Huslia, Alaska

Local Hazard Mitigation Plan

2018

Prepared

for City of Huslia

October 2017, Revised April 2018

Plan Administration

The Huslia Hazard Mitigation Plan (HMP) Update, including appendices, should be updated every five years, after a disaster response, or as appropriate in response to community mitigation activities. This Hazard Mitigation Plan Update has been formally re-promulgated by the Community and sent to the State of Alaska Division of Homeland Security and Emergency Management for review and to the Federal Emergency Management Administration for approval once every five years.

Record of Plan Changes

All updates and revisions to the plan will be tracked and recorded in the following table. This process will ensure that the most recent version of the plan is disseminated and implemented as appropriate.

Date	Change No.	Purpose of Update
2010	Original Release	
2018	Update	Update hazard profiles, mitigation actions and strategies for Huslia

Plan Distribution List

Copies of this HMP will be provided to the following communities, agencies, and persons. Updates will be provided when available. Recipients will be responsible for updating their respective HMP copies when they receive changes. The City Administrator is ultimately responsible for dissemination of all plan updates.

Date	No. of Copies	Community/Agency/Person
		City of Huslia
		Huslia Traditional Council
		Yukon-Koyukuk School District
		Denali Commission
		Alaska Division of Homeland Security and Emergency Management
		Federal Emergency Management Agency Region 10

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1 Introduction

Historically, communities and regions within the state of Alaska have been impacted from natural hazard events, and many of these events have devastated homes and other vital infrastructure, resulting in injuries or death in the aftermath of the event. Costs to repair, rebuild, or to replace homes, critical facilities, and infrastructure, particularly in remote Alaska communities are staggering. One proven way to minimize these costs is for communities to develop a Hazard Mitigation Plan (HMP). Throughout the HMP process, communities work with other local partners, stakeholders, individuals within the communities, state, and federal planning partners. Section 1.4 of this plan provides a list of FEMA hazard mitigation assistance programs that provide funding support for a community to pursue mitigation projects that were listed during development of their HMP or HMP Update.

The HMP creates a framework for identifying hazards, vulnerabilities and determining a community's priorities "to reduce or eliminate long-term risk to human life and property from natural hazards." (44 CFR, Part 201.2) This plan is designed to fulfill the requirements set forth in the 44 Code of Federal Regulations (CFR) 201.4 Disaster Mitigation Act 2000 (DMA 2000) to identify hazards facing the community, to complete a risk assessment and vulnerability analysis, and to identify and coordinate mitigation efforts with State, Federal, and local partners. Specifically, this HMP describes the planning process and methodology used; introduces the community and its location and unique characteristics that make up the community and its people; identifies unique hazards the community faces; assesses the vulnerabilities of the community to these hazards; and puts forth sustainable mitigation strategies to create a more resilient community.

The Huslia 2018 HMP Update provides documentation of the planning process and how hazard mitigation resources have been organized (Sections 1 and 2); provides a profile of the community (Section 3); characterization of natural hazards and a risk assessment (Section 4); a capability assessment of funding sources and resources (Section 5); introduction of goals and strategies (Section 6); includes a maintenance plan for the HMP, including plan adoption, monitoring, evaluating, and updating the HMP (Section 7); and references for the HMP (Section 8).

1.1 Hazard Mitigation Planning

The DMA 2000 highlights the importance of mitigation planning and emphasizes planning for disasters before they occur. This act provides funding for mitigation planning and projects. Mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to, and the capabilities of, the individual communities.

1.2 The Planning Process Tasks

Hazard mitigation planning, whether developing a plan for the first time or a plan update, is implemented in a series of tasks. The figure below, based on FEMA's handbook illustrates these tasks.

Figure 1-1 FEMA Recommended Mitigation Planning Tasks

Source: FEMA Local Mitigation Planning Handbook, March 2013

1.3 Authorities

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), Title 42 of the United States Code 5121 et seq. Section 322, provides the legal basis for FEMA mitigation plan requirements as a

precondition for receiving FEMA mitigation project grants. The Disaster Mitigation Act of 2000 (DMA 2000), Title 44 of the Code of Federal Regulations (CFR), Part 201, amends the Stafford act by establishing mitigation planning requirements that emphasize the need for State, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts. Other state, regional and national programs may also reference the community's HMP as a funding condition. Table 1-1 identifies applicable legal authorities and other planning documents that support the HMP.

Table 1-1 Legal Authorities and Other Supporting Documents

Federal
▪ Disaster Mitigation Act 2000, PL 106-390 ▪ Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-707 ▪ Code of Federal Regulations, Part 201. ▪ National Flood Insurance Act of 1968, 42 USC 4104c, as amended by the National Flood Insurance Reform Act of 1944, Public Law 103-325 ▪ The Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, Public Law 108-264
State
▪ State of Alaska Hazard Mitigation Plan, October 2013 ▪ Alaska Statute 26.23, Department of Military and Veterans Affairs, Disasters
Local
▪ 2010 Huslia HMP ▪ Huslia 2016 Small Community Emergency Response Plan (SCERP) ▪ Huslia Community Plan, 2017 ▪ Huslia Emergency Streambank and Shore Protection Section 14 Project Preliminary Fact Sheet, The U.S. Army Corps of Engineers (USACE) – CAP14-2015 (Appendix 5) ▪ Huslia Water System Biomass Heating System, Indian Health Service Proposed Sanitation Capital Improvement

For more information regarding FEMA planning process, hazard identification and risk assessment, and mitigation strategy requirements, refer to Appendix 7. The appendix also details those sections within the HMP that document how each of these requirements has been satisfied.

1.4 Hazard Mitigation Assistance (HMA) Programs

FEMA's Hazard Mitigation Assistance (HMA) Guidance introduces three primary programs that provide funding for eligible mitigation planning and mitigation projects to reduce disaster losses and to protect life and property from future disaster damages. The three HMA programs are the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and the Pre-Disaster Mitigation (PDM) Program. The application cycles for these programs are announced via http://www.grants.gov/.

- HMGP assists in implementing long-term hazard mitigation planning and projects following a Presidential major disaster declaration

- FMA provides funds for planning and projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis. FMA facilitates Severe Repetitive Loss (SRL) and Repetitive Flood Claim (RFC) programs

- PDM provides funds for hazard mitigation planning and projects on an annual basis

The HMA grant programs provide funding to States, Tribes, and local entities that have a FEMA-approved State, Tribal, or Local HMPs. The HMGP and the PDM grants are authorized under the Stafford Act and DMA 2000, while the FMA is authorized under the National Flood Insurance Act. The HMGP is a directly-funded competitive disaster grant program. The PDM and FMA programs, also competitive, rely on specific pre-disaster grant funding sources, sharing several common elements. Each of the HMA programs have a percentage of Federal/non-Federal cost-share requirements. For further information regarding the HMGP, PDM, and FMA Programs, refer to Appendix 7.

The City of Huslia does not participate in the NFIP; therefore the City is not be eligible for grant funding through FMA programs.

FEMA has issued several policies that facilitate the mitigation of adverse effects from climate change on the built environment, structures and infrastructure. Recognizing that the risk of disaster is increasing because of multiple factors, including the growth of population in and near high-risk areas, aging infrastructure, and climate change, FEMA promotes climate change adaptation as discussed in Appendix 7.

2 Planning Process

Meridian Management, Inc. (Meridian), on behalf of the Alaska Division of Homeland Security and Emergency Management (DHS&EM), began working with the City of Huslia in June 2017 to organize resources and help begin the planning process for updating the 2010 Huslia Hazard Mitigation Plan. Beginning with phone calls and emails, the City of Huslia was provided FEMA planning resources, including guidance documents and sources for the local Planning Committee for hazard mitigation planning on-line training. City Administrator Elsie Vent served as the point of contact in the community for Meridian staff, and has coordinated the efforts of the HMP Planning Team. The Planning Team, made up of the Huslia Planning Committee and working with regional, state, and other stakeholders, is described in Section 2.1.

A primary resource for beginning the planning process has been the FEMA Local Mitigation Planning Handbook, March 2013, and FEMA's Hazard Mitigation Planning Frequently Asked Questions (FAQ). Many other FEMA products are available for guidance on specific topics associate with the HMP. Section 8 References provides a compilation of supporting documentation and material used for developing this HMP Update.

Information contained in the 2018 update of the Huslia HMP can be used in future updates for the State of Alaska HMP, which currently is being updated from the 2013 plan. The State also makes local planning and community infrastructure documents available that have been used in coordination with this HMP Update. The Alaska Division of Community and Regional Affairs (DCRA), Planning and Land Management Section, provides a Community Plans Library and a Community Infrastructure Library. Section 2.3 provides details of the extent of coordination and incorporation of other planning efforts with this HMP Update.

Upon initiating the planning process for this HMP Update, the Planning Team accessed the Huslia Hazard Mitigation Plan 2010 to review the mitigation strategy sections. This review prepared the Planning Team for discussion of updates regarding the success or lack of success in meeting the 2010 mitigation goals.

2.1 Planning Team

Huslia's Planning Team consists of a local planning committee, working with coordinating partners and stakeholders that include participation with organizations, programs and businesses; regional organizations such as regional health corporations, native associations, etc.; and State and Federal agencies responsible for review, approval, and funding to implement the HMP. The Planning Team is a necessary resource for

updating the HMP and serves as the primary source of gathering feedback, data, and information used to update the HMP.

2.1.1 Huslia Planning Committee

The Huslia Planning Committee is responsible for initiating and maintaining the HMP strategy and coordinating with the greater planning team. The local planning committee that developed the 2010 Huslia HMP reconvened to work on this 2017 update. Table 2-1 provides the names and contact information for the Huslia Planning Committee.

Table 2-1 Huslia Planning Committee

Name	Title	Organization	Email
Elsie Vent: Team Leader	City Administrator	City of Huslia	ElsieSV@gci.net
Speedy Sam	City Mayor	City of Huslia	SpeedyASam@Yahoo.com
Lorraine Pavlick	City Council Member	City of Huslia	Not available
Irene Peters	City Council Member	City of Huslia	Not available
Joyce Sam	City Council Member	City of Huslia	Not available
Karen Sam	City Council Member	City of Huslia	Not available
Leona Starr	City Council Member	City of Huslia	bifeltlj@hotmail.com
Jeanette Williams	City Council Member	City of Huslia	Jvent.is@hotmail.com
Jeanette Vent	Community Member	Huslia Resident	Not available
Harold Vent	Community Member	Huslia Resident	Not available
Brent Nichols	State Hazard Mitigation Officer	The Alaska Division of Homeland Security and Emergency Management (DHS&EM)	Brent.Nichols@alaska.gov

2.1.2 Coordinating Partners and Stakeholders

The 2010 Huslia HMP list of coordinating partners and stakeholders was updated for this 2017 HMP Update. Table 2-2 shows the names and contact information for the HMP coordinating stakeholders that were contacted (*) or were suggested to be contacted. This list should be reviewed regularly as part of the City's approach to plan implementation, and revised for completeness, including accurate contact information and additional organizations impacted by hazards and hazard mitigation actions.

Table 2-2 Coordinating Partners and Stakeholders

Local Organizations	Contact Name	Phone	Email or Mailing Address
City of Huslia	Elsie Vent	(907) 829-2266	elsiesv@gci.net
Huslia Traditional Council	Shandara Swatling	(907) 829-2294	P.O. Box 70 Huslia, AK 99746
VPSO	Vacant	(907) 829-2266	
Rose Ambrose Health Clinic	Health Aid	(907) 829-2253	P.O. Box 70 Huslia, AK 99746

Local Organizations	Contact Name	Phone	Email or Mailing Address
Huslia Volunteer Fire Department	Elsie Vent	(907) 829-2266	elsiesv@gci.net
Jimmy Huntington School	Casey Weter, Principal	(907) 829-2405	PO Box 110 Huslia, AK 99746 cweter@yksd.com

Regional or State-Wide Organizations	Contact Name	Phone	Address
Tanana Chiefs Conference*	Kyle Wright	907-452-8251	Kyle.Wright@TananaChiefs.org
Yukon-Koyukuk School District	Superintendent	907-374-9400	4762 Old Airport Way Fairbanks, AK 99709
Alaska Village Electric Cooperative*	Heidi Bowlus	907-565-5340	4831 Eagle Street Anchorage, AK 99504
Rural Alaska Community Action Program, Inc. (RurAL CAP)*	Mitzi Barker, Planning & Const. Division Director	(907) 279-2511	731 East 8th Avenue Anchorage, AK 99501 info@weatherizeme.org
Alaska Native Tribal Health Consortium (ANTHC) Emergency Services	Dispatch	(907) 729-4427	CommunityEnvHealth@ANTHC.org
ANTHC DEHE	Brian Sanford	(907) 729-5673	BSanford@ANTHC.org
ANTHC Grant Writers	Melodie Fair Max Neale	(907) 729-2418	MDFair@ANTHC.org MDNeale@ANTHC.org
RMW (TCC)	Fred Kameroff	(907) 452-8251 ext. 3266	frederick.kameroff@tananachiefs.org
U.S. Army Corp of Engineers	Wendy Shaw, P.E.	(907) 223-6895	POA.Floodplain@usace.army.mil
Denali Commission	Chris Allard Don Antrobus	(907) 271-1414	
State Hazard Mitigation Officer	Brent Nichols	(907) 428-7016	Brent.Nichols@Alaska.gov

2.2 Public Involvement

The City of Huslia hosted a public meeting July 13, 2017 to initiate the Huslia HMP Update.

2017 Meeting for the HMP Update

A public meeting was scheduled by the City Administrator for Thursday, July 13, 2017 in the afternoon. The Planning Committee was informed and the City posted a public notice at the City office and the Huslia Post Office. The meeting was also announced on the local radio broadcast station and on citizen band radio channels.

Meridian Management Inc. planners traveled to the community to assist in facilitating the public involvement meeting (a copy of the sign-in sheet and the public announcement provided by the City Council are included in Appendix 2). The 2.5 hour meeting was attended by members of the Planning Committee, the Huslia Tribe, and the public. There were about 30 Huslia residents in attendance and participation was good.

Meeting attendees identified local hazards to be addressed in the HMP based on discussion of the hazards identified in the 2010 HMP, the 2010 mitigation goals and potential actions, and developments since the approval of the 2010 HMP. Participants decided that the 2018 HMP Update hazards would primarily address riverbank erosion and wildfire.

Following review of the planning process and tables from the 2010 HMP the Planning Committee identified the following as hazards ranking based on perceived risk:

1. Erosion
2. Wildfire
3. Severe Weather
4. Climate Change
5. Permafrost degradation
6. Flood
7. Drought
8. Earthquake

Profiles of each of these hazards are provided in Section 4.2.

The following is a summary of the significant comments from the July 13, 2017, public input meeting for this HMP Update:

Should update assessment values shown in 2010 HMP (tables 7-2 and 7-4: Item #6 is #1 priority). The cost of loss reported as less than the cost of mitigation proposed;therefore project not initiated. $300k/house (HUD?)

Small Community Emergency Response Action Plan – New this year (incorporated) with other emergency management.

Huslia needs engineering study of the river bank erosion first to get cost of work. Huslia needs a comprehensive plan then coordinate with stakeholders on decisions to construct river back erosion controls.

Lots of contributing factors to increased rate of erosion – loss of permafrost – Linked to climate change.

Wildfire could block access of only one road to get to airport. This is an evacuation issue.

Need to develop assets for local and wild fire response (tools different between residential and wildland fires).

Access to hydrants needs to be secure, especially being able to do firefighting at "scattered sites", those homes being built further away and not on the piped water system – includes new homes being built.

Organize fire protection response (e.g. fire crew under contract) Update volunteer list and training (including first aid).

Improve communications for response.

Seek funding for study. USACE, Denali Commission, FEMA, HMP – find and use matching funds

Relocation is an option but not desired.

2.3 2018 Revised Update

The State DMVA/DHS&EM contracted Ecology and Environment, Inc.(E & E) to review the Draft Huslia 2017 HMP Update and to make the necessary revisions to meet FEMA requirements for approval. During the initial review, E & E determined that there needed to be additional public involvement in the planning process to address data gaps and ensure that the community and Planning Committee were given additional opportunity to provide feedback on the plan E & E contacted the City of Huslia and scheduled an additional meeting on Saturday, March 10, 2018. E & E provided the City Administrator with a public notice which was posted at the City office and post office, and the City Administrator announced the meeting on citizen band radio throughout the village the morning of the meeting. Five of the 7-member Council met and discussed the data gaps identified by E & E and provided comments on the draft HMP. A copy of the sign-in sheet for the special meeting is included in Appendix 2.

This current document reflects the decisions made by the City Council and members of the Planning Team, based on public input .

2.4 Incorporation of Existing Plans

Plans available on the State of Alaska Division of Community and Regional Affairs (DCRA) Community Plans and Infrastructure Library have been reviewed and referenced during this hazard mitigation planning update. The following plans and documents were reviewed for coordination with the 2018 Huslia HMP Update:

- USACE Alaska Baseline Erosion Assessment 2009
- State of Alaska Hazard Mitigation Plan 2013
- Huslia 2016 SCERP
- Huslia Community Plan 2017

Coordination with regional and statewide organizations is necessary to identify and incorporate other infrastructure planning and land use developments that could impact Huslia. Coordination of planning needs will be an ongoing effort to maintain an effective mitigation strategy for the community. This is discussed further in Section 7, Plan Maintenance and Implementation.

3 Community Profile

This section describes the location, geography, and history; demographics; and land use development trends of Huslia as reported by the State of Alaska.

Community public information about Huslia can be accessed at the Alaska DCRA Community Database Online site for Huslia.

Location and history information has changed very little for the 2018 HMP Update. Some changes in geography are observed as a result of erosion. Updates to demographic and development trends related to the Planning Area are provided in the following subsections.

3.1 Planning Area

The planning area was established based on the initial Huslia Hazard Mitigation Plan 2010. Aerial maps depict the approximately 1.1 square mile planning area to focus on hazard vulnerabilities within the area.

3.1.1 Location, Geography, and History

Figure 3-1 Location

Huslia (pronounced HOOS-lee-uh) is a second class city located in Alaska's Unorganized Borough. The community is situated on the north bank of the Koyukuk River, about 170 river miles northwest of Galena and 290 air miles west of Fairbanks. Huslia covers approximately 16.4 square land miles and approximately 0.7 square miles of water. The community lies within the Koyukuk National Wildlife Refuge, at approximately 65.698610 North Latitude and -156.399720 West Longitude. (Sec. 33, T004N, R012E, Kateel River Meridian). Under ANCSA 14(c)(3), the K'oyitl'ots'ina Limited Village Corporation has reconveyed certain land to the local city government to provide for community use and expansion (ANCSA 14c plats describing land conveyed to Huslia). Figure 2-2 provides an aerial map and the Alaska Department of Community, Commerce, and Economic Development (DCCED) make available Community Mapping for Huslia in Figure 2-3.

From the years 1843 through 1926, missionaries and commercial enterprises caused the local Athabascans to transition from their nomadic lifestyle. The Cutoff Trading Post and other infrastructure began to develop in the early 1920s. However, due to repeated flooding, inhabitants moved to the current townsite where a school was built in 1950; then a post office, airport, and roads were built in 1952. At this point families started to remain near town and build homes, and eventually built a clinic in 1960. The City became incorporated in 1969. The Huslia Tribal Council has existed since 1972 and works closely with the City government to improve its resident's quality of life.

Extreme temperature changes seasonally throughout Alaska's interior. Huslia temperatures range from a winter low of -65 degrees Fahrenheit (ºF) to above 90ºF during summer. The area receives approximately 13 inches of rain and 70 inches of snow.

Figure 3-2 Huslia Area Map

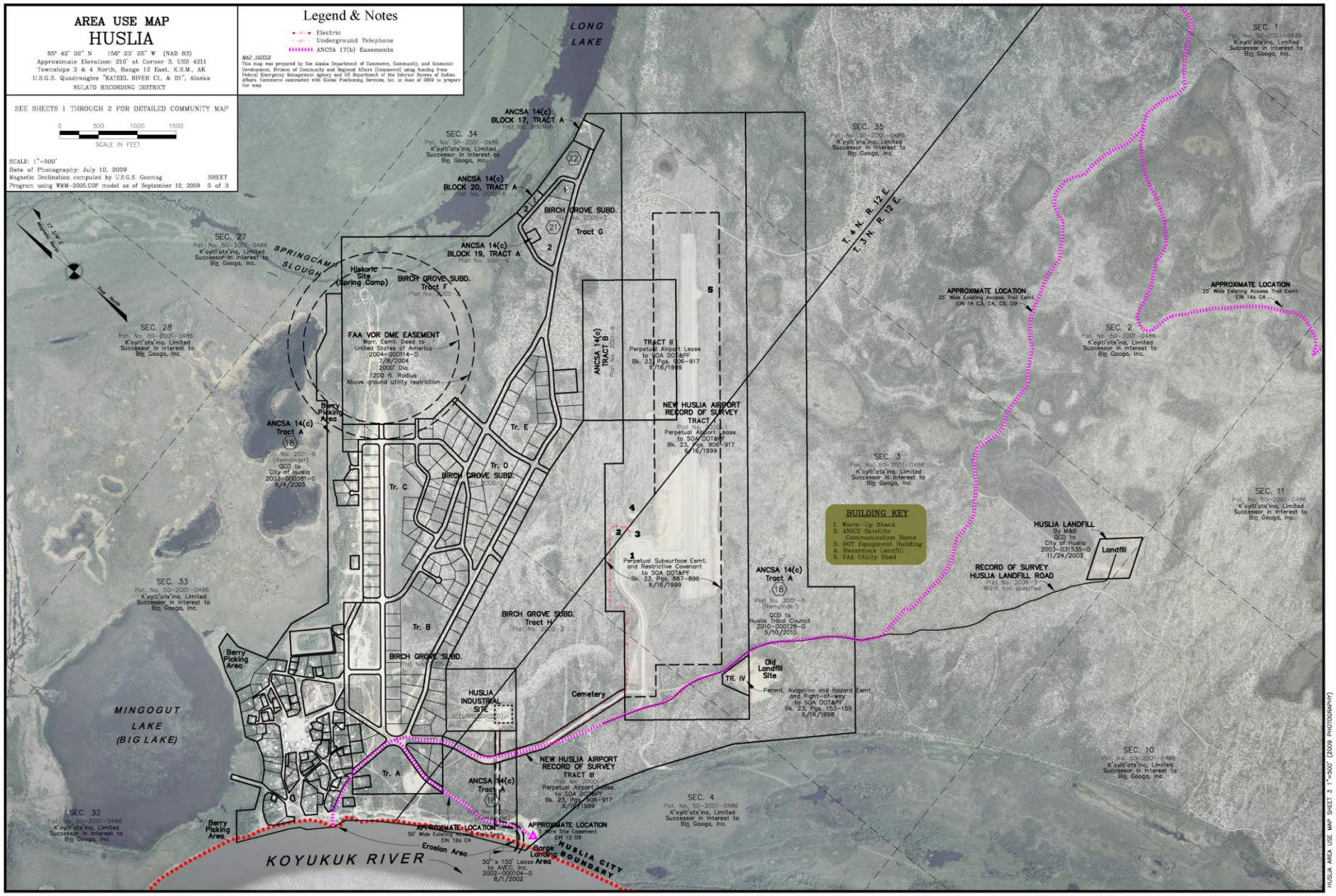


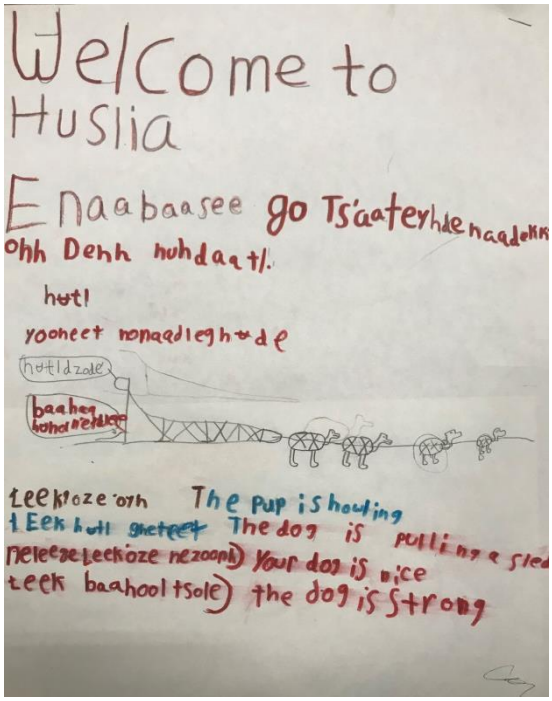
Figure 3-3 Huslia Community Map (DCCED 2009)

3.1.2 Culture

Huslia is an Athabascan village and most residents are related by birth or marriage. Subsistence lifestyle is prevalent and culturally significant to Huslia's inhabitants.

The Huslia region historically has been inhabited by the Koyukon Athabascans, who were a nomadic people. They migrated throughout the year between seasonal camps, where they harvested wild game and fish, gathered berries and other food sources available between the south fork of the Koyukuk and Kateel River valleys. Trading supplemented their subsistence lifestyle by procuring goods from Kobuk River Eskimos and other travelers traversing the area. Beginning in the mid-nineteenth century, the local Athabascans transitioned from a nomadic lifestyle, establishing villages based on missionary and commercial enterprises that developed along the major rivers of the area.

Huslia Village is the name of the federally recognized Tribe and a member of the Doyon Limited Regional Corporation and K'oyitl'ots'ina Limited Village Corporation.



3.1.3 Transportation

Water travel is the principal mode of transportation during the summer. Cargo and fuel arrives by barge twice each year, in May and September. Groceries are flown in weekly by bypass mail. Huslia is accessible by air year-round. There is a 4,000' long by 75' wide lighted gravel airstrip that is owned by the state. Snowmachines, ATVs, and skiffs are used for local transportation. Huslia has a network of winter trails, and the frozen river is used as an ice road to neighboring villages.

3.1.4 Demographics

The 2010 census recorded 275 residents, of which the median age was 26 indicating a relatively young population. The population of Huslia is expected to grow at the same or accelerated rate because over half of the population is younger than 27 years of age.

Huslia is a Athabaskan village, and about 94.9 percent of residents recognize themselves as Alaska Native. The male and female composition is approximately 54.2 and 45.8 percent respectively. The 2010 census revealed that there are 219 households with the average household having approximately 4.5 individuals. The most recent 2017 Department of Labor and Workforce Development estimated population is 293. **Figure 3-4** illustrates the recent population trend of the City of Huslia.

Huslia is in Alaska's State Senate District T, State House District 39, and State Judicial District 4.

Year	Population
2010	275
2011	301
2012	314
2013	322
2014	339
2015	326
2016	326

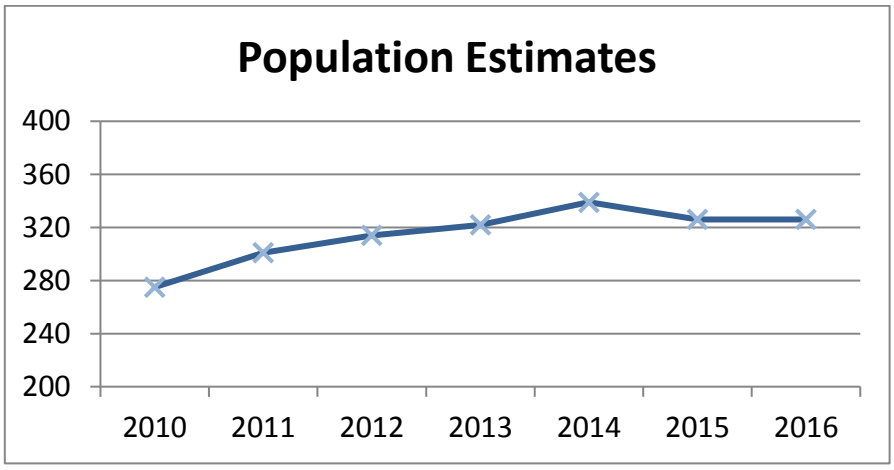


Figure 3-4 Population Data – Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section.

3.1.5 Economy

There are limited employment opportunities in the City of Huslia. Established government agencies such as the City and Tribal Offices, the school district, and the health clinic, provide the bulk of the employment opportunities. The summer months bring firefighting and outside construction job opportunities; however, subsistence is critical to the economy of the residents of Huslia. Figure 3-5 illustrates local jobs as workers by industry.

2015 Workers by Industry

	Number of workers	Percent of total employed	Female	Male	Age 45 and over	Age 50 and over
Natural Resources and Mining	12	9.0	4	8	1	1
Construction	8	6.0	1	7	1	1
Manufacturing	2	1.5	1	1	0	0
Trade, Transportation and Utilities	2	1.5	1	1	1	1
Educational and Health Services	20	14.9	19	1	6	4
Leisure and Hospitality	3	2.2	0	3	0	0
Local Government	85	63.4	44	41	31	23
Other	2	1.5	0	2	1	1

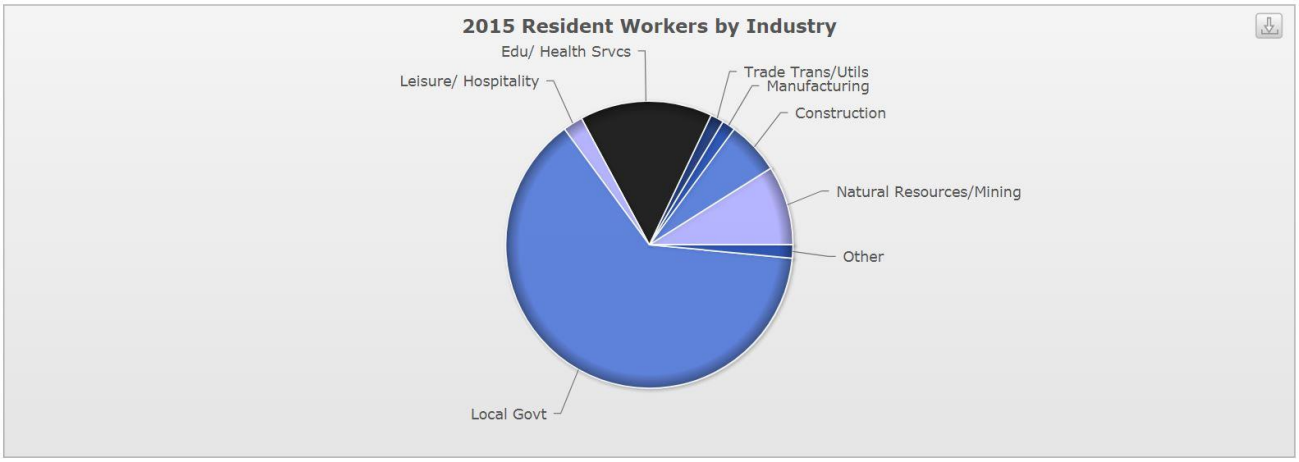


Figure 3-5 Worker data by Industry – Source: Alaska Department of Labor and Workforce Development, Research and Analysis Section

3.1.6 Infrastructure

Huslia has a 4,000-foot public gravel runway owned by the State of Alaska Department of Transportation & Public Facilities (DOT&PF), Northern Region.

The City of Huslia has piped water distribution and piped wastewater collection systems serving the majority of homes, and operates a groundwater treatment facility and washeteria. Homes that are outside of the range of piped sanitation facilities have individual wells and septic systems. Table 4-10 lists the infrastructure in Huslia with the location and estimated replacement value.

The Alaska Village Electric Cooperative (AVEC) operates diesel generators which provide electric power in Huslia.

3.1.7 Homes

There are 14 homes that have individual wells and septic systems. There are 26 additional undeveloped residential lots located outside of the piped system. 2010 U.S. Census data reports 105 housing units located in Huslia with 87% occupancy.

A total of 105 single-family residential buildings were considered in this analysis. Table 4-8 provides home value based on estimated cost of new home with water well.

3.1.8 Climate Change Impacts

Alaska has been considered by climate scientists as ground zero for the impacts that have been felt all over the state. This HMP discusses impacts of climate change within the profiles of the natural hazards in Section 4.3.

Nature

Earth's 2015 surface temperatures were the warmest since modern record keeping began in 1880, according to independent analyses by NASA and the National Oceanic and Atmospheric Administration (NOAA).

Globally-averaged temperatures in 2015 shattered the previous mark set in 2014 by 0.23 degrees Fahrenheit (0.13 Celsius). Only once before, in 1998, has the new record been greater than the old record by this much.

The 2015 temperatures continue a long-term warming trend, according to analyses by scientists at NASA's Goddard Institute for Space Studies (GISS) in New York. NOAA scientists concur with the finding that 2015 was the warmest year on record based on separate, independent analyses of the data. Because weather station locations and measurements change over time, there is some uncertainty in the individual values in the NASA index. Taking this into account, NASA analysis estimates 2015 was the warmest year with 94 percent certainty.

Referring to the data released, NASA Administrator Charles Bolden says, "Climate change is the challenge of our generation, …[this] is a key data point that should make policy makers stand up and take notice - now is the time to act on climate." (NASA, 2017)

The planet's average surface temperature has risen about 1.8 degrees Fahrenheit (1.0 degree Celsius) since the late-19th century, a change largely driven by increased carbon dioxide and other human-made emissions into the atmosphere (NASA, 2017).

General Impacts

Rising temperatures may provide some benefits in Alaska, such as a longer growing season for agricultural crops, increased tourism, and access to natural resources that are currently inaccessible due to ice cover, like offshore oil. However, climate change is also having adverse effects on many ecosystems and species, and is creating new hardships for Alaska Native populations and remote, rural communities.

Future Occurrence

Northern latitudes are warming faster than more temperate regions, and Alaska has already warmed much faster than the rest of the country. The maps in **Error! Reference ource not found.** show changes in temperature (relative to 1971-1999) projected for Alaska in the early, middle, and late parts of this century, if heat-trapping gas (also known as greenhouse gas) emissions continue to increase (higher emissions, A2), or are substantially reduced (lower emissions, B1) (Stewart B. C., Kunkel, Stevens, & Sun, 2013)

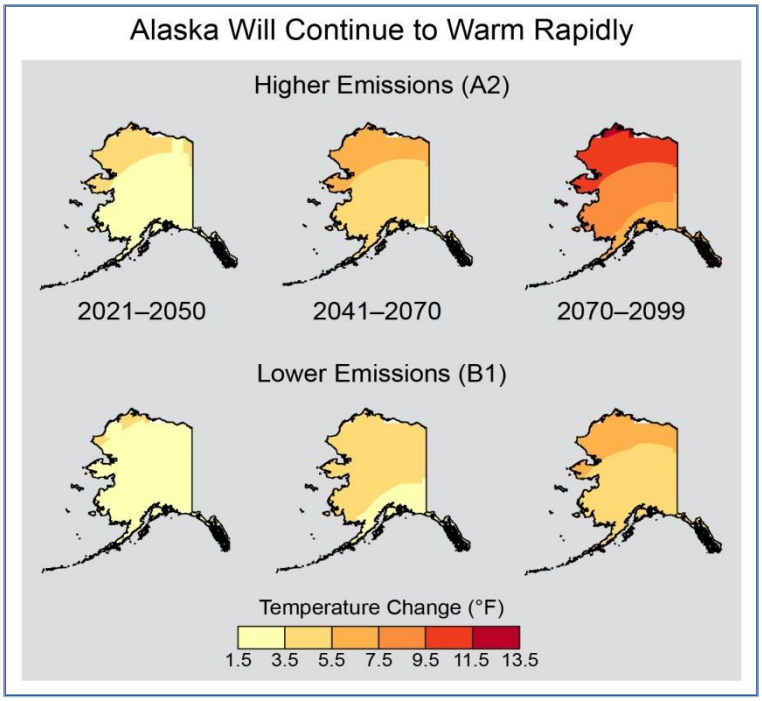


Figure 3-6 Alaska Warming

4 Risk Assessment

Risk assessment is the process of identifying the potential loss of life, personal injury, economic injury, and property damage resulting from hazards. This process is accomplished using four steps:

Step 1: Identify Hazards

Step 2: Profile Hazard Events

Step 3: Inventory Assets and Vulnerabilities

Step 4: Estimate Losses

44 CFR § 201.6(c)(2) requires local jurisdictions to provide sufficient hazard and risk information from which to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. The following sections address the unique hazards faced by Huslia and describe the community's risk based on the probability of disaster, vulnerability, and exposure.

In accordance with 44 CFR §201.6, the Risk Assessment (Section 4) is the basis for the mitigation strategy (Section 5). Information in this chapter is used by the Planning Committee to identify and prioritize mitigation actions. Risk assessment criteria and applicable 44 CFR §78 Flood Mitigation Assistance criteria for profiling hazards and vulnerability assessments are provided in Table 4-1.

Table 4-1 Federal Requirements for Risk Assessment

44 CFR §201.6 Local Mitigation Plans (c) Plan Content (2) Risk Assessment The risk assessment shall include:
(i) *A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events* ***(ii)*** *A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. The plan should describe vulnerability in terms of:* ***(A)*** *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;* ***(B)*** *An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate;* ***(C)****Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.* ***(iii)*** *For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.*
44 CFR §78.5 Flood Mitigation Plan development
(b) *Description of the existing flood hazard and identification of the flood risk, including estimates of the number and type of structures at risk, repetitive loss properties, and the extent of flood depth and damage potential.*

4.1 Hazard Analysis

Hazard analysis involves identifying and profiling the hazards that could affect the community. A hazard analysis includes the identification, screening, and profiling of each hazard.

Hazard identification is the process of recognizing the natural events that threaten an area. Natural hazards result from unexpected or uncontrollable natural events of sufficient magnitude. Human, Technological, and Terrorism related hazards are beyond the scope of this plan. Even though a particular hazard may not have occurred in recent history in the study area, all natural hazards that may potentially affect the study area are considered; the hazards that are unlikely to occur or for which the risk of damage is accepted as being very low, are eliminated from consideration – *hazard screening*.

Hazard profiling is accomplished by describing hazards in terms of their nature, history, magnitude, frequency, location, extent, and probability. Hazards are identified through historical and anecdotal information, existing plans, studies, and hazard maps collection and review for the study area. Hazard maps are used to determine the geographic extent of the hazards and define the approximate boundaries of the areas at risk.

For this 2018 HMP Update the hazard analysis began with the Planning Team's review of the 2010 Huslia HMP and discussion of progress made through implementation of mitigation actions and the mitigation strategy.

4.1.1 Hazard Identification and Screening

The Planning Team reviewed the hazards profiled in the 2010 HMP, then evaluated and screened the comprehensive list of potential hazards based on a range of factors. These factors included prior knowledge or perception of the relative risks presented by each hazard; the ability to mitigate the hazards; and the known or expected availability of information regarding the hazards (see Table 4-2).

Following the review, the Planning Team determined that eight hazards pose the greatest threat to the community: erosion, fire, severe weather, climate change impacts, ground failure (subsidence), flood, drought, and earthquake.

Table 4-2 Identification of Hazards

Hazard Screening	Hazard Profiled (yes/no)	Profile Justification
Erosion	Yes	Erosion occurs during high water events, ice jam scouring, and normal river current flow, because Huslia is located on the outside bend of the Koyukuk River. The City has approximately ½-mile embankment exposure to erosion activity. See Erosion profile Section 4.3.1
Fire – Wildland & Community Conflagration	Yes	Historic wildfire occurrences during summer dry season (April-October). The City is bordered on two sides by scrub growth and low fuels making the wildland urban interface hazardous. See Fire hazard profile Section 4.3.2

Hazard Screening	Hazard Profiled (yes/no)	Profile Justification
Severe Weather	Yes	Annual weather patterns, severe cold, freezing rain, and snow accumulations are predominant threats. The snowfall amount directly affects winter weather damages. Heavy snow loading presents a threat to structures. More snow provides better ground insulation to help prevent buried water and sewer lines from freezing. Severe cold usually occurs during December-January. High winds typically occur from February-March and August-September. August experiences the most rain. Too much rain causes wild game to move to more distant dry ground away from the City increasing resident travel to harvest subsistence foods. Heavy rain and spring thaw causes high river water which reduces the City's residents' ability to harvest King salmon for subsistence needs. See Severe Weather profile Section 4.3.3
Ground Failure	Yes	Discontinuous permafrost is present throughout the City; however, it is more prevalent at the northeastern part of the City. Thawing of the permafrost contributes to ground failure and land subsidence. See Ground Failure profile Section 4.3.5
Flood	No	Riverine flooding currently is not a threat to Huslia as it is situated above the floodplain of the Koyukuk River. The Huslia 2010 HMP reported that Mingoguit Lake at the northwest edge of the community overfills its banks and floods nearby homes. Residents living beside the lake, as well as attendees at the public meeting July 13, 2017, reported that the flooding of the lake does not impact the community. Therefore, flooding was not profiled for the Huslia 2018 HMP Update. See Flood profile Section 4.3.6
Drought	Yes	Dry seasons prevent sufficient groundwater for essential berry and subsistence food growth. Insufficient water also reduces food sources for wild game and reduces river water replenishments. Reduced water depth causes increased water temperature; high water temperature reduces fish fry survivability. Consequently, drought seasons have a direct negative impact preventing wild food, fish, or wild game availability for harvesting. See Drought profile Section 4.3.7
Earthquake	Yes	Infrequent, unpredictable occurrences. There are reports of large central-Alaska earthquakes being felt in Huslia. See Earthquake profile Section 4.3.8

Hazard Screening	Hazard Profiled (yes/no)	Profile Justification
Volcano	No	Not profiled. Wind-blown volcanic ash may pose some problems for the community, but is not considered a significant hazard or threat.
Snow Avalanche	No	Not profiled. Community is at low risk for avalanche. The predominately flat terrain is not conducive to avalanche. River banks and bluffs are too steep to facilitate the snow accumulation required for avalanche.
Tsunami and Seiche	No	Not profiled. Huslia is located 17 miles inland from the Bering Sea and is not at risk of tsunamis. Huslia Lake is a small lake with sloped banks and is unlikely to generate a seiche.

4.2 Hazard Profiles

The following section profiles each hazard identified in Section 4.3 and assesses the risk associated with each. Each risk assessment considers the following attributes:

- **Hazard Description:** A brief introduction to the mechanisms behind the hazard.
- **Location:** An indication of geographic areas that are most likely to experience the hazard.
- **Past Occurrences/History:** Similar to location, a chronological highlight of recent occurrences of the hazard accompanied by an extent or damage cost, if available.
- **Extent/Probability:** A description of the potential magnitude of the hazard, accompanied by the likelihood of the hazard occurring (or a timeframe of recurrence, if available).
- **Cascading Impacts:** A brief overview of secondary hazards often associated with the hazards.
- **Vulnerability:** A description of the potential magnitude of losses associated with the hazard. Vulnerability may be expressed in quantitative or qualitative values depending upon available data
- **Potential Impacts from Future Climate Conditions:** A brief overview indicating ways in which the hazard profile may change over time due to a changing climate, if applicable.

To enhance the usability of the HMP, risk assessments have been streamlined to provide only critical information within the body of this section. Each hazard was assigned a rating based on the following criteria and on historic events for probability (

Table 4-3) and magnitude/severity (Table 4-4).

Table 4-3 Hazard Probability Criteria

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

Table 4-4 Hazard Magnitude/Severity Criteria

Magnitude / Severity	Criteria
4 - Catastrophic	Multiple deaths. Complete shutdown of facilities for 30 or more days. More than 50% of property is severely damaged.
3 - 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.
2 - 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.
1 - 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.

The hazards profiled for Huslia are presented in the following subsections. The order of presentation of the hazards profiled does not signify the level of importance or risk, which may fluctuate over time and with other changes that take place in the community.

4.2.1 Erosion

Erosion is a serious problem in Huslia and the community's top priority in their hazard mitigation strategy. Past erosion control and bank stabilization efforts have been largely unsuccessful.

Hazard Description

Erosion rarely causes death or injury. However, erosion causes the destruction of property and infrastructure, and reduces the available extent of land available for development. Erosion is a natural process, but its effects can be exacerbated by human activity.

Riverbank soil undercut by the flow of the Koyukuk River, will slide into the river in a geologic process known as mass wasting. During erosion events along the Koyukuk River, mass wasting can be sudden and

threaten fishing boats and equipment at the riverbank. Boat and barge landings at Huslia require annual reconstruction due to the impact of erosion events following spring floods.

Figure 4-1 Illustration of Riverine Erosion in Huslia

Riverine Erosion

Riverine erosion results from the force of flowing water and ice formations in and adjacent to river channels. This erosion affects the bed and banks of the channel and can alter any channel or riverbank. In less stable braided channel reaches, erosion, and deposition of material are a constant issue. In more stable meandering channels, episodes of erosion may only occur occasionally.

Most of the geomorphic change that occurs in a river system is in response to a peak flow event. It is a natural process, but its effects can be exacerbated by human activity. Removing vegetation or disturbing soils at the river bank, wave action due to boat wash, and in-channel construction that alters flow are some examples of human activity that can exacerbate riverine erosion.

Riverine erosion in areas of permafrost removes insulating soil and contributes to permafrost melting, thus decreasing the shear strength of the river bank soils making them more susceptible to erosion. Ice rich permafrost melting also causes saturation of the riverbank, which increases erosion potential. The degradation of permafrost has an accelerating and compounding effect on erosion process.

Location

The most active erosion area in Huslia is at the 70-foot high bluff along 2,000 feet of the river adjacent to the community. Figure 4-1 provides comparison of the Huslia river bank between 1974 and 2017. Although this image does not provide a scale or perspective to indicate the extent of erosion over time, the 2017 photo illustrates that mass wasting has occurred since 1974.

Previous Occurrence/History

Table 4-5 History of Erosion Events

Date	Location and Extent	Estimated Loss
1986-1987	Grout-filled fabric matting (sandbags filled with cement and stitched together) installed on the embankment to armor riverbank. The structure was washed out, creating a navigational hazard.	Not reported
1989	In the spring of 1989, high water topped the old wastewater lagoon and washed out its westerly side.	Not reported

Date	Location and Extent	Estimated Loss
June 1998	Governor declared a disaster existed in Huslia (98-188) as result of acute erosion due to flooding that caused damage to public infrastructure.	Not reported
May 2003	Riverine erosion 60 feet inland along 2,000 feet of riverbank	Not reported
Spring 2004	Riverine erosion 100 feet inland along 2,000 feet of riverbank	Not reported
Spring 2005	Riverine erosion 80 feet inland along 2,000 feet of riverbank	Not reported
2015	1 house moved	$142,750
2016	2 houses moved	$285,500
2017	1 house dismantled for scrap	Not reported

Extent and Probability

Erosion occurs annually, although the severity varies. The most significant erosion events occurred during spring break-up and can be expected to occur again due to the ongoing nature of riverine erosion. The hazard probability for erosion is "highly likely," which was assigned a rating of 4.

The Alaska Village Electric Cooperative power plant, gas and oil bulk fuel storage facility, numerous homes, and water and sewer pipes have been relocated to avoid erosion damage at an estimated cost of $450,000 (USACE, Erosion Information Paper - Huslia Alaska, 2007). During the March 10, 2018 meeting, the City Administrator clarified that the cost of $450,000 was to move the power plant and did not include relocation of homes and other utility piping.

The *Alaska Legislative Appropriations for Flood and Erosion Control Report* indicates that between 1985 and 1990, Huslia received six legislative grants for river bank stabilization and erosion control, totaling $3,395,000. One grant funded installation of an articulated concrete mat along part of the eroding river bank in an attempt to stop erosion; however, the mat failed the following year when the river undercut the structure. The concrete mat slid into the river and the community identified it as a navigational hazard in response to a survey related to erosion control. Several homes that were near the riverbank have been relocated due to continuing erosion. Erosion has resulted in the uncontrolled release of diesel contaminated sites and has destroyed sanitation infrastructure (USACE, Erosion Information Paper - Huslia Alaska, 2007).

Cascading Impacts

Erosion of the riverbank bluff can cause melting of permafrost near the river's edge, which can result in localized ground failure inland of the riverbank. As ice rich permafrost melts, water drains from the soil, opening up voids in the soil causing the ground to collapse. On the surface, this appears as potholes or sinkholes, which can be detrimental to building foundations and other infrastructure. Near the river embankment melting permafrost results in a loss of soil shear strength and contributes to mass wasting of the bluff into the river. Riverine erosion increases permafrost vulnerability as insulating material is eroded away. Resulting permafrost melting leads to an acceleration of erosion.

Vulnerability

Single erosion events have been reported to cause the loss of village land at the river's bluff as much as 80 feet along the 2,000-foot stretch adjacent to the village. Three homes were relocated in 2016 due to erosion threat. For hazard mitigation planning purposes this HMP is using new home cost as replacement cost reported to be approximately $434,000 each (Section 4.3.1 and Table 4-9). Based on Table 3-4, the magnitude/severity rating is a 2, "Limited." The Vulnerability for riverine erosion has been inconsisent; however the City percieves the vulnerability to be increasing.

As the bluff erodes, additional structures, including several homes are threatened. Figure 4-9 shows the USACE projected extent of erosion to 2065 based on qualitative analysis (USACE 2015). Erosion, however, has not been consistent; therefore, it is difficult to predict future erosion lines. The primary project summary from the 1962 Public Health Service (PHS) project states, "The riverbank is eroding at a rate of about 50 feet each year, and represents a serious erosion problem that might respond to engineered river controls." The 1973 project summary states, "The City has faced problems of bank erosion in the past and several houses have been relocated due to the erosion activities of the river. Within the past six years, however, the riverbank erosion has decreased because of the deposition of a sandbar in front of the City." The projected riverbank erosion was estimated at an average of 10-feet per year for infrastructure planning (MWH, 2001). Natural progression of the river bed alignment is highly unpredictable; therefore, all projections are merely speculative. However, development in the erosion zone should be avoided due to the potential loss.

The U.S. Army Corps of Engineers (USACE), in the 2009 "Alaska Baseline Erosion Assessment," identified Huslia as one of 26 "Priority Action Communities" experiencing erosion problems. The USACE further described these Priority Action Communities as being subject to "serious erosion that is threatening the viability of the community, or, in some cases, significant resources are being expended to minimize those threats." The riverine erosion at Huslia is described as "… erosion that undercuts the foundation upon which the community sits. Multiple structures including homes, water and power supply, and the sewage lagoon are expected to be affected in less than 10 years." (USACE, 2009).

In the *Erosion Information Paper – Huslia, Alaska* (USACE 2007), the USACE attributed the impacts of erosion primarily result from "riverine processes. The conditions causing or contributing to the erosion are reported to include natural river flow, flooding, ice jams, undercutting, spring break-up, boat traffic, vehicle traffic on the beach and the bank, and the loss of permafrost."

Potential Impacts from Future Climate Conditions

As stated in the vulnerabilities above, potential impacts from future climate change conditions include permafrost thaw, flooding, ice jams, which could cause undercutting of the riverbank.

4.2.2 Fire

The Huslia Planning Team identified both wildland fire and conflagration as hazards affecting their community.

Hazard Description

Wildland fire

A wildland fire is a type of uncontrolled fire that spreads via consumption of vegetation. It often begins unnoticed, spreads quickly, and is usually signaled by dense smoke that may be visible from miles around. Wildland fires can be caused by human activities (such as arson or campfires) or by natural events such as lightning. Wildland fires often occur in forests or other areas with ample vegetation. In addition to wildland fires, wildfires can be classified as urban fires, interface or intermix fires, and prescribed fires.

Conflagration

For the purposes of this hazard characterization, community fire conflagration is defined as a community fire that involves one or more critical facilities in the community. The number of structures required to meet this general definition of "conflagration" varies with the size of the community. Commonly conflagration is characterized as fire that involves a significant portion of the community's built environment; however, in a remote village community, the destruction of a single critical facility due to fire may justify a community disaster declaration. Conflagrations, so defined, are a disaster level hazard because they can substantially impair the community's ability to function. In contrast to wildland fire, conflagrations involve constructed materials and developed areas of the community as their primary fuel source.

Factors complicating conflagrations are hazardous substance releases, structural collapse, interruption of services and commerce, loss of historical and cultural values, requirements for evacuation, and sheltering. While conflagrations can occur in different facilities within a community, a primary concern in many Alaska villages is the "old town" area where construction is denser and older and there are public utilities as well as significant historical and commercial property.

Location

Wildfire

Figure 4-2 shows the location of reported fires and the perimeter of wildfires from 1990 to 2017.

Conflagration

Older abandoned buildings should be considered a potential source of fire in the community as these wooden structures present an attractive nuisance site where children could allow a heat source or smoking material to get out of control. Older buildings can be expected to have an increased likely hood of collapse during fire which increases their hazard magnitude. The old water treatment plan is an example of such a hazard, which is listed in Table 4-6 of the Vulnerability section of this profile.

Previous Occurrence/History

The community reports being concerned about the potential hazard posed by wildfires burning in proximity to Huslia in 2016. These fires prompted the community to address this issue in their local emergency planning.

Extent and Probability

Based on a lack of reported fire hazard impacts on the community of Huslia the probability of an event is not considered high; however, the probability is Possible (see Table 4-3).

Airport access routes for emergency evacuation, buildings near the outer perimeter of the community, and abandoned buildings that present an attractive nuisance are locations that represent the most potential for a hazard related to fire.

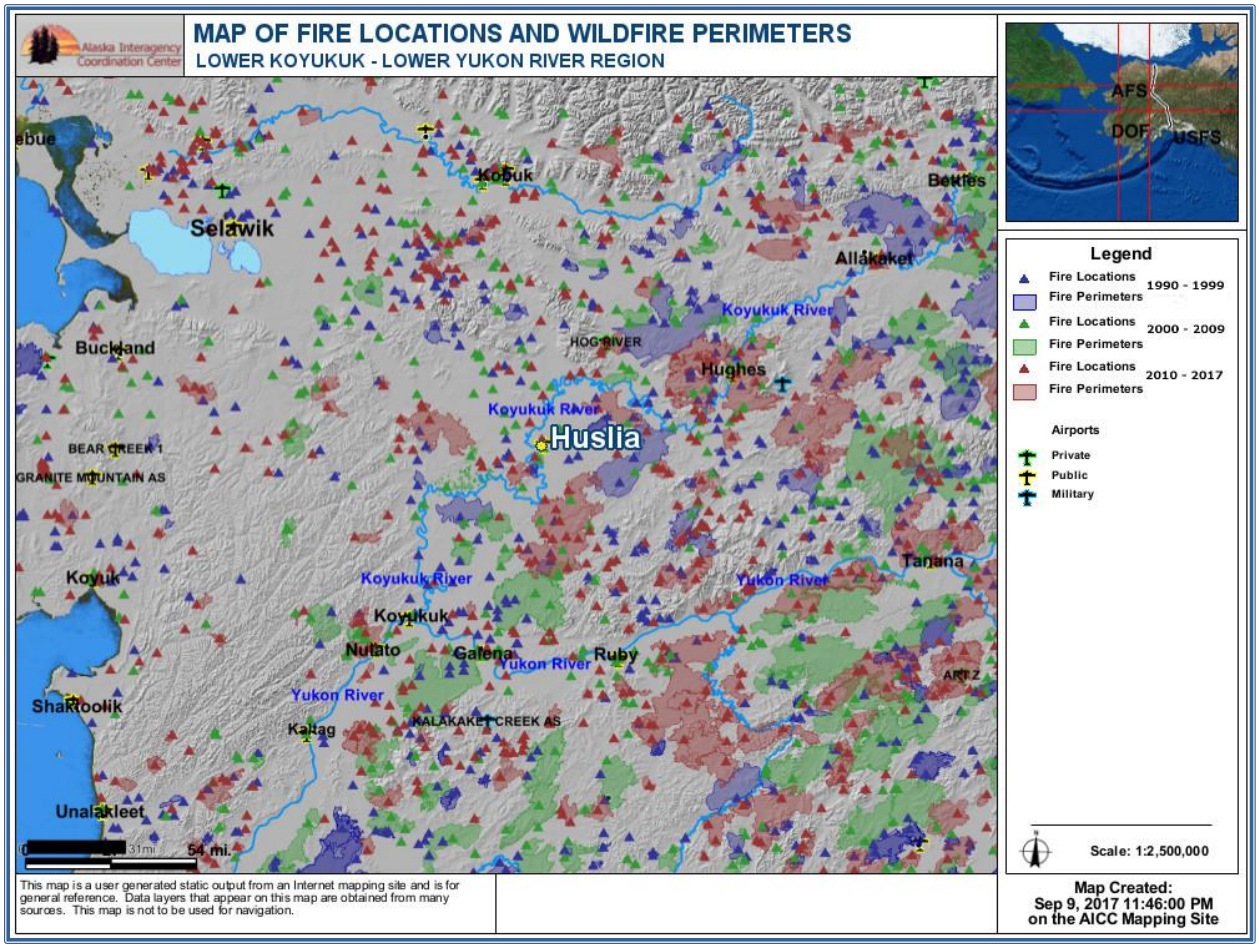


Figure 4-2 History of Fires and Wildfires

Cascading Impacts

The indirect effects of wildland fires can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and cause river and stream siltation; thereby enhancing flood potential, harming aquatic life, and degrading water quality. Lands stripped of vegetation are also subject to increased debris flow hazards.

Vulnerability

A Huslia Volunteer Fire Department was identified in the 2010 HMP but the community reports that it has not been active. Re-establishing the volunteer fire department will be added to the hazard mitigation strategy. The vulnerablility for fire has not changed from 2010; however, there is concern for the potential for conflagration fires that could start in old, abandoned buildings.

The piped water system for the community includes flush hydrants that can be used as a source of water for fighting fires, if they are in good operating condition. Conditions of fire and firefighting could result in injuries and/or illness that results in permanent disability, or a fire could result in the shutdown of critical facilities for at least a week, or more than 25% or property could be severely damaged by a fire event; therefore the magnitude and severity is "Critical," rated at 3 (see Table 4-4).

Table 4-6 Building Presenting a Potential Fire Hazard

Building	Location
Old Water Treatment Plant	"Old Town" area, behind the City offices

Potential Impacts from Future Climate Conditions

Wildfire

The U.S. Environmental Protection Agency (EPA), reporting on the impacts of climate change in Alaska:

> *Higher temperatures and drier conditions increase the risks of drought, wildfire, and insect infestation. 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. 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.*

Climate change is expected to increase the prevalence of wildfire. As atmospheric temperatures rise, the rate of evaporation and transportation increase leads to drier terrestrial conditions. Furthermore, increases in temperature and atmospheric moisture levels will increase the frequency of electrical storms and lighting strikes that can ignite wildfires.

Higher temperatures and drier conditions increase the risks of drought, wildfire, and insect infestation. 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 (Chapin, et al., 2014). Fires change forest habitat, improving conditions for moose and some plant species, but reducing the lichen that caribou rely on in winter. 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 (Markon, Trainor, & Chapin, 2012)

4.2.3 Severe Weather

Hazard Description

Impacts associated with severe weather events include roof collapse, trees and power lines falling, damage to light aircraft and sinking small boats, injury and death resulting from snow machine or vehicle accidents, injuries from overexertion while shoveling all due to heavy snow.

Severe weather in Alaska includes high winds, thunder and lightning storms, hail, and winter weather. Winter weather includes heavy and drifting snows, ice, *aufeis*, freezing rain/ice storms, extreme cold. *Aufeis* is glaciation or ice buildup from drainages, streams and rivers potentially affecting road surfaces and infrastructure. Huslia experiences the following:

Heavy and Drifting Snow

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. Drifting snow is the uneven distribution of snowfall and snow depth caused by surface winds

Freezing Rain and Ice Storms

Freezing rain and ice storms occur when rain or drizzle freezes on surfaces, accumulating 12 inches in less than 24 hours.

Extreme Cold

The definition of extreme cold varies according to the normal climate of a region. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme." The National Weather Service (NWS) website talks about wind chill and its affect on people from exposure to cold, hypothermia, and frostbite, which can result in serious injury or even death. In Alaska, extreme cold usually involves temperatures between -20 to -50°F. Excessive cold may accompany winter storms, be left in their wake, or can occur without storm activity. The City of Huslia's coldest temperature on record occurred January 29-31, 1999 and measured -67ºF.

High Winds

High winds occur in Alaska when there are winter low-pressure systems in the North Pacific Ocean and the Gulf of Alaska. Alaska's high wind can equal hurricane force but fall under a different classification because they are not cyclonic nor possess other characteristics of hurricanes. In Alaska, high winds (winds in excess of 60 mph) occur rather frequently over the Interior due to strong pressure differences, especially where influenced by mountainous terrain. The City of Huslia's highest recorded wind speed reached 49.5 mph (NOAA 2006a).

Location

The nearest NWS Office is Fairbanks. Huslia is located in the NWS Weather Zone 216 encompassing the Lower Koyukuk and Lower Yukon basin.

The NWS has continued to modify their system for assigning weather zones to facilitate and more accurately confine weather patterns to relevant geographic areas. Consequently the data in Table 4-7 reflects different zone numbering patterns and should be used to depict weather events that have historically impacted the area; some of which may not have impacted the City of Huslia as severely as other areas within the same zone.

Previous Occurrence/History

Table 4-7 lists recorded severe weather events reported by the NWS, which includes impacts to Huslia in the storm report narrative or details.

Table 4-7 Severe Weather Events

Date	Impact	Location and Extent	Fatalities/ Injuries	Estimated Loss
1999-01-29	Extreme Cold/Wind Chill	While northern Alaska was under a relatively cold air mass already, a large pool of colder air moved from the Russian high Arctic Ocean to the Chukchi Sea coast west of Barrow on Jan. 29th and proceeded southeast to the interior of Alaska through the 31st, where it remained until being slowly warmed February 10-12th. Lowest recorded temperature for this event was in Huslia at -67° F	0/0	None Reported
2000-02-01	High Wind/Blizzard	Reported high wind event with blizzard conditions at Huslia	0/0	None Reported
2003-10-30	Winter Weather/Ice Storm	Rain and freezing rain was reported at Huslia and Kaltag	0/0	None Reported
2005-03-20	High Wind	Huslia AWOS peak gust 54 knots (62 mph).	0/0	None Reported
2008-04-03	Winter Storm	Several inches of snow in surrounding areas and Huslia received more precipitation most likely in the form of freezing rain.	0/0	None Reported
2009-01-13	Winter Storm	Several inches of snow in surrounding areas and Huslia received some freezing rain.	0/0	None Reported

Date	Impact	Location and Extent	Fatalities/ Injuries	Estimated Loss
2010-10-19	Heavy Snow	Temperatures were just cold enough to support snow and some of the snow fell heavily at times. Public reports from Huslia of 7 to 8 inches of snow.	0/0	None Reported
2011-12-03	Winter Storm	At Huslia, the snow began at approximately 1045AKST on the 3rd and continued to fall steadily through 0930AKST on the 4th. There were reports of snow drifts that were 2 to 3 feet deep, but it was nearly impossible to measure the amount of snow that fell due to significant blowing and drifting snow. The wind gusted as high as 35 kt/43 mph at the Huslia AWOS.	0/0	None Reported
January 2012	Cold/Wind Chill	Sustained low temperatures. Coldest month on record for this NWS reporting zone.	0/0	None Reported
January 2012	Cold/Wind Chill	Heavy snow. 12.8 inches reported buy observer north of Ruby.	0/0	None Reported
February 2012	Heavy Snow	Observer in the region reported 11 inches of snow fall over 8 hour period.	0/0	None Reported
February 2012	Blizzard	Blizzard conditions throughout Western Alaska	0/0	None Reported
December 2012	Heavy Snow	Eight to ten inches of snow was received within the NWS reporting zone	0/0	None Reported
December 2011	Winter Storm		0/0	None Reported
December 2011	Heavy Snow		0/0	None Reported
January 1, 2011	Heavy Snow	A total of 12 inches of snow was observed at Ruby. The snow began at 0756AKST on the 1st and ended at 2233AKST on the 2nd. The heaviest of the snow fell on the 1st, and it is likely that there was 6 inches of snowfall by late on the evening of the 1st.	0/0	None Reported
February 8, 2011	Heavy Snow	Snow fell across the lower Koyukuk Valley and middle Yukon Valleys from the early morning hours on the 8th through the afternoon hours on the 9th. Snowfall amounts ranged from 6 inches at Galena to one foot at Koyukuk. A total of 6 to 8 inches was observed at Ruby.	0/0	None Reported

Date	Impact	Location and Extent	Fatalities/ Injuries	Estimated Loss
February 24, 2011	Winter Storm	The storm produced widespread blizzard conditions along the west coast as well as the arctic coast and heavy snowfall and high winds in parts of the interior. There were also areas of flooding and high water observed along parts of the west coast.	0/0	None Reported
April 7, 2011	Winter Storm		0/0	None Reported
May 20, 2011	Thunderstorm Wind	Gusty winds peaked at 49 mph. Thunderstorm was nearby. Two roofs were damaged. A number of small trees were blown down.	0/0	None Reported
November 3, 2011	Winter Storm	|Zone 216: Heavy snow was observed at Galena with a storm total of 11 inches. The snow began at approximately 1400AKST on the 3rd, and the accumulating snow ended by approximately 1000AKST on the 4th. The snow was likely accompanied by significant blowing and drifting snow along and near the Nulato Hills. The Kaltag ASOS observed frequent wind gusts of 30 to 35 mph, and short periods of reduced visibility to one quarter of a mile.	0/0	None Reported
December 3, 2011	Winter Storm		0/0	None Reported
December 7, 2011	Heavy Snow	|Zone 216: A total of 12.5 inches of snow was observed by the cooperative observer 14 miles northeast of Ruby. The snow began on the morning of the 7th and continued through the 8th. A total of 7.3 inches of snow was observed by 0630AKST on the morning of the 8th, with an additional 5.5 inches of snow observed from 0630AKST on the 8th through 0630AKST on the 9th.	0/0	None Reported

Date	Impact	Location and Extent	Fatalities/ Injuries	Estimated Loss
December 10, 2011	Heavy Snow	|Zone 216: Heavy snow was observed in parts of the middle Yukon Valley from the afternoon hours on the 10th through the early morning hours on the 11th. The Koyukuk Post Office estimated that 8 inches of snow fell, and the Ruby Post Office estimated a storm total of approximately 12 inches.	0/0	None Reported

Extent and Probability

Based on previous occurrences and the criteria identified in Table 4-3, it is highly likely a severe storm event will occur in the next three years The probability of a severe storm event is greater than 20 percent but less than or equal to 33 percent "Likely" per year or a rating of 4.

Cascading Impacts

A quick thaw after a heavy snow can also cause substantial flooding. Impacts from extreme cold include hypothermia, halting transportation from fog and ice, congealed fuel, frozen pipes, disruption in utilities, frozen pipes, and carbon monoxide poisoning. Buildings that are older and/or not constructed with materials designed to withstand heavy snow and wind (e.g., hurricane ties on crossbeams) are more vulnerable to the impacts of severe weather.

Until the snow can be removed, airports and roadways are impacted, even closed completely, stopping the flow of supplies and disrupting emergency and medical services. Accumulations of snow can cause roofs to collapse and knock down power lines. Heavy snow can also damage light aircraft and sink small boats. A quick thaw after a heavy snow can cause substantial flooding. Typical impacts include repair and snow removal costs. The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on the community.

Ice buildup can collapse utility lines and communications towers, as well as make transportation difficult. Ice can also become a problem on roadways if the temperature warms up just enough for precipitation to fall as freezing rain where a pressure differential occurs across a mountain range. Aufeis forms during the winter when emerging ground water freezes. If aufeis occurs on a roadway, it makes travel difficult.

Extreme cold can lead to hypothermia and frostbite, which are both serious medical conditions. Cold causes fuel to congeal in storage tanks and supply lines, stopping electric generators. Without electricity, heaters do not work, causing water and sewer pipes to freeze or rupture. Extreme cold can also interfere with air transportation if the ambient temperature is below an aircraft's minimum operating temperature. Extreme cold increases the likelihood of ice jams and flooding. If extreme cold conditions are combined with low/no snow cover, the ground's frost level can change, creating problems for underground infrastructure. Temperatures as low as -60°F have been recorded in Huslia.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level.

The impact from these events can range from inconvenience to life-threatening conditions, particularly if air travel is restricted. Huslia is not accessible by road, and all goods are brought in by air. Air transportation is particularly critical for evacuations related to medical emergencies.

Injuries and deaths related to heavy snow usually occur as a result of vehicle and or snow machine accidents. Casualties also occur due to overexertion while shoveling snow and hypothermia caused by overexposure to the cold weather.

Extreme cold can also bring transportation to a halt. Aircraft may be grounded due to extreme cold and ice fog conditions, cutting off access as well as the flow of supplies to communities. Long cold spells can cause rivers to freeze, disrupting shipping and increasing the likelihood of ice jams and associated flooding.

Extreme cold also interferes with the proper functioning of a community's infrastructure by causing fuel to congeal in storage tanks and supply lines, stopping electric generation. Without electricity, heaters and furnaces do not work, causing water and sewer pipes to freeze or rupture. If extreme cold conditions are combined with low or no snow cover, the ground's frost depth can increase, disturbing buried pipes. The greatest danger from extreme cold is its effect on people. Prolonged exposure to the cold can cause frostbite or hypothermia and become life-threatening. Infants and elderly people are most susceptible. The risk of hypothermia due to exposure greatly increases during episodes of extreme cold, and carbon monoxide poisoning is possible as people use supplemental heating devices (NOAA 2001).

Heavy rain creates flooding and damages roads and infrastructure while no rain reduces subsistence capability by preventing crop growth, wildlife availability and water access. Severe weather events can directly determine the City's survivability.

Vulnerability

Based on past severe weather events and the criteria identified in Table 4-3, the magnitude and severity of severe weather in Huslia is considered 2-Limited. Based on past severe weather events, the vulnerability from this hazard remains low.

Potential Impacts from Climate Change

Over the past 60 years, the average temperature across Alaska has increased by approximately 3°F. This increase is more than twice the warming seen in the rest of the United States. Warming in the winter has increased by an average of 6°F and has led to changes in ecosystems, such as earlier breakup of river ice in the spring. As the climate continues to warm, average annual temperatures in Alaska are projected to increase an additional 2 to 4°F by the middle of this century. Precipitation in Alaska is projected to increase during all seasons by the end of this century. Despite increased precipitation, the state is likely to become drier due to greater evaporation caused by warming temperatures and longer growing seasons (Chapin, et al., 2014) (EPA, 2017).

4.2.4 Permafrost Degradation/Ground Failure (Land Subsidence)

Hazard Description

In Huslia, land subsidence can be contributed to seasonally frozen ground and permafrost thawing. The subsidence is also linked to riverbank erosion: the sandy soil allows for water to readily drain into the ground until it reaches the permafrost table. Water may then travel horizontally across the table and drain through the unfrozen, exposed riverbank.

Land subsidence is characterized as any sinking or settling of the earth's surface. Underground mining, ground water, petroleum extraction, and drainage of organic materials are typical causes of subsidence. However, these causes for land subsidence are rare in Alaska. More common land subsidence causes in Alaska are sediment compaction, tectonic subsidence during earthquakes, and ice-rich permafrost thawing.

Location

Permafrost mapping published in 1998 and 2008 indicate Huslia is in an area of sporadic, 10-50%, permafrost (Jorgenson et al. 2008) with medium, 10-20%, ice content (Brown and others, 1998). Low lying areas west of the village are reported to have an active layer of 2 to 3 feet.

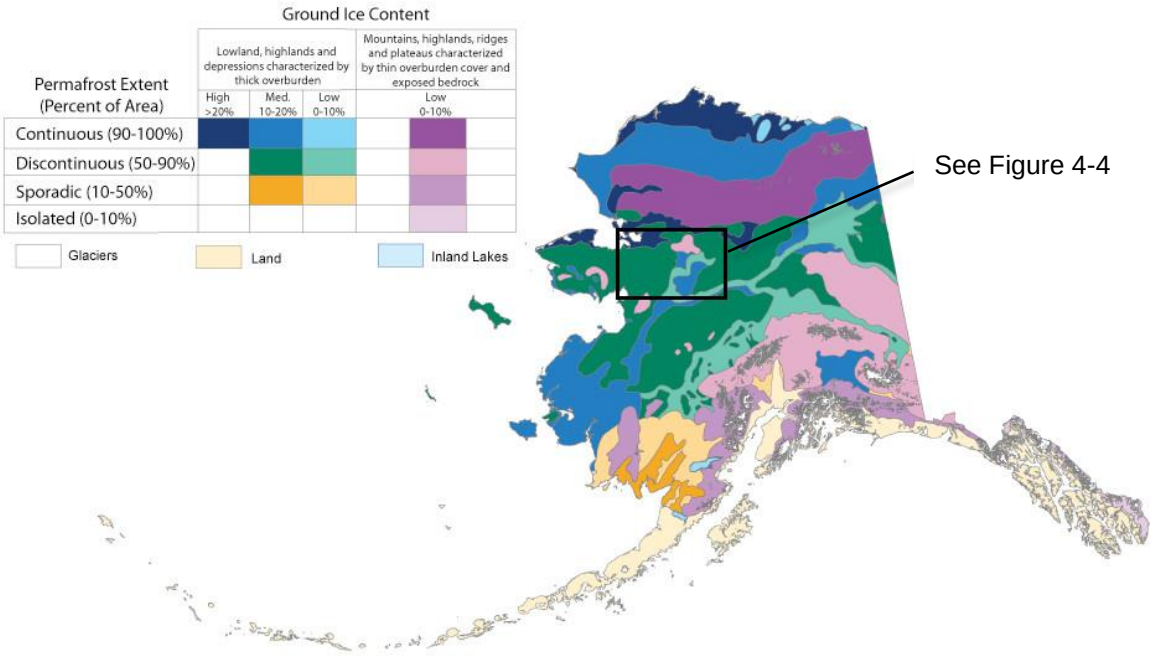


Figure 4-3 Permafrost Map of Alaska (Brown and others, 1998)

Figure 4-4 Permafrost Lower Koyukuk and Yukon (Jorgenson et al. 2008)

Previous Occurrence/History

There is no written record defining permafrost impacts. However, the Planning Team identified that periodic, uneven settling of the ground within the community has damaged buildings and roads constructed in permafrost areas.

Extent and Probability

Ground failure in the form of land subsidence is expected to be an ongoing occurrence.

Figure 4-5 indicates the areas at high risk for subsidence, including the area surrounding the school and roads with a history of subsidence problems. The City anticipates damage to roads and walkways to be an annual occurrence based on previous occurrences.

Cascading Impacts

As the riverbank erodes, the permafrost table retreats from the exposed bank as the insulating soils are washed away. In addition to affecting the land stability directly above the melting permafrost table, this can increase the rate of water drainage vertically as it is unimpeded by the permafrost, allowing for a more rapid flow and collapse of surface ground layers.

Vulnerability

Huslia has already experienced impacts from riverbank erosion exacerbated by permafrost thaw and ground failure. As a result of the erosion, the old power plant and several homes have been relocated as shown in Figure 4-6. The vulnerability for permafrost degradation/ground failure has stayed the same; however, the City perceives that riverbank erosion impacts and undercutting has led to more permafrost thaw and ground failure since 2017.

Potential Impacts from Future Climate Conditions

Permafrost degradation in Huslia is a concern due to riverine erosion that is exacerbated by permafrost melting, which results in loss of soil shear strength near the riverbank bluff. This ground failure causes an acceleration of riverine erosion which is directly impacting the community.

4.3 Vulnerability Assessment

A vulnerability assessment, as stipulated in DMA 2000 and federal regulations, predicts the extent of exposure that may result from a hazard event of a given intensity in a given area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps: asset inventory, methodology, data limitations, exposure analysis for current assets, and areas of future development.

4.3.1 Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets that may be affected by hazard events include population (for community-wide hazards), residential buildings (where data is available), and critical facilities and infrastructure. The assets and associated values throughout the City of Huslia are identified and discussed in detail in the following sections.

Homes

Population data for Huslia was obtained from State of Alaska website of 2010 U.S. Census and the Department of Labor Division of Research and Analysis (DOL DRA). Huslia's total population for 2016 was estimated by the Alaska Department of Labor and Workforce Development at 326; and increase from a population 275 based on the U.S. Census in 2010.

The value of residential buildings is presented here as the cost to construct a new home based on the Interior Regional Housing Authority (IRHA) reported average cost of construction for a single-family home in a "barge-in" community range $325,000 to $375,000[1]. Installation of new sanitation infrastructure estimated by Indian Health Service (IHS) Sanitation Tracking and Reporting System (STARS) in Huslia for 2017 is $117,500.

New home estimate:

$350,000 + $117,500 ≅ $467,500.

Table 4-9 Estimated Population and Homes Valuation

[1] Telephone inquiry with IRHA home builder Donovan Ketzler September 6, 2017.

Population		Residential Buildings	
2010 Census	AKDL&WD 2016 Estimate	Total Residential Building Count	Total Value of Residential Buildings
275	326	105	$45,570,000

Sources: City of Huslia U.S. Census 2010, and DOL DRA.
[1] Average replacement value of all single-family residential buildings with new well installation estimated $434,000 per structure.

The cost of moving a home has been reported by the City of Huslia [2] and installation of new sanitation infrastructure estimated by STARS.

Relocate home cost
Local Labor $6,000
Equipment $19,250
Water & Sewer $117,500

Estimated cost to relocate home = $142,750

Existing Critical Facilities and Infrastructure

A critical facility is defined as a facility that provides essential products and services to the general public, such as preserving the quality of life in the City of Huslia and fulfilling important public safety, emergency response, and disaster recovery functions. The critical facilities profiled in this plan include the following:

- Government facilities, such as city and tribal administrative offices, departments, or agencies.
- Emergency response facilities, including police, Village Public Safety Officer (VPSO), fire, and Code Red equipment.
- Educational facilities, including K-12 schools.
- Care facilities, such as medical clinics, congregate living health, residential and continuing care, and retirement facilities.
- Community gathering places, such as community and youth centers.
- Utilities, such as electric generation, communications, water and waste water treatment, sewage lagoons, landfills.

Figure 4-5 Huslia Post Office

Table 4-10 Infrastructure

Occupancy Type	Facility Name	Location/Address	Estimated Value	Occupancy
Government Facility	Huslia City Hall	58 Dakli Street	$408,908.00	2 Occ.
	US Post Office	34 Dakli Street	$240,000.00	1 Occ.
Transportation Facilities	Huslia Airport	Airport Road	$9,763,344.80	0 Occ.
	Fire Station	58 Dakli Street	$52,820.00	0 Occ.

[2] Reported by Huslia City Administrator and Planning Committee Lead, Elsie Vent September 14, 2017.

Occupancy Type	Facility Name	Location/Address	Estimated Value	Occupancy
Emergency Response Facility	VPSO Office at City Hall	See City Office		
Educational Facility	Jimmy Huntington School (K-12)	41 Jimmy Huntington Road	$835,878.40	102 Occ.
	Head Start	31 Jimmy Huntington Road	$309,782.40	20 Occ.
Care Facility	Huslia Health Clinic	166 Old Spring Camp Road	$1,470,505.60	4 Occ.
Community Facility	Church – Catholic	1 Hilltop Street	$560,000.00	1 Occ.
	Church- Good Shepherd	67 Moonlight Drive	$560,000.00	0 Occ.
	Equipment Storage Shed	Dakli Street	$88,000.00	0 Occ.
	Senior Center - Elders Building	60 Dakli Street	$229,605.60	4 Occ.
	Community Hall	57 Dakli Street	$240,000.00	0 Occ.
	RJ's Hardware & Gen Store	Moonlight Drive	$160,000.00	1 Occ.
	R&M Mercantile Co	92 Moonlight Drive	$320,000.00	1 Occ.
	Teacher Housing	12 Dalbi Street	$743,952.00	14 Occ.
Roads	Roads (BIA) @ $100,000/mile	130 miles	$1,040,000.00	0 Occ.
	Roads (City) @ $200,000/mile	18.8 miles	$150,400.00	0 Occ.
	Landfill Access Road	1 mile	$288,000.00	0 Occ.
	Airport Access Road		$159,891.20	0 Occ.
Bridges	None		$0.00	
Utilities	City/Huslia Gas & Oil Fuel Storage Facility, 60,559 gal	110 Airport Road	$891,468.00	1 Occ.
	AVEC Fuel Storage Tanks, 67,174 gal	110 Airport Road	$960,000.00	2 Occ.
	Yukon-Koyukuk Schools Fuel Storage Tanks, 39,874 gal	41 Jimmy Huntington Road	$640,000.00	__Occ.
	Distribution Line to Barge Landing (Fuel)		$183,948.00	0 Occ.
	Distribution Line to Barge Landing (Gas)		$200,000.00	0 Occ.
	Water Treatment Plant/Washeteria	181 Spring Camp Road	$2,192,000.00	2 Occ.
	Huslia Public Water Supply	181 Spring Camp Road	$1,760,000.00	0 Occ.
	AVEC Power Generation	New Airport Road	$59,200.00	2 Occ.
	Satellite Dish - ARCS	58 Dakli Street	$96,000.00	0 Occ.
	Telephone-ACS (underground)	Community Wide	$240,000.00	0 Occ.
	Utility Poles	Community Wide	$144,000.00	0 Occ.
	Landfill, Class 3	Airport Road	$700,800.00	0 Occ.
	Sewage Lagoon		$400,000.00	0 Occ.
	Piped Sewer System	Community Wide	$2,880,000.00	0 Occ.

Occupancy Type	Facility Name	Location/Address	Estimated Value	Occupancy
	Piped Water System	Community Wide	$1,345,360.00	0 Occ.
	Power Distribution System	Community Wide	$208,444.80	0 Occ.
	Community Well	Old Airport Road	$280,000.00	0 Occ.

Future Critical Facilities and Infrastructure

Immediate plans for future development in Huslia includes housing construction in the new residential subdivision with power distribution, new teacher housing, renovation of 30 single family IRHA housing units, new landfill access road, major airport improvements, new piped water distribution lines, and relocating above ground power poles away from erosion threatened area.

Figure 4-6 Home lost to erosion in 2017

4.3.2 Methodology

A conservative exposure-level analysis was conducted to assess the risks of the identified hazards. This analysis is a simplified assessment of the potential effects of the hazards on values at risk without consideration of probability or level of damage.

Figure 4-7 Erosion undercutting the salvaged home's foundation in March, 2018

Critical facilities were identified by the Planning Committee and compared to locations where hazards are likely to occur. If any portion of the critical facility fell within a hazard area, it was counted as being exposed and vulnerable to the particular hazard.

Replacement structure values were originally obtained from the State of Alaska Critical Facilities Database, the capital projects database, or provided by the City of Huslia. The HMP Update 2018 applied a basic depreciation of 20% to all of the facilities for updating this assessment. For each physical asset located within a hazard area, exposure was calculated by assuming the worst-case scenario—the asset would be completely destroyed and replaced. The aggregate exposure was calculated, in terms of replacement value or insurance coverage, for each category of structure or facility. To evaluate the the population at risk, the analysis represents the number of people at risk, not the number of potential injuries or deaths.

4.3.3 Data Limitations

The vulnerability estimates provided herein are simple updates of those provided in the original 2010 Huslia HMP, which used the best data available at that time. Updated data developed by the Planning Committee and from public input has been incorporated; however, these estimates result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses.

It is also important to note that the quantitative vulnerability assessment results are limited to the exposure of people, buildings, and critical facilities and infrastructure to the identified hazards. This plan update includes the best available information. Such impacts could be developed with future updates of the HMP.

4.3.4 Exposure Analysis

4.3.4.1 Erosion

Huslia has been identified in the *Alaska Baseline Erosion Assessment, 2009*, as "a Priority Action Community" where significant resources are being expended to minimize threats, and the viability of the community may be threatened by the erosion.

During the July 2017 public involvement meeting, members of the community reported recent mass wasting erosion events are increasing in severity and frequency, continuing to encroach on homes and infrastructure, and endangering boats on the river. In 2017, one home was removed from its foundation and dismantled for salvaging, while the foundation remained as a hazard loss in the eroding river bank (**Figure 4-**).

Impacts due to climate change are believed to be accelerating erosion.

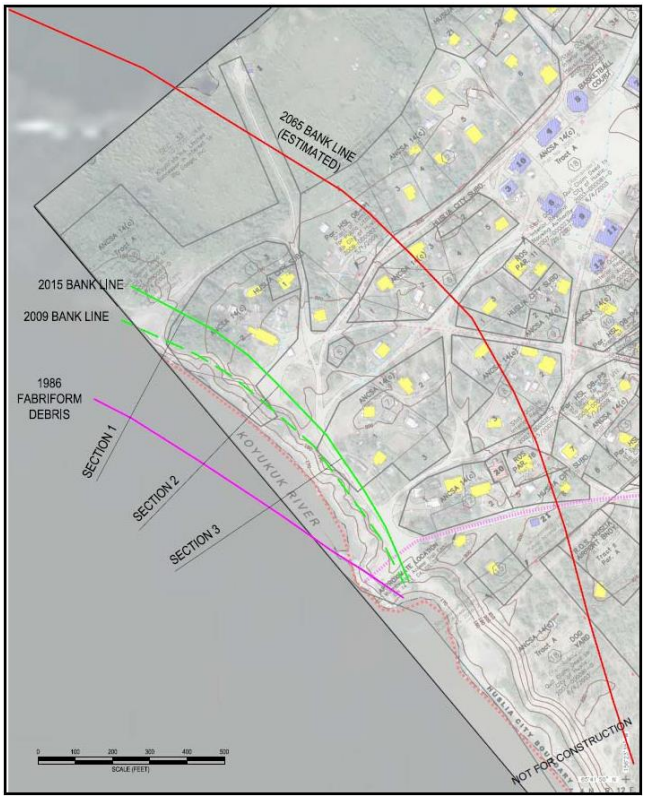


Figure 4-9 Cut Wood Debris Used to Armor Embankment

At a special meeting on March 10, 2018, members of the Planning Committee shared that the erosion had begun to undercut the foundation of the building. As a comparison, a State planning contractor took photos from the eastern side of the building foundation. Although the area was snow covered, the edge of the riverbank is visible in the photo.

The figure on the following page depicts the riverbank armored with cut brush and wood debris to help reduce the rate of erosion (4-9).

Figure 4-10 Projected Erosion Line Over time (USACE 2015)

In December 2015, the USACE, under authority of Section 14, Flood Control Act of 1946, made a determination that there is no Federal interest in pursuing further study or a project to provide riverbank protection at Huslia (see Appendix 5). The USACE found that the cost of relocating the threatened facilities and infrastructure (est. $3.1 million) was less than the least expensive alternative for protecting the threatened facilities and infrastructure in place ($17 million).

This decision was based on investigation of prior studies, reports, expected future conditions, and preliminary evaluation of mitigation alternatives (USACE 2015).

Attendees at the public meeting in July 2017 disagreed and felt that the USACE estimate of $3.1 million to relocate facilities over the next 50 years underestimates relocation costs. The Planning Committee recommends implementing a feasibility study to identify a riverbank protection alternative to prevent erosion. A detailed cost estimate of relocation is needed to justify future actions; therefore, a detailed cost estimate for relocation is included in the HMP mitigation strategy. Huslia's city administrator reported at the public input meeting that the cost of home relocation was $300,000 to $375,000 each based on the cost to construct a new home in Huslia and Indian Health Services Sanitation Tracking and Reporting System (IHS STARS). This estimate was confirmed in a separate conversation with the Interior Regional Housing Authority estimated cost for replacing a new home in Huslia.

There are approximately six critical facilities (worth $5,935,256) and one commercial building (worth $400,000) located in areas along the Koyukuk River embankment that are exposed and historically prone to erosion. There are eight people in three residential buildings, outbuildings, and sheds (worth approximately $236,400) located in areas exposed and historically prone to erosion.

Impacts from erosion include loss of land and any development on that land. Erosion hinders channel navigation and damages public utilities (barge landings, electric and water/wastewater utilities) in Huslia. Costs associated with ongoing erosion control need to be included in mitigation planning.

Reports of erosion rates have varied across planning efforts since the 1960s. A community erosion survey conducted by the USACE indicated the riverbank had been eroding at an estimated rate of 10 to 30 feet per year; however, substantially greater rates were reported during recent breakup flooding when mass wasting

events occur due to river bank undercutting. The community reported that the river eroded 60 feet of bluff in sections along 2,000 feet of bank in May of 2003, 100 feet in 2004, and 80 feet in 2005. (USACE 2007).

At the special meeting on March 10, 2018, Huslia's City Administrator provided information to the planning contractor regarding the current extent of erosion since the July 2017 meeting. Figure 4-11 provides a visual depiction of the approximate area that has eroded and the number of homes that were relocated to Birch Hill Subdivision.

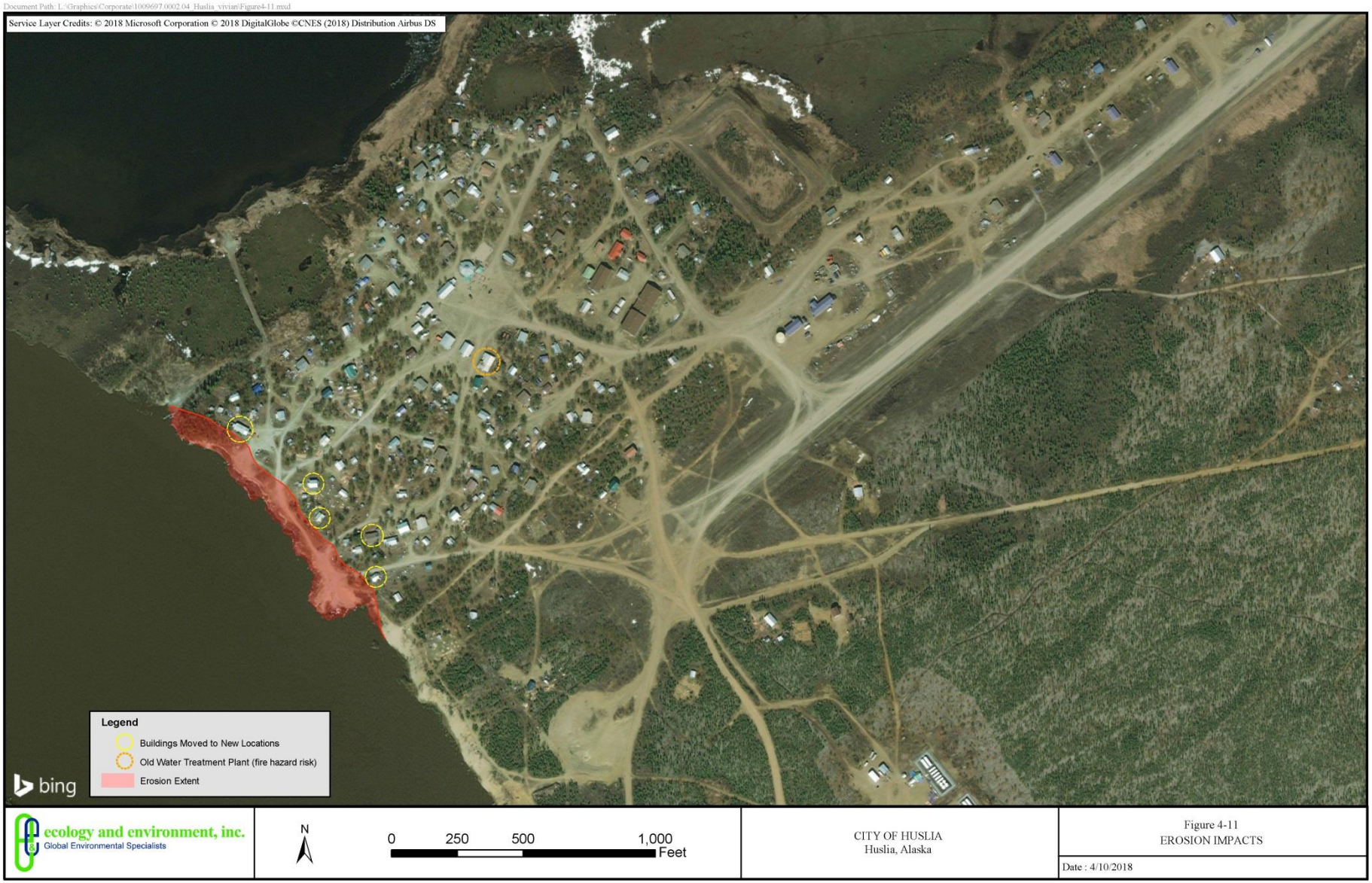


Figure 4-11Erosion Extent 2018

4.3.4.2 Fire

Impacts associated with a wildland fire encroaching on Huslia include the potential for loss of life and property. Subsistence resources can also be impacted. Buildings closer to the outer edge of town, those with a lot of vegetation surrounding the structure, and those constructed with wood are some of the buildings that are more vulnerable to the impacts of wildland fire.

The residence of Huslia expressed concern that wildfire could engulf the area between the community and the airport, which would hinder air evacuation during a fire emergency. Wildfire defensible buffer zones should be installed and maintained to reduce the threat of wildfire to airport access and buildings at the outer edge of the village.

Figure 4-12 and accompanying text provide recommendations from the Bureau of Land Management and the Alaska Fire Service for fire management zones near Huslia. The Fire Management Options are defined on the following page.

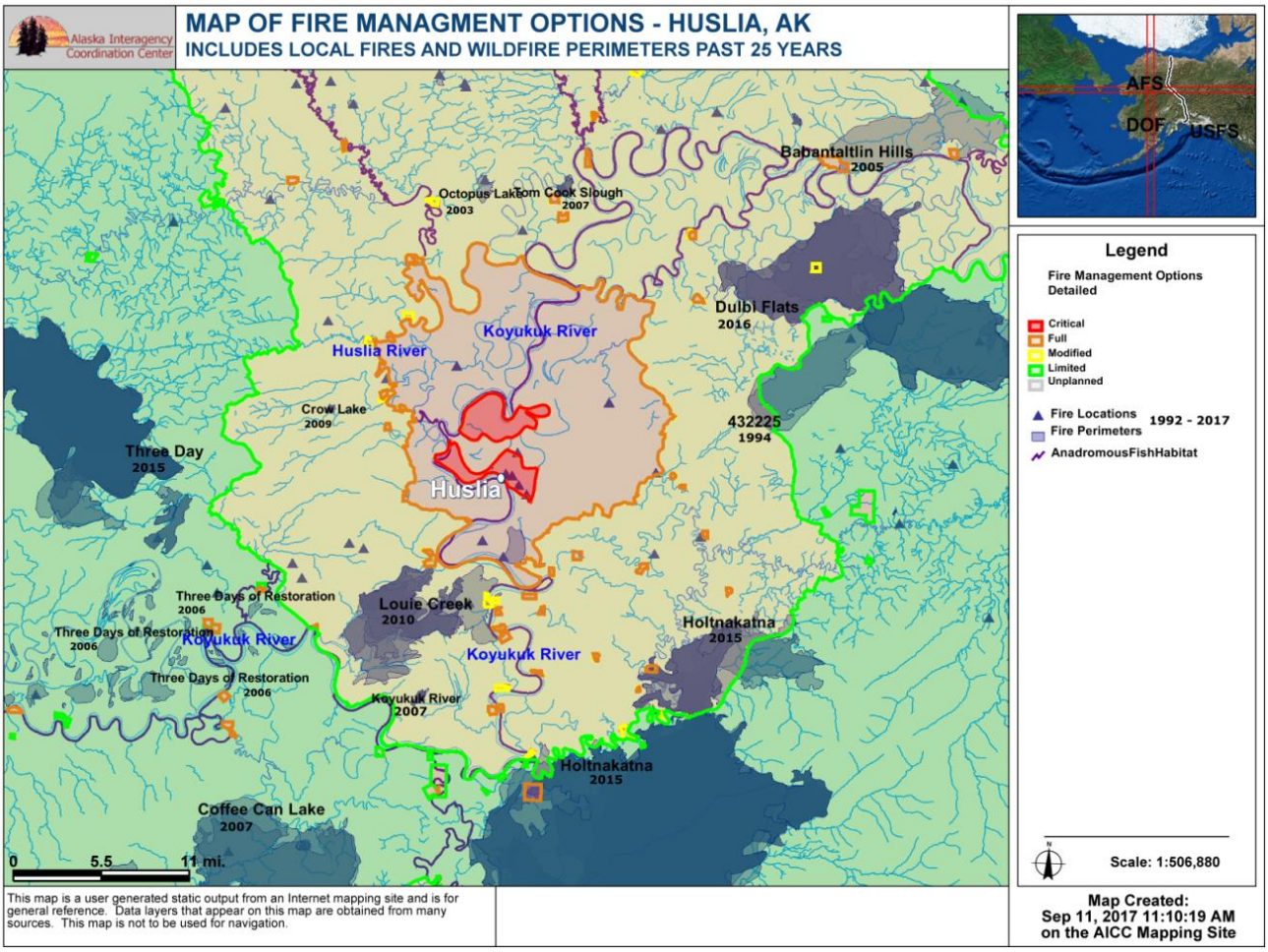


Figure 4-12 Fire Management Options[3]

CRITICAL - These are the highest priority areas/sites for suppression actions and assignment available firefighting resources. Lands in the wildland-urban interface and other populated areas where there is an

[3] No warranty is made by the Bureau of Land Management or the Alaska Fire Service as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data.

immediate threat to human life, primary residences, inhabited property, community-dependent infrastructure, and structural resources designated as National Historic Landmarks qualify to be considered for this designation. This classification is applicable to an entire town or village as well as a single inhabited structure.

FULL - This option provides for protection of cultural and paleontological sites, developed recreational facilities, physical developments, administrative sites and cabins, uninhabited structures, high-value natural resources, and other high-value areas that do not involve the protection of human life and inhabited property. Structure on or eligible for inclusion on the National Register of Historic Places and non-structural sites on the National Register are placed in this category. Both broad areas and specific sites qualify to be designated as Full.

MODIFIED - This option provides a management level between Full and Limited. The intent is to balance acres burned with suppression costs and also to accomplish land and resource management objectives when conditions are favorable. Site-specific actions are taken as warranted. Conversion dates are included to further steer management decisions.

LIMITED - Designated for broad, landscape-scale areas where the low density and wide distribution of values to be protected allows for fire to function in its ecological role. Sites that warrant higher levels of protection may occur within the boundaries of Limited protection and actions to protect these sites will be taken when warranted without compromising the intent of this management option.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same impact level. Community education, building materials, and prepared response personnel are some things that could lessen future impacts. Some Huslia residents are employed in firefighting activities and can be a resource in addressing this hazard.

4.3.4.3 Severe Weather

The entire City of Huslia is equally vulnerable to the effects of severe weather. Winter snows average 5-6 inches per storm; wind speed varies based on weather patterns but reach as high as 49 mph, while record lows have reached -61ºF. Section 4.2.3 provides a profile of severe weather that impacts Huslia.

The Old Water Treatment plant is abandoned and vulnerable to wind and snow loading as the structure is beginning to fail. The building is not currently being used and is considered at risk of collapse in a heavy snow or wind event. An assessment of the facility is required to determine the cost of any necessary abatement and to develop a demolition plan.

To lessen future impacts, the City has considered instituting and enforcing building codes to accommodate the effects of severe weather on structures, but has chosen not to do so because of the perception of government overreach and the administrative overhead associated with maintaining municipal building codes.

4.3.4.4 Permafrost Degradation/Ground Failure (Land Subsidence)

Permafrost has been determined to be sporadic in the area of Huslia with medium ice content (Section 4.2.4). Permafrost degradation is a contributing factor in the rate of riverine erosion at Huslia but the magnitude of permafrost degradation on riverine erosion is not clear. There are no reports of recent damage due to permafrost degradation for locations further from the river.

4.3.4.5 Flood

The community has indicated that there are no areas that have been historically impacted by riverine floods. The City residential area located adjacent to the Mingoguit Lake has had lake overflow water surround their houses but without causing significant damage.

The Community has indicated they experience minor flooding from Mingoguit Lake from snowmelt overflow. No residential damages have been experienced and potential impacts are limited to slight roadbed erosion and to buildings on slab foundations, not located on raised foundations, and/or not constructed with materials designed to withstand flooding events (e.g., cross vents to allow water to pass through an open area

under the main floor of a building). These buildings are more vulnerable to the impacts of flooding if the water was sufficiently high.

Although the City of Huslia does not perceive their minor overflow flooding warrants NFIP participation; they are still considering NFIP benefits and future participation.

4.3.4.6 Drought

Based on the Planning team's knowledge of past drought events and the criteria identified in Table 3-3, the extent of drought impacts in the City of Huslia are considered negligible. The community will experience minor quality of life loss, and shutdown of critical facilities and services for 24 hours or less and where less than ten percent of property is severely damaged.

Drought damages include decreased subsistence food source availability, reduced fish return rates, and result in excess travel costs to access caribou and game birds. Reduced food source availability results in excessive expenditures for both replacement food sources and their shipping costs due to the City's rural location.

4.3.4.7 Earthquake

Impacts to the community such as significant ground movement that may result in infrastructure damage are not expected. Minor shaking may be seen or felt based on past events. Although all structures are exposed to earthquakes, buildings within Huslia are constructed with wood have slightly less vulnerability to the effects of earthquakes than those with masonry.

Impacts to future populations, residences, critical facilities, and infrastructure are anticipated at the same low impact level as Huslia is not located in an area with a high probability of strong shaking.

4.3.5 Areas of Future Development

Relocation of homes and community buildings will continue if erosion control measures are not implemented. The USACE determined that a project to construct erosion controls would not be pursued, because the cost of construction of erosion controls are greater than the cost of relocating homes and buildings.

4.4 Land Use and Development Trends

The annual population growth has held at an average of two percent from 1950 through 2000 but has decreased slightly between 2000 and 2007. Land ownership in the City of Huslia includes Doyon, Ltd.; the K'oyiti'ots'ina Limited, Village Corporation; the State of Alaska; and private land owners, land designated as open space, and other sections that contain various hydrological bodies. One area of town is classified as airport land use and the Koyukuk Wildlife Refuge surrounds the community.

Land use in the City of Huslia is predominately residential with few areas for commercial services and community (or institutional) facilities. Community facilities are classified under institutional land use such as schools and government facilities.

The City of Huslia has no formal zoning or other land use controls. There are areas of commercial land use within the City of Huslia that include facilities such as RJ's Hardware & General Store, R&M Mercantile Company, and a bakery.

4.4.1 Development Trends

Funding is being sought for engineering study of erosion control at bluff embankment. New home subdivisions are being developed on the old airport property. The Indian Health Service (IHS), under the RurAL CAP Weatherization Program, has proposed a biomass heating project for the washeteria and water treatment plant, and expansion of water and sewer services for the relocated and new homes (Appendix 6).

5 Capability Assessment

The City of Huslia capability assessment reviews the existing authorities, policies, programs and resources, and its ability to expand on and improve these existing policies and programs, needed to implement the proposed mitigation strategy. The City has a current (2017) Comprehensive Plan and Economic Development Plan. Updates of these plans and any future plans will intigrate the Hazard Mitigation Plan.

The capability assessment completed for the 2010 Huslia HMP has been updated to include the 2016 Small Community Emergency Plan (SCERP) completed by the City of Huslia. The SCERP is a quick reference guide to use before, during, and after an emergency or disaster. The guide provides checklists for immediate actions at the local level, which are specific for Huslia; however, it includes local, regional, state, and federal contact information. Huslia's SCERP includes communication protocols, shelter and evacuation plans, emergency and sustained response and recovery planning.

Table 5-1 City of Huslia Regulatory Tools

Regulatory Tools (ordinances, codes, plans)	Existing?	Comments (Year of most recent update; problems administering it, etc)
Building code	No	
Zoning ordinances	No	
Subdivision ordinances or regulations	No	
Special purpose ordinances	No	
Comprehensive Plan	Yes	2017 Huslia Community Plan
Economic Development Plan	Yes	2017 Huslia Community Plan
Small Community Emergency Response Plan	Yes	Huslia Small Community Emergency Response Plan completed in December 2016
Land Use Ordinance	No	
Land Use Plan	No	

5.1 Local Resources

The City of Huslia has two planning, land, and financial management tools to implement hazard mitigation activities. The resources available in these areas have been assessed by the hazard mitigation Planning Team, and are summarized in Table 5-2 and Table 5-3 below.

Table 5-2 City of Huslia Staff Resources

Staff/Personnel Resources	Y/N	Department/Agency and Position
Planner or engineer with knowledge of land development and land management practices	No	ANTHC provides Planner/Engineering Support
Engineer or professional trained in construction practices related to buildings and/or infrastructure	No	ANTHC provides Planner/Engineering Support
Planner or engineer with an understanding of natural and/or human-caused hazards	No	ANTHC provides Planner/Engineering Support
Floodplain Manager	No	State Floodplain Manager

Staff/Personnel Resources	Y/N	Department/Agency and Position
Surveyors	No	Village may hire surveying consulting services
Staff with education or expertise to assess the jurisdiction's vulnerability to hazards	No	
Personnel skilled in GIS and/or HAZUS	No	
Scientists familiar with the hazards of the jurisdiction	No	
Emergency manager	Yes	Elsie Vent, City Administrator and Fire Chief
Grant writers	YES	ANTHC Healthy Communities Program

Table 5-3 City of Huslia Financial Resources

Financial Resources	Accessible or Eligible to Use (Yes/No/ City input required)
Community Development Block Grants	Yes, for Multipurpose Building; 2011 Design and 2017 Construction
Capital Improvement Projects Funding	Yes, IHS eligible via ANTHC
Authority to levy taxes for specific purposes	No
Fees for water, sewer, gas, or electric service	City input required
Impact fees for homebuyers or developers for new developments/homes	City input required
Withhold spending in hazard-prone areas	City input required

5.2 Federal Resources

The Federal government requires local governments to have a HMP in place to be eligible for mitigation funding opportunities through FEMA such as the HMA Programs described in Appendix 7. The Mitigation Technical Assistance Programs available to local governments are also a valuable resource. FEMA may also provide temporary housing assistance through rental assistance, mobile homes, furniture rental, mortgage assistance, and emergency home repairs. The Disaster Preparedness Improvement Grant also promotes educational opportunities with respect to hazard awareness and mitigation.

FEMA, through its Emergency Management Institute, offers training in many aspects of emergency management, including hazard mitigation. FEMA has also developed a large number of documents that address implementing hazard mitigation at the local level. Several key resources are described below and include internet link to the materials of additional information. Documents can also be order directly from FEMA: FEMA Distribution Center and a FEMA Publication Order Form is provided in Section 8:

E-mail: FEMA-Publications-Warehouse@dhs.govmail
Phone: 1-800-480-2520
Fax: 240-699-0525

- Recommended FEMA Online Training:
    - FEMA IS-393.B: Introduction to Hazard Mitigation

- FEMA IS-318: Mitigation Planning for Local and Tribal Communities
- FEMA IS-212.B: Introduction to Unified Hazard Mitigation Assistance (HMA)
- More specific training, including mitigation training specific to the hazards profiled in this HMP can be found here: FEMA ISP Courses.

- Key FEMA Online Resources and Documents:
  - Hazard Mitigation Grant Program (https://www.fema.gov/hazard-mitigation-grant-program). This site contains information about FEMA's Hazard Mitigation Grant Program (HMGP). The purpose of this site is to connect individuals and state, local, and tribal government representatives with the resources they need to implement hazard mitigation measures in their communities.
  - Hazard Mitigation Planning Frequently Asked Questions (https://www.fema.gov/hazard-mitigation-planning-frequently-asked-questions). This page provides answers to Frequently Asked Questions (FAQs) concerning hazard mitigation planning.
  - FEMA Publications Catalog FEMA P-20 / March 2010 (https://www.fema.gov/media-library-data/20130726-1723-25045-0186/p_20.pdf). This catalog is a work in progress. It's a compilation of all FEMA publication products printed since 2007. As products come to FEMA for printing or reprinting, they're added to this catalog. In essence, this catalog contains the most recent publication products in our inventory
  - Mitigation Best Practices Portfolio *(*https://www.fema.gov/mitigation-best-practices-portfolio). Learn about Mitigation Best Practices. The stories in this portfolio offer ideas for you to use in reducing or preventing damage from disasters.
  - Disaster Assistance: A Guide to Recovery Programs FEMA-229 / update August 2009 (https://www.fema.gov/media-library/assets/documents/6341). Disaster Assistance: A Guide to Recovery Programs supports the National Response Plan as a resource for Federal, State, local, and non-governmental officials. It contains brief descriptions and contact information for Federal programs that may be able to provide disaster recovery assistance to eligible applicants.
  - Unified Federal Environmental and Historic Preservation Review Guide For Federal Disaster Recovery Assistance Applicants
  - Emergency Management Guide for Business and Industry (https://www.fema.gov/media-library/assets/documents/3412). This guide provides step-by-step advice to organizations on how to create and maintain a comprehensive emergency management program.
- Department of Agriculture (USDA). Assistance provided includes: Emergency Conservation Program, Non-Insured Assistance, Emergency Watershed Protection, Rural Housing Service, Rural Utilities Service, and Rural Business and Cooperative Service.
- Department of Energy (USDOE), Office of Energy Efficiency and Renewable Energy, Weatherization Assistance Program. This program minimizes the adverse effects of high energy costs on low-income, elderly, and handicapped citizens through client education activities and weatherization services such as an all-around safety check of major energy systems, including heating system modifications and insulation checks.

- Department of Health and Human Services (DHHS), Administration of Children & Families, Administration for Native Americans (ANA). The ANA awards funds through grants to American Indians, Native Americans, Native Alaskans, Native Hawaiians, and Pacific Islanders. These grants are awarded to individual organizations that successfully apply for discretionary funds. ANA publishes in the Federal Register an announcement of funds available, the primary areas of focus, review criteria, and the method of application (http://www.acf.hhs.gov/programs/ana/).

- Department of Housing and Urban Development (HUD), Office of Homes and Communities, Section 108 Loan Guarantee Programs. This program provides loan guarantees as security for Federal loans for acquisition, rehabilitation, relocation, clearance, site preparation, special economic development activities, and construction of certain public facilities and housing.

- Community Development Block Grant Disaster Recovery Program (HUD/CDBG). Provides grant assistance and technical assistance to aid communities in planning activities that address issues detrimental to the health and safety of local residents, such as housing rehabilitation, public services, community facilities, and infrastructure improvements that would primarily benefit low- and moderate-income persons.

- Department of Labor, Employment and Training Administration, Disaster Unemployment Assistance. Provides unemployment subsistence grants for those who become unemployed because of a major disaster or emergency. Applicants must have exhausted all benefits for which they would normally be eligible.

- Environmental Protection Agency (EPA), Overview of Federal Disaster Funding Opportunities for Water and Wastewater Utilities. This website provides a listing and short descriptions of funding programs from the U.S. Department of Agriculture (USDA), Federal Emergency Management Agency (FEMA), U.S. Environmental Protection Agency (EPA), U.S. Department of Housing and Urban Development (HUD) and U.S. Small Business Administration (SBA)

- Federal Financial Institutions. Member banks of Federal Deposit Insurance Corporation, Financial Reporting Standards or Federal Home Loan Bank Board may be permitted to waive early withdrawal penalties for Certificates of Deposit and Individual Retirement Accounts.

- Internal Revenue Service (IRS), Tax Relief. Provides extensions to current year's tax return, allows deductions for disaster losses, and allows amendment of previous tax returns to reflect loss back to three years.

- USACE. The USACE Alaska District's Civil Works Branch studies potential water resource projects in Alaska. These studies analyze and solve water resource issues of concern to the local communities. These issues may involve navigational improvements, flood control or ecosystem restoration. The agency also tracks flood hazard data for over 300 Alaskan communities on floodplains or the sea coast. These data help local communities assess the risk of floods to their communities and prepare for potential future floods. The USACE is a member and co-chair of the Alaska Climate Change Sub-Cabinet.

- U.S. Small Business Administration (SBA). May provide low-interest disaster loans to individuals and businesses that have suffered a loss due to a disaster. Requests for SBA loan assistance should be submitted to DHS&EM.

5.3 State Resources

- DHS&EM is responsible for improving hazard mitigation technical assistance for local governments for the State of Alaska. Providing hazard mitigation training, current hazard information and communication facilitation with other agencies will enhance local hazard

mitigation efforts. DHS&EM administers FEMA mitigation grants to mitigate future disaster damages such as those that may affect infrastructure including the elevation, relocation, or acquisition of hazard-prone properties. DHS&EM also provides mitigation funding resources for mitigation planning on their web site at http://www.ak-prepared.com/plans/mitigation/mitigati.htm.

- Division of Senior Services: Provides special outreach services for seniors, including food, shelter and clothing.

- Division of Insurance: Provides assistance in obtaining copies of policies and provides information regarding filing claims.

- Department of Military and Veteran's Affairs (DMVA): Provides damage appraisals and settlements for VA-insured homes, and assists with filing of survivor benefits.

- The Community Health and Emergency Medical Services (CHEMS) is a section within Division of Public Health within the Department of Health and Social Services (DHSS). DHSS is charged with promoting and protecting the public health and one of CHEMS' responsibilities is developing, implementing, and maintaining a statewide comprehensive emergency medical services system. The department's statutory mandate (Alaska Statute 18.08.010) requires it to:

(1) Coordinate public and private agencies engaged in the planning and delivery of emergency medical services, including trauma care, to plan an emergency medical services system.

(2) Assist public and private agencies to deliver emergency medical services, including trauma care, through the award of grants in aid.

(3) Conduct, encourage, and approve programs of education and training designed to upgrade the knowledge and skills of health personnel involved in emergency medical services, including trauma care.

(4) Establish and maintain a process under which hospitals and clinics can represent themselves to be trauma centers because they voluntarily meet criteria adopted by the department which are based on an applicable national evaluation system.

- DCCED/DCRA. DCRA administers the HUD/CDBG, FMA Program, and the Climate Change Sub-Cabinet’s Interagency Working Group’s program funds and administers various flood and erosion mitigation projects, including the elevation, relocation, or acquisition of flood-prone homes and businesses, throughout the State. This department also administers programs for State "distressed" and "targeted" communities.

- Division of Environmental Conservation (DEC). DEC’s primary roles and responsibilities concerning hazards mitigation are ensuring safe food and safe water, and pollution prevention and pollution response. DEC ensures water treatment plants, landfills, and bulk fuel storage tank farms are safely constructed and operated in communities. Agency and facility response plans include hazards identification and pollution prevention and response strategies.

- Department of Transportation& Public Facilities (DOT&DOT&PFPF). DOT&PF personnel provide technical assistance to the various emergency management programs, to include mitigation. This assistance is addressed in the DHS&EM-DOT&PF Memorandum of Agreement

and includes, but is not limited to: environmental reviews; archaeological surveys; and historic preservation reviews.

- In addition, DOT&PF and DHS&EM coordinate buy-out projects to ensure that there are no potential right-of-way conflicts with future use of land for bridge and highway projects, and collaborate on earthquake mitigation.

- Additionally, DOT&PF provides safe, efficient, economical, and effective operation of the State's highways, harbors, and airports. DOT&PF uses it's Planning, Design and Engineering, Maintenance and Operations, and Intelligent Transportation Systems resources to identify the hazard, plan and initiate mitigation activities to meet the transportation needs of Alaskans and make Alaska a better place to live and work. DOT&PF budgets for the temporary replacement bridges and materials necessary to make the multi-model transportation system operational following a natural disaster.

- DNR administers various projects designed to reduce stream bank erosion, reduce localized flooding, improve drainage, and improve discharge water quality through the stormwater grant program funds. Within DNR, the Division of Geological and Geophysical Survey (DGGS) is responsible for the use and development of Alaska's mineral, land, and water resources, and collaboration on earthquake mitigation.

  - The DNR's Division of Forestry (DOF). DOF participates in a statewide wildfire control program in cooperation with the forest industry, rural fire departments and other agencies. Prescribed burning may increase the risks of fire hazards; however, prescribed burning reduces the availability of fire fuels and therefore the potential for future, more serious fires.

  - DOF also manages various wildland fire programs, activities, and grant programs such as the FireWise Program, the Community Forestry Program and the Volunteer Fire Assistance and Rural Fire Assistance Grant programs. Information can be found at http://forestry.alaska.gov/fire/current.htm.

5.3.1 Other Funding Sources and Resources

The following provide focused access to valuable planning resources for communities interested in sustainable development activities.

- FEMA, http://www.fema.gov - includes links to information, resources, and grants that communities can use in planning and implementation of sustainable measures.
- American Planning Association (APA), http://www.planning.org - a non-profit professional association that serves as a resource for planners, elected officials, and citizens concerned with planning and growth initiatives.
- Institute for Business and Home Safety (IBHS), http://ibhs.org - an initiative of the insurance industry to reduce deaths, injuries, property damage, economic losses, and human suffering caused by natural disasters.
- American Red Cross (ARC). Provides for the critical needs of individuals such as food, clothing, shelter, and supplemental medical needs. Provides recovery needs such as furniture, home repair, home purchasing, essential tools, and some bill payment may be provided.
- Crisis Counseling Program. Provides grants to State and Borough Mental Health Departments, which in turn provide training for screening, diagnosing, and counseling techniques. Also provides funds for counseling, outreach, and consultation for those affected by disaster.

6 Mitigation Goals and Strategies

Mitigation goals are derived from problem statements and describe the reduction or avoidance of vulnerability to hazards.

Mitigation strategy is the course of mitigation actions taken in order to meet the mitigation goals.

6.1 Developing Mitigation Goals

This section presents goals to reduce or avoid long-term vulnerabilities identified in Section 4.3.4 related to the hazards profiled in Section 4.2.

6.1.1 Changes in Development

The 2018 Huslia HMP Update reflects changes due to developments in the community:

- The City removed two structures from the main part of town to an industrial site, where they would no longer pose a fire hazard to other critical facilities.
- The Planning Committee chose Erosion as the top priority hazard for mitigation. The USACE Title 14 report indicates that erosion control structures are not cost effective; however the community will continue to pursue funding for further study of this option in an effort to avoid relocating the community.
- Updated assessment of property values and cost to relocate warrant reconsideration of USACE Title 14 CAP Report.
- The community has developed a Small Community Emergency Response Plan.
- Flood was removed from the hazards profiled due to the low probability of impact to the community.
- Drought was removed from the hazards profiled due to the lack of impact in the community.
- Earthquake mitigation was removed from the vulnerability assessment due to the low probability of impact to the community.

6.1.2 Problem Statements

- Huslia is losing land and property to mass wasting erosion events during seasonal flooding and high water at the Koyukuk River.
- Erosion is accelerated by permafrost degradation.

- Huslia is subject to severe weather events, especially severe winter weather. Severe weather can damage residential and municipal infrastructure, interrupting essential service including life safety and sanitation systems. Severe weather events in Huslia have the potential to threaten life and cause permanent injury.
- Wildfires encroaching on Huslia have the potential to ignite buildings near the village perimeters. There is a concern that wildfire could block the airport access road when needed for emergency evacuation.
- Conflagration fires within the village could spread from building to building and damage critical facilities infrastructure.
- Land subsidence due to permafrost degradation could result in damage to roadway and building foundations.
- Huslia's governing bodies are not aware of the funding opportunities that exist to develop and execute hazard mitigation projects.
- The climate impacts of global warming could increase the probability and magnitude of natural hazards including erosion, flooding, permafrost degradation, wildland fire, severe weather events and drought.

6.1.3 Goals

Goal statements are typically long-range, policy-oriented statements representing community-wide visions. As such, 10 goals were developed to reduce or avoid long-term vulnerabilities to the identified hazards (Table 6-1). The City's priorities have not changed and erosion remains the number one concern. Moving up on the priorities list is training and obtaining funding for training. Mitigation Goals to provide solutions to the problems statement in Section 6.1.2. Solutions are further developed into mitigation actions that are given a priority ranking in Table 6-2 Mitigation Actions.

The Planning Committee reviewed the goals established in the 2010 HMP and due to the low vulnerabilities and impacts to Huslia, three natural hazards were removed from the 2018 mitigation goals. These include the removal of Earthquake, Drought, and Flood.

Table 6-1 Mitigation Goals

No.	Goal Description
1	Losses due to erosion will be reduced or eliminated
2	Losses due to fires will be reduced or eliminated.
3	Losses due to severe weather will be reduced or eliminated
4	Losses due to permafrost degradation will be reduced or eliminated
5	Emergency management programs will meet state standards and best practices among Alaska villages.
6	Coordinating Partners and Stakeholders will be familiar with the 2018 Huslia HMP Update and will provide recommendations for ongoing improvement.
7	The local community will be aware of disaster preparedness, emergency response services, and hazard mitigation.
8	Community planning for development and infrastructure will acknowledge the Huslia HMP and incorporate mitigation actions where appropriate.
9	Monitor the climate impacts of global warming on natural hazards and local environmental systems
10	Maintenance of the 2018 Huslia HMP Update will incorporate public input.

6.2 Identifying Mitigation Actions

Mitigation actions are program activities, policies, or projects that help achieve the goals of a mitigation plan. Mitigation actions are usually grouped into six broad categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. As listed in Table 6-2, the Planning Team developed 25 potential mitigation actions, with a particular emphasis placed on projects and programs that reduce the effects of hazards on both new and existing buildings and infrastructure.

Table 6-2 Mitigation Actions

Goals		Actions to be taken by the Local Planning Committee		
No.	Description	ID	Description	Priority
1	Losses due to erosion will be reduced or eliminated	A	Identify and prioritize specific properties in need of protection from erosion.	Low
		B	Relocate buildings that are at risk of being affected by erosion.	High
		C	Seek funding and apply for grants/funding to implement riverbank protection.	High
		D	Research erosion control alternatives.	Low
		E	Design and install engineered erosion control structures.	Med
		F	Install embankment armoring utilizing available resources.	Med
2	Losses due to fires will be reduced or eliminated.	A	Coordinate with Alaska Department of Transportation regarding airport and airport access road fire mitigation strategy.	Med
		B	Identify, develop, implement, and enforce fuel breaks and reduction zones to prevent potential wildland fire in hazard areas.	High
		C	Identify structures in the community that represent a potential fire hazard.	Med
		D	Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.	Low
		E	Provide wildland fire information in an easily distributed format for all residents.	Med
		F	Establish local fire response teams	High
3	Losses due to severe weather will be reduced or eliminated	A	Identify, prioritize, procure, and install emergency back-up power systems for the clinic and water treatment plant.	High
		B	Provide copies of the Huslia Small Community Emergency Response Plan to members of the Local Planning Committee and to local stakeholders.	Low
		C	Educate the community on the contents of the Huslia Small Community Emergency Response Plan and how it will be implemented when needed.	Med
		D	Identify structures in the community that are vulnerable to damage due to severe weather and develop a plan to weatherize or remove structures that are vulnerable to damage due to severe weather.	High

Goals		Actions to be taken by the Local Planning Committee		
No.	Description	ID	Description	Priority
4	Losses due to permafrost degradation will be reduced or eliminated	A	Identify and monitor any areas of land subsidence and avoid construction in those areas where land subsidence has occurred.	High
		B	Identify and monitor signs of differential settling of buildings, foundations, or of other infrastructure.	High
5	Emergency management programs will meet state standards and best practices among Alaska villages.	A	Encourage Hazard Mitigation Training and other emergency management training opportunities for members of the Local Planning Committee and volunteers in the community.	Med
6	Coordinating Partners and Stakeholders will be familiar with the 2018 Huslia HMP Update and will provide recommendations for ongoing improvement.	A	Distribute the 2018 Huslia HMP Update to Coordinating Partners and Stakeholders for review and request specific feedback.	High
		B	Identify planned community or outside agency projects (ANTHC, DCCED, DOT&PF, and HUD etc.) designed to mitigate hazards identified within this HMP.	Med
		C	Encourage Coordinating Partners and Stakeholders to access and review the 2018 Huslia HMP Update online.	Med
		D	Engage the Coordinating Partners and Stakeholders when changes or updates are made to the Huslia HMP Update and request their review and input.	Med
7	The local community will be aware of disaster preparedness, emergency response services, and hazard mitigation.	A	Hold an annual or biennial “hazard meeting” to provide information to residents about recognition and mitigation of natural hazards that affect the City of Huslia. Information should be presented in the form of a brochure or different form of written media so that residents can take information with them after the meeting. Topics should include safe fire practices while engaged in various activities (e.g., subsistence) in and around the community to help prevent wildland fires, and how the Small Communities Emergency Response Plan is used in the event of an emergency in Huslia..	High
		B	Encourage Huslia residents to access and review the 2018 Huslia HMP Update online.	Med

6.3 Evaluating and Prioritizing Mitigation Actions

After mitigation goals and actions were developed, the Planning Team assessed the potential mitigation actions to carry forward in the mitigation strategy. The Planning Team evaluated and prioritized each of the mitigation actions to determine which actions would be included in the Mitigation Action Plan. The Mitigation Action Plan represents mitigation projects and programs to be implemented through the cooperation of multiple entities within the Planning Team made up of the Local Planning Committee and the Coordinating partners and stakeholders. To complete this task, the hazards that were regarded as the most significant within the community (erosion, fire, and severe weather). Erosion is considered the most severely threatening hazard which will determine the community's long-term survival.

On July 13, 2017, the Planning Committee in a public meeting prioritized mitigation actions to be carried forward from the 2010 HMP to the 2018 HMP Mitigation Action Plan. To determine the priority of the mitigation action, consideration was given to each hazard's history, extent, location and probability. Based on the meeting discussions and research of the nature and history of the hazards, a rating criteria of each hazard's probability and magnitude or severity (Table 4-3 and Table 4-4), was used to qualify the priority given to each hazard. Table 6-3 provides the status of the mitigation actions established in 2010 HMP.

Item 3B of Table 6-3 lists an action to purchase backup generators. At the March 10, 2018 special meeting, the City Administrator stated that the school and the water treatment plant already have backup generators; however, the clinic and the gas station do not have backup generators.

Table 6-3 Mitigation Action Plan Status

Action ID From HMP 2010	Description	Priority	Responsible Department	Action Taken	Status
1A	Hold an annual or biennial "hazard meeting" to provide information to residents about recognition and mitigation of all natural hazards that affect the City of Huslia. Information should be presented in the form of a brochure or different form of written media so that residents can take information with them after the meeting. Topics should include (but are not limited to) the benefits of participating in the NFIP and safe fire practices while engaged in various activities e.g., subsistence) in and around the community to help prevent wildland fires.	High	City of Huslia Staff	Yes	Meetings were held to discuss erosion and evacuation planning, and relocating homes as needed. Meetings were held to develop the Small Communities Emergency Response Plan 2017. Meetings were held to plan relocation or demolition of abandoned structures to reduce threat of fire. Huslia currently does not participate in NFIP; however will consider the benefits of participation in the future. At this time, flooding has had limited impact on the community.
2A	Identify and pursue funding opportunities to implement mitigation actions.	High	City of Huslia Staff, Huslia Village Council	Yes	Ongoing
2C	Incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc. to demonstrate multi-benefit considerations and facilitate using multiple funding source consideration.	Med	City of Huslia Staff	Minor	This should not incur significant costs and should be budgeted into the city staff operating budget. More coordination should be sought with ANTHC infrastructure planning. ANTHC was not aware of Huslia's HMP.
3A	Identify potential or funded community or outside agency projects (ANTHC, DCCED, AKDOT, and HUD etc.) designed to mitigate hazards identified within this HMP.	Med	City of Huslia	Unknown	No reports have indicated outside agency

Action ID From HMP 2010	Description	Priority	Responsible Department	Action Taken	Status
3B	Purchase and install generators with main power distribution disconnect switches for identified and prioritized critical facilities susceptible to short-term power disruption. (i.e., first responder and medical facilities, schools, correctional facilities, and water and sewage treatment plants, etc.)	High	City of Huslia Staff, Huslia Village Council	Unknown	Public meeting included discussion of minor cost to protect vital infrastructure from hazard damage and feasibility of this action item because there is staff already in place to maintain community's power generation facilities.
5A	Develop pubic outreach program to train earthquake safety; perform drop-cover-hold drills at schools and public facilities.	Low	City of Huslia, Huslia Tribal Council	Unknown	No report of earthquake impacts to Huslia; therefore earthquake removed from hazards profiled in 2018
6A	Prioritize properties in need of erosion control measures to include identification of specific mitigation measures.	High	City of Huslia, Huslia Tribal Council	Unknown	This cost would be the
6B	Relocate buildings that are at risk of being affected by erosion.	High	City of Huslia, Huslia Tribal Council	Yes	Several buildings have been relocated or dismantled.
6C	Apply for grants/funds to implement riverbank protection methods.	High	City of Huslia, Huslia Tribal Council	Unknown	ongoing
8D	Develop outreach program to educate the public concerning planting process and materials used to stabilize hill slopes or stream banks. This is known as bio-engineering; which uses logs, root wads, wood debris, or other vegetation to reduce scour and erosion.	High	City of Huslia, Huslia Tribal Council	Unknown	Cut brush and wood debris is placed to help armor the embankment
6E	Install embankment protection such as vegetation, riprap, gabion baskets, sheet piling, and walls to reduce or eliminate erosion.	High	City of Huslia, Huslia Tribal Council	Unknown	Time, material and equipment costs have not been tracked by the City to determine the cost of this ongoing effort

Action ID From HMP 2010	Description	Priority	Responsible Department	Action Taken	Status
7A	Adopt and enforce floodplain management ordinances.	High	City of Huslia, Huslia Tribal Council	No	Huslia is not implementing building ordinances.
7B	Acquire (buy-out), relocate, elevate, or otherwise flood-proof identified critical facilities and private properties.	High	City of Huslia, Huslia Tribal Council	Yes	Homes were relocated to avoid being lost to erosion, and to reduce risk from fire. Flooding has not been a significant hazard for Huslia.
8A	Map existing permafrost areas to assist in critical facility relocation siting	Mediu m	City of Huslia, Huslia Tribal Council	Unknown	Permafrost conditions are determined when siting is being done for new construction.
9A	Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting special needs populations.	Mediu m	City of Huslia, Huslia Tribal Council	Unknown	This action may have been partially implemented as part of the planning to produce the Small Communities Emergency Response Plan; however, hazard mitigation was not addressed.
10A	Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.	Low	City of Huslia, Huslia Tribal Council	Unknown	Is done by regional and statewide organizations. Not clear what outreach has been done.

6.4 Mitigation Action Plan

Prioritizing the mitigation actions in the Mitigation Action Plan was completed to provide the community with an approach to implementing the HMP. Table 6-4 provides a summary of the Mitigation Action Plan priorities.

Table 6-4 Mitigation Action Plan

Action ID. and DEPT	Description	Priority	Potential Funding*	Timeframe	Benefit Cost Assessment
1B City of Huslia and Huslia Tribal Council	Relocate buildings that are at risk of being affected by erosion.	High	State, Federal, Local	2022	Relocating homes may be more cost effective that losing the home to erosion or providing a new home.
1C City ADMIN	Seek funding and apply for grants/funding to implement riverbank protection.	High	State, Federal, Local	2020	Update the benefit cost assessment based on re-evaluation of cost of new homes associated with relocation.
2B City of Huslia and Huslia Tribal Council	Identify, develop, implement, and enforce fuel breaks and reduction zones to prevent potential wildland fire in hazard areas.	High	State, Federal, Local	2018	Local planning and labor are cost effective compared to the losses associated with interruption to emergency evacuation or building fires that could spread consume critical facilities.
2F Local fire response crew	Re-establish local fire response teams	Medium	State, Federal, Local	2019	The city of Huslia has locally trained fire fighters and a history of having a fire response company so that costs to re-establish the fire response group should not be significant compared to the costs associated with losses due to fire.
3A City ADMIN	Identify, prioritize, procure, and install emergency back-up power systems for the clinic and gas station.	Medium	State, Federal, Local	2022	The full costs of implementing this will require market analysis and planning that is beyond the scope of this HMP update. Cost data should be obtained from a program to plan this effort.
3D City of Huslia	Identify structures in the community that are vulnerable to damage due to severe weather and develop a plan to weatherize or remove structures that are vulnerable to damage due to severe weather.	High	State, Federal, Local	2022	Planning should be integral to city operations and the data may already be available suggesting minimal costs associated with having this planning in place.

Action ID. and DEPT	Description	Priority	Potential Funding*	Timeframe	Benefit Cost Assessment
5B City ADMIN	Encourage Hazard Mitigation Training and other emergency management training opportunities for members of the Local Planning Committee and other interested parties in the community	Medium	State, Federal, Local	2018	Research emergency management training grants available through DHS&EM and FEMA.
5C City ADMIN	Training and assistance will be sought by the City of Huslia to become skilled in procurement of resources for developing emergency management and hazard mitigation programs	High	State, Federal, Local	2018	Local expertise in procuring funding through grant processes and the like is necessary to avoid the cost of hired consultants and grant writers.
6A City and tribal planners	Distribute The 2018 Huslia HMP Update to Coordinating Partners and Stakeholders for review and request specific feedback.	High	State, Federal, Local	2018	Costs will be minimized while access is increased through use of on-line access and collaboration. The benefit of online coordination will be the capture of collaboration activity in a shared online environment.

Action ID. and DEPT	Description	Priority	Potential Funding*	Timeframe	Benefit Cost Assessment
7A City of Huslia and Huslia Tribal Council	Hold an annual or biennial "hazard meeting" to provide information to residents about recognition and mitigation of natural hazards that affect the City of Huslia. Information should be presented in the form of a brochure or different form of written media so that residents can take information with them after the meeting. Topics should include safe fire practices while engaged in various activities (e.g., subsistence) in and around the community to help prevent wildland fires, and how the Small Communities Emergency Response Plan is used in the event of an emergency in Huslia..	High	State, Federal, Local	2018	This hazard meeting could be incorporated into an existing tribal membership meeting or emergency preparedness meeting to minimize costs. The benefit will be in obtaining required public input to the HMP.

7 Plan Maintenance and Implementation

The Huslia HMP, including appendices, will be updated every five years, after a disaster response, or as appropriate in response to community mitigation activities, changes to land use development and changes to critical infrastructure. The HMP will be formally re-promulgated by the Community and sent to Alaska DHS&EM and FEMA for approval once every five years.

7.1 Adoption by Local Governing Bodies and Supporting Documentation

The requirements for the adoption of this HMP by the local governing body are that the local hazard mitigation plan shall include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, Commissioner, Tribal Council)

The City of Huslia is the local jurisdiction represented in this HMP and meets the requirements of Section 409 of the Stafford Act and Section 322 of DMA 2000.

Following the State DHS&EM's review and FEMA's approval pending adoption, the local governing body of the City of Huslia adopted the HMP by resolution. A scanned copy of the resolution is included in Appendix 4.

7.2 Monitoring, Evaluating, and Updating the HMP

Prior to work being done to produce the HMP Update 2018 there is no record of HMP monitoring, evaluation or updates. Table 6-3 Mitigation Action Plan Status provides a 2017 review of the status of the HMP 2010 Mitigation Action Plan.

The 2018 Huslia HMP Update was prepared as an effort of the HMP Planning Team comprised of the Local Planning Committee and the Coordinating Partners and Stakeholders. Each of the Coordinating Partners and Stakeholders will be provided access to the approved 2018 Huslia HMP Update. The City Administrator of Huslia, as the HMP Planning Team Leader, (or their designee) will serve as the primary point of contact and will coordinate the efforts to monitor, evaluate, and revise the HMP. To maintain momentum and build upon previous hazard mitigation planning efforts and successes, the Local Planning Committee will be responsible for monitoring, evaluating, and update the HMP.

The Planning Team will conduct an annual review during the anniversary week of the plan's official FEMA approval date to monitor the progress in implementing the HMP, particularly the Mitigation Action Plan. An Annual Review Worksheet (see Appendix 1) will provide the basis for possible changes in the HMP Mitigation Action Plan by refocusing on new or more threatening hazards, adjusting to changes to or increases in resource allocations, and engaging additional support for the HMP implementation. The Local Planning Committee Leader will initiate the annual review two months prior to the scheduled planning meeting date to ensure that all data is assembled for discussion with the Planning Team. 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:

- Participation in the HMP implementation.
- Notable changes in the risk of natural or human-caused hazards.
- Impacts of land development activities and related programs on hazard mitigation.
- Progress made with the Mitigation Action Plan (identify problems and suggest improvements as necessary).
- The adequacy of local resources for implementing of the HMP.

A system of reviewing the progress on achieving the mitigation goals and implementing the Mitigation Action Plan activities and projects will also be accomplished during the annual review process. During each annual review, each authority administering a mitigation project will submit a Progress Report to the Planning

Team. As shown in Appendix 1, the report will include the current status of the mitigation project, including any changes made to the project, the identification of implementation problems and appropriate strategies to overcome them, and whether or not the project has helped achieved the appropriate goals identified in the plan.

In addition to the annual review, the Planning Team will update the HMP every five years. To ensure that this update occurs, in the third year following adoption of the HMP, the Planning Team will undertake the following activities:

- Request grants assistance for DHS&EM to update the HMP (this can take up to one year to obtain funding and one year to update the plan).
- Thoroughly analyze and update the risk of natural and human-made hazards.
- Provide a new annual review (as noted above), plus a review of prior annual reviews.
- Provide a detailed review and revision of the mitigation strategy.
- Prepare a new Mitigation Action Plan for the City of Huslia
- Prepare a new draft HMP Update.
- Submit an HMP Update to the DH&EM and FEMA for approval.
- Submit the FEMA approved plan for adoption by the City of Huslia

7.3 Implementation through Existing Planning Mechanisms

After the adoption of the HMP, The Planning Committee will ensure that HMP information is incorporated into new and existing planning efforts. The Planning Committee will ensure the following activities:

- Conduct a review of the community-specific regulatory tools to assess the integration of the mitigation strategy. These regulatory tools are identified in the capability assessment Section 5.
- Work with pertinent Local Organizations (Section 2**Error! Reference source not found.**) to increase awareness of the HMP and provide assistance in integrating the mitigation strategy (including the Mitigation Action Plan) into relevant planning mechanisms. Implementation of these requirements may require updating or amending specific planning mechanisms.
- Work with the Coordinating Partners and Stakeholders (**Error! Reference source not found.**) to increase awareness of the HMP and provide assistance in integrating the mitigation strategy (including the Mitigation Action Plan) into planning documents.

7.4 Continued Public Involvement

The City of Huslia is dedicated to involving the public directly in the continual reshaping and updating of the HMP as depicted in their Mitigation Actions Plan Matrix, Table 6-4, four of the planned Mitigation Actions (1A, 5A, 6D, 9A, and 10A) are outreach activities focused to keeping their population involved and aware of the hazards threatening their community.

A paper copy of the HMP and any proposed changes will be available at the City Office. An address and phone number of the Planning Team Leader, to whom people can direct their comments or concerns will also be available at the City Office.

The Planning Team will also identify opportunities to raise community awareness about the HMP and the hazards that affect the area. This effort could include attendance and provision of materials at city-sponsored events, outreach programs, and public mailings. Any public comments received regarding the HMP will be

collected by the Planning Team Leader, included in the annual report, and considered during future HMP updates.

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Appendix 1 - Mitigation Maintenance Forms and Worksheets

Maintaining Your Hazard Mitigation Plan

Learn How to Maintain Your Hazard Mitigation Plan and Get the Best Results!

This Guide provides information on

- Who to contact for help
- Where to get information

Reviewing Your Jurisdiction's Hazard Mitigation Plan Every Year Can Pay Big Dividends.

Annual maintenance provides your community with the opportunity to update your project list and pursue grant projects that can prevent or reduce damage from natural hazards. It also provides an opportunity to see if the plan is on track. Following these steps and answering a few questions provides the reviewing authority the chance to make needed adjustments.

Before the Annual Review Begins:

Step 1 – Contact the State

The State of Alaska has access to the latest information about changes in state and federal laws, various grant programs, and data about hazards that can improve the quality of the Hazard Mitigation Plan (HMP) and grant applications for hazard mitigation projects. Below is a list of contacts for your use.

State Contacts:

The Alaska Division of Homeland Security and Emergency Management (DHS&EM)

Mark Roberts – State Hazard Mitigation Officer Phone: 907-428-7016 Email: Mark.Roberts@Alaska.gov

Ervin Petty – Hazard Mitigation Planner Phone: 907-428-7015 Email: Ervin.Petty@Alaska.gov

Taunnie Boothby – Certified Floodplain Manager of the National flood Insurance Program (NFIP) for Alaska Phone: 907-269-4583 Email: Taunnie.Boothby@Alaska.gov Web: www.commerce.state.ak.us/dca/planning/nfip/nfip.htm

Step 2 - Coordinating with Other State and Federal Agencies

Many state and federal agencies specialize in gathering hazard-related information that can be useful in preparing HMP plans and grant applications for hazard mitigation projects. Discussions with the State of Alaska may reveal the need to speak with specific state or federal agency representatives who possess the latest information about disasters and projects relevant to your jurisdiction.

Step 3 – Don't Forget to Alert Citizens about the Annual Review

Before the annual maintenance of your jurisdiction's hazard mitigation plan begins, invite the public to participate. Alerting citizens that your jurisdiction will be discussing community safety has several benefits:

- The community may gain knowledge about a potentially hazardous condition of which they were unaware;
- Interested citizens will become educated about community efforts

to prevent damage from hazards and promote community safety;

- The community may obtain volunteer resources that can lead or assist in managing a grant project or help implement a mitigation action that might not otherwise be possible; and

- Citizen participation in project implementation may count as "local match" for grant dollars if local match is required.

As the Annual Review Begins:

Provide a sign-up sheet at the meeting to record who participated in the annual review. Have everyone in attendance sign their names and indicate who they represent. Keep a summary of any changes made to the plan during the annual review. By documenting this event, the jurisdiction will easily satisfy Federal Emergency Management Agency's requirement to document the planning process (Crosswalk Requirement 4 – CFR §201.6(b)) when the 5-year plan update is due.

Discuss and Answer Questions

The following questions are provided to help guide participants through the annual review of a hazard mitigation plan.

Questions to ask the state:

Have the FEMA hazard mitigation planning requirements changed since your hazard mitigation plan was adopted? (For most jurisdictions, the answer is yes. The state can help identify new requirements).

Has the Alaska All-Hazard Risk Mitigation Plan been modified since your plan's last review?

Have any laws changed that would affect the hazard mitigation plan, goals or mitigation projects?

Are there new mitigation grant requirements that need to be discussed during the annual review?

Questions about the Risk Assessment

Have new issues or hazard-related problems been identified that aren't addressed in the hazard mitigation plan?

Has the jurisdiction experienced any new disasters since the plan was adopted or last updated? (If yes, be sure to update the "history of previous occurrences sections" of the plan during the next plan update. Mention all Presidential-declared disasters and Alaska "state-declared" disasters.)

Has the damage from new disasters been documented? Are photographs of the damage and verification of high water marks available.

Have new areas not previously identified in the hazard mitigation plan been damaged by hazardous events since the plan was approved or last updated? Are there any new impacts from recent hazardous events that should now be identified in the plan? If yes, did the hazard mitigation plan accurately anticipate the impacts from the event(s)?

Has the risk assessment of the Alaska All-Hazard Risk Mitigation Plan been reviewed to see if new information is pertinent to the local review?

Have changes (e.g., structures elevated, new dike, new road, retro-fitting for earthquakes, etc.) occurred that might reduce the effects of a hazardous event?

Have changes (e.g., new development in the floodplain, etc.) to the community increased the chance that damage might occur from a hazardous event?

Are new studies or data available that require immediate consideration?

Questions about Goals and Mitigation Measure Implementation

Are the goals of the plan being achieved through implementation of successful mitigation measures?

Have any mitigation measures been implemented since the plan was adopted or last updated? Identify and describe.

Have implemented mitigation measures achieved the desired results?

Have any of the mitigation measures been implemented through other programs?

Have the implemented mitigation measures been successful at preventing or reducing disaster-related damage? Can the estimated dollars saved be determined?

Have any programs or practices hindered or limited the effectiveness of the jurisdiction's hazard mitigation efforts?

Are the existing mitigation measures still appropriate, given current resources or changes made to the risk assessment?

Do any of the remaining proposed mitigation measures need to be re-prioritized?

Questions about Grant Administration

Do you have any mitigation success stories?

How many projects have been implemented since the plan was adopted or last updated? Were grant dollars used and was the grant closeout process successfully completed?

Which mitigation projects are underway? Are they being funded by federal grants or by other grant sources?

Obtain Hazard Mitigation Planning Resources

"Local Multi-hazard Mitigation Planning Guidance" (July 1, 2008)

http://www.fema.gov/library/viewRecord.do?id=3336

"FEMA Hazard Mitigation Planning Guides" ... a "How To" series ... for preparing hazard mitigation plans:

- Getting Started: Building Support for Mitigation Planning

- Understanding Your Risks: Identifying Hazards and Estimating Losses

- Developing a Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies

- Bringing the Plan to Life: Ensuring the Success of the Hazard Mitigation Plan Using Benefit-Cost Analysis in Mitigation Planning
- Incorporating Historic Resources into Mitigation Planning
- Integrating Human-Caused Hazards into Mitigation Planning
- Multi-Jurisdictional Approaches to Mitigation Planning
- Securing Resources for Mitigation Planning

http://www.fema.gov/plan/mitplanning/resources.shtm

Additional Resources for Each Hazard

The following agencies and Worldwide Web Links contain information useful in hazard identification, risk analysis and in developing mitigation measures to reduce damage.

Floods

FEMA= Floodsmart
http://www.floodsmart.gov/

FEMA - http://www.fema.gov/hazard/flood/index.shtm

National Weather Service
http://www.nws.noaa.gov

Alaska Department of Commerce, Community and Economic Development – Floodplain Management
http://www.commerce.state.ak.us/dca/nfip/nfip.htm

U.S. Army Corps of Engineers -
2204 3rd Street, Elmendorf AFB,
AK 99506 – phone: 907-753-2610
http://www.poa.usace.army.mil/en/cw/fld_haz/communities.htm

Wildfires

FEMA - http://www.fema.gov/hazard/wildfire/index.shtm

Fire Ready - http://fireready.com/

Firewise - http://www.firewise.org/

US Geological Survey (USGS)
http://www.usgs.gov/hazards/wildfires/

Alaska Dept. of Natural Resources – Division of Forestry
http://forestry.alaska.gov/fire/current.htm

Earthquakes

United States Geological Survey – USGS - http://www.usgs.gov/hazards/earthquakes/

FEMA – http://www.fema.gov/hazard/earthquake/index.shtm

Alaska Earthquake Information Center
http://www.aeic.alaska.edu/

Alaska Sea Grant Program
http://seagrant.uaf.edu/features/earthquake.php

Landslides and Erosion

United States Geological Survey – USGS
http://landslides.usgs.gov

FEMA - http://www.fema.gov/hazard/landslide/index.shtm

Alaska Dept. of Homeland Security and Emergency Management
http://ready.alaska.gov/plans/mitigation/landava.htm

Volcanoes

United States Geological Survey – USGS
http://volcanoes.usgs.gov

FEMA - http://www.fema.gov/hazard/volcano/index.shtm

Alaska-- http://www.avo.alaska.edu

Tsunami

FEMA - http://www.fema.gov/hazard/tsunami/index.shtm

National Oceanic Atmospheric Administration (NOAA)
http://www.prh.noaa.gov/ptwc/

Univ. of Washington - http://www.ess.washington.edu/tsunami/index.html

Alaska Sea Grant Program
http://seagrant.uaf.edu/features/earthquake.php

National Weather Service/West Coast and Alaska Tsunami Warning Center
http://wcatwc.arh.noaa.gov/events/eventmap.php

Seiches

USGS - http://earthquake.usgs.gov/learning/topics/seiche.php

Snow Avalanches

National Snow and Ice Data Center
http://nsidc.org/snow/avalanche/

Severe Weather

FEMA - http://www.fema.gov/hazard/winter/index.shtm

National Weather Service
http://www.nws.noaa.gov/

National Weather Service (Fairbanks)
http://pafg.arh.noaa.gov/

Annual Review Questionnaire

Plan Section	Questions	YES	NO	Comments
Planning Process	Are there internal or external organizations and agencies that have been invaluable to the planning process or to mitigation action?			
	Are there procedures (e.g., meeting announcements, plan updates) that can be done more efficiently?			
	Has the Local Planning Committee undertaken any public outreach activities regarding the HMP or implementation of mitigation actions?			
Hazard Profiles	Has a natural and/or human-caused disaster occurred in the reporting period?			
	Are there natural and/or human-caused hazards that have not been addressed in this HMP and should be?			
	Are additional Maps or new hazards available? If so, what have they revealed?			
Vulnerability Analysis	Do any new critical facilities or infrastructure need to be added to the assets lists?			
	Have there been changes in development patterns that could influence the effects of hazards or create additional risks?			
Mitigation Strategy	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
	Are the mitigation goals still applicable?			
	Should new mitigation actions be added to the communities Mitigation Action Plan?			
	Do existing mitigation actions listed in the Mitigation Action Plan need to be reprioritized?			
	Are the mitigation actions listed the Mitigation Action Plan appropriate for available resources?			
Other/ Additional				

Mitigation Action Progress Report

Progress Report Period: _____to: _____
(Date) (Date)

Project Title: _____Project ID# _____

Responsible Agency: _____

Address: _____

City: _____

Contact Person: _____Title: _____

Phone #(s): _____Email address: _____

List Supporting Agencies and
Contacts:_____
_____
_____
_____
_____

Total Project Cost: _____ Anticipated Cost Overrun/Underrun: _____

Date of Project Approval: _____ Start Date of the Project: _____

Anticipated completion Date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase):

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Mitigation Action Milestones

Milestones	Planned Date of Project Completion	Date Complete

Plan Goals Addressed:

Goal: _____

Indicators of Success:

_____

_____

☐ **Project on Schedule**

☐ **Project Completed**

☐ **Project Delayed**

☐ **Explain**_____

_____

_____

☐ **Project Canceled**

Explain_____

_____

_____

☐ **Cost Unchanged**

☐ **Cost Overrun**

Explain_____

_____

_____

☐ **Cost Underrun**

Explain_____

_____

_____

Summary of Progress on Project for this Report

A. What was accomplished duing this peproting period?:_____

_____

_____

_____

B. What obstacles, problems, or delays did you encounter, if any:

_____

_____

_____

_____

C. How was Each Problem Resolved?:_____

_____

_____

_____

_____

Appendix 2 – Documentation of Public Involvement

CITY OF HUSLIA

HAZARD MITIGATION PLANNING COORDINATION

For questions about this you can contact Raymond O'Neill (907) 351-2529 or the City of Huslia

The Village is updating its Hazard Mitigation Plan and is asking you, as a community stakeholder, to participate in our coordination efforts. We have prepared a short questionnaire to help you participate. Please review and complete as much as possible before returning your responses via email.

Have you contributed to Hazard Mitigation Planning with Huslia in the past?

- ❑ ***Yes***
- ❑ ***No***

Here is a FEMA frequently asked questions (FAQ) website that will be helpful: https://www.fema.gov/hazard-mitigation-planning-frequently-asked-questions

Below is a list of 16 hazard mitigation actions proposed by the community in its most recent Hazard Mitigation Planning efforts.

Please provide any observations you have regarding these proposed mitigation actions in the comments column of the table below or email any specific observations you have. Please provide any additional mitigation actions you think would be appropriate for the community but is not listed here.

DESCRIPTION	PRIORITY	TIMEFRAME	COMMENTS
Hold an annual or biennial "hazard meeting" to provide information to residents about recognition and mitigation of natural hazards. Education in the community about hazards will be a focus of this meeting.	High	ongoing	
Identify and pursue funding opportunities to implement mitigation actions.	High	ongoing	
Incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement, and land use plans, etc.	Medium	1-3 years	
Identify potential or funded community or outside agency projects (ANTHC, DCCED, AKDOT, and HUD etc.) designed to mitigate hazards identified within this HMP.	Medium	1-3 years	
Purchase and install generators with main power distribution disconnect switches for prioritized critical facilities susceptible to short-term power disruption. (i.e., first responder and medical facilities, schools, correctional facilities, and water and sewage treatment plants, etc.)	High	1-5 years	
Develop pubic outreach program to train earthquake safety; perform drop-cover-hold drills at schools and public facilities.	Low	2-4 years	

Description	Priority	Timeframe	Comments
Prioritize properties in need of erosion control measures to include identification of specific mitigation measures.	High	1-2 Years	
Relocate buildings that are at risk of being affected by erosion.	High	ongoing	
Apply for grants/funds to implement riverbank protection methods.	High	ongoing	
Develop outreach program to educate the public concerning planting process and materials used to stabilize hill slopes or stream banks. This is known as bio-engineering; which uses logs, root wads, wood debris, or other vegetation to reduce scour and erosion.	High	2-4 years	
Install embankment protection such as vegetation, riprap, gabion baskets, sheet piling, and walls to reduce or eliminate erosion.	High	2-5 years	
Adopt and enforce floodplain management ordinances.	High	ongoing	
Acquire (buy-out), relocate, elevate, or otherwise flood-proof identified critical facilities and private properties.	High	3-5 years	
Map existing permafrost areas to assist in critical facility relocation siting	Medium	4 years	
Develop and maintain severe winter storm public outreach program defining mitigation activity benefits through educational outreach aimed at households and businesses while targeting special needs populations.	Medium	2-4 years	
Develop outreach program to educate and encourage fire-safe construction practices for existing and new construction in high risk areas.	Low	2-4 years	

Below is a list of hazards profiled by the community in its most recent planning effort. Probability and Impact are rated on qualitative 1-5 scale for each hazard. Please review these and provide any comments for the planning committee to consider.

Risk Priority Index			
Hazard	**Probability**	**Impact**	**Comments**
Drought	2 Possible	1 Negligible	
Earthquake	1 Remote	1 Negligible	
Erosion	3 Likely	2 Limited	
Flooding	4 High	3 Critical	
Permafrost degradation	2 Possible	2 Limited	
Severe Winter Storm	4 High	1 Negligible	
Wildfires	3 Likely	3 Critical	
Climate Change	1 Remote	4 Catastrophic	

The full 2010 ***City of Huslia Hazard Mitigation Plan*** and other community planning for Huslia can be accessed here:
https://www.commerce.alaska.gov/dcra/dcrarepoext/Pages/CommunityPlansLibrary.aspx

Please provide any additional feedback you have regarding this questionnaire and the Hazard Mitigation Planning for the Community of Huslia.

_____
_____
_____
_____
_____
_____
_____
_____

The City of Huslia is facilitating a public involvement meeting on July 13th- July 14th to gather public input to the Hazard Mitigation Planning Process. For questions about this you can contact Raymond O'Neill (907) 351-2529 or the City of Huslia

Please tell us who you are

Agency _____

Contact Name _____

Phone Number _____

Email Address _____

Mailing Address _____

Thank you!

Appendix 3 – Waste Erosion Assessment Report (WEAR)

DISCLAIMER: Data displayed below is for informational purposes only.

EXISTING DEFICIENCIES:

Water: Ten homes have relocated within the last three years due to continual river bank erosion (an estimated 75 ft in 2014). All homes were relocated to the Birch Grove Subdivision. This area of town is not served by the existing water distribution system. Residents are currently self hauling their own water, no in-home water service, from the watering point at the water treatment plant. DL = 4

Sewer: Ten homes have relocated within the last three years due to continual river bank erosion (an estimated 75 ft in 2014). This area of town is not connected to the existing community wide sewer collection system. All homes were relocated to the Birch Grove Subdivision. Residents are currently using honey buckets and self hauling their own sewer. DL = 4

Solid Waste: None

O & M: None

PROPOSED FACILITIES:

Water: This project will provide individual on site wells for four homes, which is the first service to these homes (HI=A). Scope includes well drilling, casing, and screening as well as well development and testing of the on site wells. Scope also includes installation of the well pump, controls, heat tracing, service lines, and home connections. Connect one home located downtown to the water main. Upgrade water treatment systems in seven homes to attain operational functionality. Finally, install interior plumbing in seven of the homes including pressure tank, water heater, kitchen and bathroom sinks, shower, and all required plumbing.

Sewer: This project will provide individual septic systems for four homes, which is the first service to these homes (HI=A). Scope includes leach field development, installation of laterals and insulating cover for drainfield, septic tank and gravity service line, arctic home connection, and interior plumbing to include toilet, sink, and shower drains and all required associated plumbing for seven homes. Connect one home located downtown to the sewer main.

Solid Waste: None

O & M: None

COST ESTIMATE

Scope Item	Funding Source	Quantity	Units	Health Impact Tier
Water, Other - Other water	IHS Regular	1	Ls.	A
Sewer, Other - Other sewer	IHS Regular	1	Ls.	A

Health Impact Tier:
A - First Service
B - Regulatory Compliance
C - Essential Upgrades
D - Beneficial Upgrades
E - Desired Upgrades

DISCLAIMER: Data displayed below is for informational purposes only.

EXISTING DEFICIENCIES:

Water: The existing washeteria/water treatment plant relies on imported heating fuel to keep the facility in operation and prevent system freeze-ups. There is no available back-up energy source. The loss of heat to the system would cause catastrophic damage to the piping system. This is not correctable by routine maintenance. (D.L. 2). The high cost of energy coupled with the energy intensive nature of public water infrastructure in Huslia creates a significant financial burden for the community's residents due to the these high costs. Installation of this Biomass Heating System will serve to significantly lower the operating costs and enhance the long term sustainability of the new washeteria. The existing water system in the community does not take advantage of lower cost local energy sources like the proposed system.

Sewer: None

Solid Waste: None

O & M: None

PROPOSED FACILITIES:

Water: This project will provide a biomass heating system for the washeteria/water treatment plant and health clinic. The facilities will consist of a biomass boiler, heat exchangers, controls and associated piping. The potential fuel displacement is 8,474 gallons of the 14,580 gallons of heating fuel to be used by the washeteria/water treatment plant and health clinic. The proportional fuel price based on heating demand of each building and each facility's cost of fuel is $4.12/gallon (see attached feasibility analysis and fuel invoices). The annual cost of fuel displaced by this project is estimated to equal $34,907. Another economic benefit includes the collection of wood which will create local jobs and keep city resources within the community. To operate the biomass boiler, the city will have to purchase cords of wood from local harvesters, which is anticipated to sell at $300 per cord. This money is not exported to outside entities for heating oil and stays within the community as a result. This project will provide energy efficiency improvements and an important back-up heating source, increasing the operational efficiencies and sustainability of sanitation infrastructure. (H.I.=D)

Sewer: None

Solid Waste: None

O & M: None

COST ESTIMATE

Scope Item	Funding Source	Quantity	Units	Health Impact Tier
Water, Other - Other water	IHS Regular	1	Ls.	D

Health Impact Tier:
A - First Service
B - Regulatory Compliance
C - Essential Upgrades
D - Beneficial Upgrades
E - Desired Upgrades

Total Costs: $477,788.00

Total Costs: $907,044.00

Appendix 4 – Plan Approval Resolution

U.S. Department of Homeland Security
FEMA Region 10
130 – 228th Street, SW
Bothell, Washington 98021

FEMA

August 28, 2018

Mr. Brent Nichols
State Hazard Mitigation Officer
Alaska Division of Homeland Security and Emergency Management
P.O. Box 5750
Fort Richardson, Alaska 99505-5750

Dear Mr. Nichols:

As requested, on August 28, 2018, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA), Region 10, completed a pre-adoption review of the ***Huslia, Alaska Local Hazard Mitigation Plan 2018***. This letter serves as Region 10's commitment to approve the plan upon receiving documentation of its adoption by the City of Huslia. The plan successfully contains the required criteria, excluding the adoption, for hazard mitigation plans, as outlined in Code of Federal Regulation Title 44 Part 201.

Once FEMA approves the plan, the City of Huslia is eligible for mitigation project grants.

Please contact our Regional Mitigation Champion, Kate Skaggs, currently providing interim support to the Mitigation Planning Program at (541) 600-4047 with any questions.

Sincerely,

X _____ 2018.08.29 10:05:59 -07'00'

Tamra Biasco
Chief, Risk Analysis Branch
Mitigation Division

KS:vl

09-20-18P02:21 RCVD

HUSLIA CITY COUNCIL
58 DAKLI STREET, BOX 10, HUSLIA, ALASKA 99746

RESOLUTION 2018-06

A RESOLUTION OF ADOPTION FOR THE CITY OF HUSLIA, ALASKA HAZARD MITIGATION PLAN.

WHEREAS, the City of Huslia is vulnerable to damages from natural hazard events which pose a threat to Public health safety and could result in property loss and economic hardship;

WHEREAS, a Hazard Mitigation Plan (the Plan) has been developed through the work of the City of Huslia Planning Team interested parties within the City of Huslia;

WHEREAS, the Plan recommends hazard mitigation actions that will protect people and property Affected by natural hazards in the City of Huslia, that will reduce future public, private, Community, and personal costs of disaster response and recovery that will reinforce the City of Huslia's leadership in emergency preparedness efforts;

WHEREAS, the Disaster Mitigation Act of 2000 (P.L. 106-390) (DMA 2000) and associated Federal Regulations published under CFR Part 201 require the City of Huslia to formally adopt a Hazard Mitigation Plan subject to the approval of the Federal Emergency Management Agency to be eligible for federal hazard mitigation projects and activities funds;

WHEREAS, public meetings were held to receive comment on the Plan as required by DMA 2000;

NOW THEREFORE BE IT RESOLVED by the Huslia City Council of the City of Huslia that:

1. The Plan is hereby adopted as an official plan of the City of Huslia.
2. The City of Huslia official identified in the Mitigation Action Plan (Section 8) are hereby directed to implement the recommended actions assigned to them. These officials will report quarterly on their activities, accomplishments, and progress of the Huslia City Council.
3. The City of Huslia's Hazard Mitigation Planning Team will provide annual progress reports on the status of the implemented Mitigation Action Plan's project to the Planning Team Leader. This report shall be submitted to the Huslia City Council annually by the adoption anniversary date.
4. The City of Huslia's Planning Team will complete periodic updates of the Plan as indicated in the Plan Maintenance (Section 8), but no less frequently than every five years.

NOW THEREFORE BE IT RESOLVED by the Huslia City Council that the City of Huslia adopts the City of Huslia **Hazard Mitigation Plan,** dated Sept 14 ,2018 as this jurisdiction's Hazard Mitigation Plan, and resolves to execute the actions in the Plan.

DATED THIS 14 **DAY OF SEPTEMBER, 2018**

Sr Joyce Sam
Mayor's Signature

ATTEST: Lisa Kent
City Administrator's signature

U.S. Department of Homeland Security
FEMA Region 10
130 228th Street, SW
Bothell, Washington 98021-8627

FEMA

October 11, 2018

The Honorable S. Joyce Sam
Mayor, City of Huslia
P.O. Box 10
Huslia, Alaska 99746

Dear Mayor Sam:

On October 10, 2018, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) Region 10, approved the *Huslia, Alaska Local Hazard Mitigation Plan 2018* as a local plan as outlined in Code of Federal Regulations Title 44 Part 201. This approval provides the jurisdiction eligibility to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's, Hazard Mitigation Assistance grants projects through October 9, 2023, through your state.

FEMA individually evaluates all application requests for funding according to the specific eligibility requirements of the applicable program. Though a specific mitigation activity or project identified in the plan may meet the eligibility requirements, it may not automatically receive approval for FEMA funding under any of the aforementioned programs.

Over the next five years, we encourage you to follow the plan's schedule for monitoring and updating, and to develop further mitigation actions. To continue eligibility, jurisdictions must review, revise as appropriate, and resubmit the plan within five years of the original approval date.

If you have questions regarding your plan's approval or FEMA's mitigation grant programs, please contact Mike Johnson, Emergency Management Specialist with Alaska Division of Homeland Security and Emergency Management, at (907) 428-7055, who locally coordinates and administers these efforts.

Sincerely,

Mark Carey, Director
Mitigation Division

Enclosure

cc: Brent Nichols, Alaska Division of Homeland Security and Emergency Management

KS:rg

APPENDIX A:
LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: City of Huslia	**Title of Plan:** Hazard Mitigation Plan	**Date of Plan:** 2018
Local Point of Contact: Elsie Vent	**Address:** City of Huslia / ADMINISTRATION P.O. Box 10 58 Dakli St. Huslia, AK 99746	
Title: City Administrator		
Agency: City of Huslia		
Phone Number: (907) 829-2266	**E-Mail:** elsiesv@gci.net	

State Reviewer:	**Title:**	**Date:**
Mike Johnson	Hazard Mitigation Planner	05/14/2018

FEMA Reviewer:	**Title:**	**Date:**
Amanda Siok Amanda.Siok@fema.dhs.gov Kate Skaggs Kate.Skaggs@mbakerintl.com	Mitigation Planning Lead Mitigation Champion	July 3, 2018 August 28, 2018
Date Received in FEMA Region 10	May 18, 2018	
Plan Not Approved		
Plan Approvable Pending Adoption	August 29, 2018	
Plan Approved	October 10, 2018	

SECTION 1:
REGULATION CHECKLIST

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
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 §201.6(c)(1))	See sections 1.2, 1.3, 1.4, 2 and 2.1 PDF 10	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	See section 2.1.1, 2.1.2 and 2.3 PDF 10-11	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	See section 2.2 and 2.3 PDF 12-13	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	See Table 1-1, section 2.4 PDF 14	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	See section 2.2, 2.3, 7.2, 7.3, and 7.4 PDF 70	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	See section 7.2 PDF 69	X	
ELEMENT A: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	See section 4.2 PDF 22-49	X	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	4.2.1 thru 4.2.4 PDF 22-49	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	sections 4.2.1 to 4.2.4) PDF 22-49	X	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	PDF 9	X	
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	See section 5 PDF 50-51	X	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Huslia does not participate in NFIP PDF 9	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	See section 6.1.3, Table 6-1 PDF 57	X	
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 §201.6(c)(3)(ii))	See Sections 6.2, 6.4, Tables 6-2 & 6-4 PDF 59-60	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	See Sections 6.2, 6.4, Tables 6-2 & 6-4	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	See section 5.1, Tables 5-1 and 5-3	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT C: REQUIRED REVISIONS			
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 6.1. Also P4-8, 4-11, 4-17 an 4-19	X	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 6.3 and Table 6-3 PDF 62	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 6.3, and Table 6-3	X	
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	See Appendix 4	X	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))		N/A	
ELEMENT E: REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

SECTION 2:
PLAN ASSESSMENT

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

Plan Strengths

- DHS- The plan was picked up by E&E after a sub caliber product was produced by Merdian. E&E immediately recognized the need for community involvement. Scheduled and conducted community meetings in order to get local ideas and buy-in.
- DHS- Attendance was high (32). Pictures of the meeting and items discussed are shown.
- DHS- The plan provides an easy to follow path to annual review. Simple questions that will provide information during the next update cycle.
- Planning team consists of residents, elected officials, and city council.
- Several external partners and stakeholders were invited to participate in the planning process including the health district, tribal council, schools district, and RurAL CAP.

Opportunities for Improvement

- Consider adding a column to the tables for the planning team and stakeholders to describe how each partner contributed to the planning process.
- The appendices of the plan should be looked over and reorganized. They appear to be out of order and contain many scanning error with upside-down images and poor image to text conversions.
- Consider developing a list of potential reoccurring events/activities that could be leveraged to engage the public more effectively than providing a draft document for comment.
- References to tables, maps, and sections

Element B: Hazard Identification and Risk Assessment

Plan Strengths and Opportunities for Improvement

Strengths:

- DHS – Plans covers all hazard elements and clearly states why three (volcano, avalanche and tsunami) are not profiled.
- DHS- Figure 4-3 is a good overall state map of permafrost but does little to show the Huslia area. Adding Figure 4-4 makes the both of them infinitely more useable.
- DHS – Figure 4-11 is a great visual depiction of land lost to erosion in less than a year. (July 17 to March 18).
- DHS – Included potential impacts from future climate conditions in risk assessment.
- The risk assessment section is organized well and contains concise information for each hazard.

- Where available, reports and findings on hazard information are documented.
- The impacts section for erosion, the identified primary hazard, has a thorough analysis of impacts and next steps.

Opportunities for Improvement

- Consider changing the description of the Historical Occurrences to be more focused on the damages and impacts from the event, rather than the size and duration of the event. This section is meant to provide a picture of what future occurrences could look like based on past events.

Element C: Mitigation Strategy
Plan Strengths

- The plan includes a list of problem statements
- A comprehensive range of mitigation actions are identified for all the hazards profiled.
- Action has been taken on several mitigation items. Consider adding an executive summary to the plan highlighting progress and mitigation successes.
- DHS- Within the 6.1.2 Problem Statement section it clearly states the city is in need of mitigation outreach. With the issues identified in the plan several needed mitigation projects can be scoped.
- DHS- Goal 7A is an opportunity for community outreach from DHS. Identified in the 2010 plan – the "Hazard meeting" was successful.

Opportunities for Improvement:

- It is challenging to determine which actions are brought forward from the old plan and which are new. Consider adding a column or using color coding to distinguish new actions from old.
- Consider a more detailed review for grammar, spelling, and other details in the final plan.

B. Resources for Implementing Your Approved Plan

The **Region 10 Integrating Natural Hazard Mitigation into Comprehensive Planning** is a resource specific to Region 10 states and provides examples of how communities are integrating natural hazard mitigation strategies into comprehensive planning. You can find it in the FEMA Library at http://www.fema.gov/media-library/assets/documents/89725.

The **Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials** resource provides practical guidance on how to incorporate risk reduction strategies into existing local plans, policies, codes, and programs that guide community development or redevelopment patterns. It includes recommended steps and tools to assist with local integration efforts, along with ideas for overcoming possible impediments, and presents a series of case studies to demonstrate successful integration in practice. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=7130.

The **Mitigation Ideas: A Resource for Reducing Risk from Natural Hazards** resource presents ideas for how to mitigate the impacts of different natural hazards, from drought and sea level rise, to severe winter weather and wildfire. The document also includes ideas for actions that communities can take to

reduce risk to multiple hazards, such as incorporating a hazard risk assessment into the local development review process. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=6938.

The **Local Mitigation Planning Handbook** provides guidance to local governments on developing or updating hazard mitigation plans to meet and go above the requirements. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=7209.

The **Integration Hazard Mitigation and Climate Adaptation Planning: Case Studies and Lessons Learned** resource is a 2014 ICLEI publication for San Diego with a clear methodology that could assist in next steps for integration impacts of climate change throughout mitigation actions. http://icleiusa.org/wp-content/uploads/2015/08/Integrating-Hazard-Mitigation-and-Climate-Adaptation-Planning.pdf

The **Local Mitigation Plan Review Guide and Tool** resource is available through FEMA's Library and should be referred to for the next plan update. http://www.fema.gov/library/viewRecord.do?id=4859

The **Tribal Multi-Hazard Mitigation Planning Guidance:** This resource is specific to tribal governments developing or updating tribal mitigation plans. It covers all aspects of tribal planning requirements and the steps to developing tribal mitigation plans. You can find the document in the FEMA Library at http://www.fema.gov/media-library/assets/documents/18355

National Fire Adapted Communities Learning Network

Volcanic Eruption Mitigation Measures: For information on Mitigation Actions for Volcanic Eruptions that would satisfy the C4 requirement, please visit: http://earthzine.org/2011/03/21/volcanic-crisis-management-and-mitigation-strategies-a-multi-risk-framework-case-study/ and http://www.gvess.org/publ.html.

The FEMA Region 10 **Risk Mapping, Analysis, and Planning program (Risk MAP)** releases a monthly newsletter that includes information about upcoming events and training opportunities, as well as hazard and risk related news from around the Region. Past newsletters can be viewed at http://www.starr-team.com/starr/RegionalWorkspaces/RegionX/Pages/default.aspx. If you would like to receive future newsletters, email rxnewsletter@starr-team.com and ask to be included.

The mitigation strategy may include eligible projects to be funded through FEMA's hazard mitigation grant programs (Pre-Disaster Mitigation, Hazard Mitigation Grant Program, Flood Mitigation Assistance). Contact your State Hazard Mitigation Officer, Brent Nichols at Brent.Nichols@alaska.gov, for more information.

Appendix 5 – USACE-CAP14-2015

December 31, 2015
Pacific Ocean Division
Pacific Ocean Alaska

HUSLIA EMERGENCY STREAMBANK AND SHORE PROTECTION
SECTION 14 PROJECT PRELIMINARY FACT SHEET

1. **Project:** Huslia Section 14 Emergency Streambank and Shore Protection

2. **Location of Project/Congressional Delegation:** Huslia, population 259, is on the north bank of the Koyukuk River, about 170 river miles northwest of Galena, 290 miles west of Fairbanks, and 370 miles northwest of Anchorage (Figure 1). Huslia is a 2nd class city in the unorganized borough and is within the Koyukuk National Wildlife Refuge. In 1949 Huslia relocated to its present location from approximately 16 miles upstream due to erosion and flooding problems.

   Senator Lisa Murkowski (R-AK)
   Senator Dan Sullivan (R-AK)
   Representative Don Young (R-AK, At-Large)

3. **Study Authority:** Section 14, Flood Control Act of 1946 (PL 79-526), as amended for emergency streambank and shoreline protection for public facilities and services.

4. **Study Purpose:** The purpose of this study is to identify problems and opportunities associated with providing riverbank protection at Huslia, Alaska, determine whether there is a Federal interest in implementing an emergency shoreline protection project within the community, and to identify a non-Federal sponsor willing and able to partner with the Corps of Engineers to develop the study and project.

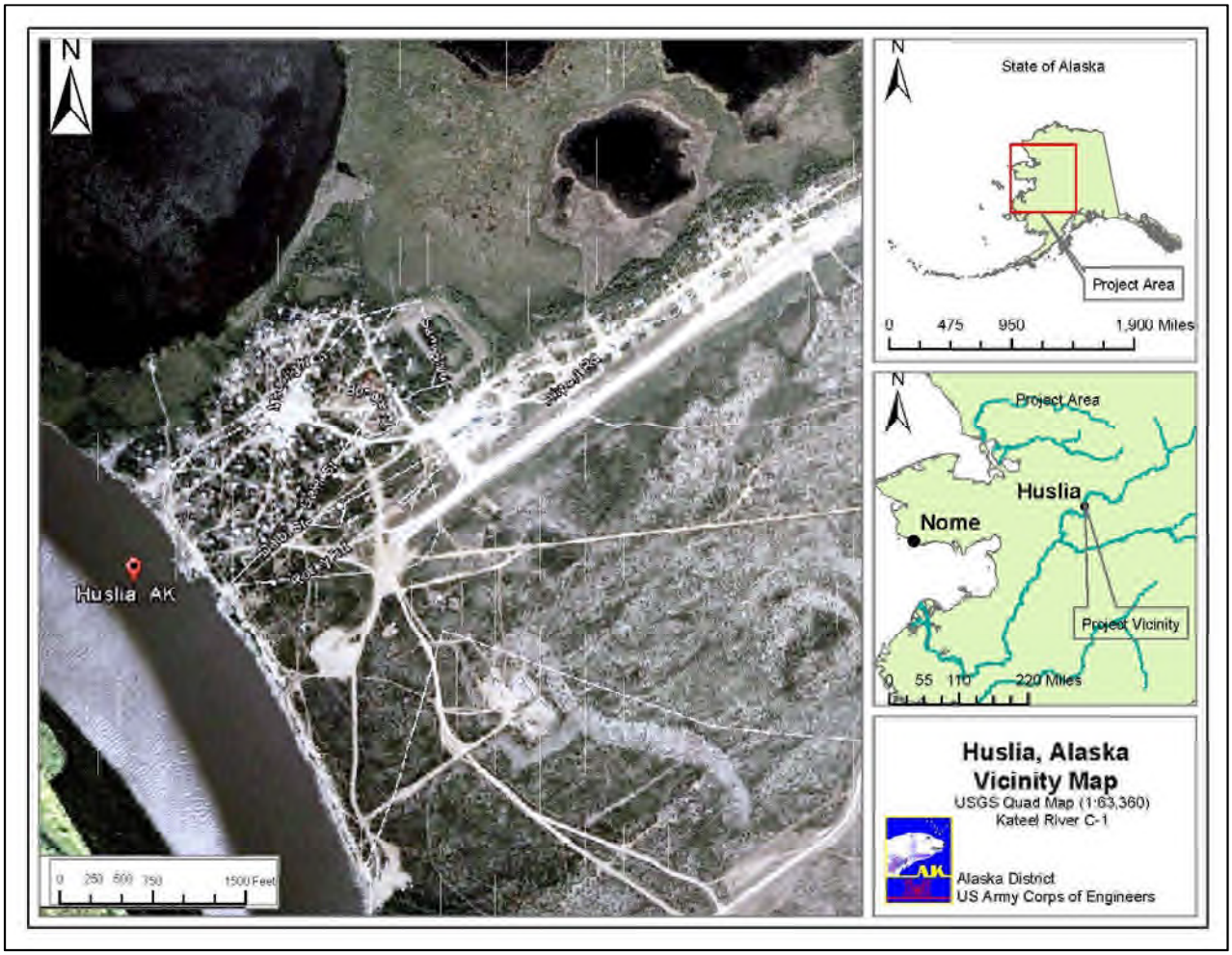

Figure 1: Project Area Map

5. Discussion of Prior Studies, Reports and Existing Water Projects:

Alaska Baseline Erosion Assessment – In this 2007 study Huslia was listed as a "Priority Action Community." The erosion study found "the most active erosion area is estimated to be 2,000 feet along the 70-foot-high riverbank. The community survey indicated the riverbank has been eroding at an estimated rate of 10 to 30 feet per year, but substantially greater rates have been reported during recent breakup flooding. The survey reported that the river eroded 2,000 feet of bank inland 60 feet in 2003, 100 feet in 2004, and 80 feet in 2005."

Huslia Denali Commission Information Paper – In 2011 the Corps of Engineers, Alaska District, under the authority of the Denali Commission, inspected Huslia's barge landing to evaluate its current status and impacts that erosion was having on it. The report concluded that the current barge landing facilities consist of a sand barge loading area that is constantly being eroded by the river. Each spring the loading area must be re-developed to allow use by incoming barges.

6. Plan Formulation

a. Identified Problems: Erosion problems in Huslia are reported to be caused primarily from riverine processes. Conditions causing or contributing to erosion include natural river flow, flooding,

ice jams, undercutting, spring break-up, wave action caused from boat traffic, vehicle traffic on the beach and the bank, and the loss of permafrost[1]. The river bank of the Koyukuk River at Huslia is characterized by a high bluff of fine sand. Bank erosion is primarily the result of riverine processes which transport material form the lower portion of the bank downriver. This causes slope stability failures in the upper bank and results in the steep bluff currently found at Huslia. As erosion continues, the top of the bluff retreats towards the community of Hulsia. Figure 2 shows the extent that erosion is expected to reach by 2065. This erosion would affect approximately 20 personal dwellings, roads, sewer and water lines, power, and buried telephone lines.

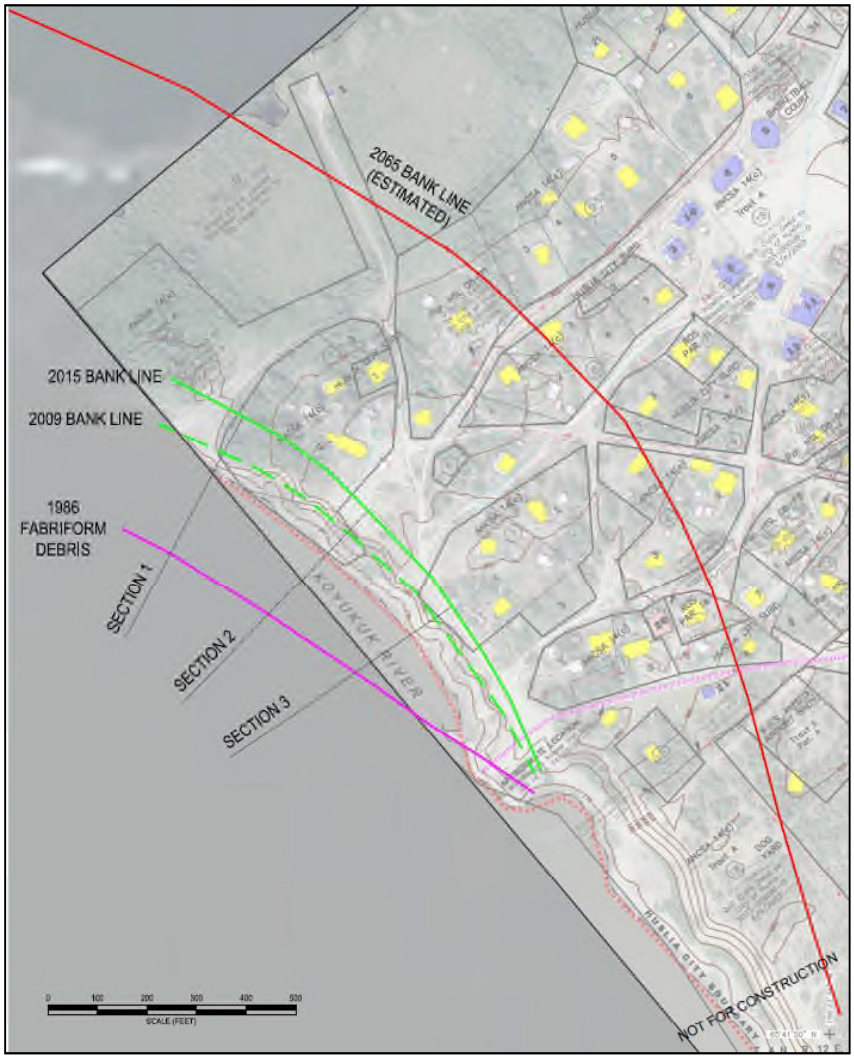

Figure 2: Projected 50 year erosion map[2]

- **Existing Conditions:** Huslia moved in 1949 from Old Town (a.k.a. Cutoff Trading Post), which was approximately 4 miles northwest overland (16 river miles upstream) from the current location. The community was previously located on swampy ground, which was prone to frequent flooding and erosion problems. The community's current location is on top of a bluff overlooking the Koyukuk River. The soil there is a highly erodible fine grain sand and silt mixture.

[1] Corps of Engineers, Alaska District, 2007 Baseline Erosion Assessment.
[2] Source: Imagery from State of Alaska Community Map (2009) and Digital Globe (2011).

In 1986, the State implemented an erosion prevention project, which included placing grout filled fabric matting on the embankment, in an attempt to stop or slow the erosion occurring on the river face of the community. The matting failed in 1987, when the river undercut the structure and the concrete matting slid into the river. The community now considers the failed matting a navigational hazard.

- **Expected Future Conditions:** Using historic information gathered from community members during a site visit, the erosion rate from the streambank was estimated to be 8.7 to 10.4 feet per year. This rate was estimated from the comparisons of 1986 and 2009 bank line photography. Assuming a 10 foot per year erosion rate following the previous year's trends, structures that are less than 500 feet from the active erosion area are in danger of failing from erosion by the year 2065 (Figure 2).

As a result of the active erosion conditions, the community of Huslia has already started reconstructing or relocating their endangered, damaged, and new structures away from the river's edge. The old runway is being re-zoned and utilized as new lots for construction (Figure 3).

Figure 3: Position of New and Old Runways

- **Planning Constraints & Planning Objectives:**

Constraints:

- Any solution should continue to allow the community to operate their boat loading and unloading operations both during and after construction.

Objectives:

- Reduce riverbank erosion occurring at Huslia, AK.
- Implement a project that will protect public facilities and facilities owned by non-profit organizations.

b. Alternative Plans: A number of alternatives were considered and included both structural and non-structural. The non-structural measures considered include relocating the endangered structures and infrastructure. Structural measures include a stone groin field alternative and a stone revetment with apron.

- **No Action Alternative:** Implementing the no action alternative would take no action to reduce bluff erosion at the river embankment. The study objective would not be met and no opportunity to reduce erosion would be realized. The bluff would continue to erode at approximately 10 feet per year. The community's infrastructure (i.e. streets, power lines, sewer and water system, phone lines, etc.) would be lost as the ground beneath them eroded.

- **Relocation of endangered structures and infrastructure:** The relocation of endangered structures and infrastructure alternative was an investigation into what public infrastructure (i.e. public buildings, telephone/power/sewer/water lines, roads…) would be damaged within a 50-year period and the cost it would take to relocate these to a non-threatened location.

In accordance with ER 1105-2-100, "the least cost alternative plan is considered to be justified if the total costs of the proposed alternative is less than the costs to relocate the threatened facility."

- **Stone groin alternative:** A groin field constructed from quarried stone would direct the thalweg of the river away from the bank and hold its location between a series of groins. To be effective, the groin field needs to cover the length of the river bend (Figure 4) from the point where the thalweg migrates to the left bank of the river through the area to be protected. Using shorter extents would subject the upstream groins to flanking, which would lead to progressive migration of the river past the shoreward ends of the groins. Groin spacing would range from 1.5 times the groin length to 3 times the groin length (estimated to be 300 feet) upstream of the area to be protected.

The groins would be constructed from stone quarried from a source approximately 10 miles from the community. Materials would be produced in the winter and hauled over ice roads and stockpiled near the community. Construction would occur in the summer, after breakup, using land based equipment. Construction access ramps from the top of the bank to the base of the groins would be cut at each site. These ramps would be filled with core rock to key in the groins.

Ice flow during breakup on the Koyukuk River is a concern. The ends of the groins would need to be armored to protect from maximum impact of ice flow. It is estimated that the nose of each groin would require 4,000-pound armor stones (A-rock) (Figure 5). The rest of the structure would be armored with a 4-foot layer of 700-pound riprap (B-rock) as shown by the cross section in Figure 6. The core of each groin would be constructed from rock spalls of 10 inches or less (Core material). Scour is expected to occur at the nose of each groin. To prevent a slope failure, the toe at the nose of each groin would include a 6-foot-thick launching section of B rock. As scour develops, the material from this layer would roll or launch down the slope of the groin to fill the hole with non-erodible material. Quantities required to

construct this alternative are shown in Table 1. This alternative is estimated to cost approximately $42.0 million.

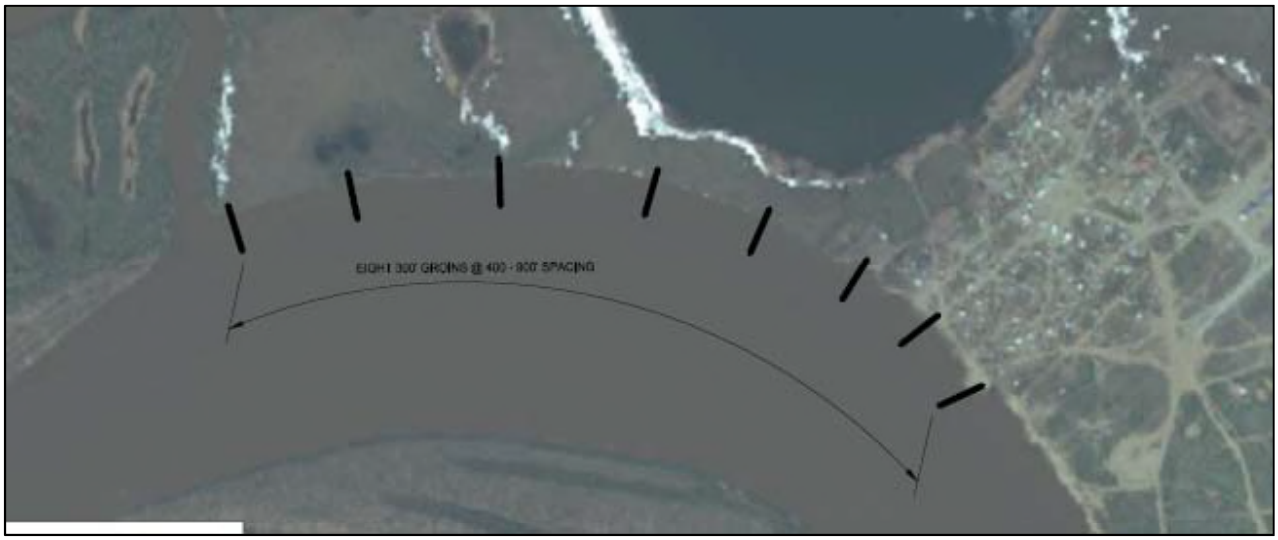

Figure 4: Groin layout and configuration

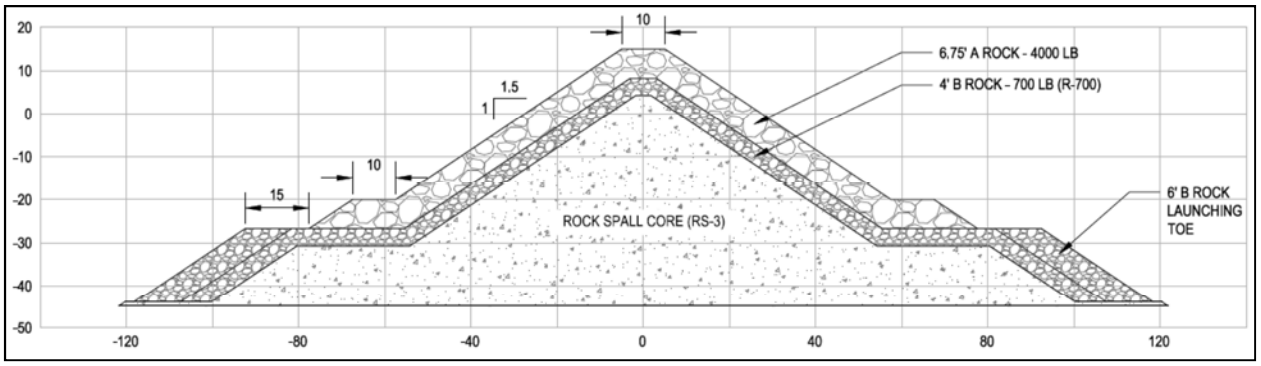

Figure 5: Groin Nose Section

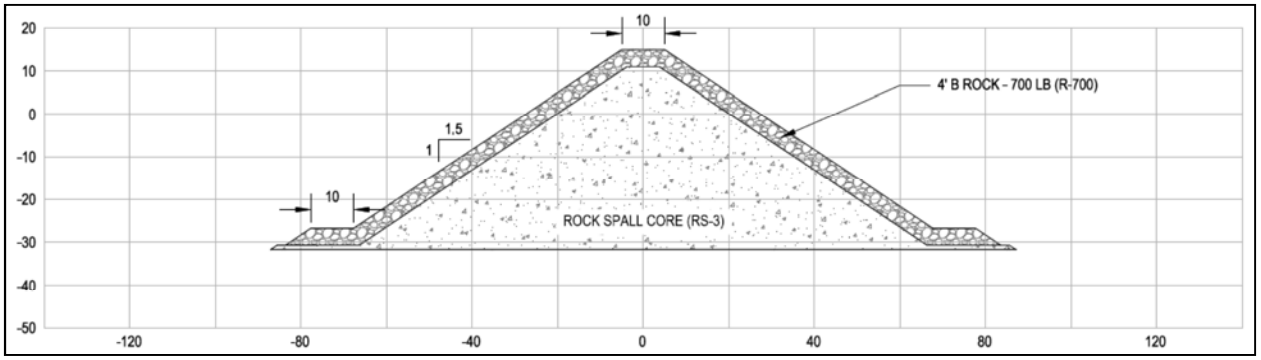

Figure 6: Groin Trunk Section

Table 1: Estimate of Material Quantities for Groin Construction

Material	Volume (CY)
A-Rock	40,000
B-Rock	88,000
C-Rock	328,000

- **Rock revetment with flanking apron alternative:** A revetment would armor the bank of Huslia from erosion. This alternative includes a 1,300 foot long revetment with a 550-foot-long flanking apron (Figure 7). The revetment would be constructed on a 2H:1V slope. The bank would be shaped to the current bluff slope by filling with rock spalls from the toe of the bank and placing B rock and A rock on top of the prepared slope. Rock gradations for this alternative are the same as for the groins (Figure 8).

While the extent of a revetment is smaller than a groin field, it is more susceptible to flanking and undermining. To prevent the revetment from being undermined, a flanking apron of B-Rock would be constructed on the upstream side of the revetment. The apron would be 12 feet thick and 150 feet wide. As the river erodes the bank upstream of the revetment, the apron would launch into the river creating a riprap protected slope (Figure 9). Quantities required to construct this alternative are shown in (Table 2). This alternative is estimated to cost $17.0 million.

Figure 7: Revetment layout

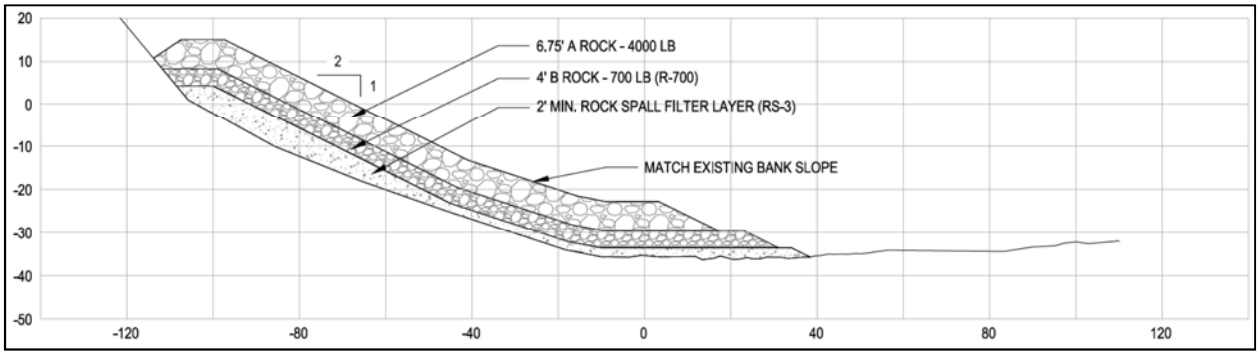

Figure 8: Revetment Section

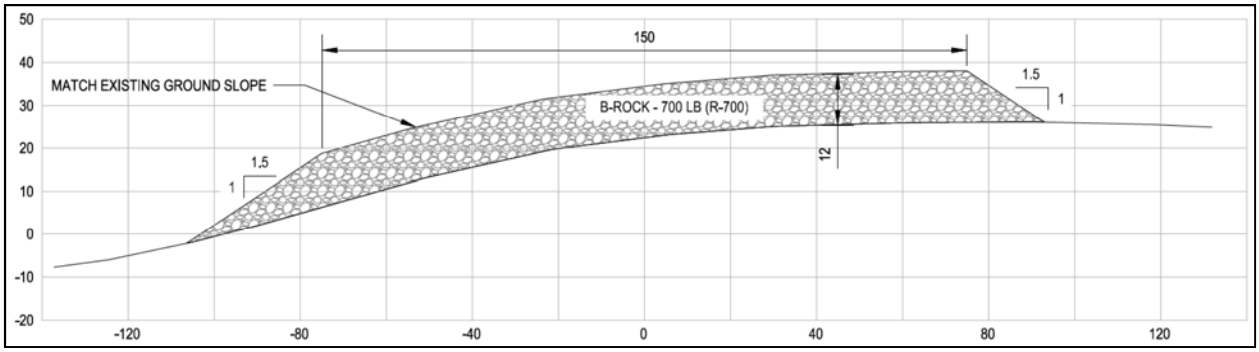

Figure 9: Flanking Apron Section

Table 2: Estimate of Material Quantities for Revetment Construction

Material	Volume (CY)
A-Rock	43,000
B-Rock	30,000
C-Rock	27,000
B-Rock Apron	45,000

c. Preliminary Cost Comparison of Alternatives:

- The cost of relocating the affected infrastructure would be $3,100,000 as compared to the cost of the embankment stabilization alternatives, which are anticipated to cost $42,000,000 for the groins, and $17,000,000 for the flanking apron

Feasibility Level Engineering Considerations:

Additional information would need to be investigated during the feasibility phase of the study in order to fully develop the alternatives to stop or slow the erosion occurring along the Huslia embankment. A feasibility level study includes data gathering efforts, design efforts, and planning efforts to produce more accurate information on which to base a decision to construct a project. The following summarizes activities that would be completed to formulate and compare engineering alternatives if a feasibility level investigation is found to have a Federal interest.

- **Site Survey:** A physical survey of the site would need to be performed to provide a basis for the design of the alternatives. The survey would need to include land and hydrographic elements that cover all expected construction impacts on the site. Topographic extents would need to include approximately 5,500

feet of the Koyukuk River at Huslia to cover the location of the groin field and approximately 1,500 feet to cover the revetment. The upland survey also would need to include the area around the flanking apron. The hydrographic survey would need to cover the river to approximately 700 feet from the toe of the bank for the same extents as the upland survey as well as five full cross sections of the river for hydraulic analysis of the site.

- **River Flow Analysis:** Stage and flow records of the Koyukuk River would need to be analyzed to determine expected maximum water levels and current velocities at the toe of the groins or revetment. Analysis would be performed with a HEC-RAS model to determine the effect of adding obstructions (groins) to the river geometry. A HEC-HMS model may also be required if insufficient gage records are available to determine design flows; in this case flows could be estimated with a simple hydrologic model using regional precipitation estimates.

- **Ice Analysis:** Ice may produce significant forces against a groin field or revetment. Ice forces would be developed by the ice engineering group at the Cold Regions Research and Engineering Laboratory (CRREL) to determine likely lateral loads on the structures during breakup events.

- **Stability and Foundation Analysis:** A geotechnical analysis of slope stability would be performed for each alternative to ensure the final slope geometry of the project meets minimum factors of safety criteria. Soil properties of the bluff and beach material would be determined either through a drilling program that produces physical samples of the site, which would be analyzed in a lab, or through research of existing geotechnical reports at Huslia for other projects. Specific criteria for filtering the native bank material and an estimate of structure settling would be incorporated into the design.

- **Plan, Profile, and Section Design:** A range of alternatives would be designed using criteria developed from the analysis tasks. Design efforts would include plan views of each alternative and typical sections, with critical details such as maintaining beach access to the Koyukuk River.

- **Construction Analysis:** Construction analysis would be based on a hypothetical plan to construct the alternatives that looks at material sources, construction methods, and temporary facilities needed to build the project. These assumptions would form the basis of a construction cost estimate, which would be generated for each alternative.

Environmental Feasibility Considerations:

- **National Environmental Policy Act (NEPA) –** The Corps of Engineers and the non-Federal sponsor would prepare an appropriate NEPA document, expected to be an environmental assessment (EA), containing the results of the analysis of the potential effects of each of the alternatives formulated. The village of Huslia lies within the boundaries of the U.S. Fish & Wildlife Service (USFWS) Koyukuk National Wildlife Refuge, so significant interest in the project should be expected. Since an Environmental Impact Statement (EIS) is not expected to be required, a formal scoping meeting is not required; however, scheduled community scoping meetings to discuss the project purpose and need and alternatives that achieve those objectives would be used to also discuss environmental concerns and obtain local information sufficient to complete the NEPA process.

- **Fish and Wildlife Coordination Act Report (FWCA) –** The Fish & Wildlife Coordination Act (FWCA) requires the Corps and the non-Federal sponsor to coordinate with the USFWS and the Alaska Department of Fish & Game (ADFG) in the planning of all water resource development projects. Deliverables associated with coordination under the FWCA may include (1) Planning Aid Letters that describe the project-specific issues and opportunities related to the conservation and enhancement of fish and wildlife resources, and (2) draft and final Fish and Wildlife Coordination Act Reports that provide the formal views of the Federal and State natural resource agencies on alternative plans. The cost estimate includes funding to the USFWS for their document preparation.

- **Endangered Species Act (ESA) –** Informal communication with the USFWS to date indicates that no threatened or endangered species are known to be present in or otherwise utilize the project area, and no critical habitat has been designated. Informal consultation with the USFWS would continue throughout project planning; preparation of a biological assessment and formal consultation with the USFWS under section 7(a)(2) of the Endangered Species Act (ESA) is not anticipated.

- **National Historic Preservation Act (NHPA) –** The goal of the NHPA Section 106 process is to identify and avoid, minimize, or mitigate adverse effects on historic properties. The process has four basic steps: establish the undertaking; identify and evaluate historic properties; assess effects to historic properties; and resolve any adverse effects. Coordination and review under section 106 of the National Historic Preservation Act with the State Historic Preservation Officer (SHPO), Native Tribe of Huslia, Huslia Tribal Council, K'oyitl'ots'ina, Ltd (tribal corporation), and any other identified potentially consulting parties, would be ongoing throughout project planning. However, due to the constant erosion of the river bank and the small area likely constituting the area of potential effect (APE), adverse effects on historic properties (any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places) is not anticipated. If such adverse effects are identified during the planning process, a Section 106 agreement document (Programmatic Agreement (PA), or Memoranda of Agreement (MOA)) would be negotiated and executed. The agreement document would identify the measures to be implemented to resolve those adverse effects through avoidance, minimization, or mitigation.

- **Clean Water Act (CWA) –** The Corps of Engineers does not issue itself permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. However, in accordance with the section 404(b)(1) Guidelines developed by the Administrator of the US Environmental Protection Agency (USEPA) and the Secretary of the Army acting through the Chief of Engineers, and as part of the NEPA process, the Corps of Engineers shall prepare an evaluation of the effects of proposed discharges of any dredged or fill materials into waters of the U.S., including the State waters of Alaska, and shall seek a Certificate of Reasonable Assurance IAW Section 401 of the Clean Water Act from the Alaska Department of Environmental Conservation (ADEC).

- **Anadromous Waters –** A review of the ADFG Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes indicates that the Koyukuk River supports some life functions of anadromous fish species (salmon, trout, char, whitefish, sturgeon, etc.). King and chum salmon are taken by gill nets, and a few pink and coho salmon and inconnu are harvested as well. As a result, the potential for adversely impacting important anadromous fish resources are likely to be a significant environmental consideration for this project.

The National Marine Fisheries Service (NMFS) considers freshwater salmon habitat to fall under its mandate to protect Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act.

- **State Lands and Waters –** While the Corps of Engineers has navigational servitude over all navigable waters pursuant to the Commerce Clause in the Constitution of the United States (including the Koyukuk River and its tributaries), the non-Federal sponsor does not. As a result, coordination with the Alaska Department of Natural Resources (DNR) would be necessary to conduct work within the river and for the removal of material from the river bed. The non-Federal sponsor would be responsible for obtaining all permits and/or easements from the DNR, if deemed necessary.

- **Existing Conditions Survey –** A pre-construction survey of the local river ecology, river bank vegetation, and water quality in the project area would be conducted.

Cost Estimate

Table 3: Alternative Cost Estimates

Alternative	Cost
Relocation	$3.1 Million
Rock revetment with flanking apron	$17 Million
Rubble mound groins	Approximately $42 Million

- **Relocation Costs:**

The relocation alternative considered the excavation and relocating of all underground utilities, including approximately 2,050 linear feet (lf) of sewer/water lines, 1,650 lf of underground electrical, and 950 lf of underground telephone lines, mob/demob of work equipment, real estate for displaced dwellings (approximately 20), and the shipping and re-installation of new utilities (assumed to be similar lengths of excavation).

- **Rock revetment with flanking apron:**

The rock revetment with flanking apron cost estimate is based off the design and layout depicted in Figures 7, 8, and 9. The quantities for this alternative are estimated to be A-Rock 43,000 CY; B-Rock 30,000 CY; C-Rock 27,000 CY; and Apron B-Rock 45,000C CY. This estimate also includes construction of an ice road to access and haul the rock and mob/demob of construction equipment.

- **Groin Field:**

The groin-field estimate is based off the design and configuration depicted in Figures 4, 5, and 6. The groin-field design alternative would utilize approximately three times the amount of rock as the rock revetment with flanking apron, and is approximately three time the cost as the flanking apron alternative.

7. Federal Interest:

The least cost alternative plan is considered to be justified if the total cost of the proposed alternative is less than the cost to relocate the threatened facilities (ER 1105-2-100(F-23)(d). The least cost alternative for protection in place is $17 million, while the relocation cost is estimated to be $3.1 million. Therefore, there is no Federal interest in pursuing a Feasibility Study at this time.

8. Study Phase Schedule:
Not applicable, due to no Federal Interest.

9. Recommendations:
Further study under the Continuing Authorities Program, Section 14 is not recommended. The cost of relocating the threatened facilities and infrastructure is less costly than protecting it in place.

10. Views of the Sponsor:
The Huslia Tribe has received notification of the Corps of Engineers findings and has accepted the results of this investigation.

11. Project Area Map: See Figure 1 on Page 1.

12. Feasibility Phase Study Cost Estimate:
Not applicable, due to no Federal Interest.

Appendix 6 – RurAL CAP Weatherization Program Sheets

Appendix 7 – Mitigation Planning Requirements and Authorities

A-7.1 Mitigation Plan Requirements

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), Title 42 of the United States Code 5121 et seq. Section 322, provides the legal basis for FEMA mitigation plan requirements as a precondition for receiving FEMA mitigation project grants. The Disaster Mitigation Act of 2000 (DMA 2000), Title 44 of the Code of Federal Regulations (CFR), Part 201, amends the Stafford act by establishing mitigation planning requirements that emphasize the need for State, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts. Other state, regional and national programs may also reference the community's HMP as a funding condition.

The following topics provide requirement descriptions, including the CFR section (§) of the DMA 2000 authorizing the requirement. The following topics also cross-reference to those sections within the HMP that document how each requirement has been satisfied.

A-7.2 Planning Process Requirements

For the HMP to be approved by FEMA it must document the planning process including how it was prepared and who was involved in the process (DMA 2000 §201.6(c)(1)). The plan is required to document how the public was involved in the planning process during the drafting stage (DMA 2000 §201.6(b)(1)), and how neighboring communities, local and regional agencies with development authority, and other key stakeholders were provided the opportunity to be involved in the planning process (DMA 2000 §201.6(b)(2)). Section 2.1.2 provides a list of those agencies and other effected stakeholders that were contacted during the development of this HMP Update. Section 2.2 describes the public involvement process.

The HMP is required to describe how other existing plans, studies, reports and technical information were reviewed and incorporated into the plan document (DMA 2000 §201.6(b)(3)). Section 2.3 describes what other planning and studies were referenced and used by the Planning Team during the update of this HMP. Maintenance of the HMP must also be documented, including a description of how it will be monitored, evaluated, and updated within a 5-year cycle with continued public input (DMA 2000 §201.6(c)(4)(iii)), and how the public will continue to be participants in the process (DMA 2000 §201.6(c)(4)(i)). Section 2.4 provides details on how this HMP will be maintained.

A-7.3 Hazard Identification and Risk Assessment Requirements

The HMP is required to provide a description of the type, location, and extent of all natural hazards that can affect the community (DMA 2000 §201.6(c)(2)(i)), and include information about previous occurrences and the probability of future hazard events (DMA 2000 §201.6(c)(2)(i)). Section **Error! Reference source not found.**, beginning on page **Error! Bookmark not defined.**, lists natural hazards and identifies those that pose significant risk to the community. Section **Error! Reference source not found.**, beginning on page **Error! Bookmark not defined.** provides necessary detail about the hazards representing risk to the community.

A description of the impact of each of the identified hazards, as well as an overall summary of the community's vulnerability to the hazards must also be described in the HMP (DMA 2000 §201.6(c)(2)(ii)). Section **Error! Reference source not found.** beginning on page **Error! Bookmark not defined.** describes the specific impacts and the community's vulnerability to

identified hazards. Where applicable the HMP addresses NFIP insured structures within the community that have been subject to repetitive damage (DMA 2000 §201.6(c)(2)(ii)); however, the community of Huslia does not have NFIP insured structures.

A-7.4 Mitigation Strategy Requirements

The HMP is required to document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs (DMA 2000 §201.6(c)(3)). Section 5.3 describes the community's capacity for maintaining and expanding its policies and programs to implement their hazard mitigation strategy. It must also address the community's participation in and compliance with the National Flood Insurance Program (NFIP) (DMA 2000 §201.6(c)(3)(ii)). Huslia does not participate in the NFIP.

The HMP must include goals to reduce and/or avoid long term vulnerabilities to identified hazards(DMA 2000 §201.6(c)(3)(i)), with analysis of a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure (DMA 2000 §201.6(c)(3)(ii)). The HMP includes goals meeting the DMA 2000 (Section **Error! Reference source not found.**), and a comprehensive range of specific mitigation actions (Sections **Error! Reference source not found.** and **Error! Reference source not found.**). The actions identified need to be part of an action plan that describes how the actions will be prioritized (including cost benefit review), implemented, and administered by the community (DMA 2000 §201.6(c)(3)(iv)); (DMA 2000 §201.6(c)(3)(iii)) are found in Section 6.4.

In Section **Error! Reference source not found.** beginning on page **Error! Bookmark not defined.** the HMP describes the process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate (DMA 2000 §201.6(c)(4)(ii)).

A-7.5 Plan Maintenance - Review, Evaluation, and Implementation Requirements

As the community develops and mitigation efforts are implemented, the HMP must be revised to reflect developments within the community (DMA 2000 §201.6(d)(3)). **Error! Reference source not found.**, illustrates the progress made on the previous Mitigation Action Plan. Over time the community's mitigation priorities will change to reflect progress in local mitigation efforts and the HMP must reflect these changes (DMA 2000 §201.6(d)(3)). The HMP revised Mitigation Action Plan is presented in **Error! Reference source not found.**, beginning on page **Error! Bookmark not defined.**. The change in the community's priorities must be reflected in updates to the HMP (DMA 2000 §201.6(d)(3)). These are listed in **Error! Reference source not found.** beginning on page **Error! Bookmark not defined.**.

It is recommended that the community update their HMP annually, including public involvement. A formal update process, including review and approval of the HMP, is required every 5 years in order for the community to be eligible for certain FEMA program grants.

A-7.6 Plan Adoption Requirements

The State of Alaska and FEMA will review the HMP and subsequent updates to the HMP every 5 years. Following State and FEMA review and approval the community must formally adopt the HMP, documenting how the community's governing body has adopted the HMP (DMA 2000 §201.6(c)(5)). For multi-jurisdictional plans, each jurisdiction that requests approval of the plan,

there must be documentation of each jurisdictions formal adoption of the plan (DMA 2000 §201.6(c)(5)). Once the HMP has been adopted by the community it can then receive final approval by FEMA. Section **Error! Reference source not found.** beginning on page **Error! Bookmark not defined.** describes how the local governing bodies have formally adopted this HMP Update.

This HMP Update includes in the front matter the Mitigation Plan Review Tool that's been provided as a guide for developing this HMP Update and that will be used by the State of Alaska and FEMA for approving this HMP. The Mitigation Plan Review Tool indicates where within the HMP that plan review and adoption requirements have been demonstrated and documented.

A-7.7 Hazard Mitigation Assistance (HMA) Programs

FEMA's Hazard Mitigation Assistance (HMA) Guidance introduces three primary programs that provide funding for eligible mitigation planning and mitigation projects to reduce disaster losses and to protect life and property from future disaster damages. The three HMA programs are the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and the Pre-Disaster Mitigation (PDM) Program. The application cycles for these programs are announced via http://www.grants.gov/.

- HMGP assists in implementing long-term hazard mitigation planning and projects following a Presidential major disaster declaration
- PDM provides funds for hazard mitigation planning and projects on an annual basis
- FMA provides funds for planning and projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis. FMA facilitates Severe Repetitive Loss (SRL) and Repetitive Flood Claim (RFC) programs

The HMA grant programs provide funding to States, Tribes, and local entities that have a FEMA-approved State, Tribal, or Local Hazard Mitigation Plan. The HMGP and the PDM grants are authorized under the Stafford Act and DMA 2000, while the FMA is authorized under the National Flood Insurance Act. The HMGP is a directly funded competitive disaster grant program. The PDM and FMA programs, also competitive, rely on specific pre-disaster grant funding sources, sharing several common elements. Each of the HMA programs has a percentage of Federal/non-Federal cost-share requirements.

Huslia is not a participant in the NFIP and may not be eligible for grant funding through FMA programs.

FEMA has issued several policies that facilitate the mitigation of adverse effects from climate change on the built environment, structures and infrastructure. Recognizing that the risk of disaster is increasing because of multiple factors, including the growth of population in and near high-risk areas, aging infrastructure, and climate change, FEMA promotes climate change adaptation as discussed in Section 0.

A-7.8 Hazard Mitigation Grant Program – HMGP

HMGP is authorized by Section 404 of the Stafford Act, 42 U.S.C. 5170c, and is available, when authorized under a Presidential major disaster declaration requested by the Governor. Federally-

recognized tribes may also submit a request for a Presidential major disaster declaration within their impacted areas (http://www.fema.gov/media-library/assets/documents/85146).

The HMGP provides grants to States, Tribes, and local entities to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster.

Projects must provide a long-term solution to a problem, for example, elevation of a home to reduce the risk of flood damages as opposed to buying sandbags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The amount of HMGP funding available to the Applicant is based on the estimated total Federal assistance, subject to the sliding scale formula outlined in Title 44 of the Code of Federal Regulations (CFR) Section 206.432(b) that FEMA provides for disaster recovery under Presidential major disaster declarations.

A-7.9 Pre-disaster Mitigation – PDM

The PDM program provides funds to State, Tribes, and local entities, including universities, for hazard mitigation planning and mitigation project implementation prior to a disaster event. PDM grants are awarded on a nationally competitive basis. Like HMGP funding, a PDM project's potential savings must be more than the cost of implementing the project. In addition, funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The total amount of PDM funding available is appropriated by Congress on an annual basis.

A-7.10 Flood Mitigation Assistance – FMA

The goal of the FMA grant program is to reduce or eliminate flood insurance claims under the NFIP. Particular emphasis for this program is placed on mitigating repetitive (RL) properties. The primary source of funding for this program is the National Flood Insurance Fund. Grant funding is available for three types of grants, including Planning, Project, and Technical Assistance. Project grants, which use the majority of the program's total funding, are awarded to States, Tribes, and local entities to apply mitigation measures to reduce flood losses to properties insured under the NFIP.

The SRL and RFC programs under FMA program provides funding to reduce or eliminate the long-term risk of flood damage to residential structures insured under the NFIP, and the RFC program provides funding to reduce or eliminate the long-term flood damage risk to residential and nonresidential structures insured under the NFIP. Up to $10 million is available annually to assist States and communities with reducing flood damages to structures which have had one or more claim payments for flood damages. All RFC grants are eligible for up to 100 percent Federal assistance.

A-7.11 HMA Commitment to Resilience and Climate Change Adaptation

Recognizing that the risk of disaster is increasing as a result of multiple factors, including the growth of population in and near high-risk areas, aging infrastructure, and climate change, FEMA promotes climate change adaptation by acknowledging the challenges posed by climate change, including more intense storms, frequent heavy precipitation, heat waves, drought,

extreme flooding, and higher sea levels. These phenomena may have impacts on mitigation, preparedness, response, and recovery operations as well as the resiliency of critical infrastructure and various emergency assets. FEMA encourages recipients and subrecipients to consider climate change adaptation and resiliency in their planning and scoping efforts (FEMA, FY15 Hazard Mitigation Assistance (HMA) Guidance, 2015).

This HMA recognizes climate change as a contributing factor in considering the magnitude and frequency of several of the hazards profiled. The mitigation strategy developed for the community includes monitoring climate changes as a contributor to erosion, flooding, severe weather events, permafrost degradation/subsidence, wildfire, and drought.

Appendix 8 – Photographic Documentation

IMG_0415.jpg	Date: 3/10/2018	Time: 16:16	Direction: Northwest

Foundation of building removed from eroding streambank of the Kuskokwim River.

IMG_0420.jpg	Date: 3/10/2018	Time: 16:30	Direction: East

New construction on the Jimmy Huntington School.

IMG_0423.jpg	Date: 3/10/2018	Time: 16:31	Direction: North

New construction on the Jimmy Huntington School.

IMG_0424.jpg	Date: 3/10/2018	Time: 16:32	Direction: South

Huslia Water Treatment Facility.

APPENDIX A:
LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: City of Huslia	**Title of Plan:** Hazard Mitigation Plan	**Date of Plan:** 2018
Local Point of Contact: Elsie Vent	**Address:** City of Huslia / ADMINISTRATION P.O. Box 10 58 Dakli St. Huslia, AK 99746	
Title: City Administrator		
Agency: City of Huslia		
Phone Number: (907) 829-2266	**E-Mail:** elsiesv@gci.net	

State Reviewer:	**Title:**	**Date:**
Mike Johnson	Hazard Mitigation Planner	05/14/2018

FEMA Reviewer:	**Title:**	**Date:**
Amanda Siok Amanda.Siok@fema.dhs.gov Kate Skaggs Kate.Skaggs@mbakerintl.com	Mitigation Planning Lead Mitigation Champion	July 3, 2018 August 28, 2018
Date Received in FEMA Region 10	May 18, 2018	
Plan Not Approved		
Plan Approvable Pending Adoption	August 29, 2018	
Plan Approved	October 10, 2018	

SECTION 1:
REGULATION CHECKLIST

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
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 §201.6(c)(1))	See sections 1.2, 1.3, 1.4, 2 and 2.1 PDF 10	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	See section 2.1.1, 2.1.2 and 2.3 PDF 10-11	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	See section 2.2 and 2.3 PDF 12-13	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	See Table 1-1, section 2.4 PDF 14	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	See section 2.2, 2.3, 7.2, 7.3, and 7.4 PDF 70	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	See section 7.2 PDF 69	X	
ELEMENT A: REQUIRED REVISIONS			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	See section 4.2 PDF 22-49	X	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	4.2.1 thru 4.2.4 PDF 22-49	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	sections 4.2.1 to 4.2.4) PDF 22-49	X	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	PDF 9	X	
ELEMENT B: REQUIRED REVISIONS			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	See section 5 PDF 50-51	X	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Huslia does not participate in NFIP PDF 9	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	See section 6.1.3, Table 6-1 PDF 57	X	
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 §201.6(c)(3)(ii))	See Sections 6.2, 6.4, Tables 6-2 & 6-4 PDF 59-60	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	See Sections 6.2, 6.4, Tables 6-2 & 6-4	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	See section 5.1, Tables 5-1 and 5-3	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT C: REQUIRED REVISIONS			
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 6.1. Also P4-8, 4-11, 4-17 an 4-19	X	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 6.3 and Table 6-3 PDF 62	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 6.3, and Table 6-3	X	
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	See Appendix 4	X	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))		N/A	
ELEMENT E: REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

SECTION 2:
PLAN ASSESSMENT

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

Plan Strengths

- DHS- The plan was picked up by E&E after a sub caliber product was produced by Merdian. E&E immediately recognized the need for community involvement. Scheduled and conducted community meetings in order to get local ideas and buy-in.
- DHS- Attendance was high (32). Pictures of the meeting and items discussed are shown.
- DHS- The plan provides an easy to follow path to annual review. Simple questions that will provide information during the next update cycle.
- Planning team consists of residents, elected officials, and city council.
- Several external partners and stakeholders were invited to participate in the planning process including the health district, tribal council, schools district, and RurAL CAP.

Opportunities for Improvement

- Consider adding a column to the tables for the planning team and stakeholders to describe how each partner contributed to the planning process.
- The appendices of the plan should be looked over and reorganized. They appear to be out of order and contain many scanning error with upside-down images and poor image to text conversions.
- Consider developing a list of potential reoccurring events/activities that could be leveraged to engage the public more effectively than providing a draft document for comment.
- References to tables, maps, and sections

Element B: Hazard Identification and Risk Assessment

Plan Strengths and Opportunities for Improvement

Strengths:

- DHS – Plans covers all hazard elements and clearly states why three (volcano, avalanche and tsunami) are not profiled.
- DHS- Figure 4-3 is a good overall state map of permafrost but does little to show the Huslia area. Adding Figure 4-4 makes the both of them infinitely more useable.
- DHS – Figure 4-11 is a great visual depiction of land lost to erosion in less than a year. (July 17 to March 18).
- DHS – Included potential impacts from future climate conditions in risk assessment.
- The risk assessment section is organized well and contains concise information for each hazard.

- Where available, reports and findings on hazard information are documented.
- The impacts section for erosion, the identified primary hazard, has a thorough analysis of impacts and next steps.

Opportunities for Improvement

- Consider changing the description of the Historical Occurrences to be more focused on the damages and impacts from the event, rather than the size and duration of the event. This section is meant to provide a picture of what future occurrences could look like based on past events.

Element C: Mitigation Strategy
Plan Strengths

- The plan includes a list of problem statements
- A comprehensive range of mitigation actions are identified for all the hazards profiled.
- Action has been taken on several mitigation items. Consider adding an executive summary to the plan highlighting progress and mitigation successes.
- DHS- Within the 6.1.2 Problem Statement section it clearly states the city is in need of mitigation outreach. With the issues identified in the plan several needed mitigation projects can be scoped.
- DHS- Goal 7A is an opportunity for community outreach from DHS. Identified in the 2010 plan – the "Hazard meeting" was successful.

Opportunities for Improvement:

- It is challenging to determine which actions are brought forward from the old plan and which are new. Consider adding a column or using color coding to distinguish new actions from old.
- Consider a more detailed review for grammar, spelling, and other details in the final plan.

B. Resources for Implementing Your Approved Plan

The **Region 10 Integrating Natural Hazard Mitigation into Comprehensive Planning** is a resource specific to Region 10 states and provides examples of how communities are integrating natural hazard mitigation strategies into comprehensive planning. You can find it in the FEMA Library at http://www.fema.gov/media-library/assets/documents/89725.

The **Integrating Hazard Mitigation Into Local Planning: Case Studies and Tools for Community Officials** resource provides practical guidance on how to incorporate risk reduction strategies into existing local plans, policies, codes, and programs that guide community development or redevelopment patterns. It includes recommended steps and tools to assist with local integration efforts, along with ideas for overcoming possible impediments, and presents a series of case studies to demonstrate successful integration in practice. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=7130.

The **Mitigation Ideas: A Resource for Reducing Risk from Natural Hazards** resource presents ideas for how to mitigate the impacts of different natural hazards, from drought and sea level rise, to severe winter weather and wildfire. The document also includes ideas for actions that communities can take to

reduce risk to multiple hazards, such as incorporating a hazard risk assessment into the local development review process. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=6938.

The **Local Mitigation Planning Handbook** provides guidance to local governments on developing or updating hazard mitigation plans to meet and go above the requirements. You can find it in the FEMA Library at http://www.fema.gov/library/viewRecord.do?id=7209.

The **Integration Hazard Mitigation and Climate Adaptation Planning: Case Studies and Lessons Learned** resource is a 2014 ICLEI publication for San Diego with a clear methodology that could assist in next steps for integration impacts of climate change throughout mitigation actions. http://icleiusa.org/wp-content/uploads/2015/08/Integrating-Hazard-Mitigation-and-Climate-Adaptation-Planning.pdf

The **Local Mitigation Plan Review Guide and Tool** resource is available through FEMA's Library and should be referred to for the next plan update. http://www.fema.gov/library/viewRecord.do?id=4859

The **Tribal Multi-Hazard Mitigation Planning Guidance:** This resource is specific to tribal governments developing or updating tribal mitigation plans. It covers all aspects of tribal planning requirements and the steps to developing tribal mitigation plans. You can find the document in the FEMA Library at http://www.fema.gov/media-library/assets/documents/18355

National Fire Adapted Communities Learning Network

Volcanic Eruption Mitigation Measures: For information on Mitigation Actions for Volcanic Eruptions that would satisfy the C4 requirement, please visit: http://earthzine.org/2011/03/21/volcanic-crisis-management-and-mitigation-strategies-a-multi-risk-framework-case-study/ and http://www.gvess.org/publ.html.

The FEMA Region 10 **Risk Mapping, Analysis, and Planning program (Risk MAP)** releases a monthly newsletter that includes information about upcoming events and training opportunities, as well as hazard and risk related news from around the Region. Past newsletters can be viewed at http://www.starr-team.com/starr/RegionalWorkspaces/RegionX/Pages/default.aspx. If you would like to receive future newsletters, email rxnewsletter@starr-team.com and ask to be included.

The mitigation strategy may include eligible projects to be funded through FEMA's hazard mitigation grant programs (Pre-Disaster Mitigation, Hazard Mitigation Grant Program, Flood Mitigation Assistance). Contact your State Hazard Mitigation Officer, Brent Nichols at Brent.Nichols@alaska.gov, for more information.