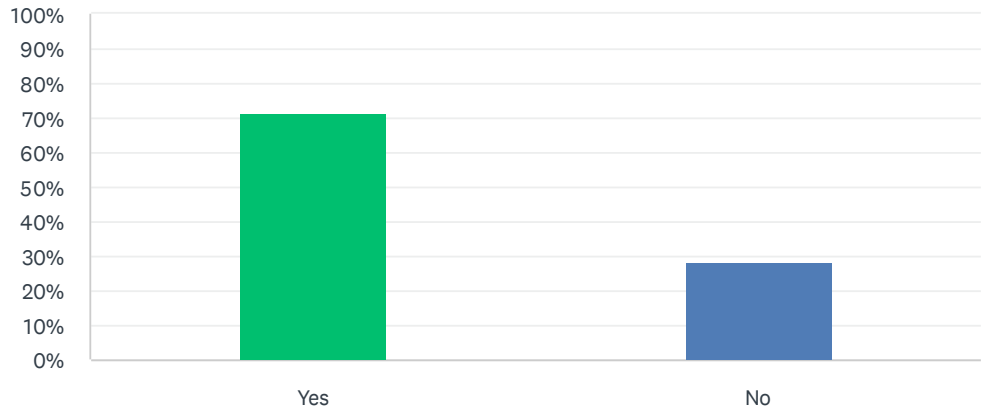
Q3 What critical facilities and infrastructure in Wasilla do you rely on?

Answered: 11 Skipped: 3

#	RESPONSES	DATE
1	Water & Wastewater, Airport, and Roads	7/6/2023 2:12 PM
2	Gas stations and grocery stores.	5/30/2023 6:40 AM
3	All utilities, roads, buildings for safety, and community facilities that assist during disasters.	5/26/2023 10:20 AM
4	None	5/26/2023 8:06 AM
5	Police & fire	5/24/2023 5:11 PM
6	Police and Fire Departments	5/23/2023 7:37 AM
7	Hospital/Fire Dept/Schools/minard Center	5/22/2023 2:50 PM
8	Roads. Electricity. Cell Service	5/22/2023 10:33 AM
9	Unknown	5/20/2023 1:32 PM
10	EMS	5/20/2023 12:58 PM
11	Grocery, roads, medical facilities	5/17/2023 5:44 PM

Q4 Would you support an ordinance for establishing building codes within City limits (ensuring all new buildings and residences are built to code to withstand high winds, earthquakes, etc.)?

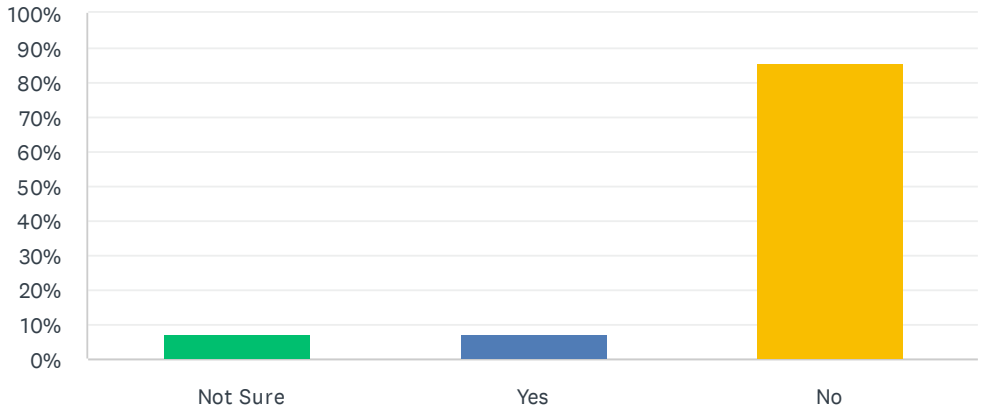
Answered: 14 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	71.43%	10
No	28.57%	4
TOTAL		14

Q5 Do you carry flood insurance for your home?

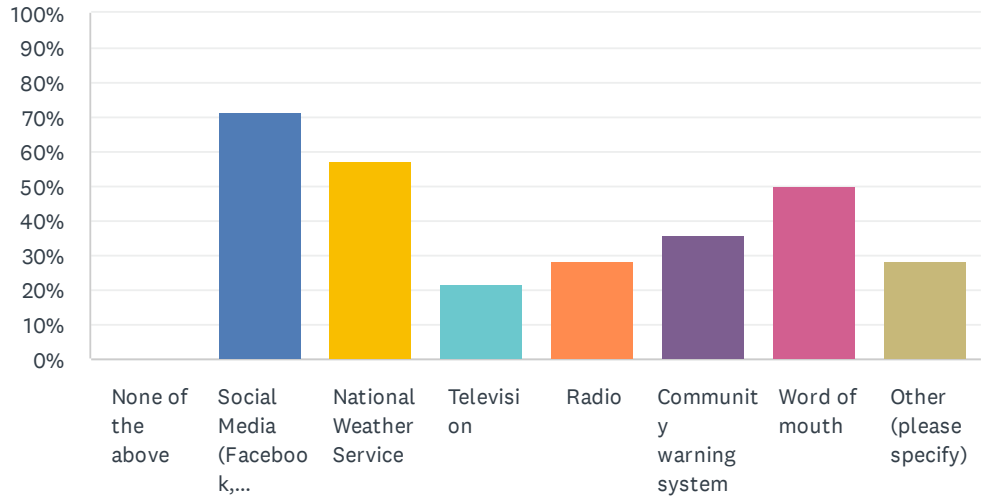
Answered: 14 Skipped: 0



ANSWER CHOICES	RESPONSES	
Not Sure	7.14%	1
Yes	7.14%	1
No	85.71%	12
TOTAL		14

Q6 How do you receive warnings regarding hazard events? Please check all that apply.

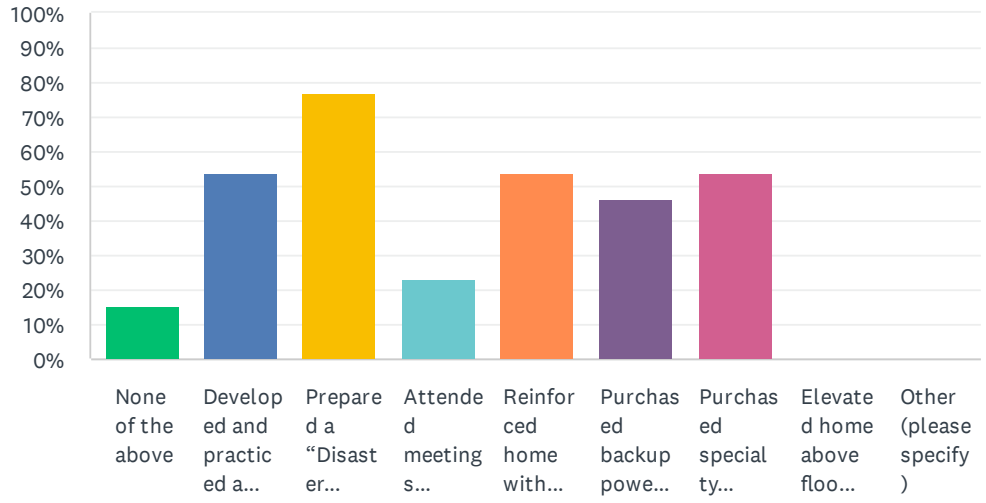
Answered: 14 Skipped: 0



ANSWER CHOICES	RESPONSES	
None of the above	0.00%	0
Social Media (Facebook, Twitter, etc.)	71.43%	10
National Weather Service	57.14%	8
Television	21.43%	3
Radio	28.57%	4
Community warning system	35.71%	5
Word of mouth	50.00%	7
Other (please specify)	28.57%	4
Total Respondents: 14		

Q7 What actions have you taken to prepare you and your household for future hazard events?

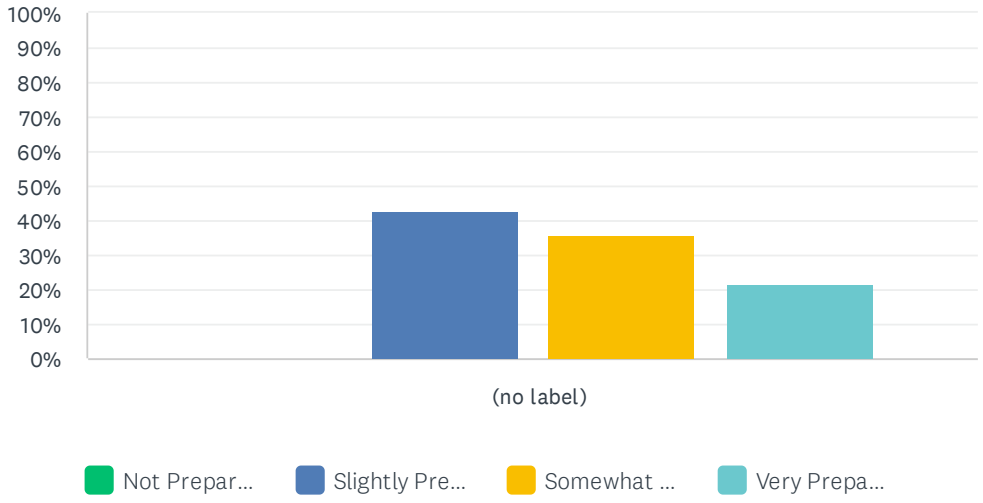
Answered: 13 Skipped: 1



ANSWER CHOICES	RESPONSES	
None of the above	15.38%	2
Developed and practiced a “Household/Family Emergency Plan” in order to decide what everyone would do in the event of a household emergency	53.85%	7
Prepared a “Disaster Supply Kit” (stored extra food, water, batteries, or other emergency supplies)	76.92%	10
Attended meetings discussing disaster preparedness	23.08%	3
Reinforced home with disaster-resistant materials (ex: installed non-structural seismic restraints for large furniture, secured roofing, etc.)	53.85%	7
Purchased backup power supply (generator, solar panels, etc.)	46.15%	6
Purchased specialty insurance (flood, earthquake, etc.)	53.85%	7
Elevated home above floodplain	0.00%	0
Other (please specify)	0.00%	0
Total Respondents: 13		

Q8 How prepared do you feel your household is for impacts of natural hazard events likely to occur in your community?

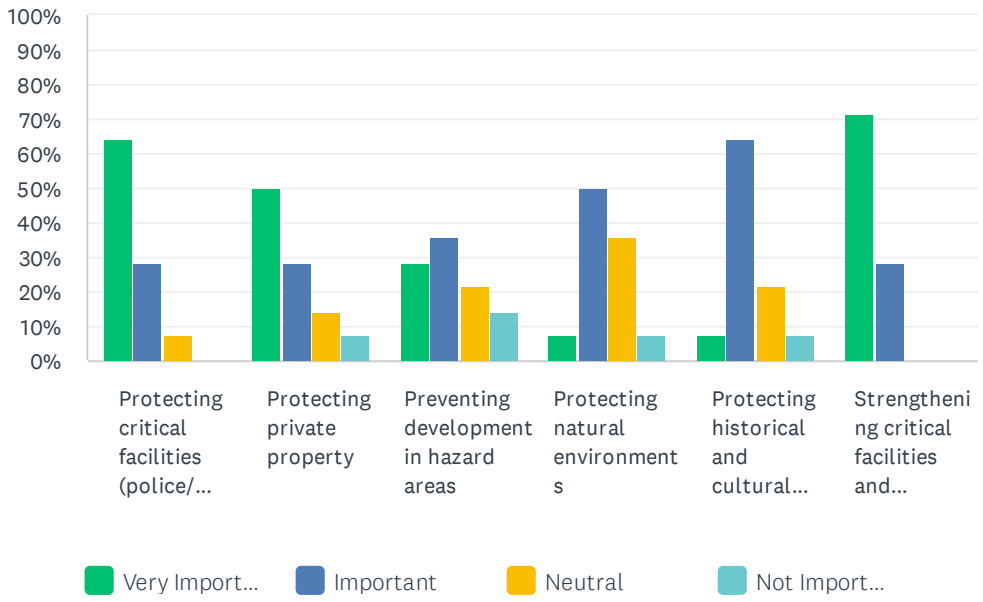
Answered: 14 Skipped: 0



	NOT PREPARED	SLIGHTLY PREPARED	SOMEWHAT PREPARED	VERY PREPARED	TOTAL	WEIGHTED AVERAGE
(no label)	0.00% 0	42.86% 6	35.71% 5	21.43% 3	14	2.79

Q9 What are your priorities for the following mitigation actions?

Answered: 14 Skipped: 0



	VERY IMPORTANT	IMPORTANT	NEUTRAL	NOT IMPORTANT	TOTAL	WEIGHTED AVERAGE
Protecting critical facilities (police/fire department, school, clinic, etc.)	64.29% 9	28.57% 4	7.14% 1	0.00% 0	14	1.43
Protecting private property	50.00% 7	28.57% 4	14.29% 2	7.14% 1	14	1.79
Preventing development in hazard areas	28.57% 4	35.71% 5	21.43% 3	14.29% 2	14	2.21
Protecting natural environments	7.14% 1	50.00% 7	35.71% 5	7.14% 1	14	2.43
Protecting historical and cultural landmarks	7.14% 1	64.29% 9	21.43% 3	7.14% 1	14	2.29
Strengthening critical facilities and emergency services	71.43% 10	28.57% 4	0.00% 0	0.00% 0	14	1.29

Q10 Do you have any specific ideas for mitigation projects associated with the identified hazards that you would like the City to consider?

Answered: 3 Skipped: 11

#	RESPONSES	DATE
1	Food Security and we need government officials that will respect the people wishes - All Legislators need to be held accountable	5/22/2023 2:50 PM
2	No	5/20/2023 1:32 PM
3	No	5/17/2023 5:44 PM