SECTION 4. PLAN MAINTENANCE

Annual Review and Updates to the Plan

The Plan will be reviewed annually by each of the major jurisdictions that have adopted the Plan. It will be evaluated to determine the effectiveness of mitigation programs, projects, or other related activities and changed accordingly. As new hazard threats arise, or mitigation data becomes available, it will be incorporated into the Plan. Each adopting jurisdiction is responsible for the section of the Plan that refers to its jurisdiction and to provide written changes, if any, annually to Whatcom County DEM prior to each annual public meeting.

Note: Each participating jurisdiction is responsible for monitoring and performing an annual review of their proposed 2021 to 2025 hazard specific action items. Instructions are found in the Annual Review and Progress Report of their Community Profile.

By adopting the Plan, jurisdictions will notify the Whatcom County DEM of status updates regarding assets, mitigation planning, or general updates that occur during the 5-year cycle for the subsequent Plan update. If necessary, a public meeting will be held with representatives of the adopting jurisdictions present to answer any questions or concerns regarding their section of the Plan. Public notices will be posted to invite public participation in the process.

The County will use this plan as a resource in its planning efforts with other planning endeavors such as the Whatcom County Development Standards, and the Comprehensive Flood Hazard Management Plan, as well as the Comprehensive Emergency Management Plan. Local participating political jurisdictions will update Whatcom County DEM to any changes in how they integrated the plan into their capital improvement plans or comprehensive planning efforts during the 5-year cycle for the subsequent Plan update.

A written report containing a summary of any changes based on annual reviews will be produced by the DEM and sent to the WSHMO following each annual review. The annual reviews by each jurisdiction and the public meeting will conclude by November 30 each year. The DEM will facilitate the review process.

Major Plan Update and Plan Reviews

A major update to the Plan will be performed and published every 5 years. It will contain all changes in strategy, identified hazards, and project updates, and will incorporate new data as it relates to the Plan. The public will also be involved in this process through public meetings coordinated by the DEM. A copy of the updated Plan will be delivered to the WSHMO for approval and forwarding to FEMA, Region X. All the jurisdictions that have adopted the Plan within Whatcom County will receive a copy of the updated Plan once it is approved.

As changes are made to other plans, the plan will be used to review them for consistency, and changes will be incorporated into other plans as necessitated by review and update of this plan.

The next 5-year update will be delivered to the WSHMO within 30 days following December 31, 2025.

Date	Product
August 2021	First annual review/update
August 2022	Second annual review/update
August 2023	Third annual review/update
August 2024	Fourth annual review/update
January thru December 2025	Major Plan Update and resubmission

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SECTION 5: APPENDICES

Appendix A: Capabilities Identification

Appendix B: List of Acronyms and Abbreviations

Appendix C: Whatcom County Risk Assessment & Mitigation Strategies for Wildland Fire

Appendix D: National Flood Insurance Program Participation (NFIP)

Appendix E: Whatcom County Mitigation Ideas

Appendix F: Mitigation Action Progress Report Form

Appendix G: Whatcom County Contact List

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APPENDIX A: CAPABILITIES IDENTIFICATION

Types of Capabilities

The ability of a jurisdiction to develop an effective hazard mitigation plan depends upon its capability to implement policy and programs which is dependent on the type of jurisdiction. This ability comes from the different types of capabilities a jurisdiction maintains. The FEMA 386 publication describes a capability assessment and outlines the types of capabilities that should be considered:

- Legal and Regulatory
- Administrative and Technical
- Fiscal

Legal and regulatory capabilities refer to the laws, regulations, authorities, and policies that govern current and potential mitigation measures. This can be broken down into two basic areas, local and extra-local. Local are those generated by the local governing agency that the jurisdiction has control over. Extra-local laws, regulations, etc. are those from a different level of government. Administrative and technical capabilities refer to a jurisdiction's staff and technical resources, as well as completed plans and studies that have considered, directly or indirectly, the mitigation of natural hazards. Technical capabilities also include the existing electronic and systemic resources. Fiscal capabilities refer to the financial resources available to achieve the identified mitigation strategies.

For the organizational purposes of this plan, administrative capabilities are organizations, agencies or departments responsible for implementing or partnering to implement mitigation measures. The fiscal capabilities at the City level are thus correlated to the budgets and expenditures of these departments as well as the separate funds available for mitigation-related activities. For special purpose districts, fiscal capabilities center on levies, contracts, and grants.

For the purposes of this Plan the 10 jurisdictions have been placed into three categories or groups of jurisdictions: Cities/Towns, School Districts, and Special Purpose Districts.

Additionally, there are **State and Federal Capabilities.** These are the regulations that dictate what a specified jurisdiction in Washington can and cannot pursue with regards to mitigation, as well as what assistance may be available. They essentially cover the same 4 capability areas that are covered in local capabilities: **Legal and Regulatory, Administrative**, **Technical,** and **Fiscal.**

Extra-Local Fiscal Resources

One of the key issues in implementing mitigation measures is finding sufficient monetary resources to do it. Fiscal resources in the form of grants are available to jurisdictions in pursuing hazard reduction activities. Grants may be administered from the federal or state level, and in some instances may be administered by the private or non-profit sector. Each grant has specific requirements and uses varying elements to conduct benefit-cost analysis. The purpose of the benefit-cost analysis is to determine if the benefits of the project exceed the costs of the project. Jurisdictions should coordinate with the administering agency to understand the program-specific requirements and conduct the required analyses.

For example, if either Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation (PDM) funding is involved in a hazard mitigation project, the jurisdiction involved will conduct a benefit-cost analysis based on guidelines provided by U.S. Department of Homeland Security, FEMA, and Washington Emergency Management Division on how to determine cost-effectiveness of mitigation projects and how to calculate the benefit-cost ratio. Both the HMGP and PDM require a benefit-cost ratio of at least 1.0 for a project to be considered for funding.

Contained on the following pages are some of the major federal resources that currently may be used to secure funding to pursue implementation of mitigation measures. In addition, there is a list of State agencies that have mitigation capabilities and, in some cases, have funds that can assist with mitigation projects. Because the funding source, available funding, requirements, and type and number of grants is constantly changing, this assessment will outline neither all potential grants nor the detailed requirements of those grants that are mentioned. The websites listed here were accessed and confirmed just prior to the finalization of this document.

Federal Capabilities

The Federal Emergency Management Agency's (FEMA) Mitigation Grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages. Currently, FEMA administers the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) program, and the Pre-Disaster Mitigation (PDM) program, the Repetitive Flood Claims (RFC) program, and the Severe Repetitive Loss (SRL) program.

FEMA's mitigation grants are provided to eligible Applicant States/Tribes/Territories that, in turn, provide sub-grants to local governments. The Applicant selects and prioritizes applications developed and submitted to them by local jurisdictions to submit to FEMA for grant funds.

Prospective Sub-applicants should consult the official designated point of contact for their Applicant State/Tribe/Territory for further information regarding specific program and application requirements.

For more information on the mitigation grant programs, see below:

Pre-Disaster Mitigation Grant Program (PDM)

http://www.fema.gov/pre-disaster-mitigation-grant-program

The PDM program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

Hazard Mitigation Grant Program (HMGP)

http://www.fema.gov/hazard-mitigation-grant-program-hmgp

The HMGP provides grants to States and local governments 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. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

Flood Mitigation Assistance (FMA) Program

http://www.fema.gov/flood-mitigation-assistance-program

The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FEMA provides FMA funds to assist States and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program.

Repetitive Flood Claims Program (RFC)

http://www.fema.gov/repetitive-flood-claims-program

The RFC grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al). Up to $10 million is available annually for FEMA to provide RFC

funds to assist States and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP).

Severe Repetitive Loss Program (SRL)

http://www.fema.gov/severe-repetitive-loss-program

The SRL grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP).

The definition of severe repetitive loss as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended (NFIA), 42 U.S.C. 4102a. An SRL property is defined as a **residential property** that is covered under an NFIP flood insurance policy and: (a) That has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or (b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building. For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart.

AFGP Fire Prevention & Safety Grants (DHS)

www.fema.gov/firegrants/fpsgrants/index.shtm

The Fire Prevention and Safety Grants (FP&S) are part of the Assistance to Firefighters Grants (AFG) and are under the purview of the Grant Programs Directorate in the Federal Emergency Management Agency. FP&S grants support projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to target high-risk populations and mitigate high incidences of death and injury. Examples of the types of projects supported by FP&S include fire prevention and public safety education campaigns, juvenile firesetter interventions, media campaigns, and arson prevention and awareness programs. In fiscal year 2005, Congress reauthorized funding for FP&S and expanded the eligible uses of funds to include Firefighter Safety Research and Development.

Fire Prevention and Safety Grants

http://www.firegrantshelp.com/search-grants/453560-fire-prevention-and-safety-fp-s- grants/

FP&S offers grants to support activities in two categories:

- activities designed to reach high-risk target groups and mitigate incidences of death and injuries caused by fire and fire-related hazards (“Fire Prevention and Safety Activity”);
- research and development activities aimed at improving firefighter safety (“Firefighter Safety Research and Development Activity”).

Buffer Zone Protection Program (BZPP)

http://www.dhs.gov/files/programs/gc_1265397547397.shtm

BZPP provides grants to build security and risk-management capabilities at the State and local level in order to secure pre-designated Tier I and Tier II critical infrastructure sites, including chemical facilities, financial institutions, nuclear and electric power plants, dams, stadiums, and other high-risk/high-consequence facilities.

Community Development Block Grants (CDBG)

http://www.hud.gov/offices/cpd/communitydevelopment/programs/

These grants are a source of funding for hazard mitigation initiatives. The objective of the CDBG program is to assist communities in rehabilitating substandard dwelling structures and to expand economic opportunities, primarily for low-to-moderate-income families. Following a Presidential declared disaster, CDBG funds may be used for long-term needs such as acquisition, reconstruction, and redevelopment of disaster-affected areas.

Disaster Preparedness and Response for Schools and Universities

http://www.edfacilities.org/rl/disaster.cfm

National Clearinghouse for Educational Facilities (NCEF's) resource list of links, books, and journal articles on building or retrofitting schools to withstand natural disasters and terrorism, developing emergency preparedness plans, and using school buildings to shelter community members during emergencies.

Emergency Management Program Grants (EMPG)

http://www.fema.gov/non-disaster-grant-management-system

The EMPG program provides resources to assist State and local governments to sustain and enhance all-hazards emergency management capabilities. States have the opportunity to use EMPG funds to further strengthen their ability to support emergency management activities while simultaneously addressing issues of national concern as identified in the National Priorities of the National Preparedness Guidelines. EMPG has a 50 percent Federal and 50 percent State cost-share cash or in-kind match requirement.

Environmental Protection Agency's National Estuary Program

http://www.epa.gov/nep/

The EPA's National Estuary Program was established by Congress in 1987 to improve the quality of estuaries of national importance. The Clean Water Act Section 320 directs EPA to develop plans for attaining or maintaining water quality in an estuary. This includes protection of public

water supplies and the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife, and allows recreational activities, in and on water, requires that control of point and nonpoint sources of pollution to supplement existing controls of pollution. In several cases, more than one State is participating in a National Estuary Program. Each program establishes a Comprehensive Conservation and Management Plan to meet the goals of Section 320.

Hazardous Materials Emergency Preparedness (HMEP) Grant Program

http://hazmat.dot.gov/training/state/hmep/hmep.htm

The Hazardous Materials Emergency Preparedness (HMEP) grant program is intended to provide financial and technical assistance as well as national direction and guidance to enhance State, Territorial, Tribal, and local hazardous materials emergency planning and training. The HMEP Grant Program distributes fees collected from shippers and carriers of hazardous materials to emergency responders for hazmat training and to Local Emergency Planning Committees (LEPCs) for hazmat planning.

Homeland Security Grant Program

http://www.fema.gov/government/grant/hsgp/index.shtm

This core assistance program provides funds to build capabilities at the State and local levels through planning, organization, equipment, training, and exercise activities. State Homeland Security Program (SHSP) also supports the implementation of State homeland security strategies and key elements of the national preparedness architecture, including the National Preparedness Guidelines, the National Incident Management System and the National Response Framework.

The Homeland Security Grant Program (HSGP) plays an important role in the implementation of Presidential Policy Directive – 8 (PPD-8) by supporting the development and sustainment of core capabilities to fulfill the National Preparedness Goal (NPG). HSGP is comprised of three interconnected grant programs:

- State Homeland Security Program (SHSP)
- Urban Areas Security Initiative (UASI)
- Operation Stonegarden (OPSG)

Together, these grant programs fund a range of preparedness activities, including planning, organization, equipment purchase, training, exercises, and management and administration.

National Earthquake Hazards Reduction Program

http://www.nehrp.gov/index.htm

The National Earthquake Hazards Reduction Program (NEHRP) was established by the U.S. Congress when it passed the Earthquake Hazards Reduction Act of 1977, Public Law (PL) 95–124. At the time of its creation, Congress' stated purpose for NEHRP was "to reduce the risks of life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program." In establishing NEHRP, Congress recognized that earthquake-related losses could be reduced through improved design and construction methods and practices, land use controls and redevelopment, prediction techniques and early-warning systems, coordinated emergency preparedness plans, and public education and involvement programs.

National Weather Service

http://www.weather.gov/

The National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.

Port Security Grant Program (PSGP)

http://www.fema.gov/port-security-grant-program

The PSGP provides grant funding to port areas for the protection of critical port infrastructure from terrorism. PSGP funds help ports enhance their risk management capabilities, domain awareness, training and exercises, and capabilities to prevent, detect, respond to, and recover from attacks involving improvised explosive devices and other non-conventional weapons.

Urban Areas Security Initiative Nonprofit Security Grant Program

http://www.fema.gov/preparedness-non-disaster-grants/urban-areas-security-initiative-nonprofit-security-grant-program

Nonprofit Security Grants Program (NSGP) provides funding support for target hardening and other physical security enhancements and activities to nonprofit organizations that are at high risk of a terrorist attack and located within one of the specific FY 2012 UASI-eligible urban areas. The FY 2012 NSGP plays an important role in the implementation of the Presidential Policy Directive – 8 by supporting the development and sustainment of core capabilities to fulfill the National Preparedness Goal.

Problem Solving Partnerships Grant Program (COPS)

http://www.cops.usdoj.gov/

The COPS Office has distributed over $12 billion to advance community policing since it was created in 1994. This funding supports a wide range of activities. COPS funding helps local law

enforcement agencies hire, equip, and train new community policing professionals. COPS funding helps redeploy existing officers into their communities and studies ways to maximize the impact they have on the people who live there. COPS funds a wide variety of strategies to advance community policing through innovative techniques and technologies.

Transit Security Grant Program

http://www.fema.gov/transit-security-grant-program

TSGP provides funds to owners and operators of transit systems (which include intracity bus, commuter bus, ferries, and all forms of passenger rail) to protect critical surface transportation infrastructure and the traveling public from acts of terrorism and to increase the resilience of transit infrastructure. The TSGP plays an important role in the implementation of PPD-8 by supporting the development and sustainment of core capabilities to fulfill the National Preparedness Goal (NPG).

Rural Development-Housing & Community Facilities Programs

http://www.rurdev.usda.gov/rhs/cf/brief_cp_grant.htm

Community Programs provides grants to assist in the development of essential community facilities in rural areas and towns of up to 20,000 in population. Grants are authorized on a graduated scale. Applicants located in small communities with low populations and low incomes will receive a higher percentage of grants. Grants are available to public entities such as municipalities, counties, and special-purpose districts, as well as non-profit corporations and tribal governments.

Grant funds may be used to assist in the development of essential community facilities. Grant funds can be used to construct, enlarge, or improve community facilities for health care, public safety, and community and public services. This can include the purchase of equipment required for a facility's operation. A grant may be made in combination with other Community Facilities financial assistance such as a direct or guaranteed loan, applicant contributions, or loans and grants from other sources.

Volunteers in Police Service (VIPS) Program

http://www.policevolunteers.org/

The VIPS Program provides support and resources for agencies interested in developing or enhancing a volunteer program and for citizens who wish to volunteer their time and skills with a community law enforcement agency. The program's ultimate goal is to enhance the capacity of state and local law enforcement to utilize volunteers.

Western Regional Climate Action Initiative

http://www.westernclimateinitiative.org/

The Western Climate Initiative (WCI) is a collaboration which was launched in February 2007 by the Governors of Arizona, California, New Mexico, Oregon and Washington to develop regional strategies to address climate change. WCI is identifying, evaluating and implementing collective and cooperative ways to reduce greenhouse gases in the region.

State Capabilities

Various law and rules have been identified in Washington State as supporting hazard mitigation. These can be found in Revised Code of Washington (RCW) and Washington Administrative Code (WAC). Washington State Constitution further identifies who does what and the basic rights in the State.

Various State of Washington State Agencies/Departments have mitigation capabilities:

- Community, Trade, Economic Development http://www.cted.wa.gov/
- Department of Fish and Wildlife http://wdfw.wa.gov/
- Department of Ecology http://www.ecy.wa.gov/ Department of Labor and Industries http://www.lni.wa.gov/
- Department of Natural Resource http://www.dnr.wa.gov/
- Department of Transportation http://www.wsdot.wa.gov/
- Governor's Office http://www.governor.wa.gov/
- Military Department (Emergency Management Division) http://www.emd.wa.gov/
- Office of Superintendent of Public Instruction http://www.k12.wa.us/
- Washington State Patrol http://www.wsp.wa.gov/

Other various capabilities in Washington State:

- Association of Washington Cities http://www.awcnet.org/
- Association of Washington Counties http://www.wacounties.org/
- Cascade Land Conservancy http://www.cascadeland.org/
- Municipal Research of Washington http://www.mrsc.org/
- Structural Engineers Association of Washington http://www.seaw.org/
- WA Association of Building Officials http://wabo.org/
- WA Association of Fire Chiefs http://www.wsafc.org/

- WA Association of Maintenance & Operations Administrators http://www.wamoa.org/
- WA Association of Sheriffs & Police Chiefs http://www.waspc.org/
- WA Emergency Management Association http://www.wsema.com/
- WA Firefighter Association http://www.wsffa.org/
- WA Fire Commissioners Association http://www.wfca.wa.gov/default.asp
- Washington Public Ports Administration http://www.washingtonports.org/
- Washington Schools Risk Management Pool http://www.wsrmp.com/

Local Capabilities

Each of the 10 individual jurisdictions has extensive local capabilities in their individual documents. Any websites associated with these local capabilities will be found within the 10 jurisdictions' addenda.

Mitigation Tools	Yes/No	Comments
Jurisdictional Capabilities		
Comprehensive Plan	Yes	
Capital Facilities Element	Yes	
Environmental & Critical Areas Element	Yes	
Land Use Element	Yes	
County Code	Yes	
Building/Fire Code	Yes	
Critical Areas	Yes	
Shoreline Regulations	Yes	
Zoning	Yes	
Critical Areas Regulations	Yes	
Flood Hazards	Yes	
Administrative Tools		
County Executive (elected official)	Yes	
County Council (elected officials)	Yes	
Planning & Land Services	Yes	
Board of Adjustment/Hearing Examiner	Yes	
Commercial Fire Safety/Code Inspection	Yes	
Regional Capabilities		
Hazard Mitigation Planning Team	Yes	
Local Business Districts	Yes	
Local Emergency Management	Yes	
Local Fire Agencies	Yes	

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APPENDIX B: LIST OF ACRONYMS AND ABBREVIATIONS

ACS	Auxiliary Communications Service
AFG	Assistance to Firefighters Grants
AHAB	All Hazard Alert Broadcast Siren
APA	Approval Pending Adoption
AWIA	America's Water infrastructure Act of 2018
BBWARM	Birch Bay area of Whatcom County Stormwater Program
B.C.	British Columbia
BCT	Bellingham Cruise Terminal
BFD	Bellingham Fire Department
BLI	Bellingham International Airport
BMC	Bellingham Municipal Code
BMC	Blaine Municipal Code
BST	Bellingham Shipping Terminal
BZPP	Buffer Zone Protection Program
Cascades	The Cascade Range
CDBG	Community Development Block Grants
CDS	Community Development Services
CEMP	Comprehensive Emergency Management Plan
CERT	Community Emergency Response Team
CFHMP	Comprehensive Flood Hazard Management Plan
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
COSMOS	Coastal Storm Modeling Systems
CRS	Community Rating System
CSZ	Cascadia Subduction Zone
CTP	Cooperating Technical Partners
CWPP	Community Wildfire Protection Plan
DMA	Disaster Mitigation Act of 2000
DEM	Division of Emergency Management
EF	Essential Facility
EIS	Environmental Impact Statement
EMD	Emergency Management Division
EMPG	Emergency Management Program Grants
EOC	Emergency Operations Center
EPA	Environmental Protection Agency

E&PS	Environmental and Planning Services
FCZD	Flood Control Zone District
FEMA	Federal Emergency Management Agency
FERN	Ferndale Emergency Response Network
FIPS	Federal Information Processing Standards
FLIP	Floodplain Integrated Planning Process
FMA	Flood Mitigation Assistance
FMC	Ferndale Municipal Code
FP&S	Fire Prevention and Safety Grants
FR	Federal Regulation
GIS	Geographic Information Systems
GMA	Growth Management Act
HIVA	Hazard Identification and Vulnerability Analysis
HMF	Hazardous Materials Facility
HMF	Hazard Mitigation Forum
HMEP	Hazardous Materials Emergency Preparedness Grants Program
HMGP	Hazard Mitigation Grant Program
HPL	High Potential Loss
HSGP	Homeland Security Grant Program
I-5	Interstate 5
IBC	International Building Code
ICC	International Code Council
ICT	Interagency Coordination Team
IFPL	Industrial Fire Precaution Level
IPAWS	Integrated Public Alert and Warning System
IRC	International Residential Code
KGMI	Emergency Alert System Station 790 AM
LAMIRD	Limited Area of More Intense Rural Development
LF	Linear Feet
LFD	Lynden Fire Department
LiDAR	Light Detection and Ranging
LUS	Lifeline Utility System
MAR	Managed Aquifer Recharge
MLLW	Mean Lower Low Water
MMI	Modified Mercalli Intensity Scale
MOST	Method of Splitting Tsunami
mph	miles per hour

MU	Multiple Hazards
NAD	North American Datum of 1983
NEHRP	National Earthquake Hazard Reduction Program
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NHMP	Natural Hazards Mitigation Plan
NOA	Naturally Occurring Asbestos
NOAA	National Oceanic and Atmospheric Association
NPDES	National Pollutant Discharge Elimination System
NPG	National Preparedness Goal
NTHMP	National Tsunami Hazard Mitigation Program
NW	Northwest
NWAC	Northwest Avalanche Center
NWS	National Weather Service
OEM	Office of Emergency Management
OFM	Office of Financial Management
OHV	Off Highway Vehicle
OPSG	Operation Stonegarden
PDM	Pre-Disaster Mitigation
PL	Public Law
Plan	Whatcom County Natural Hazards Mitigation Plan
PSE	Puget Sound Energy
PSGP	Port Security Grant Program
PUD	Public Utility District
PW	Public Works
RAMS	Risk Assessment and Mitigation Strategy
RCW	Revised Code of Washington
RFL	Repetitive Flood Loss Property
SCSMAP	Swift Creek Sediment Management Action Plan
SHMO	State Hazard Mitigation Officer
SHSP	State Homeland Security Program
SLIP	Streamline Landslide Mapping Protocol
SRL	Severe Repetative Loss Program
SR	State Route
SWIF	System-Wide Improvement Framework
TIME	Tsunami Inundation Mapping Effort
TSGP	Transit Security Grant Program

UASI	Urban Areas Security Initiative
UGA	Urban Growth Area
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USGS	U.S. Geological Society
VMC	Volunteer Mobilization Center
WABO	Washington Association Building Officials
WAC	Washington Administrative Code
WCI	Western Climate Initiative
WCNHMP	Whatcom County Natural Hazard Mitigation Plan
WCSO	Whatcom County Sheriff's Office
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WGS	Washington Geological Survey
WPSAPS	Wildfire Prevention Spatial Assessment and Planning Strategies
WSCP	Water Shortage Contingency Plan
WSDOT	Washington State Department of Transportation
WTA	Whatcom Transportation Authority
WSHMO	Washington State Hazard Mitigation Officer
WUI	Wildland/Urban Interface

APPENDIX C: WHATCOM COUNTY RISK ASSESSMENT & MITIGATION STRATEGIES FOR WILDLAND FIRE

This Assessment has been prepared for the Whatcom County using the Risk Assessment and Mitigation Strategies (RAMS) planning process. RAMS was developed for fire managers to be a holistic approach to analyzing wildland FUELS, HAZARD, RISK, VALUE, and SUPPRESSION CAPABILITY. It considers the effects of fire on unit ecosystems by taking a coordinated approach to planning at a landscape level and allows users to develop fire prevention and/or fuels treatments programs.

The steps involved in this process include:

- Identification of spatial Compartments for study
- Fire Management Zone 37 = Whatcom County
- Assessment of significant issues within each Compartment

Compartment 13: 37653 Part 1

Compartment 13 contains 295,228 acres in Fire Management Zone 37. The Compartment experiences 4.00 fires per year, totaling 5 acres. The characteristics of the compartment indicate that: Catastrophic Fire Likely.

Fuels Hazard characteristics are rated:

- Fuels (flame length produced): 8 + Feet (High)
- Crowning Potential: 0 - 2 (Low)
- Slope Percent: 0 - 20 (Low)
- Aspect: North (Low)
- Elevation: 0 - 3500 (High)

Protection Capability ratings are:

- Initial Attack: 21 - 30 minutes (Moderate)
- Suppression Complexity: Average (Moderate)

Ignition Risk factors include:

- Population Density - Wildland Urban Interface
  - 1001+ Dwellings/structures

- Power Lines In Unit
  - Sub-station
  - Distribution Lines
  - Transmission Lines

- Industrial Operations
  - Active timber sale
  - Maintenance/service contracts
  - Mining
  - Debris/slash burning
  - Construction project

- Recreation
  - Dispersed camping areas, party areas, hunters, water based, hiking
  - Off highway vehicle use
  - Developed camping areas

- Flammables Present
  - Powder magazine
  - Gas pumps or storage
  - Gas or oil wells/transmission

- Other
  - Woodcutting area, power equipment
  - Dump
  - Fireworks, children with matches
  - Electronic installations
  - Shooting/target
  - Government operations
  - Cultural Activities
  - Incendiary

- Railroads
  - Railroads are present

- Transportation System
  - Public Access Road(s)
  - County road(s)
  - State/Federal highway(s)

- Commercial Development
  - Camps, resorts, stables
  - Schools
  - Business, agricultural/ranching

Compartment 13: 37653 Part II

Compartment Values are characterized:

- Recreation: Developed recreation site within or adjacent to area **(High)**
- Administrative: High value or numerous administrative sites **(High)**
- Wildlife/Fisheries: Highly significant habitat **(High)**
- Range Use: Range allotment within area, normal/average use **(Moderate)**
- Watershed: Stream Class PI, I. Important water use/riparian area. Domestic water use **(High)**
- Forest/Woodland: Standing timber/woodland on 26 - 50% of area **(Moderate)**
- Plantations: 15% or less of area in or programmed for plantations **(Low)**
- Private Property: High loss and threat potential due to numbers and placement **(High)**
- Cultural Resources: Archaeological/historical findings of high significance **(High)**
- Special Interest Areas: Area is adjacent to a Special Interest area **(Moderate)**
- Visual Resources: Maximum modification dominates **(Low)**
- T&E Species: Species present **(High)**
- Soils (Erosion): Low significance (EHR < 4) **(Low)**
- Airshed: High receptor sensitivity **(High)**
- Vegetation: Potential for sensitive plants **(Moderate)**

Compartment 14: 37656 Part I

Compartment 14 contains 360,471 acres in Fire Management Zone 37. The Compartment experiences 8.00 fires per year, totaling 98 acres. The characteristics of the compartment indicate that: Catastrophic Fire Likely.

Fuels Hazard characteristics are rated:

- Fuels (flame length produced): 8 + Feet **(High)**
- Crowning Potential: 6 + **(High)**
- Slope Percent: 21 - 35 **(Moderate)**
- Aspect: North **(Low)**
- Elevation: 0 - 3500 **(High)**

Protection Capability ratings are:

- Initial Attack: 31+ minutes **(High)**
- Suppression Complexity: Complex **(High)**

Ignition Risk factors include:

- Population Density - Wildland Urban Interface
  - 1001+ Dwellings/structures
- Power Lines In Unit

  - Transmission Lines
  - Distribution Lines
  - Sub-station
- Industrial Operations
  - Active timber sale
  - Construction project
  - Debris/slash burning
  - Mining
  - Maintenance/service contracts
- Recreation
  - Dispersed camping areas, party areas, hunters, waterbased, hiking
  - Developed camping areas
  - Off highway vehicle use
- Flammables Present
  - Powder magazine
  - Gas or oil wells/transmission
  - Gas pumps or storage
- Other
  - Fireworks, children with matches
  - Electronic installations
  - Woodcutting area, power equipment
  - Shooting/target
  - Government operations
  - Incendiary
  - Cultural Activities
  - Dump
- Railroads
  - Railroads are present
- Transportation System
  - State/Federal highway(s)
  - County road(s)
  - Public Access Road(s)
- Commercial Development
  - Schools
  - Camps, resorts, stables
  - Business, agricultural/ranching

Compartment 14: 37656 Part II

Compartment Values are characterized:

- Recreation: Developed recreation site within or adjacent to area **(High)**
- Administrative: High value or numerous administrative sites **(High)**

- Wildlife/Fisheries: Highly significant habitat **(High)**
- Range Use: Range allotment within area, normal/average use **(Moderate)**
- Watershed: Stream Class PI, I. Important water use/riparian area. Domestic water use. **(High)**
- Forest/Woodland: Standing timber/woodland on 51+% of area **(High)**
- Plantations: 31+% or less of area in or programmed for plantations **(High)**
- Private Property: High loss and threat potential due to numbers and placement **(High)**
- Cultural Resources: Archaeological/historical findings of high significance **(High)**
- Special Interest Areas: Area is adjacent to a Special Interest area **(Moderate)**
- Visual Resources: Partially retain existing character **(Moderate)**
- T&E Species: Species present **(High)**
- Soils (Erosion): Moderately erodible (EHR 4-12) **(Moderate)**
- Airshed: High receptor sensitivity **(High)**
- Vegetation: Potential for sensitive plants **(Moderate)**

Compartment 15: 37658 Part I

Compartment 15 contains 948,133 acres in Fire Management Zone 37. The Compartment experiences 1.00 fires per year, totaling 6 acres. The characteristics of the compartment indicate that: Catastrophic Fire Possible.

Fuels Hazard characteristics are rated:

- Fuels (flame length produced): 8 + Feet (High)
- Crowning Potential: 3 - 5 (Moderate)
- Slope Percent: 36 + (High)
- Aspect: South (High)
- Elevation: 5001 + (Low)

Protection Capability ratings are:

- Initial Attack: 31+ minutes (High)
- Suppression Complexity: Simple (Low)

Ignition Risk factors include:

- Population Density - Wildland Urban Interface
  - 501-1000 Dwellings/structures
- Power Lines In Unit
  - Transmission Lines
  - Sub-station
  - Distribution Lines

- Industrial Operations
  - Debris/slash burning
  - Mining
  - Construction project
  - Active timber sale
  - Maintenance/service contracts
- Recreation
  - Dispersed camping areas, party areas, hunters, waterbased, hiking
  - Developed camping areas
  - Off highway vehicle use
- Flammables Present
  - Powder magazine
  - Gas or oil wells/transmission
  - Gas pumps or storage
- Other
  - Electronic installations
  - Fireworks, children with matches
  - Woodcutting area, power equipment
  - Shooting/target
  - Government operations
  - Incendiary
  - Cultural Activities
  - Dump
- Railroads
  - Railroads are present
- Transportation System
  - State/Federal highway(s)
  - Public Access Road(s)
  - County road(s)
- Commercial Development
  - Schools
  - Camps, resorts, stables
  - Business, agricultural/ranching

Compartment 15: 37658 Part II

Compartment Values are characterized:

- Recreation: Developed recreation site within or adjacent to area **(High)**
- Administrative:

Few or no administrative sites **(Low)**

- Wildlife/Fisheries: Highly significant habitat **(High)**
- Range Use: Little or no range use **(Low)**
- Watershed: Stream Class PI, I. Important water use/riparian area. Domestic water use **(High)**
- Forest/Woodland: Standing timber/woodland on 51+% of area **(High)**
- Plantations: 16 - 30% or less of area in or programmed for plantations **(Moderate)**
- Private Property: Little or no threat or loss potential **(Low)**
- Cultural Resources: Minimal archaeological/historical findings, potential for Native American use **(Moderate)**
- Special Interest Areas: Area is adjacent to a Special Interest area **(Moderate)**
- Visual Resources: Preserve and retain existing character **(High)**
- T&E Species: Species present. (High)
- Soils (Erosion): Moderately erodible (EHR 4-12) **(Moderate)**
- Airshed: Low receptor sensitivity (Low)
- Vegetation: Potential for sensitive plants **(Moderate)**

APPENDIX D: NATIONAL FLOOD INSURANCE PROGRAM PARTICIPATION (NFIP)

F1-WHATCOM COUNTY National Flood Insurance Program Participation

Topic	Considerations	Where to find Information	Answer
Insurance Summary	How many NFIP policies are in the community? What is the total premium and coverage?	CRS Floodplain Specialist ISO, Community Hazard Mitigation	994 policies in force $224,779,300.00 insurance in force 17 repetitive loss properties 7 mitigated properties. The Repetitive Loss Structures in Whatcom are residential. This is based off the 2018 Washington State Repetitive Loss Record from the State Mitigation Strategist at the Washington Emergency Management Division. There may currently be different Repetitive Loss structure types located in Whatcom, but the 2018 Repetitive Loss Record is the best available data.
	How many claims have been paid in the community? What is the total amount of paid claims?	CRS Floodplain Specialist ISO, Community Hazard Mitigation	307 paid losses $3,712,362.59 total losses paid

Topic	Considerations	Where to find Information	Answer
	How many of the claims were for substantial damage?		24 sub. damage claims since 1977
	Number of Structures exposed to flood risk within the community	Community Floodplain Administrator (FPA)	Approx. 5,043 Assessor parcels with improvement values (or structures) as of last map update (2019) plus new construction to date - we do not have the ability to do a precise structure count per parcel.
	Describe any areas of flood risk with limited NFIP policy coverage	Community FPA & FEMA Insurance Specialist	There is good coverage within the mapped floodplain areas. However, areas that could get damage due to flood events outside of the mapped floodplain (alluvial fan and channel migration zone areas)
Staff Resources	Does the community have a dedicated Floodplain Manager or NFIP Coordinator?	Community FPA	Yes
	Is floodplain management an auxiliary duty?		No
	Is there a Certified Floodplain Manager on Staff?		Yes there are 2 CFM's currently on staff
	Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections,		Education and outreach includes an annual flood newsletter, , annual repetitive

Topic	Considerations	Where to find Information	Answer
	engineering capability)		loss mailing, annual letter to Insurance/Local Realtors/Lenders regarding flood insurance. Administrative includes: Floodplain inquiries, permit review, GIS education, comprehensive flood planning, and flood hazard reduction.
	What are the barriers to running an effective NFIP program in the community, if any?		Limited resources due to budget constraints and competing priorities
Compliance History	Is the community in good standing with the NFIP?	• State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes
	Are there any outstanding compliance issues (i.e., current violations)?		No
	When was the most recent Community Assistance Visit (VAC) or Community Assistance Contact (CAC)?		Last CAV was closed on 12/4/2017
Regulation	When did the community enter the NFIP?	• Community Status Book http://www.fema.gov/fema/cs b.shtm	09/30/1977 regular entry
	When did the community's Flood Insurance Rate Maps (FIRMS) become effective?		September 30, 1977
	Are the FIRMS digital or paper?	• Community FPA, State or FEMA NFIP Specialists	Paper and digital (DFIRM-GIS layers)

Topic	Considerations	Where to find Information	Answer
	Does the Floodplain Ordinance meet or exceed FEMA or State minimum requirements? If so, in what ways?	• Community FPA	Yes , was updated in 2019 to reflect new Countywide Flood Insurance Study (FIS) and exceeds minimum requirements.
	Provide an explanation of the permitting process and include a copy of floodplain permit.	• Community FPA	Applicant goes to Planning/ Development services for a permit. Permit is screened at the counter to determine if the project is located within the floodplain. If project is located within the floodplain it is routed to the Flood Division for a flood review and conditions are put on the applicable permit (see attached).
	Does the community participate in CRS?	• Community FPA, Sate, FEMA NFIP	Yes
	What is the community's CRS Class Ranking?	• Flood Insurance Manual Community status book report for state WA (fema.gov)	6
	What categories and activities provide CRS points and how can the class be improved?	• Community FPA, FEMA CRS Coordinator, ISO representative	CRS Activities: 310,320,330,360,430,502,510,520,450, 501,510,520,530,610
	Does the plan include CRS planning requirements?	• CRS manual https://www.fema.gov/sites/	Yes

Topic	Considerations	Where to find Information	Answer
		default/files/documents/fema_community-rating-system_coordinators-manual_2017.pdf	

NFIP CONTINUED COMPLIANCE ACTIONS

Topic	Considerations	Answer
Staff Resources	Identify need for additional staff. Identify training needs of existing staff.	We could use additional staff, but hiring is limited due to budget issues. We have 3 staff eligible to take the CFM.
Compliance	When is the next Community Assistance visit anticipated? If unknown, discuss any need for CAV, CAC, or other compliance assistance.	Unknown We have recently requested concurrence from FEMA regarding compliance with Ag. Structures.
Flood Risk Maps	Are there flood prone areas that need new flood studies? What areas are highest priority and why? Does the community have new data that can be included in future flood map updates?	Currently, Whatcom County is in the process of finalizing a Levee Analysis and Mapping Procedure (LAMP) project to update the Flood Maps and FIS for the Lower Nooksack River Reaches 1-5. Draft Work Maps have been submitted to the communities for comment. Preliminary FIRMS or Maps and FIS is scheduled to be released in the Winter of 2021 with a projected Effective date of Fall 2023.
Community Outreach	Consider outreach and education to provide in the community. Outreach can be targeted to increase NFIP policies, promote NFIP services, or increase knowledge of local flood risk, among other topics. Consider a variety of audiences, such as elected officials or builders.	We actively provide outreach and education as documented in CRS program. We have developed a "Building in a Floodplain" brochure and diagram for permit inquiries and applicants. We also provide outreach materials on our website accessible to variety of audiences.
Community Rating System (CRS)	Does the community want to participate in the CRS program? Does the community want to improve its current CRS class ranking? Identify activities the community is or will be pursuing to gain CRS points.	Whatcom County currently participates in the CRS program No, not at this time. Nothing at this time.

F2-CITY OF BELLINGHAM National Flood Insurance Program Participation

Topic	Considerations	Where to find Information	Answer
Insurance Summary	How many NFIP policies are in the community? What is the total premium and coverage?	• State NFIP Coordinator or FEMA NFIP Specialist	95 policies in force $33,986,900.00 insurance in force 2 repetitive loss properties. The Repetitive Loss Structures in Bellingham are non- residential. This is based off the 2018 Washington State Repetitive Loss Record from the State Mitigation Strategist at the Washington Emergency Management Division. There may currently be different Repetitive Loss structure types located in Bellingham, but the 2018 Repetitive Loss Record is the best available data.
	How many claims have been paid in the community? What is the total amount of	• FEMA NFIP or Insurance Specialist	29 paid claims $702,702.51 total losses paid

Topic	Considerations	Where to find Information	Answer
	paid claims? How many of the claims were for substantial damage?		1 sub. damage claim since 1978
	Number of Structures exposed to flood risk within the community	• Community Floodplain Administrator (FPA)	464
	Describe any areas of flood risk with limited NFIP policy coverage	• Community FPA & FEMA Insurance Specialist	A portion of the Baker Creek floodplain is not within a study area while it has had repeated flooding. Flooding is somewhat dependent on system capacity issues with Interstate 5 and other State conveyance systems.
Staff Resources	Does the community have a dedicated Floodplain Manager or NFIP Coordinator?	• Community FPA	Storm and Surface Water Utility Manager also acts as Floodplain Administrator
	Is floodplain management an auxiliary duty?		Yes
	Is there a Certified Floodplain Manager on Staff?		No
	Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)		Plan reviewers are trained to determine if projects or structures are within floodplain boundaries with required review for all permits. GIS system has FEMA coverage for

Topic	Considerations	Where to find Information	Answer
			permit review. Permits are conditioned for no occupancy until all certifications are complete and returned.
	What are the barriers to running an effective NFIP program in the community, if any?		Change to true digital mapping may ease process.
Compliance History	Is the community in good standing with the NFIP?	• State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes
	Are there any outstanding compliance issues (i.e., current violations)?		No
	When was the most recent Community Assistance Visit (VAC) or Community Assistance Contact (CAC)?		11/28/2016 last CAV date
	Is a CAV or CAC scheduled or needed?		Changes to floodplains are forthcoming. A CAV would be appreciated.
Regulation	When did the community enter the NFIP?	• Community Status Book http://www.fema.gov/fema/csb.s htm	09/02/1982 regular entry.
	When did the community's Flood Insurance Rate Maps (FIRMS) become effective?		09/02/1982
	Are the FIRMS digital or paper?	• Community FPA, State or FEMA NFIP Specialists	Digital
	Does the Floodplain Ordinance meet or exceed FEMA or State minimum requirements? If so, in what ways?	• Community FPA	Ordinances and maps updated and revised January 16, 2004. Deemed in compliance at that time.

Topic	Considerations	Where to find Information	Answer
		NFIP Continued Compliance Actions	

NFIP CONTINUED COMPLIANCE ACTIONS

Topic	Considerations	Answer
Staff Resources	Identify need for additional staff. Identify training needs of existing staff.	For the amount of floodplain area within City existing staff level is sufficient. Ongoing training and/or refresher courses would be helpful.
Compliance	When is the next Community Assistance visit anticipated? If unknown, discuss any need for CAV, CAC, or other compliance assistance.	Unknown. Bellingham would welcome a CAV, however, the number of projects within flood areas has diminished. We are looking at a major stream rerouting project for Squalicum Creek that would be of interest.
Regulation	Are there potential ordinance changes to consider strengthening requirements? Are there potential improvements to permitting process or other administrative aspects of the community's NFIP program? Could the community enhance its floodplain services?	City still working on potential changes to comply with BiOp. Digital mapping. We should enter CRS program.
Flood Risk Maps	Are there flood prone areas that need new flood studies? What areas are highest priority and why? Does the community have new data that can be included in future flood map updates?	Yes, Bellingham has apprised FEMA of flood areas on Baker Creek outside of the area of study in the past. Bellingham will likely be providing a new study for Squalicum Creek as a part of the stream reroute. A new study for Padden Creek will be needed as a result of a proposed project to daylight 1/2 mile of this stream that was formerly culverted. Priority for the City would be Squalicum and Padden Creeks.

Topic	Considerations	Answer
		It is expected that the City will be submitting data for those two projects.
Community Outreach	Consider outreach and education to provide in the community. Outreach can be targeted to increase NFIP policies, promote NFIP services, or increase knowledge of local flood risk, among other topics. Consider a variety of audiences, such as elected officials or builders.	Community outreach has not been a significant part of our program due to the limited nature of the flooding. Discussion of that lacking at a CAV would be appreciated.
Community Rating System (CRS)	Does the community want to participate in the CRS program? Does the community want to improve its current CRS class ranking? Identify activities the community is or will be pursuing to gain CRS points.	Not Participating. Bellingham will consider entering CRS. It is likely that we need only to quantify some of the existing activities that we already do to receive a CRS class ranking.

F3-CITY OF BLAINE National Flood Insurance Program Participation

Topic	Considerations	Where to find Information	Answer
Insurance Summary	How many NFIP policies are in the community? What is the total premium and coverage?	• State NFIP Coordinator or FEMA NFIP Specialist	51 policies in force $13,963,900.00 insurance in force 0 repetitive losses
	How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	• FEMA NFIP or Insurance Specialist	3 paid losses $267,790.34 total paid losses 0 sub. damage claims since 1978
	Number of Structures exposed to flood risk within the community	• Community Floodplain Administrator (FPA)	8 (eight)
	Describe any areas of flood risk with limited NFIP policy coverage	• Community FPA & FEMA Insurance Specialist	Not aware of any
	Does the community have a	• Community FPA	No, covered by

Topic	Considerations	Where to find Information	Answer
Staff Resources	dedicated Floodplain Manager or NFIP Coordinator?		Community Development Director
	Is floodplain management an auxiliary duty?		Yes
	Is there a Certified Floodplain Manager on Staff?		No
	Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability		Permit review
	What are the barriers to running an effective NFIP program in the community, if any? Lack of staff, funds, and minimal impact/benefit		
Compliance History	Is the community in good standing with the NFIP?	• State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes
	Are there any outstanding compliance issues (i.e., current violations)?		No
	When was the most recent Community Assistance Visit (VAC) or Community Assistance Contact (CAC)?		11/28/2016 last CAV date
	Is a CAV or CAC scheduled or needed?		Not scheduled, and not needed
Regulation	When did the community enter the NFIP?	• Community Status Book http://www.fema.gov/fema/csb.shtm	07/16/1979 regular entry
	When did the community's Flood Insurance Rate Maps (FIRMS) become effective?		7/16/1979
	Are the FIRMS digital or paper?	• Community FPA, State or FEMA NFIP Specialists	Digital
	Does the Floodplain Ordinance meet or exceed FEMA or State minimum requirements? If so, in what ways?	• Community FPA	Does not meet the recent ESA standards
	Provide an explanation of the	• Community FPA	Requests are

Topic	Considerations	Where to find Information	Answer
	permitting process and include a copy of floodplain permit.		reviewed for compliance in conjunction with Shoreline permits, and with building permits when Shoreline permit not required. It is a staff review for code compliance. We do not have a flood plain permit application.
	Does the community participate in CRS?	• Community FPA, Sate, FEMA NFIP	No
	What is the community's CRS Class Ranking?	• Flood Insurance Manual http://www.fema.gov/business/nfip/manual.shtm	
	What categories and activities provide CRS points and how can the class be improved?	• Community FPA, FEMA CRS Coordinator, ISO epresentative	
	Does the plan include CRS planning requirements?	• CRS manual http://www.fema.gov/library/viewRecord.do?id=2434	

NFIP CONTINUED COMPLIANCE ACTIONS

Topic	Considerations	Answer
Staff Resources	Identify need for additional staff. Identify training needs of existing staff.	
Compliance	When is the next Community Assistance visit anticipated? If unknown, discuss any need for CAV, CAC, or other compliance assistance.	
Regulation	Are there potential ordinance changes to consider strengthening requirements? Are there potential improvements to permitting process or other administrative aspects of the community's NFIP program? Could the community enhance its floodplain	Yes, the ordinance can be revised to comply with the ESA requirements.

Topic	Considerations	Answer
	services?	
Flood Risk Maps	Are there flood prone areas that need new flood studies? What areas are highest priority and why? Does the community have new data that can be included in future flood map updates?	
Community Outreach	Consider outreach and education to provide in the community. Outreach can be targeted to increase NFIP policies, promote NFIP services, or increase knowledge of local flood risk, among other topics. Consider a variety of audiences, such as elected officials or builders.	
Community Rating System (CRS)	Does the community want to participate in the CRS program? Does the community want to improve its current CRS class ranking? Identify activities the community is or will be pursuing to gain CRS points.	

F4-CITY OF EVERSON National Flood Insurance Program Participation

Topic	Considerations	Where to find Information	Answer
Insurance Summary	How many NFIP policies are in the community? What is the total premium and coverage?	• State NFIP Coordinator or FEMA NFIP Specialist	127 policies in force $31,819,000.00 insurance in force 9 repetitive loss properties. The Repetitive Loss Structures in Everson are residential. This is based off the 2018 Washington State Repetitive Loss Record from the State Mitigation

Topic	Considerations	Where to find Information	Answer
			Strategist at the Washington Emergency Management Division. There may currently be different Repetitive Loss structure types located in Whatcom, but the 2018 Repetitive Loss Record is the best available data.
	How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	• FEMA NFIP or Insurance Specialist	48 paid losses $464,029.21 total losses paid 2 Substantial Damage Claims
	Number of Structures exposed to flood risk within the community	• Community Floodplain Administrator (FPA)	Number of structures in the "Flood Plain": 453 Number of structures in the "Floodway": 14 Number of residential structures in the "Flood Plain": 254 Number of residential structures in the "Floodway": 5 (data compiled 10/2007)
	Describe any areas of flood risk with limited NFIP policy coverage	• Community FPA & FEMA Insurance Specialist	None
Staff Resources	Does the community have a dedicated Floodplain Manager or NFIP	• Community FPA	Yes

Topic	Considerations	Where to find Information	Answer
	Coordinator?		
	Is floodplain management an auxiliary duty?		Yes
	Is there a Certified Floodplain Manager on Staff?		No
	Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)		Permit review, community outreach, administration services, inspections.
	What are the barriers to running an effective NFIP program in the community, if any?		Loss of floodplain specialist at DOE regional level makes floodplain management more difficult to find answers to specific questions.
Compliance History	Is the community in good standing with the NFIP?	• State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes
	Are there any outstanding compliance issues (i.e., current violations)?		No
	When was the most recent Community Assistance Visit (VAC) or Community Assistance Contact (CAC)?		12/11/2014 last CAV date
	Is a CAV or CAC scheduled or needed?		None scheduled
Regulation	When did the community enter the NFIP?	• Community Status Book http://www.fema.gov/fema/cs b.shtm	08/02/1982 regular entry
	When did the community's Flood Insurance Rate Maps (FIRMS) become effective?		08/02/1982
	When did the community's Flood Insurance Rate Maps (FIRMS) become effective?		08/02/1982
	Are the FIRMS digital or paper?	• Community FPA, State or FEMA NFIP Specialists	Digital
	Does the Floodplain Ordinance meet or exceed FEMA or State minimum	• Community FPA	Meets

Topic	Considerations	Where to find Information	Answer
	requirements? If so, in what ways?		
	Provide an explanation of the permitting process and include a copy of floodplain permit.	• Community FPA	We provide a City prepared Development Assessment Flow Chart and Floodplain Development Permit for applicants to complete as part of the normal Building Permit application process.
	Does the community participate in CRS?	• Community FPA, Sate, FEMA NFIP	Yes
	What is the community's CRS Class Ranking?	• Flood Insurance Manual Community status book report for state WA (fema.gov)	6
	What categories and activities provide CRS points and how can the class be improved?	• Community FPA, FEMA CRS Coordinator, ISO representative	Activities 310 -630 are applied and we continue to review policies and procedures to improve our rating.
	Does the plan include CRS planning requirements?	• CRS manual http://www.fema.gov/library/viewRecord.do?id=2434	Yes

NFIP CONTINUED COMPLIANCE ACTIONS

Topic	Considerations	Answer
Staff Resources	Identify need for additional staff. Identify training needs of existing staff.	Additional staff would be helpful to maximize the best possible rating for our community through application of all aspects of Activities 310-630.
Compliance	When is the next Community Assistance visit anticipated?	As scheduled by DOE.

	If unknown, discuss any need for CAV, CAC, or other compliance assistance.	
Regulation	Are there potential ordinance changes to consider strengthening requirements? Are there potential improvements to permitting process or other administrative aspects of the community's NFIP program? Could the community enhance its floodplain services?	Considering amendments to assess BAS ramifications. None at this time. Not at this time.
Flood Risk Maps	Are there flood prone areas that need new flood studies? What areas are highest priority and why? Does the community have new data that can be included in future flood map updates?	Johnson creek overflow corridor. No
Community Outreach	Consider outreach and education to provide in the community. Outreach can be targeted to increase NFIP policies, promote NFIP services, or increase knowledge of local flood risk, among other topics. Consider a variety of audiences, such as elected officials or builders.	
Community Rating System (CRS)	Does the community want to participate in the CRS program? Does the community want to improve its current CRS class ranking? Identify activities the community is or will be pursuing to gain CRS points.	We currently participate. Yes More community information assimilation. Policy review and revision

F5-CITY OF FERNDALE National Flood Insurance Program Participation

Topic	Considerations	Where to find Information	Answer
Insurance Summary	How many NFIP policies are in the community?	• State NFIP Coordinator or FEMA NFIP Specialist	98 policies in force $25,096,400.00

Topic	Considerations	Where to find Information	Answer
	What is the total premium and coverage?		insurance in force. 1 9 repetitive loss properties. The Repetitive Loss Structures in Ferndale are residential. This is based off the 2018 Washington State Repetitive Loss Record from the State Mitigation Strategist at the Washington Emergency Management Division. There may currently be different Repetitive Loss structure types located in Ferndale, but the 2018 Repetitive Loss Record is the best available data.
	How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	• FEMA NFIP or Insurance Specialist	40 paid losses $1,061,601.64 total losses paid 10 sub. damage claims since 1978
	Number of Structures exposed to flood risk within the community	• Community Floodplain Administrator (FPA)	Undetermined / Do not know
	Describe any areas of flood risk with limited NFIP policy coverage	• Community FPA & FEMA Insurance Specialist	Undetermined / Do not know
Staff	Does the community have a dedicated Floodplain	• Community FPA	No

Topic	Considerations	Where to find Information	Answer
Resources	Manager or NFIP Coordinator?		
	Is floodplain management an auxiliary duty?		Yes – managed by Community Development Director or designee
	Is there a Certified Floodplain Manager on Staff?		No
	Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)		City of Ferndale reviews development proposals for compliance with Floodplain Management requirements as defined by the Ferndale Municipal Code. Review may include modifications to development submittals.
	What are the barriers to running an effective NFIP program in the community, if any?		Public perception that FIRM's in certain portions of the City are inaccurate/ out of date. Lack of new modeling cannot verify or deny these claims.
Compliance History	Is the community in good standing with the NFIP?	• State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes
	Are there any outstanding compliance issues (i.e., current violations)?		No / Unknown
	When was the most recent Community Assistance Visit (VAC) or Community Assistance Contact (CAC)?		9/19/2012 last CAV date. Note that the City has worked with FEMA (last contact 7/29/2011) in

Topic	Considerations	Where to find Information	Answer
			developing ordinances intended to comply with NMFS Biological Opinion
	Is a CAV or CAC scheduled or needed?		Unknown
Regulation	When did the community enter the NFIP?	• Community Status Book http://www.fema.gov/fema/csb.s htm	06/01/1983 regular entry
	What did the community's Flood Insurance Rate Maps (FIRMS) become effective?		January 16, 2004
	Are the FIRMS digital or paper?	• Community FPA, State or FEMA NFIP Specialists	Yes
	Does the Floodplain Ordinance meet or exceed FEMA or State minimum requirements? If so, in what ways?	• Community FPA	The current ordinance meets or exceeds standards at this time, but does not reflect Biological Opinion. City Council will consider adopting new standard that meets or exceeds standards on August 15th 2011.
	Provide an explanation of the permitting process and include a copy of floodplain permit.	• Community FPA	Review processes vary dramatically depending on specific land use proposal. Generally speaking, an application is made to the City, and is reviewed by the Community Development Department. If the development is proposed within a floodplain, the City will attach

Topic	Considerations	Where to find Information	Answer
			conditions to the development permit specifying the steps necessary to achieve compliance with flood regulations. In these cases, the development permit acts as the floodplain permit.
	Does the community participate in CRS?	• Community FPA, Sate, FEMA NFIP	Yes
	What is the community's CRS Class Ranking?	• Flood Insurance Manual Community status book report for state WA (fema.gov)	6
	What categories and activities provide CRS points and how can the class be improved?	• Community FPA, FEMA CRS Coordinator, ISO representative	N/A – However, while DOE/FEMA staff have been very cooperative on navigating various compliance issues, there haven't been opportunities to discuss ways to participate in incentive programs, etc.
	Does the plan include CRS planning requirements?	• CRS manual http://www.fema.gov/library/viewRecord.do?id=2434	N/A

NFIP CONTINUED COMPLIANCE ACTIONS

Topic	Considerations	Answer
Staff Resources	Identify need for additional staff. Identify training needs of existing staff.	Application of current flood regulations is manageable under current staff levels. If there were ways to establish universal, electronic reporting or documentation

Topic	Considerations	Answer
		processes, it could be helpful (while modeling has improved, much of the reporting seems to have not kept up with technology)
Compliance	When is the next Community Assistance visit anticipated? If unknown, discuss any need for CAV, CAC, or other compliance assistance.	Unknown. CAV's should be conducted less as an audit (though there are some auditing functions) and more as a way to provide tools to communities that may not be employing them and may not be aware of them. As development within the floodplain becomes less of an option, applications for development permits become less common. In some cases, lack of compliance may be the result of inactivity and unfamiliarity. CAV's should be conducted with the approach of trying to gain compliance, rather than searching for non-compliance.
Regulation	Are there potential ordinance changes to consider strengthening requirements? Are there potential improvements to permitting process or other administrative aspects of the community's NFIP program? Could the community enhance its floodplain services?	The floodplain management ordinance, once adopted pursuant to the Biological Opinion, should offer improved guidance for development without substantial changes. Stable regulations will allow the City to expand its services to the community. Improvements in flood modeling technology has revealed that notions of mitigating flood attenuation capacity by "digging a bigger hole" do not always work. Regulations that emphasize this philosophy without providing other methods of discovery should be reexamined.
Flood Risk Maps	Are there flood prone areas that need new flood studies? What areas are highest priority and why? Does the community have new data that can be included in future flood map updates?	The community has questioned whether the current FIRM's accurately analyze the 100-Year Flood within the downtown core; the current FIRM's reflect flood areas that have not historically flooded or given indication of potential flooding.

Topic	Considerations	Answer
Community Outreach	Consider outreach and education to provide in the community. Outreach can be targeted to increase NFIP policies, promote NFIP services, or increase knowledge of local flood risk, among other topics. Consider a variety of audiences, such as elected officials or builders.	If the Biological Opinion-compliant ordinance is adopted, the City expects to provide educational materials to elected officials and the development community.
Community Rating System (CRS)	Does the community want to participate in the CRS program? Does the community want to improve its current CRS class ranking? Identify activities the community is or will be pursuing to gain CRS points.	The City is interested in participating, pending a CAV in September/October 2011.

F6-CITY OF LYNDEN National Flood Insurance Program Participation

Topic	Considerations	Where to find Information	Answer
Insurance Summary	How many NFIP policies are in the community? What is the total premium and coverage?	• State NFIP Coordinator or FEMA NFIP Specialist	20 policies in force $5,941,900.00 insurance in force 0 repetitive loss properties
	How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	• FEMA NFIP or Insurance Specialist	6 paid losses $54,898.81 total losses paid 0 sub. damage claims since 1978
	Number of Structures exposed to flood risk within the community	• Community Floodplain Administrator (FPA)	3 to 4
	Describe any areas of flood	• Community FPA & FEMA	N/A

Topic	Considerations	Where to find Information	Answer
	risk with limited NFIP policy coverage	Insurance Specialist	
Staff Resources	Does the community have a dedicated Floodplain Manager or NFIP Coordinator?	• Community FPA	Public Works Director
	Is floodplain management an auxiliary duty?		Yes
	Is there a Certified Floodplain Manager on Staff?		Yes
	Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)		On a case by case basis
	What are the barriers to running an effective NFIP program in the community, if any?		None
Compliance History	Is the community in good standing with the NFIP?	• State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes
	Are there any outstanding compliance issues (i.e., current violations)?		No
	When was the most recent Community Assistance Visit (VAC) or Community Assistance Contact (CAC)?		9/21/2012 last CAV date
	Is a CAV or CAC scheduled or needed?		
Regulation	When did the community enter the NFIP?	• Community Status Book http://www.fema.gov/fema/csb.shtm	11/03/1982 regular entry
	What did the community's Flood Insurance Rate Maps (FIRMS) become effective?		11/03/1982
	Are the FIRMS digital or paper?	• Community FPA, State or FEMA NFIP Specialists	Digital
	Does the Floodplain Ordinance meet or exceed FEMA or State minimum requirements? If so, in what ways?	• Community FPA	Meets requirements

Topic	Considerations	Where to find Information	Answer
	Provide an explanation of the permitting process and include a copy of floodplain permit.	• Community FPA	Done on a case by case basis
	Does the community participate in CRS?	• Community FPA, Sate, FEMA NFIP	No
	What is the community's CRS Class Ranking?	• Flood Insurance Manual Community status book report for state WA (fema.gov)	N/A
	What categories and activities provide CRS points and how can the class be improved?	• Community FPA, FEMA CRS Coordinator, ISO representative	N/A
	Does the plan include CRS planning requirements?	• CRS manual http://www.fema.gov/library/viewRecord.do?id=2434	N/A

NFIP CONTINUED COMPLIANCE ACTIONS

Topic	Considerations	Answer
Topic	Considerations	Answer
Staff Resources	Identify need for additional staff. Identify training needs of existing staff.	None
Compliance	When is the next Community Assistance visit anticipated? If unknown, discuss any need for CAV, CAC, or other compliance assistance.	Not needed
Regulation	Are there potential ordinance changes to consider strengthening requirements? Are there potential improvements to permitting process or other administrative aspects of the community's NFIP program? Could the community enhance its floodplain services?	N/A No N/A
Flood Risk Maps	Are there flood prone areas that need new flood studies? What areas are highest priority and why?	No None Just the information the City

Topic	Considerations	Answer
	Does the community have new data that can be included in future flood map updates?	receives from Whatcom County River and Flood
Community Outreach	Consider outreach and education to provide in the community. Outreach can be targeted to increase NFIP policies, promote NFIP services, or increase knowledge of local flood risk, among other topics. Consider a variety of audiences, such as elected officials or builders.	N/A
Community Rating System (CRS)	Does the community want to participate in the CRS program? Does the community want to improve its current CRS class ranking? Identify activities the community is or will be pursuing to gain CRS points.	Unknown

F7-CITY OF NOOKSACK National Flood Insurance Program Participation

Topic	Considerations	Where to find Information	Answer
Insurance Summary	How many NFIP policies are in the community? What is the total premium and coverage?	• State NFIP Coordinator or FEMA NFIP Specialist	39 policies in force $12,061,600.00 insurance in force 0 repetitive losses
	How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	• FEMA NFIP or Insurance Specialist	6 paid loss $53,667.65 total losses paid 0 sub. damage claims since 1978
	Number of Structures exposed to flood risk within the community	• Community Floodplain Administrator (FPA)	174 (including outbuildings) in FEMA flood zone AE areas
	Describe any areas of flood risk with limited NFIP policy coverage	• Community FPA & FEMA Insurance Specialist	None

Topic	Considerations	Where to find Information	Answer
Staff Resources	Does the community have a dedicated Floodplain Manager or NFIP Coordinator?	• Community FPA	No
	Is floodplain management an auxiliary duty?		Yes, one of duties of the Public Works Director
	Is there a Certified Floodplain Manager on Staff?		No
	Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)		Services are as listed with the exception of engineering capability
	What are the barriers to running an effective NFIP program in the community, if any?		None
Compliance History	Is the community in good standing with the NFIP?	• State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes
	Are there any outstanding compliance issues (i.e., current violations)?		No
	When was the most recent Community Assistance Visit (VAC) or Community Assistance Contact (CAC)?		04/24/2008 last CAV date
	Is a CAV or CAC scheduled or needed?		No
Regulation	When did the community enter the NFIP?	• Community Status Book http://www.fema.gov/fema/csb.shtm	09/02/1982 regular entry
	What did the community's Flood Insurance Rate Maps (FIRMS) become effective?		01/16/2004, revision is currently underway.
	Are the FIRMS digital or paper?	• Community FPA, State or FEMA NFIP Specialists	Both
	Does the Floodplain Ordinance meet or exceed FEMA or State minimum requirements? If so, in what ways?	• Community FPA	The current City of Nooksack ordinance meets all requirements.

Topic	Considerations	Where to find Information	Answer
	Provide an explanation of the permitting process and include a copy of floodplain permit.	• Community FPA	Builders or individuals apply for a Floodplain Development Permit at time of Building Permit application for individual structures. Permit application attached.
	Does the community participate in CRS?	• Community FPA, Sate, FEMA NFIP	No
	What is the community's CRS Class Ranking?	• Flood Insurance Manual Community status book report for state WA (fema.gov)	
	What categories and activities provide CRS points and how can the class be improved?	• Community FPA, FEMA CRS Coordinator, ISO representative	
	Does the plan include CRS planning requirements?	• CRS manual http://www.fema.gov/library/viewRecord.do?id=2434	

NFIP CONTINUED COMPLIANCE ACTIONS

Topic	Considerations	Answer
Staff Resources	Identify need for additional staff. Identify training needs of existing staff.	As small as the City of Nooksack is, staffing is adequate.
Compliance	When is the next Community Assistance visit anticipated? If unknown, discuss any need for CAV, CAC, or other compliance assistance.	2013, if a five year visit is standard.
Regulation	Are there potential ordinance changes to consider strengthening requirements? Are there potential improvements to permitting process or other administrative aspects of the community's NFIP program? Could the community enhance its floodplain services?	There are no ordinance changes being planned, a change was made in 2010 to correct an omission from previous City Council action. The City is always looking for ways to improve the process involved.
Flood Risk Maps	Are there flood prone areas that need new flood studies? What areas are highest priority and why? Does the community have new data that can be included in future flood map updates?	The City of Nooksack recently completed a flood study that is submitted to FEMA at this time.
Community Outreach	Consider outreach and education to provide in the community. Outreach can be targeted to increase NFIP policies, promote NFIP services, or increase knowledge of local flood risk, among other topics. Consider a variety of audiences, such as elected officials or builders.	The City of Nooksack feels that additional outreach could be made, but local individuals, officials, and builders seem to understand the process if they are involved in any way.
Community Rating System (CRS)	Does the community want to participate in the CRS program? Does the community want to improve its current CRS class ranking? Identify activities the community is or will be pursuing to gain CRS points.	The City of Nooksack would be interested in participation in the CRS program. Yes Unknown

F8-CITY OF SUMAS National Flood Insurance Program Participation

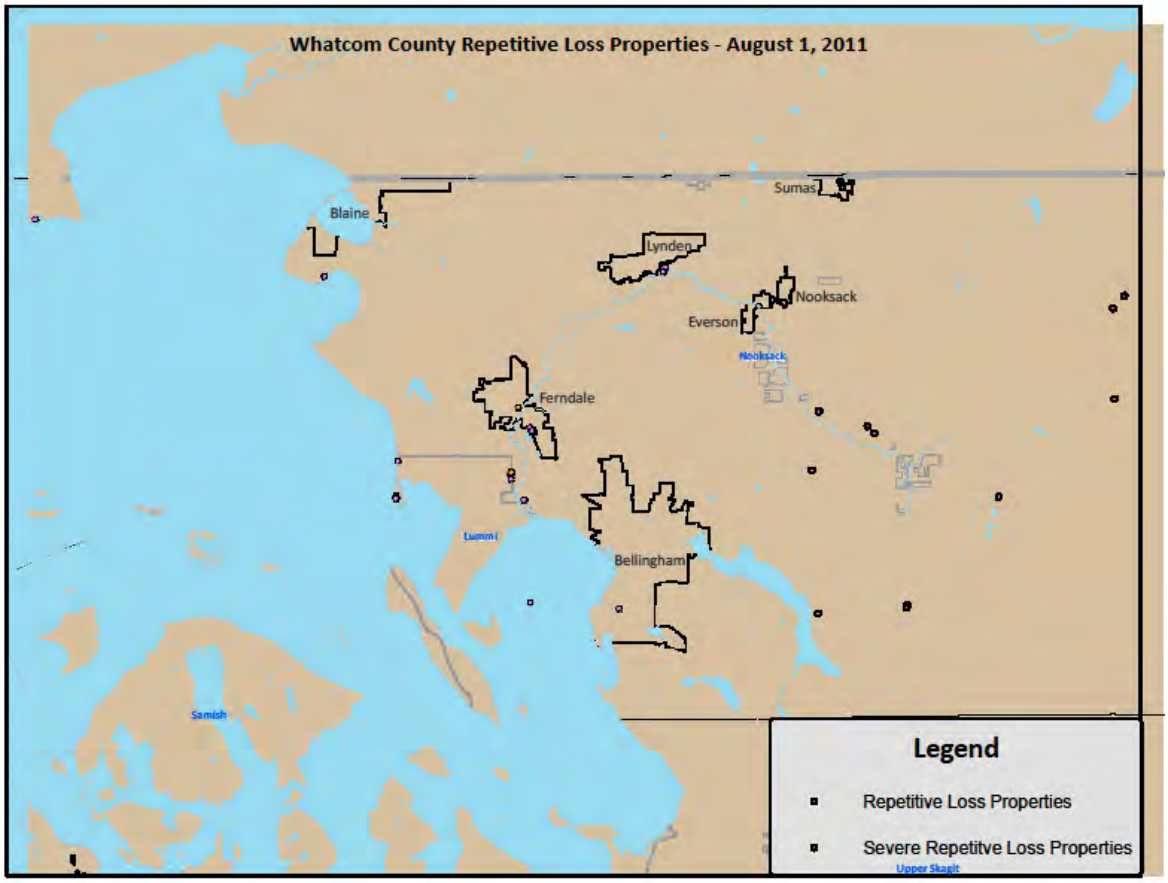
Topic	Considerations	Where to find Information	Answer
Insurance Summary	How many NFIP policies are in the community? What is the total premium and coverage?	• State NFIP Coordinator or FEMA NFIP Specialist	167 policies in force $40,899,700.00 insurance in force 8 repetitive loss properties. The Repetitive Loss Structures in Sumas are residential. This is based off the 2018 Washington State Repetitive Loss Record from the State Mitigation Strategist at the Washington Emergency Management Division. There may currently be different Repetitive Loss structure types located in Sumas, but the 2018 Repetitive Loss Record is the best available data.
	How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	• FEMA NFIP or Insurance Specialist	82 paid losses $1,043,047.34 total losses paid 5 sub. damage claims since 1978
	Number of Structures exposed to flood risk within	• Community Floodplain Administrator (FPA)	429

Topic	Considerations	Where to find Information	Answer
	the community		
	Describe any areas of flood risk with limited NFIP policy coverage	• Community FPA & FEMA Insurance Specialist	N/A
Staff Resources	Does the community have a dedicated Floodplain Manager or NFIP Coordinator?	• Community FPA	Yes, Rod Fadden
	Is floodplain management an auxiliary duty?		Yes
	Is there a Certified Floodplain Manager on Staff?		No
	Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)		I do permit reviews, Outreach CCR renewals, Inspections
	What are the barriers to running an effective NFIP program in the community, if any?		N/A
Compliance History	Is the community in good standing with the NFIP?	• State NFIP Coordinator, FEMA NFIP Specialist, community records	Yes, we get the 15% discount
	Are there any outstanding compliance issues (i.e., current violations)?		No
	When was the most recent Community Assistance Visit (VAC) or Community Assistance Contact (CAC)?		12/11/2014 last CAV date
	Is a CAV or CAC scheduled or needed?		No
Regulation	When did the community enter the NFIP?	• Community Status Book http://www.fema.gov/fema/csb.shtm	05/15/1985 regular entry
	What did the community's Flood Insurance Rate Maps (FIRMS) become effective?		01/16/2004
	Are the FIRMS digital or paper?	• Community FPA, State or FEMA NFIP Specialists	Digital
	Does the Floodplain Ordinance meet or exceed FEMA or State minimum	• Community FPA	Yes

Topic	Considerations	Where to find Information	Answer
	requirements? If so, in what ways?		
	Provide an explanation of the permitting process and include a copy of floodplain permit.	• Community FPA	The floodplain permit is issued at the time the building permit is.
	Does the community participate in CRS?	• Community FPA, Sate, FEMA NFIP	Yes
	What is the community's CRS Class Ranking?	• Flood Insurance Manual Community status book report for state WA (fema.gov)	7
	What categories and activities provide CRS points and how can the class be improved?	• Community FPA, FEMA CRS Coordinator, ISO representative	310-350, 410-450, 510-540, 610-
	Does the plan include CRS planning requirements?	• CRS manual http://www.fema.gov/library/viewRecord.do?id=2434	

NFIP CONTINUED COMPLIANCE ACTIONS

Topic	Considerations	Answer
Staff Resources	Identify need for additional staff. Identify training needs of existing staff.	Ok
Compliance	When is the next Community Assistance visit anticipated? If unknown, discuss any need for CAV, CAC, or other compliance assistance.	N/A
Regulation	Are there potential ordinance changes to consider strengthening requirements? Are there potential improvements to permitting process or other administrative aspects of the community's NFIP program? Could the community enhance its floodplain services?	No No No
Flood Risk Maps	Are there flood prone areas that need new flood studies? What areas are highest priority and why? Does the community have new data that can be included in future flood map updates?	No N/A Yes
Community Outreach	Consider outreach and education to provide in the community. Outreach can be targeted to increase NFIP policies, promote NFIP services, or increase knowledge of local flood risk, among other topics. Consider a variety of audiences, such as elected officials or builders.	We do newsletters
Community Rating System (CRS)	Does the community want to participate in the CRS program? Does the community want to improve its current CRS class ranking? Identify activities the community is or will be pursuing to gain CRS points.	Already in the program



The repetitive loss properties in the 2011 Repetitive Loss Map above are up to date. Should there be changes to the properties displayed, or additional properties are added to the repetitive loss property category, this map will be updated to reflect those changes.

APPENDIX E: WHATCOM COUNTY MITIGATION IDEAS

(Reference: FEMA's Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards (January 2013)

The purpose of this document is to provide a resource that communities can use to identify and evaluate a range of potential mitigation actions for reducing risk to natural hazards and disasters. The focus of this document is mitigation, which is action taken to reduce or eliminate long-term risk to hazards. Mitigation is different from preparedness, which is action taken to improve emergency response or operational preparedness.

This document is intended to be a starting point for gathering ideas and should not be used as the only source for identifying actions. Communities should seek innovative and different ideas for reducing risk that meet their unique needs. The actions listed are not necessarily eligible for Federal assistance programs. Users should review specific program guidance and contact their State Hazard Mitigation Officer (SHMO) or regional FEMA office for more information.

Hazard Descriptions

Risk Codes: D—Drought; EQ—Earthquake; VE—Volcanic Eruption; ER—Erosion; ET--Extreme temperatures; F—Flood; HA—Hail; LS—Landslide; L—Lightning; SW--Severe wind; WW--Severe winter weather; SU—Subsidence; T—Tornado; Tsunami—TSU; WF—Wildfire; MU--Multiple Hazards

Drought (D)

A drought is a period of unusually constant dry weather that persists long enough to cause deficiencies in water supply (surface or underground). Droughts are slow onset hazards, but, over time, they can severely affect crops, municipal water supplies, recreational resources, and wildlife. If drought conditions extend over a number of years, the direct and indirect economic impacts can be significant. High temperatures, high winds, and low humidity can worsen drought conditions and also make areas more susceptible to wildfire. In addition, human actions and demands for water resources can accelerate drought-related impacts.

Earthquake (EQ)

An earthquake is a sudden release of energy that creates a movement in the earth's crust. Most earthquake-related property damage and deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the extent and duration of the shaking. Other damaging earthquake effects include landslides, the down-slope movement of soil and rock (in mountain regions and along hillsides), and liquefaction.

Volcanic Eruption

A volcano is a vent in the earth's crust through which magma (molten rock), rock fragments, gases, and ashes are ejected from the earth's interior. A volcanic mountain is created over time by the accumulation of these erupted products on the on the earth's surface.

Erosion (ER)

Erosion wearing away of land, such as loss of riverbank, beach, shoreline, or dune material. It is measured as the rate of change in the position or displacement of a riverbank or shoreline over a period of time. Short-term erosion typically results from periodic natural events, such as flooding, hurricanes, storm surge, and windstorms, but may be intensified by human activities. Long-term erosion is a result of multi-

year impacts such as repetitive flooding, wave action, sea level rise, sediment loss, subsidence, and climate change. Death and injury are not typically associated with erosion; however, it can destroy buildings and infrastructure.

Extreme Temperatures (ET)
Extreme heat and extreme cold constitute different conditions in different parts of the country. Extreme cold can range from near freezing temperatures in the southern United States to temperatures well below zero in the northern states. Similarly, extreme heat is typically recognized as the condition where temperatures consistently stay ten degrees or more above a region's average high temperature for an extended period. Fatalities can result from extreme temperatures, as they can push the human body beyond its limits (hyperthermia and hypothermia).

Flood (F)
A flood is the partial or complete inundation of normally dry land. The various types of flooding include riverine flooding, coastal flooding, and shallow flooding. Common impacts of flooding include damage to personal property, buildings, and infrastructure; bridge and road closures; service disruptions; and injuries or even fatalities.

Hail (HA)are a potentially damaging outgrowth
Hailstorms are a potentially damaging outgrowth of severe thunderstorms. Hailstorms frequently accompany thunderstorms, so their locations and spatial extents overlap. Hail can cause substantial damage to vehicles, roofs, landscaping, and other areas of the built environment. U.S. agriculture is typically the area most affected by hail storms, which cause severe crop damage even during minor events.

Landslide (LS)
The movement of a mass of rock, debris, or earth down a slope by force of gravity is considered a landslide. Landslides occur when the slope or soil stability changes from stable to unstable, which may be caused by earthquakes, storms, volcanic eruptions, erosion, fire, or additional human-induced activities. Slopes greater than 10 degrees are more likely to slide, as are slopes where the height from the top of the slope to its toe is greater than 40 feet. Slopes are also more likely to fail if vegetative cover is low and/or soil water content is high. Potential impacts include environmental disturbance, property and infrastructure damage, and injuries or fatalities.

Lightning (L)
Lightning is a discharge of electrical energy that results from the buildup of positive and negative charges in a thunderstorm, which creates a "bolt" when the buildup of charges becomes strong enough. Lightning can strike communications equipment (e.g., radio or cell towers, antennae, satellite dishes, etc.) and hamper communication and emergency response. Lightning strikes can also cause significant damage to buildings, critical facilities, and infrastructure, largely by igniting a fire. Lightning can also ignite a wildfire.

Severe Wind (SW)
Severe wind can occur alone, such as during straightline wind events, or it can accompany other natural hazards, including hurricanes and severe thunderstorms. Severe wind poses a threat to lives, property, and vital utilities primarily due to the effects of flying debris or downed trees and power lines. Severe wind will typically cause the greatest damage to structures of light construction, particularly manufactured homes.

Severe Winter Weather (WW)
Severe winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Severe winter weather can down trees, cause widespread power outages, damage property, and cause fatalities and injuries.

Subsidence (SU)
Subsidence is the gradual settling or sudden sinking of the Earth's surface due to subsurface movement of earth materials. The level of subsidence ranges from a broad lowering to collapse of land surface. Most causes of subsidence are human-induced, such as groundwater pumpage, aquifer system compaction, drainage of organic soils, underground mining, hydrocompaction, natural compaction, sinkholes, and thawing permafrost. Areas located above or adjacent to karsts topography have a greater risk of experiencing subsidence. Sudden collapses of surface areas can damage and destroy buildings and infrastructure.

Tornado (T)
A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. The destruction caused by tornadoes ranges from light to catastrophic depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, including residential dwellings and particularly manufactured homes. Tornadoes are more likely to occur during the months of March through May and tend to form in the late afternoon and early evening.

Tsunami (TSU)
A tsunami is a series of great waves that are created by undersea disturbances, such as earthquakes or volcanic eruptions. As opposed to typical waves that crash at the shoreline, tsunamis bring a continuously flowing "wall of water" that has the potential to cause devastating damage in coastal areas immediately along the shore. Areas at greatest risk are less than 50 feet above sea level and within 1 mile of the shoreline. Most deaths that occur during a tsunami result from drowning. Associated risks include flooding, polluted water supplies, and damaged gas lines.

Wildfire (WF)
A wildfire is any outdoor fire that is not controlled, supervised, or arranged. Wildfire probability depends on local weather conditions; outdoor activities such as camping, debris burning, and construction; and the degree of public cooperation with fire prevention measures. Wildfires can result in widespread damage to property and loss of life.

The suggested mitigation actions are summarized into five types: (1) Public Awareness; (2) Local Planning and Regulations; (3) Structural and Infrastructure Projects; (4) Natural Systems Protection; and, (5) Education and Awareness Programs.

PUBLIC AWARENESS

- Emergency preparedness education programs for schools.
- Drills, exercises in homes, workplaces, classrooms, etc.
- Public service announcements.
- Hazard "safety fairs."
- Hazard conferences, seminars.
- Hazard awareness weeks.
- Preparedness handbooks, brochures.
- Distribution of severe weather guides, homeowner's retrofit guide, etc.
- Regular newspaper articles.
- Direct mailings.
- Utility bill inserts.
- Annual correspondence with residents reminding them of the need to be hazard prepared.

LOCAL PLANNING AND REGULATIONS

D-1 Assess Vulnerability to Drought Risk

To better understand and assess local vulnerability to drought, consider actions such as:

- Gathering and analyzing water and climate data to gain a better understanding of local climate and drought history.
- Identifying factors that affect the severity of a drought.
- Identifying available water supplies.
- Determining how the community and its water sources have been impacted by droughts in the past.

D-2 Monitor Drought Conditions

Monitoring drought conditions can provide early warning for policymakers and planners to make decisions through actions including:

- Identifying local drought indicators, such as precipitation, temperature, surface water levels, soil moisture, etc.
- Establishing a regular schedule to monitor and report conditions on at least a monthly basis.

D-3 Monitor Water Supply

Monitoring the water supply and its functions can save water in the long run through actions such as:

- Regularly checking for leaks to minimize water supply losses.
- Improving water supply monitoring.

D-4 Plan for Drought

Plan for future drought events in your area through actions such as:

- Developing a drought emergency plan.
- Developing criteria or triggers for drought-related actions.

- Developing a drought communication plan and early warning system to facilitate timely communication of relevant information to officials, decision makers, emergency managers, and the general public.
- Developing agreements for secondary water sources that may be used during drought conditions.
- Establishing an irrigation time/scheduling program or process so that all agricultural land gets the required amount of water. Through incremental timing, each area is irrigated at different times so that all water is not consumed at the same time. Spacing usage may also help with recharge of groundwater.

D-5 Require Water Conservation During Drought Conditions

Require mandatory water conservation measures during drought emergencies, including:

- Developing an ordinance to restrict the use of public water resources for non-essential usage, such as landscaping, washing cars, filling swimming pools, etc.
- Adopting ordinances to prioritize or control water use, particularly for emergency situations like firefighting.

D-6 Prevent Overgrazing

Prevent overgrazing, which has been linked to drought vulnerability, through actions such as:

- Establishing a grazing policy or permitting program to prevent overgrazing.
- Reducing the number of animals and improving range management.

EQ-1 Adopt and Enforce Building Codes

Building codes reduce earthquake damage to structures. Consider actions such as:

- Adopting and enforcing updated building code provisions to reduce earthquake damage risk.
- Adopting the International Building Code (IBC) and International Residential Code (IRC).

EQ-2 Incorporate Earthquake Mitigation into Local Planning

Earthquake risk can be reduced through local planning, codes, and ordinances, including:

- Creating a seismic safety committee to provide policy recommendations, evaluate and recommend changes in seismic safety standards, and give an annual assessment of local and statewide implementation of seismic safety improvements.
- Developing and distributing guidelines or passing ordinances that require developers and building owners to locate lifelines, buildings, critical facilities, and hazardous materials out of areas subject to significant seismic hazards.
- Incorporating structural and non-structural seismic strengthening actions into ongoing building plans and activities in the capital improvement plan to ensure that facilities remain operational for years to come.
- Supporting financial incentives, such as low interest loans or tax breaks, for home and business owners who seismically retrofit their structures.

EQ-3 Map and Assess Community Vulnerability to Seismic Hazards

To better understand and assess local vulnerability to earthquakes, consider actions such as:

- Developing an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage, including pre-1940s homes and homes with cripple wall foundations.
- Collecting geologic information on seismic sources, soil conditions, and related potential hazards.
- Creating an earthquake scenario to estimate potential loss of life and injuries, the types of potential damage, and existing vulnerabilities within a community to develop earthquake mitigation priorities.
- Using Hazus to quantitatively estimate potential losses from an earthquake.
- Maintaining a database to track community vulnerability to earthquake risk.
- Using GIS to map hazard areas, at-risk structures, and associated hazards (e.g., liquefaction and landslides) to assess high-risk areas.

EQ-4 Conduct Inspections of Building Safety

Inspections can be used to assess earthquake risk, such as:

- Establishing a school survey procedure and guidance document to inventory structural and non-structural hazards in and around school buildings.
- Using rapid visual screening to quickly inspect a building and identify disaster damage or potential seismic structural and non-structural weaknesses to prioritize retrofit efforts, inventory high-risk structures and critical facilities, or assess post-disaster risk to determine if buildings are safe to re-occupy.
- Consulting industry standard publications such as American Society of Civil Engineers (ASCE) 31 - Seismic Evaluation of Existing Buildings, ASCE 41 - Seismic Rehabilitation of Existing Buildings, and Applied Technology Council (ATC) 20 - Procedures for Post-earthquake Safety Evaluation of Buildings.

ER-1 Map and Assess Vulnerability to Erosion

Erosion risk can be better assessed and monitored with mapping techniques, including the following:

- Using GIS to identify and map erosion hazard areas.
- Developing and maintaining a database to track community vulnerability to erosion.
- Using GIS to identify concentrations of at-risk structures.
- Improving mapping of hazard areas to educate residents about unexpected risks.

ER-2 Manage Development in Erosion Hazard Areas

Erosion damage can be mitigated by regulating how development occurs in hazard areas, such as the following:

- Adopting sediment and erosion control regulations.
- Adopting zoning and erosion overlay districts.
- Developing an erosion protection program for high hazard areas.
- Employing erosion control easements.
- Prohibiting development in high-hazard areas.
- Developing and implementing an erosion management plan.
- Requiring mandatory erosion surcharges on homes.
- Locating utilities and critical facilities outside of areas susceptible to erosion to decrease the risk

of service disruption.

ER-3 Promote or Require Site and Building Design Standards to Minimize Erosion Risk

Development can be designed to minimize damage due to erosion using the following techniques:

- Constructing open foundation systems on buildings to minimize scour.
- Constructing deep foundations in erosion hazard areas.
- Clustering buildings during building and site design.
- Designing and orienting infrastructure to deter erosion and accretion.

ET-1 Reduce Urban Heat Island Effect

As urban areas develop and buildings and roads replace open land and vegetation, urban regions become warmer than their rural surroundings, forming an "island" of heat. Several methods for reducing heat island effects include:

- Increasing tree plantings around buildings to shade parking lots and along public rights-of-way.
- Encouraging installation of green roofs, which provide shade and remove heat from the roof surface and surrounding air.
- Using cool roofing products that reflect sunlight and heat away from a building.

F-1 Incorporate Flood Mitigation in Local Planning

Comprehensive planning and floodplain management can mitigate flooding by influencing development. Strategies include:

- Determining and enforcing acceptable land uses to alleviate the risk of damage by limiting exposure in flood hazard areas. Floodplain and coastal zone management can be included in comprehensive planning.
- Developing a floodplain management plan and updating it regularly.
- Mitigating hazards during infrastructure planning. For example, decisions to extend roads or utilities to an area may increase exposure to flood hazards.
- Adopting a post-disaster recovery ordinance based on a plan to regulate repair activity, generally depending on property location.
- Passing and enforcing an ordinance that regulates dumping in streams and ditches.
- Establishing a "green infrastructure" program to link, manage, and expand existing parks, preserves, greenways, etc.
- Obtaining easements for planned and regulated public use of privately-owned land for temporary water retention and drainage.

F-2 Form Partnerships to Support Floodplain Management

Partnerships between local, state, and regional entities help expand resources and improve coordination. Consider the following actions:

- Developing a storm water committee that meets regularly to discuss issues and recommend projects.
- Forming a regional watershed council to help bring together resources for comprehensive analysis, planning, decision-making, and cooperation.

- Establishing watershed-based planning initiatives to address the flood hazard with neighboring jurisdictions.
- Forming a citizen plan implementation steering committee to monitor progress on local mitigation actions. Include a mix of representatives from neighborhoods, local businesses, and local government.

F-3 Limit or Restrict Development in Floodplain Areas

Flooding can be mitigated by limiting or restricting how development occurs in floodplain areas through actions such as:

- Prohibiting or limiting floodplain development through regulatory and/or incentive-based measures.
- Limiting the density of developments in the floodplain.
- Requiring that floodplains be kept as open space.
- Limiting the percentage of allowable impervious surface within developed parcels.
- Developing a stream buffer ordinance to protect water resources and limit flood impacts.
- Prohibiting any fill in floodplain areas.

F-4 Adopt and Enforce Building Codes and Development Standards

The use of building codes and development standards can ensure structures are able to withstand flooding. Potential actions include:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Adopting ASCE 24-05 Flood Resistant Design and Construction. ASCE 24 is a referenced standard in the IBC that specifies minimum requirements and expected performance for the design and construction of buildings and structures in the flood hazard areas to make them more resistant to flood loads and flood damage.
- Adding or increasing "freeboard" requirements (feet above base flood elevation) in the flood damage ordinance.
- Prohibiting all first floor enclosures below base flood elevation for all structures in flood hazard areas.
- Considering orientation of new development during design (e.g., subdivisions, buildings, infrastructure, etc.).
- Setting the design flood elevation at or above the historical high water mark if it is above the mapped base flood elevation.
- Using subdivision design standards to require elevation data collection during platting and to have buildable space on lots above the base flood elevation.
- Requiring standard tie-downs of propane tanks.

F-5 Improve Storm Water Management Planning

Rainwater and snowmelt can cause flooding and erosion in developed areas. Storm Water management practices to prevent this include:

- Completing a storm water drainage study for known problem areas.
- Preparing and adopting a storm water drainage plan and ordinance.
- Preparing and adopting a community-wide storm water management master plan.
- Regulating development in upland areas in order to reduce storm water run-off through a storm

water ordinance.
- Linking flood hazard mitigation objectives with EPA Storm water Phase II initiatives.
- Developing engineering guidelines for drainage from new development.
- Requiring a drainage study with new development.
- Encouraging the use of Low Impact Development techniques

F-6 Adopt Polices to Reduce Storm Water Runoff

In addition to storm water management, techniques to reduce rain runoff can prevent flooding and erosion, such as:
- Designing a "natural runoff" or "zero discharge" policy for storm water in subdivision design.
- Requiring more trees be preserved and planted in landscape designs to reduce the amount of storm water runoff.
- Requiring developers to plan for on-site sediment retention.
- Requiring developers to construct on-site retention basins for excessive storm water and as a firefighting water source.
- Encouraging the use of porous pavement, vegetative buffers, and islands in large parking areas.
- Conforming pavement to land contours so as not to provide easier avenues for storm water.
- Encouraging the use of permeable driveways and surfaces to reduce runoff and increase groundwater recharge.
- Adopting erosion and sedimentation control regulations for construction and farming.

F-7 Improve Flood Risk Assessment

Heighten awareness of flood risk with the following:
- Incorporating the procedures for tracking high water marks following a flood into emergency response plans.
- Conducting cumulative impact analyses for multiple development projects within the same watershed.
- Conducting a verification study of FEMA's repetitive loss inventory and developing an associated tracking database.
- Regularly calculating and documenting the amount of flood-prone property preserved as open space.
- Requiring a thorough watershed analysis for all proposed dam or reservoir projects.
- Developing a dam failure study and emergency action plan.
- Using GIS to map areas that are at risk of flooding.
- Obtaining depth grid data and using it to illustrate flood risk to citizens.
- Incorporating digital floodplain and topographic data into GIS systems, in conjunction with Hazus, to assess risk.
- Developing and maintaining a database to track community exposure to flood risk.
- Revising and updating regulatory floodplain maps.

F-8 Join or Improve Compliance with NFIP

The National Flood Insurance Program (NFIP) enables property owners in participating communities to purchase insurance protection against flood losses. Actions to achieve eligibility and maintain compliance include:

- Participating in NFIP.
- Adopting ordinances that meet minimum Federal and state requirements to comply with NFIP.
- Conducting NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.
- Designating a local floodplain manager and/or CRS coordinator who achieves CFM certification.
- Completing and maintaining FEMA elevation certificates for pre-FIRM and/or post-FIRM buildings.
- Requiring and maintaining FEMA elevation certificates for all new and improved buildings located in floodplains.

F-9 Manage the Floodplain Beyond Minimum Requirements

In addition to participation in NFIP, implementing good floodplain management techniques that exceed minimum requirements can help minimize flood losses. Examples include:

- Incorporating the ASFPM's "No Adverse Impact" policy into local floodplain management programs.
- Revising the floodplain ordinance to incorporate cumulative substantial damage requirements.
- Adopting a "no-rise" in base flood elevation clause for the flood damage prevention ordinance.
- Extending the freeboard requirement past the mapped floodplain to include an equivalent land elevation.
- Including requirements in the local floodplain ordinance for homeowners to sign non-conversion agreements for areas below base flood elevation.
- Establishing and publicizing a user-friendly, publicly-accessible repository for inquirers to obtain Flood Insurance Rate Maps.
- Developing an educational flyer targeting NFIP policyholders on increased cost of compliance during post-flood damage assessments.
- Annually notifying the owners of repetitive loss properties of Flood Mitigation Assistance funding.
- Offering incentives for building above the required freeboard minimum (code plus).

F-10 Participate in the CRS

The Community Rating System (CRS) rewards communities that exceed the minimum NFIP requirements. Depending upon the level of participation, flood insurance premium rates are discounted for policyholders. Potential activities that are eligible to receive credit include:

- Advising the public about the local flood hazard, flood insurance, and flood protection measures.
- Enacting and enforcing regulations that exceed NFIP minimum standards so that more flood protection is provided for new development.
- Implementing damage reduction measures for existing buildings such as acquisition, relocation, retrofitting, and maintenance of drainage ways and retention basins.
- Taking action to minimize the effects of flooding on people, property, and building contents through measures including flood warning, emergency response, and evacuation planning.

F-11 Establish Local Funding Mechanisms for Flood Mitigation

Potential methods to develop local funding sources for flood mitigation include:

- Using taxes to support a regulatory system.
- Using impact fees to help fund public projects to mitigate impacts of land development (e.g., increased runoff).
- Levying taxes to fix maintenance of drainage systems and capital improvements.

LS-1 Map and Assess Vulnerability to Landslides

Improve data and mapping on specific landslide risks in the community by:

- Studying areas where riparian landslides may occur.
- Completing an inventory of locations where critical facilities, other buildings, and infrastructure are vulnerable to landslides.
- Using GIS to identify and map landslide hazard areas.
- Developing and maintaining a database to track community vulnerability to landslides.
- Assessing vegetation in wildfire-prone areas to prevent landslides after fires (e.g., encourage plants with strong root systems).

LS-2 Manage Development in Landslide Hazard Areas

Landslide risk can be mitigated by regulating development in landslide hazard areas through actions such as:

- Creating a plan to implement reinforcement measures in high-risk areas.
- Defining steep slope/high-risk areas in land use and comprehensive plans and creating guidelines or restricting new development in those areas.
- Creating or increasing setback limits on parcels near high-risk areas.
- Locating utilities outside of landslide areas to decrease the risk of service disruption.
- Restricting or limiting industrial activity that would strip slopes of essential top soil.
- Incorporating economic development activity restrictions in high-risk areas.

SLR-1 Map and Assess Vulnerability to Sea Level Rise

To better understand and assess local vulnerability to sea level rise, consider actions such as:

- Modeling various “what-if” scenarios to estimate potential vulnerabilities in order to develop sea level rise mitigation priorities.
- Using GIS to map hazard areas, at-risk structures, and associated hazards (e.g., flood and storm surge) to assess high-risk areas.
- Developing an inventory of public buildings and infrastructure that may be particularly vulnerable to sea level rise.
- Adding future conditions hydrology and areas that may be inundated by sea level rise to Digital Flood Insurance Rate Maps (DFIRM).

SLR-2 Manage Development in High-Risk Areas

Local governments can mitigate future losses resulting from sea level rise by regulating development in potential hazard areas through land use planning, including:

- Using zoning, subdivision regulations, and/or a special sea level rise overlay district to designate high-risk areas and specify the conditions for the use and development of specific areas.

- Promoting conservation and management of open space, wetlands, and/or sea level rise boundary zones to separate developed areas from high-hazard areas.
- Prohibiting the redevelopment of areas destroyed by storms or chronic erosion in order to prevent future losses.
- Encouraging compact community design in low-risk areas.
- Establishing setbacks in high-risk areas that account for potential sea level rise.

SRL-3 Prevent Infrastructure Expansion in High-Risk Areas

Future development can be protected from damage resulting from sea level rise through the following:

- Setting guidelines for annexation and service extensions in high-risk areas.
- Locating utilities and critical facilities outside of areas susceptible to sea level rise to decrease the risk of service disruption.
- Requiring all critical facilities to be built 1 foot above the 500-year flood elevation (considering wave action) or the predicted sea level rise level, whichever is higher.

SW-1 Adopt and Enforce Building Codes

Adopt regulations governing residential construction to prevent wind damage. Examples of appropriate regulations are:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Adopting standards from International Code Council (ICC)-600 Standard for Residential Construction in High-Wind Regions.
- Reviewing building codes and structural policies to ensure they are adequate to protect older structures from wind damage.
- Requiring or encouraging wind engineering measures and construction techniques that may include structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced pedestrian and garage doors, window shutters, waterproof adhesive sealing strips, or interlocking roof shingles.
- Requiring tie-downs with anchors and ground anchors appropriate for the soil type for manufactured homes.
- Prohibiting the use of carports and open coverings attached to manufactured homes.
- Requiring the use of special interlocking shingles designed to interlock and resist uplift forces in extreme wind conditions to reduce damage to a roof or other structures.
- Improving nailing patterns.
- Requiring building foundation design, braced elevated platforms, and protections against the lateral forces of winds and waves.
- Requiring new masonry chimneys greater than 6 feet above a roof to have continuous reinforced steel bracing.
- Requiring structures on temporary foundations to be securely anchored to permanent foundations.

SW-2 Promote or Require Site and Building Design Standards to Minimize Wind Damage

Damage associated with severe wind events can be reduced or prevented if considered during building and site design. Examples include the following:

- Using natural environmental features as wind buffers in site design.
- Incorporating passive ventilation in the building design.
- Incorporating passive ventilation in the site design. Passive ventilation systems use a series of vents in exterior walls or at exterior windows to allow outdoor air to enter the home in a controlled way.
- Encouraging architectural designs that limit potential for wind-borne debris.
- Improving architectural design standards for optimal wind conveyance.
- Encouraging wind-resistant roof shapes (e.g., hip over gable).

SW-3 Assess Vulnerability to Severe Wind

In order to better understand and assess local vulnerability to severe wind, consider actions such as:

- Developing and maintaining a database to track community vulnerability to severe wind.
- Using GIS to map areas that are at risk to the wind hazard associated with different hurricane conditions (e.g., Category 1, 2, 3, etc.) and to identify concentrations of at-risk structures.
- Creating a severe wind scenario to estimate potential loss of life and injuries, the types of potential damage, and existing vulnerabilities within a community to develop severe wind mitigation priorities.
- Using Hazus to quantitatively estimate potential losses from hurricane wind.

SW-4 Protect Power Lines and Infrastructure

The regular maintenance and upkeep of utilities can help prevent wind damage. Possible strategies are:

- Establishing standards for all utilities regarding tree pruning around lines.
- Incorporating inspection and management of hazardous trees into the drainage system maintenance process.
- Preemptively testing power line holes to determine if they are rotting.
- Inspecting utility poles to ensure they meet specifications and are wind resistant.
- Burying power lines to provide uninterrupted power after severe winds, considering both maintenance and repair issues.
- Upgrading overhead utility lines (e.g., adjust utility pole sizes, utility pole span widths, and/or line strength).
- Avoiding use of aerial extensions to water, sewer, and gas lines.
- Using designed-failure mode for power line design to allow lines to fall or fail in small sections rather than as a complete system to enable faster restoration.
- Installing redundancies and loopfeeds.

WW-1 Adopt and Enforce Building Codes

Buildings and infrastructure can be protected from the impacts of winter storms with the following regulations:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Ensuring the development and enforcement of building codes for roof snow loads.
- Discouraging flat roofs in areas that experience heavy snows.

SS-1 Adopt Building Codes and Development Standards

Building codes and development standards can be established to mitigate storm surge damage. Possible

regulations include:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Adopting ASCE-24-05 Flood Resistant Design and Construction. ASCE 24, created by the American Society of Civil Engineers, is a referenced standard in the IBC that specifies minimum requirements and expected performance for the design and construction of buildings and structures in flood hazard areas to make them more resistant to flood loads and flood damage.
- Establishing design standards for buildings located in areas susceptible to storm surge.
- Implementing V-zone construction requirements for new development located in coastal A-zones.
- Adopting building requirements for higher elevation in inundation zones.
- Requiring open foundations (e.g., piles or piers) in coastal areas.
- Requiring deep foundations in order to avoid erosion and scour.

SS-2 Improve Land Use Planning and Regulations

Land uses should be planned and regulated to minimize the impact of storm surge. Possible measures to implement include:

- Developing and maintaining a beach management plan.
- Adopting shoreline setback regulations and establishing coastal setback lines.
- Adopting coastal zone management regulations.
- Eliminating all obstructions in areas along the coast subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves (also known as the V-zone).
- Planning for future storm surge heights due to sea level rise.
- Limiting or prohibiting development in areas along the coast subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves (referred to as the V-zone on Flood Insurance Rate Maps).
- Adopting coastal A-zones, areas of special flood hazard that extend inland and are subject to breaking waves between 1.5 and 3 feet, and ensuring that they are mapped accurately.
- Adopting and enforcing coastal A-zones in A-zones.

SS-3 Minimize Risk to New Facilities and Infrastructure

Infrastructure and critical facilities can be protected from storm surge damage through the following:

- Locating future critical facilities outside of areas susceptible to storm surge.
- Requiring that all critical facilities meet requirements of Executive Order 11988 and be built 1 foot above the 500-year flood elevation (considering wave action).

SS-4 Map and Assess Vulnerability to Storm Surge

Storm surge risk can be better assessed and monitored with mapping techniques, including the following:

- Using GIS to map areas that are at risk to inundation by storm surge.
- Developing and maintaining a database to track community vulnerability to storm surge.

SU-1 Map and Assess Vulnerability to Subsidence

Some areas with subsidence risk may not be fully identified in your community. Consider actions such as:

- Using GIS to map areas that are susceptible to subsidence.
- Identifying and mapping old mining areas or geologically unstable terrain so that development can be prevented or eliminated.
- Using ground-penetrating radar to detect lava tubes and map their location.
- Supporting mapping efforts to identify areas of existing permafrost.
- Improving accuracy of hazard area maps to educate residents about unanticipated risks. Upgrading maps provides a truer measure of risks to a community.

SU-2 Manage Development in High-Risk Areas

Development regulations should consider areas with poor soil conditions, including the following:

- Prohibiting development in areas that have been identified as at-risk to subsidence.
- Restricting development in areas with soil that is considered poor or unsuitable for development.

SU-3 Consider Subsidence in Building Design

If subsidence is considered during building design, future damage may be prevented. Potential actions include:

- Educating design professionals about where to locate information on subsidence rates and maps.
- Incorporating structural designs that can resist loading associated with subsidence.
- Adopting an ordinance promoting permafrost sensitive construction practices.
- Including potential subsidence in freeboard calculations for buildings in flood-prone areas.

SU-4 Monitor Subsidence Risk Factors

Several risk factors can be monitored to help predict subsidence, such as the following:

- Monitoring areas at risk to subsidence by remaining aware of changes in groundwater levels.
- Monitoring areas where natural resources are removed from underground.
- Filling or buttressing subterranean open spaces, as with abandoned mines, to prevent or alleviate collapse.

TSU-1 Map and Assess Vulnerability to Tsunami

Tsunami risk can be better assessed and monitored with mapping techniques, including the following:

- Using GIS to map areas that are vulnerable to inundation by tsunamis.
- Developing and maintaining a database to track community vulnerability to tsunamis.
- Offering GIS hazard mapping online for residents and design professionals.
- Educating map users on the appropriate uses and limitations of maps.
- More accurately mapping problem areas to educate residents about unanticipated risks. Upgrading maps provides a truer measure of risks to a community.

TSU-2 Manage Development in Tsunami Hazard Areas

Planning and regulations can mitigate tsunami damage in many ways, such as:

- Adopting and enforcing building codes and design standards that contain requirements for

tsunami-resistant design.
- Limiting new development in tsunami run-up areas.
- Encouraging new development that is configured to minimize tsunami losses by using site planning strategies that slow water currents, steer water forces, and block water forces.

TSU-3 Protect Against Fire Following Tsunami

Communities can encourage wildfire mitigation measures (i.e., tree breaks) in tsunami-prone areas to reduce impacts of fires that may occur after a tsunami hits the coastline.

WF-1 Map and Assess Vulnerability to Wildfire

The first step in local planning is to identify wildfire hazard areas and assess overall community vulnerability. Potential actions include:
- Using GIS mapping of wildfire hazard areas to facilitate analysis and planning decisions through comparison with zoning, development, infrastructure, etc.
- Developing and maintaining a database to track community vulnerability to wildfire.
- Creating a wildfire scenario to estimate potential loss of life and injuries, the types of potential damage, and existing vulnerabilities within a community to develop wildfire mitigation priorities.

WF-2 Incorporate Wildfire Mitigation in the Comprehensive Plan

Communities can review comprehensive plans to ensure wildfire mitigation has been addressed. The comprehensive plan may include the following:
- Recognizing the existence of wildfire hazards and identifying areas of risk based on a wildfire vulnerability assessment.
- Describing policies and recommendation for addressing wildfire risk and discouraging expansion in the wildland-urban interface.
- Including considerations of wildfire hazards in land use, public safety, and other elements of the comprehensive plan.

WF-3 Reduce Risk through Land Use Planning

Local governments can mitigate future losses by regulating development in wildfire hazard areas through land use planning, including:
- Using zoning and/or a special wildfire overlay district to designate high-risk areas and specify the conditions for the use and development of specific areas.
- Addressing density and quantity of development, as well emergency access, landscaping and water supply.
- Promoting conservation of open space or wildland-urban boundary zones to separate developed areas from high-hazard areas.
- Setting guidelines for annexation and service extensions in high-risk areas.

WF-4 Develop a Wildland- Urban Interface Code

Communities can develop regulations for safer construction and incorporate mitigation considerations into the permitting process. Potential actions include:

- Developing specific design guidelines and development review procedures for new construction, replacement, relocation, and substantial improvement in wildfire hazard areas.
- Addressing fire mitigation through access, signage, fire hydrants, water availability, vegetation management, and special building construction standards.
- Involving fire protection agencies in determining guidelines and standards and in development and site plan review procedures.
- Establishing wildfire mitigation planning requirements for large scale developments or planned unit developments.

WF-5 Require or Encourage Fire-Resistant Construction Techniques

A local government can encourage fire-resistant construction or may choose to require it through local regulations. Examples include:

- Encouraging the use of non-combustible materials (i.e., stone, brick, and stucco) for new construction in wildfire hazard areas.
- Using fire resistant roofing and building materials in remodels, upgrades, and new construction.
- Enclosing the foundations of homes and other buildings in wildfire-prone areas, rather than leaving them open and potentially exposing undersides to blown embers or other materials.
- Prohibiting wooden shingles/wood shake roofs on any new development in areas prone to wildfires.
- Encouraging the use of functional shutters on windows.

MU-1 Assess Community Risk

Understanding community vulnerability and level of risk is important to identify and prioritize mitigation alternatives. Improve risk assessment through the following:

- Obtaining local data including tax parcels, building footprints, critical facility locations, and other information for use in risk analysis.
- Developing and maintaining a database to track community vulnerability (i.e., exposure in known hazard areas).
- Establishing a process to coordinate with state and Federal agencies to maintain up-to-date hazard data, maps, and assessments.
- Keeping aerial photography current, especially in rapidly developing areas.
- Identifying the most at-risk critical facilities and evaluating potential mitigation techniques.

MU-2 Map Community Risk

Maps are an important tool for communicating risk. Consider the following for developing GIS capabilities:

- Developing a coordinated GIS Department. Find out who uses GIS, determine how it is used, and identify other potential uses.
- Incorporating a GIS system/management plan for tracking permitting, land use patterns, etc.
- Obtaining hazard data and using GIS to map risk for various hazards.

MU-3 Prevent Development in Hazard Areas

Limit or prohibit development in high-hazard areas through the following types of actions:

- Encouraging clustering of residential lots outside of hazard areas in subdivision design/review.
- Prohibiting or limiting public expenditures for capital improvements in known hazard areas.
- Organizing a managed retreat from very high-risk areas.
- Purchasing the "right of first refusal" for hazard-prone parcels targeted for public acquisition.
- Purchasing land and title in the name of a local governing body to remove structures and enforce permanent restrictions on development.
- Acquiring and using easements (e.g., conservation) to prevent development in known hazard areas.
- Using conservation easements to protect environmentally significant portions of parcels from development.
- Acquiring hazardous areas for conservation or restoring as functional public parks.
- Acquiring safe sites for public facilities (e.g., schools, police/fire stations, etc.).
- Prohibiting new facilities for persons with special needs/mobility concerns in hazard areas.
- Prohibiting animal shelters in known hazard areas.

MU-4 Adopt Development Regulations in Hazard Areas

Regulate development in hazard areas. Examples include:

- Using subdivision and development regulations to regulate development in hazard-prone areas.
- Evaluating the use of performance/impact zoning to set risk-based standards for land development.
- Requiring setbacks from delineated hazard areas (e.g., shorelines, wetlands, steep slopes, etc.).
- Requiring conditional/special use permits for the development of known hazard areas.
- Offering expanded development rights to developers/businesses for performing mitigation retrofits.
- Incorporating restrictive covenants on properties located in known hazard areas.
- Designating high-risk zones as special assessment districts (to fund necessary hazard mitigation projects).

MU-5 Limit Density in Hazard Areas

Limit the density of development in the hazard areas through the following techniques:

- Increasing minimum lot size for development in known hazard areas.
- Designating "agricultural use districts" in the zoning ordinance to limit densities in known hazard areas.
- Ensuring the zoning ordinance encourages higher densities only outside of known hazards areas.
- Requiring clustering for planned unit developments (PUD) in the zoning ordinance to reduce densities in known hazard areas.
- Establishing a local transfer of development rights (TDR) program for risk in known hazard areas.
- Establishing a process to use floating zones to reduce densities in damaged areas following a disaster event.

MU-6 Integrate Mitigation into Local Planning

Hazard mitigation can be integrated into local planning efforts through the following:

- Incorporating risk assessment and hazard mitigation principles into comprehensive planning efforts.
- Incorporating a stand-alone element for hazard mitigation into the local comprehensive (land use) plan.
- Incorporating hazard mitigation into broader growth management (i.e., Smart Growth) initiatives.
- Incorporating a hazard risk assessment into the local development and subdivision review process.
- Adding hazard mitigation measures to existing adequate public facilities (APF) tests and programs.
- Ensuring natural hazards are considered in all land suitability analyses (LSA).
- Determining and enforcing acceptable land uses to alleviate the risk of damage by limiting exposure in such hazard areas.
- Developing a post-disaster reconstruction plan to facilitate decision making following a hazard event.
- Involving citizens in comprehensive planning activities that identify and mitigate hazards.

MU-7 Strengthen Land Use Regulations

Land use regulations can reduce hazard risk through the following:

- Using bonus/incentive zoning to encourage mitigation measures for private land development.
- Using conditional use zoning to require or exact mitigation measures for private land development.
- Establishing a process to use overlay zones to require mitigation techniques in high-hazard districts.
- Adopting a post-disaster recovery ordinance based on a plan to regulate repair activity, generally depending on property location.
- Adopting environmental review standards.
- Incorporating proper species selection, planting, and maintenance practices into landscape ordinances.

MU-8 Adopt and Enforce Building Codes

Building codes and inspections help ensure buildings can adequately withstand damage during hazard events. Effective actions include:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Increasing the local Building Code Effectiveness Grading Schedule (BCEGS) classification through higher building code standards and enforcement practices.
- Incorporating higher standards for hazard resistance in local application of the building code.
- Providing advanced training to local building inspectors.
- Considering orientation of new development during design (e.g., subdivisions, buildings, infrastructure, etc.)
- Requiring standard tie-downs of propane tanks.
- Requiring tie-downs for all manufactured housing.
- Establishing moratorium procedures to guide the suspension of post-disaster reconstruction permits.
- Revising fire codes to limit hotel room occupancy to ensure timely evacuation of high-use and

multi-floor structures.
- Establishing "value-added" incentives for hazard-resistant construction practices beyond code requirements.

MU-9 Create Local Funding Mechanisms for Hazard Mitigation

Local funding resources can be developed through the following measures:
- Establishing a local reserve fund for public mitigation measures.
- Using impact fees to help fund public hazard mitigation projects related to land development (i.e., increased runoff).
- Requiring a development impact tax on new construction to mitigate the impacts of that development.
- Recruiting local financial institutions to participate in "good neighbor" lending for private mitigation practices.
- Providing local match to Federal funds that can fund private mitigation practices.

MU-10 Incentivize Hazard Mitigation

Incentives and disincentives can be used to promote hazard mitigation through the following measures:
- Using special tax assessments to discourage builders from constructing in hazardous areas.
- Using insurance incentives and disincentives (i.e., incentives for best practices).
- Providing tax incentives for development of low-risk hazard parcels.
- Waiving permitting fees for home construction projects related to mitigation.
- Using tax abatements, public subsidies, and other incentives to encourage private mitigation practices.
- Reducing or deferring the tax burden for undeveloped hazard areas facing development pressure.
- Encouraging infill development through tax incentives, streamlined approval processes, etc.

MU-11 Monitor Mitigation Plan Implementation

Monitoring the implementation of the local mitigation plan can ensure that mitigation actions are being completed through:
- Forming a plan implementation steering committee to monitor progress on local mitigation actions. Include a mix of representatives from neighborhoods, local businesses, and local government.
- Preparing a plan implementation monitoring schedule and outlining roles for those responsible for monitoring (i.e., local departments, agencies, and committees).
- Preparing and submitting an annual plan implementation progress report to the local elected body.

STRUCTURE AND INFRASTRUCTURE PROJECTS

D-7 Retrofit Water Supply Systems

Improve water supply and delivery systems to save water through actions such as:

- Designing water delivery systems to accommodate drought events.
- Developing new or upgrading existing water delivery systems to eliminate breaks and leaks.

EQ-5 Protect Critical Facilities and Infrastructure

Reduce potential damage to critical facilities and infrastructure from future seismic events through actions such as:

- Conducting seismic retrofitting for critical public facilities most at risk to earthquakes.
- Requiring bracing of generators, elevators, and other vital equipment in hospitals.
- Identifying and hardening critical lifeline systems (i.e., critical public services such as utilities and roads) to meet "Seismic Design Guidelines and Standards for Lifelines" or equivalent standards such as American Lifelines Alliance (ALA) guidance. This may distinguish a manageable earthquake from a social and economic catastrophe.
- Reviewing construction plans for all bridges to determine their susceptibility to collapse and retrofitting problem bridges.
- Using flexible piping when extending water, sewer, or natural gas service.
- Installing shutoff valves and emergency connector hoses where water mains cross fault lines.

EQ-6 Implement Structural Mitigation Techniques

Use structural mitigation measures to reduce damage from future seismic events, such as:

- Strengthening and retrofitting non-reinforced masonry buildings and non-ductile concrete facilities that are particularly vulnerable to ground shaking.
- Retrofitting building veneers to prevent failure.
- Building a safe room to provide protection during an earthquake.
- Installing window film to prevent injuries from shattered glass.
- Anchoring rooftop-mounted equipment (i.e., HVAC units, satellite dishes, etc).
- Constructing masonry chimneys greater than 6 feet above a roof with continuous reinforced steel bracing.

ER-4 Remove Existing Buildings and Infrastructure from Erosion Hazard Areas

To prevent damage to buildings and infrastructure from erosion, consider acquiring and demolishing or relocating at-risk buildings and infrastructure and enforcing permanent restrictions on development after land and structure acquisition.

F-12 Remove Existing Structures from Flood Hazard Areas

Communities may remove structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving lands subject to repetitive flooding.

F-13 Improve Storm Water Drainage System Capacity

Rainwater and snowmelt can cause flooding and erosion in developed areas. Structural storm water management projects that prevent this include:

- Installing, re-routing, or increasing the capacity of a storm drainage system.

- Increasing drainage or absorption capacities with detention and retention basins, relief drains, spillways, drain widening/dredging or rerouting, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, or channel redirection.
- Increasing capacity of storm water detention and retention basins.
- Increasing dimensions of drainage culverts in flood-prone areas.
- Using stream restoration to ensure adequate drainage and diversion of storm water.
- Requiring developers to construct on-site retention basins for excessive storm water and as a firefighting water source.
- Providing grassy swales along roadsides.

F-14 Conduct Regular Maintenance for Drainage Systems and Flood Control Structures

Regular maintenance will help drainage systems and flood control structures continue to function properly. Potential activities include:

- Performing regular drainage system maintenance, such as sediment and debris clearance, as well as detection and prevention of discharges into storm water and sewer systems from home footing drains, downspouts, or sewer pumps.
- Implementing an inspection, maintenance, and enforcement program to help ensure continued structural integrity of dams and levees.
- Routinely cleaning debris from support bracing underneath low-lying bridges.
- Routinely cleaning and repairing storm water drains.
- Regularly clearing sediment build-up on riverbanks near aerial lines.
- Inspecting bridges and identifying if any repairs or retrofits are needed to prevent scour.
- Incorporating ice jam prevention techniques as appropriate.

F-15 Elevate or Retrofit Structures and Utilities

Structures and utilities can be elevated to reduce flood damage, including:

- Elevating structures so that the lowest floor, including the basement, is raised above the base flood elevation.
- Raising utilities or other mechanical devices above expected flood levels.
- Elevating and anchoring manufactured homes or, preferably, keeping manufactured homes out of the floodplain.
- Relocating utilities and water heaters above base flood elevation and using tankless water heaters in limited spaces.

F-16 Flood proof Residential and Non-Residential Structures

Flood proofing techniques may protect certain structures from flood damage, including:

- Wet flood proofing in a basement, which may be preferable to attempting to keep water out completely because it allows for controlled flooding to balance exterior and interior wall forces and discourages structural collapse.
- Encouraging wet flood proofing of areas above base flood elevation.
- Using water resistant paints or other materials to allow for easy cleanup after floodwater exposure in accessory structures or in a garage area below an elevated residential structure.
- Dry flood proofing non-residential structures by strengthening walls, sealing openings, or using waterproof compounds or plastic sheeting on walls to keep water out.

F-17 Protect Infrastructure

Mitigation techniques can be implemented to help minimize losses to infrastructure from flood events, such as:

- Elevating roads and bridges above the base flood elevation to maintain dry access. In situations where flood waters tend to wash roads out, construction, reconstruction, or repair can include not only attention to drainage, but also stabilization or armoring of vulnerable shoulders or embankments.
- Raising low-lying bridges.
- Flood proofing wastewater treatment facilities located in flood hazard areas.
- Flood proofing water treatment facilities located in flood hazard areas.
- Depending on its infrastructure capabilities, using check valves, sump pumps, and backflow prevention devices in homes and buildings.
- Using bioengineered bank stabilization techniques.

F-18 Protect Critical Facilities

Techniques to protect critical facilities from flood events include:

- Requiring that all critical facilities including emergency operations centers (EOC), police stations, and fire department facilities be located outside of flood-prone areas.
- Requiring all critical facilities to meet requirements of Executive Order 11988 and be built 1 foot above the 500-year flood elevation.
- Installing/upgrading storm water pumping stations.
- Raising electrical components of sewage lift stations above base flood elevation.
- Raising manhole openings using concrete pillars.
- Installing watertight covers or inflow guards on sewer manholes.
- Installing flood telemetry systems in sewage lift stations.
- Installing back-up generators for pumping and lift stations in sanitary sewer systems along with other measures (e.g., alarms, meters, remote controls, and switchgear upgrades).
- Building earthen dikes around flood-threatened critical facilities.
- Using bioengineered bank stabilization techniques.

F-19 Construct Flood Control Measures

Small flood control structures can be built to prevent flood damage. Examples include:

- Using minor structural projects that are smaller and more localized (e.g., floodwalls or small berms) in areas that cannot be mitigated through non-structural activities or where structural activities are not feasible due to low densities.
- Using revetments (hardened materials placed atop existing riverbanks or slopes) to protect against floods.
- Using bioengineered bank stabilization techniques.

HA-1 Locate Safe Rooms to Minimize Damage

Locate tornado safe rooms inside or directly adjacent to houses to prevent hail-induced injuries that may occur when taking shelter during a severe thunderstorm.

HA-2 Protect Buildings from Hail Damage

For new construction as well as retrofitting existing buildings, techniques to minimize hail damage include:

- Including measures such as structural bracing, shutters, laminated glass in window panes, and hail-resistant roof coverings or flashing in building design to minimize damage.
- Improving roof sheathing to prevent hail penetration.
- Installing hail resistant roofing and siding.
- Contacting the Insurance Institute for Business and Home Safety (IBHS) to learn more about the most appropriate type of roof covering for your geographic region.

LS-3 Prevent Impacts to Roadways

To prevent roadway damage and traffic disruptions from landslides, consider options such as:

- Implementing monitoring mechanisms/procedures (i.e., visual inspection or electronic monitoring systems).
- Applying soil stabilization measures, such as planting soil- stabilizing vegetation on steep, publicly-owned slopes.
- Using debris-flow measures that may reduce damage in sloping areas, such as stabilization, energy dissipation, and flow control measures.
- Establishing setback requirements and using large setbacks when building roads near slopes of marginal stability.
- Installing catch-fall nets for rocks at steep slopes near roadways.

LS-4 Remove Existing Buildings and Infrastructure from Landslide Hazard Areas

To help mitigate landslide hazards, communities can acquire and demolish or relocate at-risk buildings and infrastructure and enforce permanent restrictions on development after land and structure acquisition.

L-1 Protect Critical Facilities and Equipment

Protect critical facilities and infrastructure from lighting damage with the following measures:

- Installing lightning protection devices and methods, such as lightning rods and grounding, on communications infrastructure and other critical facilities.
- Installing and maintaining surge protection on critical electronic equipment.

SRL-4 Protect Buildings and Infrastructure

Existing structures, infrastructure, and critical facilities can be protected from sea level rise through the following:

- Acquiring and demolishing or relocating structures located in high-risk areas.
- Retrofitting structures to elevate them above potential sea level rise levels.
- Retrofitting critical facilities to be 1 foot above the 500-year flood elevation (considering wave action) or the predicted sea level rise level, whichever is higher.
- Replacing exterior building components with more hazard- resistant materials.

SW-5 Retrofit Residential Buildings

The following types of modifications or retrofits to existing residential buildings can reduce future wind damage:

- Improving the building envelope.
- Installing hurricane shutters or other protective measures.
- Retrofitting gable end walls to eliminate wall failures in high winds.
- Replacing existing non-ductile infrastructure with ductile infrastructure to reduce their exposure to hazardous events.
- Retrofitting buildings with load-path connectors to strengthen the structural frames.
- Installing safe rooms.
- Reinforcing garage doors.
- Inspecting and retrofitting roofs to adequate standards to provide wind resistance.

SW-6 Retrofit Public Buildings and Critical Facilities

Public buildings and critical facilities can be retrofitted to reduce future wind damage with the following actions:

- Improving roof coverings (e.g., no pebbles, remove ballast roof systems).
- Anchoring roof-mounted heating, ventilation, and air conditioning units.
- Retrofitting buildings with load-path connectors to strengthen the structural frames.
- Retrofitting or constructing the emergency operations center to FEMA 361 standards.
- Avoiding placing flag poles or antennas near buildings.
- Upgrading and maintaining existing lightning protection systems to prevent roof cover damage.
- Requiring upgrading of reused buildings that will house critical facilities.
- Protecting traffic lights and other traffic controls from high winds.
- Converting traffic lights to mast arms.

WW-2 Protect Buildings and Infrastructure

Buildings and infrastructure can be protected from the impacts of winter storms with the following techniques:

- Adding building insulation to walls and attics.
- As buildings are modified, using new technology to create or increase structural stability.
- Retrofitting public buildings to withstand snow loads and prevent roof collapse.

WW-3 Protect Power Lines

Power lines can be protected from the impacts of winter storms with the following techniques:

- Establishing standards for all utilities regarding tree pruning around lines.
- Burying overhead power lines.
- Using designed-failure mode for power line design to allow lines to fall or fail in small sections rather than as a complete system to enable faster restoration.
- Installing redundancies and loop feeds.

WW-4 Reduce Impacts to Roadways

The leading cause of death during winter storms is from automobile or other transportation accidents, so it is important to consider ways to lessen roadway impacts. Potential strategies include:

- Planning for and maintaining adequate road and debris clearing capabilities.
- Using snow fences or "living snow fences" (e.g., rows of trees or other vegetation) to limit blowing and drifting of snow over critical roadway segments.
- Installing roadway heating technology to prevent ice/snow buildup.

SS-5 Construct Structural Control Techniques

Structural controls can be used to lessen the impact of storm surge. Examples include the following:

- Constructing groins to capture material along the shoreline in order to trap and retain sand.
- Installing geotextile sand tubes to trap sand or protect beachfront properties.
- Building a coastal berm to absorb waves and protect the shoreline from erosion.
- Building a storm berm to keep rock protection in place and provide a slow supply of sediment to the coastal system.

SS-6 Protect Infrastructure and Critical Facilities

Infrastructure and critical facilities can be protected from damage by storm surge through the following:

- Reorienting near-shore roads so they are parallel (not perpendicular) to the beach to prevent the channelization of storm surge and wind inland.
- Constructing seawalls or other structures to protect critical facilities located on the shoreline.
- Relocating existing vulnerable critical facilities outside of high-risk areas.

SU-5 Remove Existing Structures from Subsidence Hazard Areas

To prevent property loss, acquire and demolish or relocate buildings and infrastructure in high-risk areas.

TSU-4 Build Tsunami Shelters

Ensure the population is adequately protected from tsunami inundation by constructing tsunami shelters.

TSU-5 Protect Buildings and Infrastructure

Ensure buildings and infrastructures are adequately protected from tsunami inundation with the

following:

- Requiring coastal structures to be built to standards that allow for proper vertical evacuation and to be specially designed and constructed to resist both tsunami and earthquake loads.
- Locating new and relocating existing infrastructure and critical facilities outside of the tsunami hazard area.
- Elevating existing buildings above the inundation level.
- Relocating fire-prone infrastructure such as electrical lines or case tanks.

WF-6 Retrofit At-Risk Structures with Ignition-Resistant Materials

Existing structures in wildfire hazard areas can be protected through the use of non-combustible materials and technologies, including:

- Installing roof coverings, sheathing, flashing, skylights, roof and attic vents, eaves, and gutters that conform to ignition-resistant construction standards.
- Installing wall components that conform to ignition-resistant construction standards.
- Protecting propane tanks or other external fuel sources.
- Purchasing and installing external, structure-specific water hydration systems (sprinklers); dedicated power sources; and dedicated cisterns if no water source (e.g., lake, river, or swimming pool) is available.

WF-7 Create Defensible Space around Structures and Infrastructure

Local governments can implement defensible space programs to reduce risk to structures and infrastructure, including:

- Creating buffers around residential and non-residential structures through the removal or reduction of flammable vegetation, including vertical clearance of tree branches.
- Replacing flammable vegetation with less flammable species.
- Creating defensible zones around power lines, oil and gas lines, and other infrastructure systems.

WF-8 Conduct Maintenance to Reduce Risk

Local governments can implement maintenance procedures to reduce wildfire risk, including:

- Performing arson prevention cleanup activities in areas of abandoned or collapsed structures, accumulated trash or debris, and with a history of storing flammable materials where spills or dumping may have occurred.
- Preventing or alleviating wildfires by proper maintenance and separation of power lines as well as efficient response to fallen power lines.
- Routinely inspecting the functionality of fire hydrants.
- Requiring and maintaining safe access for fire apparatus to wildland-urban interface neighborhoods and properties.

MU-12 Protect Structures

Damage to structures can be prevented through the following actions:

- Acquiring or relocating structures located in hazard areas.
- Moving vulnerable structures to a less hazardous location.

- Relocating or retrofitting public buildings located in high-hazard areas.
- Relocating or retrofitting endangered public housing units in high- hazard areas.
- Retrofitting fire and police stations to become hazard resistant.
- Identifying and strengthening facilities to function as public shelters.

MU-13 Protect Infrastructure and Critical Facilities

Infrastructure and critical facilities can be protected from damage by the following:

- Incorporating hazard mitigation principles into all aspects of public-funded building.
- Incorporating mitigation retrofits for public facilities into the annual capital improvements program.
- Engineering or retrofitting roads and bridges to withstand hazards.
- Relocating or undergrounding electrical infrastructure.
- Designing and building water tanks or wells for use in times of water outage.
- Installing quick-connect emergency generator hook-ups for critical facilities

NATURAL SYSTEMS PROTECTION

D-8 Enhance Landscaping and Design Measures

Encourage drought-tolerant landscape design through measures such as:

- Incorporating drought tolerant or xeriscaping practices into landscape ordinances to reduce dependence on irrigation.
- Providing incentives for xeriscaping.
- Using permeable driveways and surfaces to reduce runoff and promote groundwater recharge.

EQ-7 Increase Earthquake Risk Awareness

There are many ways to increase awareness of earthquake risk, including:

- Working with insurance industry representatives to increase public awareness of the importance of earthquake insurance. Residential structural improvements can be factored into the process of obtaining insurance coverage or reduced deductibles.
- Developing an outreach program about earthquake risk and mitigation activities in homes, schools, and businesses.
- Educating homeowners on safety techniques to follow during and after an earthquake.
- Offering GIS hazard mapping online for residents and design professionals.

EQ-8 Conduct Outreach to Builders, Architects, Engineers, and Inspectors

Building susceptibility to earthquake damage can be improved if design professionals are made aware of proper design and building requirements. Outreach activities include:

- Conducting information sessions or other forms of outreach on seismic code provisions for new and existing buildings to enhance code use and enforcement by local architects, engineers, contractors, and code enforcement personnel.
- Training building department staff and officials on Form ATC-20 for post-earthquake building

evaluation. The ATC-20 report and addendum, prepared by the Applied Technology Council, provide procedures and guidelines for making on-the-spot evaluations and decisions regarding continued use and occupancy of earthquake- damaged buildings.

EQ-9 Provide Information on Structural and Non-Structural Retrofitting

Property owners can retrofit existing structures to reduce damage from seismic events. Potential actions include the following:

- Educating homeowners about structural and non-structural retrofitting of vulnerable homes and encouraging retrofit.
- Developing a technical assistance information program for homeowners. Teaching them how to seismically strengthen their houses can be an effective mitigation activity. The program can include providing local government building departments with copies of existing strengthening and repair information for distribution.
- Developing an outreach program to encourage homeowners to secure furnishings, storage cabinets, and utilities to prevent injuries and damage. Examples include anchoring tall bookcases and file cabinets, installing latches on drawers and cabinet doors, restraining desktop computers and appliances, using flexible connections on gas and water lines, mounting framed pictures and mirrors securely, and anchoring and bracing propane tanks and gas cylinders.
- Establishing a library of technical documents on structural and non-structural mitigation options as well as model ordinances and procedures that have been used by other jurisdictions to reduce earthquake risk.

ER-5 Stabilize Erosion Hazard Areas

To stabilize slopes susceptible to erosion, consider options such as:

- Preventing erosion with proper bank stabilization, sloping or grading techniques, planting vegetation on slopes, terracing hillsides, or installing riprap boulders or geotextile fabric.
- Stabilizing cliffs with terracing or plantings of grasses or other plants to hold soil together.
- Prohibiting removal of natural vegetation from dunes and slopes.
- Planting mature trees in the coastal riparian zone to assist in dissipation of the wind force in the breaking wave zone.
- Using a hybrid of hard/soft engineering techniques (i.e., combine low-profile rock, rubble, oyster reefs, or wood structures with vegetative planting or other soft stabilization techniques).
- Implementing marine riparian habitat reinstatement or revegetation.
- Using a rock splash pad to direct runoff and minimize the potential for erosion.
- Using bioengineered bank stabilization techniques.

F-20 Protect and Restore Natural Flood Mitigation Features

Natural resources provide floodplain protection, riparian buffers, and other ecosystem services that mitigate flooding. It is important to preserve such functionality with the following:

- Protecting and enhancing landforms that serves as natural mitigation features (i.e., riverbanks, wetlands, dunes, etc.).
- Using vegetative management, such as vegetative buffers, around streams and water sources.
- Protecting and preserving wetlands to help prevent flooding in other areas.
- Establishing and managing riparian buffers along rivers and streams.
- Retaining natural vegetative beds in storm water channels.

- Retaining thick vegetative cover on public lands flanking rivers.

F-21 Preserve Floodplains as Open Space

Preserving natural areas and vegetation benefits natural resources while also mitigating potential flood losses. Techniques include:

- Developing an open space acquisition, reuse, and preservation plan targeting hazard areas.
- Developing a land banking program for the preservation of the natural and beneficial functions of flood hazard areas.
- Using transfer of development rights to allow a developer to increase densities on another parcel that is not at risk in return for keeping floodplain areas vacant.
- Compensating an owner for partial rights, such as easement or development rights, to prevent a property from being developed.

F-22 Increase Awareness of Flood Risk and Safety

Ideas for increasing flood risk awareness include the following:

- Encouraging homeowners to purchase flood insurance.
- Annually distributing flood protection safety pamphlets or brochures to the owners of flood-prone property.
- Educating citizens about safety during flood conditions, including the dangers of driving on flooded roads.
- Using outreach programs to advise homeowners of risks to life, health, and safety.
- Offering GIS hazard mapping online for residents and design professionals.
- Establishing a Program for Public Information (PPI) with a PPI committee (as suggested by Activity 332 of the CRS Coordinator's Manual).

SLR-5 Preserve High-Hazard Areas as Open Space

Preserve open space to benefit natural resources and to reduce risk to structures from potential sea level rise. Techniques include:

- Developing an open space acquisition, reuse, and preservation plan targeting hazard areas.
- Developing a land banking program for the preservation and management of the natural and beneficial functions of flood hazard areas.
- Adopting rolling easements along the shoreline to promote natural migration of shorelines.
- Using transfer of development rights to allow a developer to increase densities on another parcel that is not at risk in return for keeping floodplain areas vacant.
- Compensating an owner for partial rights, such as easement or development rights, to prevent a property from being developed.

SLR-6 Protect and Restore Natural Buffers

Natural resources provide floodplain protection, riparian buffers, and other ecosystem services that mitigate sea level rise. It is important to preserve such functionality with the following:

- Examining the appropriate use of beach nourishment, sand scraping, dune-gap plugs, etc., for coastal hazards.
- Implementing dune restoration, plantings (e.g., sea oats), and use of natural materials.

- Examining the appropriate use of sediment-trapping vegetation, sediment mounds, etc., for coastal hazards.
- Planting sediment-trapping vegetation to buffer the coast against coastal storms by collecting sediment in protective features such as dunes or barrier islands.
- Performing sand scraping—using bulldozers to deposit the top foot of sand above the high-tide line—to reinforce the beach without adding new sand.
- Using sediment mounds to act as artificial dunes or plugs for natural dune gaps in order to slow the inland progress of storm- related wind and water.

SS-7 Protect and Restore Natural Buffers

Natural resources provide floodplain protection, riparian buffers, and other ecosystem services that mitigate storm surge risk. It is important to preserve such functionality with the following:

- Examining the appropriate use of beach nourishment, sand scraping, dune-gap plugs, etc., for coastal hazards.
- Implementing dune restoration, plantings (e.g., sea oats), and use of natural materials.
- Evaluating the appropriate use of sediment-trapping vegetation, sediment mounds, etc., for coastal hazards.
- Planting sediment-trapping vegetation to make the coast more resistant to coastal storms by collecting sediment in protective features such as dunes or barrier islands.
- Performing sand scraping—using bulldozers to deposit the top foot of sand above the high-tide line—to reinforce the beach without adding new sand.
- Using sediment mounts to act as artificial dunes or plugs for natural dune gaps in order to slow the inland progress of storm-related wind and water.

WF-9 Implement a Fuels Management Program

A fuels management program may be implemented to reduce hazardous vegetative fuels on public lands, near essential infrastructure, or on private lands by working with landowners. The program can include the following:

- Performing maintenance including fuel management techniques such as pruning and clearing dead vegetation, selective logging, cutting high grass, planting fire-resistant vegetation, and creating fuel/fire breaks (i.e., areas where the spread of wildfires will be slowed or stopped by the removal of fuels).
- Using prescribed burning to reduce fuel loads that threaten public safety and property.
- Identifying and clearing fuel loads created by downed trees.
- Cutting firebreaks into public wooded areas in the wildland-urban interface.
- Sponsoring local “slash and clean-up days” to reduce fuel loads along the wildland-urban interface.
- Linking wildfire safety with environmental protection strategies (i.e., improving forest ecology, wildlife habitat, etc.).
- Developing a vegetation management plan.

EDUCATION AND AWARENESS PROGRAMS

D-9 Educate Residents on Water Saving Techniques

Encourage citizens to take water-saving measures, such as the following:

- Installing low-flow water saving showerheads and toilets.
- Turning water flow off while brushing teeth or during other cleaning activities.
- Adjusting sprinklers to water the lawn and not the sidewalk or street.
- Running the dishwasher and washing machine only when they are full.
- Checking for leaks in plumping or dripping faucets.
- Installing rain-capturing devices for irrigation.
- Encouraging the installation of gray water systems in homes to encourage water reuse.

D-10 Educate Farmers on Soil and Water Conservation Practices

Encourage farmers to implement soil and water conservation practices that foster soil health and improve soil quality to help increase resiliency and mitigate the impacts of droughts. Potential conservation practices include the following:

- Rotating crops by growing a series of different types of crops on the same fields every season to reduce soil erosion.
- Practicing contour farming by farming along elevation contour lines to slow water runoff during rainstorms and prevent soil erosion, allowing the water time to absorb into the soil.
- Using terracing on hilly or mountainous terrain to decrease soil erosion and surface runoff.
- Planting “cover crops,” such as oats, wheat, and buckwheat, to prevent soil erosion.
- Using zero and reduced tillage to minimize soil disturbance and leave crop residue on the ground to prevent soil erosion.
- Constructing windbreaks to prevent evaporation from reclaiming salt-affected soil.
- Collecting rainwater and using natural runoff to water plants.

D-11 Purchase Crop Insurance

Preserve economic stability during a drought by encouraging agricultural interests to obtain crop insurance to cover potential losses due to drought.

ER-6 Increase Awareness of Erosion Hazards

Consider ways to help citizens become more aware of specific erosion risks in your area, such as:

- Notifying property owners located in high-risk areas.
- Disclosing the location of high-risk areas to buyers.
- Developing a brochure describing risk and potential mitigation techniques.
- Offering GIS hazard mapping online for residents and design professionals.

ET-2 Increase Awareness of Extreme Temperature Risk and Safety

The impacts of extreme temperatures on public health can be lessened if citizens know how to prepare and protect themselves. Ideas for increasing awareness include the following:

- Educating citizens regarding the dangers of extreme heat and cold and the steps they can take to protect themselves when extreme temperatures occur.

ET-3 Assist Vulnerable Populations

Measures should be taken to ensure vulnerable populations are adequately protected from the impacts of extreme temperatures, such as:

- Organizing outreach to vulnerable populations, including establishing and promoting accessible heating or cooling centers in the community.
- Requiring minimum temperatures in housing/landlord codes.
- Encouraging utility companies to offer special arrangements for paying heating bills, if not already required by state law.
- Creating a database to track those individuals at high risk of death, such as the elderly, homeless, etc.

ET-4 Educate Property Owners About Freezing Pipes

Extreme cold may cause water pipes to freeze and burst, which can cause flooding inside a building. Ideas for educating property owners include the following:

- Educating homeowners and builders on how to protect their pipes, including locating water pipes on the inside of building insulation or keeping them out of attics, crawl spaces, and vulnerable outside walls.
- Informing homeowners that letting a faucet drip during extreme cold weather can prevent the buildup of excessive pressure in the pipeline and avoid bursting.

F-23 Educate Property Owners about Flood Mitigation Techniques

Educate property owners regarding options for mitigating their properties from flooding through outreach activities such as:

- Using outreach activities to facilitate technical assistance programs that address measures that citizens can take or facilitate funding for mitigation measures.
- Encouraging homeowners to install backflow valves to prevent reverse-flow flood damages.
- Encouraging residents in flood-prone areas to elevate homes.
- Educating the public about securing debris, propane tanks, yard items, or stored objects that may otherwise be swept away, damaged, or pose a hazard if picked up and washed away by floodwaters.
- Asking residents to help keep storm drains clear of debris during storms (not to rely solely on Public Works).

HA-3 Increase Hail Risk Awareness

Conduct outreach activities to increase public awareness of hail dangers, including:

- Mailing safety brochures with monthly water bills.
- Posting warning signage at local parks, county fairs, and other outdoor venues.
- Teaching school children about the dangers of hail and how to take safety precautions.

L-2 Conduct Lightning Awareness Programs

Use outreach programs to promote awareness of lightning dangers. This could include ideas such as:

- Developing a lightning brochure for distribution by recreation equipment retailers or outfitters

in mountainous areas.
- Mailing safety brochures with monthly water bills.
- Posting warning signage at local parks.
- Teaching school children about the dangers of lightning and how to take safety precautions.

SLR-7 Increase Awareness of Sea Level Rise

Improve public awareness of risks due to sea level rise through outreach activities such as:
- Encouraging homeowners to purchase flood insurance.
- Using outreach programs to facilitate technical assistance programs that address measures that citizens can take or facilitate funding for mitigation measures.
- Annually distributing flood protection safety pamphlets or brochures to the owners of property in high-risk areas.
- Educating citizens about safety during flood conditions, including the dangers of driving on flooded roads.
- Using outreach programs to advise homeowners of risks to life, health, and safety.
- Offering GIS hazard mapping online for residents and design professionals.
- Disclosing the location of possible sea level rise areas to potential buyers.

SW-7 Increase Severe Wind Risk Awareness

Improve public awareness of severe wind through outreach activities such as:
- Informing residents of shelter locations and evacuation routes.
- Educating homeowners on the benefits of wind retrofits such as shutters, hurricane clips, etc.
- Ensuring that school officials are aware of the best area of refuge in school buildings.
- Instructing property owners on how to properly install temporary window coverings before a storm.
- Educating design professionals to include wind mitigation during building design.

WW-5 Conduct Winter Weather Risk Awareness Activities

Public awareness of severe winter storms can be improved through the following efforts:
- Informing the public about severe winter weather impacts.
- Producing and distributing family and traveler emergency preparedness information about severe winter weather hazards.
- Including safety strategies for severe weather in driver education classes and materials.
- Encouraging homeowners to install carbon monoxide monitors and alarms.
- Educating citizens that all fuel-burning equipment should be vented to the outside.

WW-6 Assist Vulnerable Populations

Protect vulnerable populations from the impacts of severe winter storms through the following efforts:
- Identifying specific at-risk populations that may be exceptionally vulnerable in the event of long-term power outages.
- Organizing outreach to vulnerable populations, including establishing and promoting accessible heating centers in the community.

SS-8 Provide Information on High-Risk Areas

Increase public awareness of storm surge risk through the following actions:

- Offering GIS hazard mapping online for residents and design professionals.
- More accurately mapping problem areas to educate residents about unanticipated risks. Upgrading maps provides a truer measure of risks to a community.
- Educating property owners in high-risk areas about mitigation options.
- Educating the public about risks, preparedness measures, and evacuation procedures.

SU-6 Educate Residents about Subsidence

Increase residents' knowledge of subsidence through the following:

- Promoting community awareness of subsidence risks and impacts.
- Offering GIS hazard mapping online for residents and design professionals.

T-3 Conduct Tornado Awareness Activities

Conduct outreach activities to increase awareness of tornado risk. Activities could include the following:

- Educating citizens through media outlets.
- Conducting tornado drills in schools and public buildings.
- Teaching school children about the dangers of tornadoes and how to take safety precautions.
- Distributing tornado shelter location information.
- Supporting severe weather awareness week.
- Promoting use of National Oceanic and Atmospheric Administration (NOAA) weather radios.

TSU-6 Increase Public Awareness of Tsunami Hazard

Improve public awareness and better prepare citizens for evacuation during a tsunami by the following:

- Educating citizens regarding the dangers of tsunami and inform them of emergency procedures and routes to use should a tsunami warning be issued.
- Conducting tsunami drills.
- Designating tsunami inundation zones and marking evacuation routes.
- Developing maps showing possible tsunami inundation areas and steering developers away from high-risk areas.
- Participating in NOAA's TsunamiReady Community program.

WF-10 Participate in Firewise Program

The Firewise program provides a series of steps that individual residents and their neighbors can take to keep their homes and neighborhoods safer from fire. Consider actions such as:

- Joining the "Firewise Communities/USA" recognition program sponsored by the National Wildlife Coordinating Group (firewise.org).
- Sponsoring Firewise workshops for local officials, developers, civic groups, and neighborhood/ homeowners' associations.
- Consulting Firewise guidance and encouraging or requiring best practices in your community.

WF-11 Increase Wildfire Risk Awareness

Education and outreach programs can target citizens, businesses, developers, landscapers, and insurers among others to increase awareness of wildfire risk and strategies for protecting homes and infrastructure. Consider actions such as:

- Offering GIS hazard mapping online for residents, developers, and design professionals.
- Organizing a local fire department tour to show local elected officials and planners the most vulnerable areas of the community's wildland-urban interface and increase their understanding of risks.
- Working with insurance companies, utility providers, and others to include wildfire safety information in materials provided to area residents.
- Developing partnerships with neighborhood groups, homeowners' associations, and others to conduct outreach activities.
- Using local fire departments to conduct education programs in schools.
- Informing the public about proper evacuation procedures.
- Forming a citizen plan implementation steering committee to monitor progress of local mitigation actions. Include a mix of representatives from neighborhoods, local businesses, and local government.

WF-12 Educate Property Owners about Wildfire Mitigation Techniques

Educate property owners on actions that they can take to reduce risk to property, such as the following:

- Installing fire mitigation systems such as interior and exterior sprinkler systems.
- Performing safe disposal of yard and household waste rather than open burning.
- Removing dead or dry leaves, needles, twigs, and combustibles from roofs, decks, eaves, porches, and yards.
- Creating a defensible space or buffer zone cleared of combustible materials around property.
- Installing and maintaining smoke detectors and fire extinguishers on each floor of their homes or other buildings.
- Safely using and storing necessary flammable materials, including machine fuels.
- Approved safety cans should be used for storing gasoline, oily rags, and other flammable materials. Firewood should be stacked at least 100 feet away and uphill from homes.
- Keeping flammables, such as curtains, secured away from windows or using heavy fire-resistant drapes.

MU-14 Increase Hazard Education and Risk Awareness

Hazard education and awareness activities that address multiple hazards include:

- Developing and implementing a multi-hazard public awareness program.
- Providing information on all types of hazards, preparedness and mitigation measures, and responses during hazard events.
- Establishing a "hazard awareness week" in coordination with the media to promote hazard awareness (seasonal).
- Establishing an interactive website for educating the public on hazard mitigation and preparedness measures.
- Annually hosting a public hazards workshop or exposition for all residents.
- Establishing hazard information centers.
- Creating a speakers bureau for disaster-related topics that focus on mitigation and preparedness measures.

- Enhancing hazard awareness of the private sector, particularly lenders, insurance agents, and realtors.
- Scheduling an annual "what's new in mitigation" briefing for the local governing body (possibly with SHMO, etc.).

MU-15 Improve Household Disaster Preparedness

Educate the public on how to prepare for hazards and disasters, including the following:

- Encouraging property owners to purchase hazard insurance not as an alternative to mitigation, but rather to add financial protection if damage does occur.
- Encouraging residents to prepare by stocking up the necessary items and planning for how family members should respond during a disaster. Publicized information about household preparedness can be found at www.ready.gov.
- Providing hazard vulnerability checklists for homeowners to conduct their own inspections.
- Promoting the purchase and use of NOAA weather radios by residents.
- Encouraging citizens to secure loose items (i.e., patio furniture).
- Participating in Nation Weather Service StormReady Program.
- Purchasing and installing NOAA weather radios in schools, government buildings, parks, etc.
- Storing digital or hard copies of public records in low-risk, offsite locations.

MU-16 Promote Private Mitigation Efforts

Encourage private mitigation efforts that address multiple hazards through the following:

- Using outreach programs to: 1) advise homeowners of risks to life, health, and safety; 2) facilitate technical assistance programs that address measures that citizens can take; or 3) facilitate funding for mitigation measures.
- Establishing, maintaining, and publicizing a library section on hazard mitigation techniques for local residents.
- Identifying and recruiting civic groups and volunteer agencies for community mitigation projects.
- Establishing a network for a business-to-business mitigation mentoring program.
- Offering hazard susceptibility audits of local small businesses.
- Completing a "demonstration model" showing use of hazard mitigation techniques for public display.
- Establishing a technical assistance program for residents to access data or resources for mitigation purposes.
- Educating the public on tradeoffs associated with multi-hazard design.

APPENDIX F: MITIGATION ACTION PROGRESS REPORT FORM

[Name of Jurisdiction] Hazard-Specific Action Items 2021-2025 – Annual Review and Progress						
Action Items	**Status** *(Choose One & **Enter Letter**):* **A.** Completed; **B.** In Progress (on schedule); **C.** In Progress (delayed); **D.** Delayed Until Funding Available; **E.** Canceled					
	2021	**2022**	**2023**	**2024**	**2025**	**Notes on yearly progress**
GENERAL: ALL HAZARDS						
Add New Action Items if Applicable						
DAM/LEVEE FAILURES						
Add New Action Items if Applicable						
DROUGHTS/HEAT WAVES						
Add New Action Items if Applicable						
EARTHQUAKES						
Add New Action Items if Applicable						

FLOODING						
Add New Action Items if Applicable						
LANDSLIDES/EROSION						
Add New Action Items if Applicable						
LAND SUBSIDENCE						
Add New Action Items if Applicable						
TORNADOES						
Add New Action Items if Applicable						
TSUNAMI						
Add New Action Items if Applicable						
WILDFIRES						
Add New Action Items if Applicable						

WINTER STORMS/FREEZES (SEVERE WINTER WEATHER)						
Add New Action Items if Applicable						
SEVERE STORMS						
Add New Action Items if Applicable						
EXTREME TEMPERATURES						
Add New Action Items if Applicable						
LANDSLIDE						
Add New Action Items if Applicable						
LIGHTNING						
Add New Action Items if Applicable						
SEVERE WIND						
Add New Action Items if Applicable						

MULTIPLE HAZARDS						
Add New Action Items if Applicable						

Progress Report Period	**From Date:**	**To Date:**
Action Item		
Responsible Agency		
Contact Name		
Contact Phone/Email		
Action Status	❑ Action completed ❑ Action canceled ❑ Action on schedule Anticipated completion date: _____ ❑ Action delayed Explain: _____	

Summary of Action Progress for this Report Period

1. **What was accomplished for this Action during this reporting period?**

2. **What obstacles, problem, or delays did the Action encounter?**

3. **If uncompleted, is the Action still relevant? Should the Action be changed or revised?**

4. **Other comments**

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APPENDIX G: WHATCOM COUNTY CONTACT LIST

#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone
1	Whatcom County	Whatcom County-unincorporated area	Deputy Director John Gargett	3888 Sound Way Bellingham ,WA 98226	ggargett@co.whatcom.wa.us	360-676-6681
2	City of Bellingham	City	Emergency Manager, Office of Emergency Management Liz Coogan	Fire Dept. 1800 Broadway Bellingham, WA 98225	Liz Coogan(ecoogan@cob.org)	(360) 778-8444
3	City of Blaine	City	Community Development Services Director Stacie Pratschner	435 Martin St. Blaine, WA 98230	spratschner@cityofblaine.com	360-332-8311
4	Sumas	City	Rollin Harper	433 Cherry Street, Sumas, WA 98295	'rollinh@sehome.com'	(360) 733-6033
5	Everson	City	Rollin Harper	433 Cherry Street, Sumas, WA 98295	'rollinh@sehome.com'	(360) 733-6033
6	Nooksack	City	Rollin Harper	433 Cherry Street, Sumas, WA 98295	'rollinh@sehome.com'	(360) 733-6033

7	Whatcom County Flood Zone	Special purpose District	Paula Harris River &Flood Manager	322 N Commercial Street, Suite 110 Bellingham, WA 98225	PHarris@co.whatcom.wa.us>	(360) 778-6285
8	Ferndale	City	City Administrator Jori Burnett	P.O. Box 936, Ferndale, WA 98248		(360) 685-2351
9	Lake Whatcom Water and Sewer District	Special purpose District	Justin Clary – General Manager	LAKE WHATCOM WATER & SEWER DISTRICT 1220 Lakeway Drive Bellingham, WA 98229	justin.clary@lwwsd.org	(360) 734-9224
10	Lynden	City	Mike Martin, City Administrator	City of Lynden 300 4th St. Lynden, WA 98264	martinm@Lyndenwa.org	(360) 354-1170, ext 5
11	Meridian School District	School District	Superintendent, Dr. James Everett	214 West Laurel Road, Bellingham, WA 98226	Jeverett@meridian.webnet.edu	360-398-7111
12	Port of Bellingham	Port	Emergency Management/Security Officer Scott McCreery	1801 Roeder Avenue Bellingham, WA	scottm@portofbellingham.com	(360) 303-5211

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