

Section 1

Plan Process Requirements

Planning Process---Requirement §201.6(b):

An open public involvement process is essential to the development of an effective plan.

Documentation of the Planning Process---Requirements §201.6(b):

In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
- (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Documentation of the Planning Process---Requirements §201.6(c)(1):

[The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

- Does the plan provide a narrative description of the process followed to prepare the plan?
- Does the plan indicate who was involved and how they contributed to the planning process, including who led the development at the staff level and were there any external contributors such as contractors?
- Does the plan indicate how the public was involved?
- Was the public provided an opportunity to comment on the plan during the draft stage and prior to plan approval?
- Was there an opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?
- Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?

Section 1
**PIERCE COUNTY
PLAN PROCESS**

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Plan Process

The Pierce County Process Section is a discussion of the planning process used to develop the Pierce County Natural Hazard Mitigation Plan, including how it was prepared, who aided in the process, and the public involvement.

The Plan is developed around all major components identified in 44 CFR 201.6, including:

- **Public Involvement Process;**
- **Jurisdiction Profile;**
- **Capability Identification;**
- **Risk Assessment;**
- **Mitigation Strategy;**
- **Critical Facility Section;** and,
- **Plan Maintenance Procedure.**

Below is a summary of those elements and the processes involved in their development.

Public Involvement Process

Public participation is a key component to strategic planning processes. Citizen participation offers citizens the chance to voice their ideas, interests, and opinions.¹ In order to accomplish this goal and to ensure that the final Pierce County Plan be comprehensive, Pierce County DEM developed a public participation process of three components:

1. A Planning Team comprised of knowledgeable individuals representative of Pierce County and natural hazards;
2. Interviews to target the specialized knowledge of individuals working with populations or areas at risk from natural hazards; and
3. Public meetings to identify common concerns and ideas regarding hazard mitigation and to discuss specific goals, objectives and measures of the mitigation plan.³

Each of these elements is discussed in further detail below. The public participation is outlined within each section. Integrating public participation during the development of the Pierce County Plan has helped to ensure an accurate depiction of the County's risks, vulnerabilities, and mitigation priorities.

Planning Team

Pierce County Department of Emergency Management (PC DEM) organized the Planning Team in the summer of 2001. The Pierce County Natural Hazards Mitigation Planning Team members have an understanding of how Pierce County is structured, how residents, businesses, and the environment may be affected by natural hazard events, are experienced in past and present mitigation activities, and represent those entities through which many of the mitigation measures would be implemented. The Planning Team guided the development of the Plan, assisted in

developing goals and measures, identified stakeholders, and shared local expertise to create a more comprehensive plan. PC DEM composed the final document. Table 1-1 lists the various people and the jurisdictions represented by those who participated on the Planning Team.

Table 1-1 Planning Team

NAME	TITLE	JURISDICTION-DEPARTMENT
David Shirer	Administrative Program Manager	Pierce County Community Services and Development
Steve Bailey	Director	Pierce County DEM
Wayne Wienholz	Fire Marshal	Pierce County DEM Fire Prevention Bureau
Claudia Ellsworth	Manager	Pierce County DEM Mitigation & Recovery
Richard Schroedel	Coordinator	Pierce County DEM Mitigation & Recovery
Luke Meyers	Coordinator	Pierce County DEM Mitigation & Recovery
Benjamin Pierson	Coordinator	Pierce County DEM Mitigation & Recovery
Denise Dyer	Division Manager	Pierce County Economic Development
Robert Allen	Specialists	Pierce County Economic Development
Debby Hyde	Special Projects Coordinator	Pierce County Executive Office
Dan Cagle	Director	Pierce County Facilities Management
Linda Gerull	Manager	Pierce County IS Geographic Information Services
Chuck Kleeberg	Director	Pierce County PALS
Chip Vincent	Principal Planner	Pierce County PALS
Gordon Aleshire	Building Official	Pierce County PALS
Katherine Brooks	Senior Planner	Pierce County PALS
Tim Ramsaur	Manager	Pierce County PWU Sewer Utility Division
Harold Smelt	Program Manager	Pierce County PWU Water Programs Division
Dan Wrye	Planner 4	Pierce County PWU Water Programs Program Support Services
Gary Predoehl	TBD	Pierce County PWU Program Development
Bruce Wagner	Manager	Pierce County PWU Maintenance Division
Mark Maenhout	Claims Investigator	Pierce County Risk Management

Planning Team Meetings

The Planning Team held 13 Planning Team Meetings, between August 23, 2001 to April 20, 2004, including formal face to face meetings and conference call meetings. Each meeting presented an opportunity for discussion, review, and evaluation of the Plan among the Planning Team. The meetings were prepared by and conducted by Planning Team Members who were representatives of PC DEM. Table 1-3 documents these meetings including name, date, place and description of each meeting.

Table 1-2 Planning Team Meetings

Planning Team Meeting #1	
August 23, 2001	Pierce County Annex Conference Room D
Where Planning Team Members Steve Bailey and Claudia Ellsworth presented to the Planning Team the Requirements of the Disaster Mitigation Act of 2000 and discussed the following items: Related County Activities (Hazard Inventory and Vulnerability Assessment (HIVA), Comprehensive Plan Critical Areas Elements, Volcanic/Lahar Hazards Update, CEMP, Community Plans, Endangered Species Act, Community Rating System), Washington State Plan (Issues & Recommendations), and Status of Pierce County Predisaster Mitigation Plan.	
Planning Team Meeting #2	
September 6, 2001	Pierce County Annex Conference Room D
Where the Planning Team discussed: Definition of “Mitigation” for purposes of the Plan, Proposed Predisaster Natural Hazard Plan Format, Briefing on Related County Mitigation Activities (Debbie Hyde, Endangered Species Act; Tim Ramsaur, Surface Water Mitigation; and Katherine Brooks, Geologic Hazards), and Next Steps.	
Planning Team Meeting #3	
September 20, 2001	Pierce County Annex Conference Room D
Where the Planning Team discussed: “Concept Paper for Section 322 of the Stafford Act as Amended by the Disaster Mitigation Act of 2000”, Discussion of Hazard Mitigation Plan Outline Revisions, October 2 and 5 Hazard Mitigation Workshop Schedule (Additional Subject Matter Experts and County Participants), Overview by Tim Ramsaur Pierce County Storm Drainage and Surface Water Management Plan, and Next Steps.	
Planning Team Meeting #4	
December 20, 2001	Pierce County Annex Conference Room D
Where the Planning Team discussed: Hazardous Areas Element of Critical Area Regulations (Katherine Brooks), Expansion of Scope/Schedule due to FEMA Publication of Mitigation Guidelines (Volume 1), Status of Plan (Incorporation of PALS Work on Critical Area Regulations, and PC DEM Hazard Inventory and Vulnerability Analysis), Next Steps (Hazard Maps of eight hazards, History of Hazards, Future Recurrence of Hazards, Begin asset inventory; Define critical facilities), Related Mitigation Activities (Tsunami/Seiche Workshop on Mitigation and Firewise Communities Workshop), and Next Steps.	
Planning Team Meeting #5	
January 24, 2002	Pierce County Annex Conference Room D
Where the Planning Team discussed: PERI Publication (Dealing with Disaster), Critical Area Regulations (Katherine Brooks Report), Comments on Mitigation Plan Chapters (Earthquake, Volcano, Tsunamis; WUI Fires, Landslides, Storms, and Flood), Hazard Maps, Mitigation Software MG2020, HAZUS, HMGP Applications, Mitigation Calendar (Tsunami Mitigation Workshop February 8 and Firewise Workshop March 21/22), and Next Steps	

Planning Team Meeting #6	
March 14, 2002	Pierce County Annex Conference Room C
Where the Planning Team discussed: Critical Area Regulations (Katherine Brooks Report), Mitigation at Work, HMGP Funding Since 1989, Mitigation Software MG2020, Comments on Mitigation Plan Chapters (Earthquake, Volcano, Tsunamis; WUI Fires, Landslides, Storms, and Flood), Next Steps.	
Planning Team Meeting #7	
October 3, 2002	Pierce County Annex Conference Room D
Where the Planning Team discussed: Habitat Protection& Restoration Package Status, PC DEM Web Page and Hazard Maps, Change of FEMA Deadline, FEMA 386 Series, Countywide Working Group September 9 th Report, Review and Adopt Plan Goals, Mitigation 20/20 Hazard Rating Summaries, Critical Facilities List, Policies and Programs List, and Next Steps.	
Planning Team Meeting #8	
December 5, 2002	Pierce County Annex Conference Room D
Where the Planning Team discussed: Plan Progress, Habitat Protection& Restoration Package Status, Mt. Rainier Discovery Center, PC DEM Web Page and Technological Hazards, Countywide Working Group October 15 th Report, Goal Statements, Mitigation Strategies Prioritization, Critical Facility Ratings, Hiring of Mitigation Coordinator, and Next Steps.	
Planning Team Meeting #9	
February 18, 2003	Pierce County Facilities Building
Where the Planning Team discussed: Plan Progress, Critical Facility Vulnerability, and Next Steps	
Planning Team Meeting #10	
May 22, 2003	Pierce County Annex
Where the Planning Team discussed: Plan Progress, Potential PDM Funding, Plan Sections (Outline), Critical Facility Section, Public Participation, New Information on Tacoma Fault, Mitigation Strategies, Implementation Strategy, and Next Steps	
Planning Team Meeting #11	
June 25, 2003	PC DEM Conference Room (Conference Call)
Where the Planning Team discussed: Plan Progress, Critical Facility Profile Review, Critical Facility Vulnerability Review, Flood Mitigation Measures, and Next Steps.	
Planning Team Meeting #12	
November 12, 2003	PC DEM Conference Room (Conference Call)
Where the Planning Team discussed: Plan Progress, Capability Review, and Next Steps.	
Planning Team Meeting #13	
May 14, 2004	Pierce County Annex
Where the Planning Team discussed: Draft Plan Review, Little Puyallup Fair Public Input, Public Comment Meetings, State and FEMA Review, and Next Steps.	

Hazard Meetings

Members of the Planning Team conducted 6 Hazard Meetings, including workshops and follow-up interviews. These were conducted with local officials with hazard-specific knowledge and hazard experts to gain proficient understanding of all natural hazards as they are related to the Plan. These meetings help to provide a more comprehensive understanding of the ways in which hazards have impacted the County. Table 1-2 documents these meetings including: name, date, place and description.

Table 1-3 Hazard Meetings

Pierce County Natural Hazard Workshop	
August 23, 2001	Tacoma Public Library
Where Planning Team Members Steve Bailey and Claudia Ellsworth conducted a Natural Hazard Workshop. The Workshop was attended by over forty participants from scientific, nonprofit and local government community to gather information on best available science relating to natural hazards.	
Pierce County Natural Hazard Workshop	
October 2 and 5, 2001	Tacoma Public Library
Where Planning Team Members Steve Bailey, Claudia Ellsworth, and Richard Schroedel conducted a Natural Hazard Workshops attended by over forty participants from scientific, nonprofit and local government community to gather information on best available science relating to natural hazards.	
Pierce County Flood Hazard Meeting	
January 22, 2003	PC Water Programs
Where Planning Team members Luke Meyers and Ben Pierson met with Randy Brake from PC Water Programs and discussed the flood hazard in the Pierce County's repetitive flood loss areas.	
Pierce County Severe Storms Hazard Meeting	
February 3, 2003	National Weather Service (NWS)
Where Planning Team Member Luke Meyers met with Ted Buehner from NWS and discussed severe storm hazard problems in Pierce County.	
Pierce County Geologic Hazard Meeting	
February 19, 2003	WA State Department of Natural Resources (DNR)
Where Planning Team member Luke Meyers met with Tim Walsh from DNR and discussed earthquake, landslide, and volcano hazards in Pierce County.	
Pierce County Earthquake Hazard Meeting	
April 2003	PC DEM Conference Room
Where Planning Team members Steve Bailey, Claudia Ellsworth, Luke Meyers and Benjamin Pierson met with Craig Weaver and Brain Sherrod with new information on the earthquake hazard from the Tacoma Fault.	

Public Comment

The Planning Team provided many opportunities for public comment throughout an ongoing and open planning process. The Planning Team published information about Plan through the Plan's Website⁴ which was hosted by PC DEM's website beginning September 23, 2002. Pierce County used this site throughout the process to notify the public about Plan's process.

During the process the Planning Team also developed a broader County-wide Working Group. This group was comprised of many different types of jurisdictions in the County including but not limited to: cities, towns, school districts, fire districts, and water districts. The County-Wide Working Group meet several times during the process discussing among other things the Planning Requirements, Status of the County's Plan, and How Jurisdictions could get further involved.

Members of the Planning Team made presentations at hearings for the County's Directions Package which involved the update the County's Critical Area Regulations. The presentations involved the planning requirements and the status of the Plan.

The Planning Team also opened a booth at the 2004 Little Puyallup Fair between the days of April 15th-18th to present the Plan to the public and document any comments. This four day event allowed for a large window during which the public could engage in dialogue regarding not only the Pierce County Plan, but mitigation planning in general and what each resident's respective jurisdiction could do to become more disaster resistant.

The Planning Team also held a public comment meeting on May 25, 2004, in order to provide further opportunity for residents, local businesses, neighboring jurisdictions, and all other interested parties to comment.

See Table 1-4 for a summary of documentation of the Public Involvement.

Table 1-4 Public Involvement

Hazard Mitigation Plan Presentation For Pierce County Planning Commission	
March 26, 2001	Pierce County Annex
Where Planning Team Member Richard Schroedel, at a Pierce County Planning Commission Meeting on Habitat Protection & Restoration Package, presented the Natural Hazard Mitigation Plan Process.	
Pierce County Website Plan Information	
September 23, 2002	Pierce County DEM Website
Where the Planning Team published information regarding the Planning Requirements.	
Hazard Mitigation Plan Presentation For Land Use Advisory Committees	
April 4, 2002	Pierce County Annex

Where Planning Team Member Richard Schroedel, at a Land Use Advisory Committees Meeting on Habitat Protection & Restoration Package, presented the Natural Hazard Mitigation Plan Process.

Hazard Mitigation Plan Presentation For Watershed Councils

April 8, 2002 | Pierce County Annex

Where Planning Team Member Richard Schroedel, at a Watershed Council Meeting on Habitat Protection & Restoration Package, presented the Natural Hazard Mitigation Plan Process.

Hazard Mitigation Plan Presentation For Local City Planning Staffs

April 24 and 26, 2002 | Pierce County Annex

Where Planning Team Member Richard Schroedel, at a Local City Planning Staffs Meeting on Habitat Protection & Restoration Package, presented the Natural Hazard Mitigation Plan Process.

Hazard Mitigation Plan Presentation For Critical Area Regulations

May 1, 2002 | Pierce County Annex

Where Planning Team Member Richard Schroedel, at a Critical Area Regulations Hearing Meeting for the Habitat Protection & Restoration Package, presented the Natural Hazard Mitigation Plan Process.

Hazard Mitigation Plan Presentation For County City Building HMGP Hearing

May 8, 2002 | Tacoma Public Library

Where Planning Team Member Richard Schroedel, at a County City Building HMGP Hearing, presented the Natural Hazard Mitigation Plan Process.

Hazard Mitigation Plan Presentation For County Fire Service Providers

June 9, 2002 | Sumner Fire HQ

Where Planning Team Members at a Monthly meeting of Pierce County Fire Chiefs Association presented the following: the Plan Requirements, the Status of the County Plan, an Invitation of Participation for fire districts and cities.

Hazard Mitigation Plan Presentation For Regional Water Association

July 23, 2002 | Spanaway Water District

Where Planning Team Members at a Regular meeting of the Regional Water Association presented the following: the Plan Requirements, the Status of the County Plan, an Invitation of Participation for Water Districts, Cities, etc.

Hazard Mitigation Plan Presentation For County-Wide Working Group

September 9, 2002 | Pierce County Library Administration Building

Meeting with 55 representatives of Pierce County cities, towns, and special districts to review State planning requirements and opportunities to collaborate in Pierce County.

Pierce County Website Plan Information

September 23, 2002 | Pierce County Website

Published webpage about DMA2K Natural Hazard Planning Requirement, hazard maps for County HIVA, and a point of contact by way of phone.	
Hazard Mitigation Plan Presentation For County-Wide Working Group	
October 15, 2002	Pierce County Library Administration Building
Meeting with 30 representatives of Pierce County cities, towns, special districts and hospitals to direct beginning of plan activity.	
Website Update About Mitigation Plan	
May 7, 2003	Pierce County Website
Published updated information on County Mitigation Plan Process and provided a point of contact for public involvement (input) information by way of phone, email, and fax.	
Hazard Mitigation Plan Public Comment Booth	
April 14-18, 2004	Little Puyallup Fair (Puyallup Fair Grounds)
Where Planning Team Members staffed a booth at the Little Puyallup Fair. The booth allowed for the public to see some the results of the Plan. At the booth the there were sign in sheets, fact sheets on the Planning Requirements, Hazard Maps, Plan Website hand outs, etc.	
Public Comment Meeting Notice-Local Media	
May 18, 2004	“Tacoma News Tribune”, Pierce County Intranet, and Plan Website
Where Planning Team published a notice regarding the Public Comment Meeting in the “Tacoma News Tribune”, on the Pierce County Intranet, and on the Plan Website.	
Public Comment Meeting Email Notice-Internet	
May 21, 2004	Email Notice
Where the Planning Team sent out email notices and mail notices regarding the Public Comment Meeting to the Pierce County Council, the Pierce County-Wide Working Group, and all HMPG and PDM Jurisdictions in Pierce County. The Working Group includes the following jurisdictions:	
Bethel School District, Carbonado School District, Central Pierce Fire and Rescue, City of Bonney Lake, City of Dupont, City of Edgewood, City of Fife, City of Fircrest, City of Gig Harbor, City of Lakewood, City of Milton, City of Puyallup, City of Roy, City of Sumner, City of Tacoma, City of University Place, Clover Park School District, Curran Road Mutual Water, Dieringer School District, East Pierce Fire and Rescue, Eatonville School District, Firgrove Mutual, Franciscan Health System, Geoengineers, Gig Harbor Fire and Medic One, Lakeview Light and Power, Ohop Mutual Light, Orting School District, Pierce County Library System, Parkland Light and Water, Pierce County Fire Protection District #3, Peninsula School District, Pierce County Fire District #17, Pierce County Fire Protection District #14, Puyallup School District, Puyallup Tribe of Indians, Red Cross Mt. Rainier Chapter, SEMCON Inc., Sumner School District, Tacoma Pierce County Department of Health, Tacoma Power, Tacoma Public Works, Tacoma Water, Town of Eatonville, Town of Steilacoom, University of Place School District, Valley Water, White River School District.	

Profile Process

The Profile describes the History, Geography, Demography, Topography, Climate, Economics, Transportation, and Development Trends of the County. The information was collected from a number of sources including: the Pierce County Website; the Pierce County Budget; various Pierce County government departments; the Pierce County HIVA; the Puyallup HIVA; the Tacoma Chamber of Commerce; the Eastern Pierce County Chamber of Commerce; the SBA; and the US Census Bureau. The Pierce County profile is based in structure on other mitigation plan profiles including the Riverside Natural Hazard Mitigation Plan profile and the Clackamas County Mitigation Plan profile.¹¹

Capability Identification Process

DMA 2000 requires a “review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.” For the purposes of this plan, these elements are referred to as capabilities and their “review and incorporation” as a capability identification. The capability identification provides a scope for what mitigation measures can and cannot be implemented and identifies specific capabilities that Pierce County has which may help in the implementation of mitigation measures. Further it identifies those actions already undertaken that mitigate natural hazards, whether labeled as such or not. The identification therefore canvasses all aspects of County government that relate both directly and indirectly to mitigation activity.

The ability of a community to develop an effective hazard mitigation plan depends upon its capability to implement policy and programs. The FEMA 386 publication describes a capability assessment and outlines the types of capabilities that should be considered:

- Legal and Regulatory
- Administrative and Technical
- Political and Fiscal

Legal and regulatory capabilities refer to the laws, regulations, authorities, and policies that govern current and potential mitigation measures. 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, mitigation of natural hazards. Technical capabilities also includes the existing electronic and systemic resources. Political and fiscal capabilities refers to the level of support from elected officials for pursuing mitigation and the financial resources available to achieve the identified mitigation strategies.

In determining the structure of this section, the Planning Team viewed those employed by other jurisdictions’ in their planning efforts. The Pierce County Capability Identification Section is a modification of versions of the Pitt County, NC, Mitigation Plan,¹² the Town of Wendell, NC, Mitigation Plan,¹³ and the Clackamas County, OR, Mitigation Plan.¹⁴

For the organizational purposes of this Plan, administrative capabilities are identified and categorized by Pierce County department, i.e., which departments conduct activities relevant to

mitigation. The fiscal capabilities at the County level are thus correlated to the budgets and expenditures of these departments. Political leadership of Pierce County is divided into two components (County Executive and County Council) and these are identified within the structure of the aforementioned administrative capabilities. Thus fiscal capabilities at the County level are assumed to be an inextricable element of the administrative/political capabilities. Therefore the structure of this plan was altered from 386.3 to review and identify capabilities in three separate categories:

- Legal and Regulatory
- Political, Administrative, and Fiscal
- Technical

The section begins with an identification of capabilities at the State and Federal level that dictate what counties in Washington can and cannot pursue with regards to mitigation, as well as what assistance may be available. While not necessarily focusing on the state and federal *capabilities*, this section identifies those mechanisms that provide the basis for that which follows at the county-level identification. The end of Section 3.1 identifies fiscal capabilities in the form of federal grants that can be applied to mitigation measures. Table 3-1 provides a summary of the information in this subsection.

Sub-sections 3.2, 3.3, and 3.4 narrow the identification to Pierce County capabilities. Sub-section 3.2 identifies the legal and regulatory capabilities of the County with particular emphasis on the County's Comprehensive Plan and Development Regulations. Sub-Sections 3.1 and 3.2 are based on the document "Optional Comprehensive Plan Element for Natural Hazard Reduction" published by the Washington Department of Community Trade and Economic Development in 1998. The purpose of that document is to aid communities in establishing an element within their Comprehensive Planning effort (as mandated by the Growth Management Act) to reduce the impacts of natural hazards. It focuses on consolidating the aspects found throughout each required element that deal with natural hazard mitigation into one element. In effect, the sub-sections 3.1 and 3.2 seek to do the same, not as an element to the Comprehensive Plan, but as an identification of current legal mitigation measures and legal/regulatory means for implementing mitigation.

Sub-section 3.3 identifies the political, administrative, and fiscal capabilities by focusing on those departments that currently conduct activities related to mitigation, whether or not those activities are defined as such. This subsection is organized by department, identifies mission statements and funding sources, and includes project expenditures where relevant. The Pierce County Budget and departmental web pages provided the basis for this subsection.

Subsection 3.4 identifies the studies, plans, programs, and projects that the County has conducted or is currently conducting. This subsection relies on information compiled by PC DEM over the course of this planning process.

All of Section 3 relies on information and studies conducted by the Municipal Research and Services Center of Washington and other resources as noted. Tables 3-2 and 3-3 provide summary information on specific legal and regulatory capabilities. Table 3-4 provides further

summary information on specific technical capabilities. Table 3-5 provides further summary information on specific administrative capabilities.

The Capability Identification is a compilation of the laws, regulations, policies, programs, measures, and resources that pertain to and are available to Pierce County. Thus the section serves as a catalogue of existing mitigation measures that the County is currently pursuing and should continue. Further, it helps to determine potential avenues and constraints for implementing mitigation measures. In so doing, it provides a catalogue of the funding sources and departments that are referenced in each mitigation measure. When new mitigation measures are suggested, the capability identification section will provide the eight categories of information required for the evaluation of that measure (see “mitigation strategy process” below). Finally, it provides the template for plan maintenance in its identification of existing avenues of implementation (see “Plan Maintenance Section”).

Risk Assessment Process

The Risk Assessment describes and analyzes the risks and vulnerabilities to Pierce County from natural hazards. The assessment includes a **hazard identification description**, a **hazard profile**, and a **vulnerability description**.

Hazard Identification Description

A primary part of Pierce County’s Risk Assessment is identifying the County’s hazards. The hazard identification process used for this assessment is derived from the Pierce County Department of Emergency Management Hazard Identification Process, the Mitigation 20/20 software package, the County’s computer mapping software, and interviews with local hazard experts and County officials.

Over fifteen years ago, Pierce County DEM began identifying the County’s natural hazards in its Hazard Identification and Vulnerability Analysis (HIVA), a document used as the basis for emergency response and operations planning. State law requires each political subdivision to be part of an emergency management organization, and to have an emergency management plan. Chapter 118-30 Washington Administrative Code requires that emergency management plans be based on a written assessment and listing of the hazards to which the political subdivisions are vulnerable. The Pierce County HIVA has been revised several times, in consultation with hazard experts, each time incorporating more recent knowledge and history. During these revisions, the HIVA identified several natural hazards:

- | | |
|-----------------|---|
| Abandoned Mines | Severe Local Storms |
| Avalanche | Snow and Ice Storms |
| Drought | Subsidence |
| Earthquake | Tornadoes |
| Flooding | Tsunamis and Seiches |
| Global Warming | Volcanic Hazards (Eruptive and Noneruptive) |
| Landslides | Wildland Fires |

After Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) in late 2000, PC DEM began updating the HIVA using “best available science and information.” In early October 2001, DEM convened a series of 1-2 hour workshops over a two-day period, during which prominent regional earth scientists presented current information about known hazards, and facilitated discussion of mitigation measures. Over forty individuals from private industry and federal, state, and local government contributed their expertise at the workshops. See Appendix C for a list of participants.

The workshops increased the participants’ understanding of the devastating potential of some hazards, e.g., lahars, and raised the issue of providing an adequate definition for “hazards”. Some natural conditions have the potential to cause loss of life or property damage, but may not become “disasters”. As a result, the following definitions were developed to determine which natural hazards should be addressed by the mitigation plan.

- *Hazard*: a condition, natural or technological, which has the potential to threaten human life and property.
- *Vulnerability*: the probability that any physical, structural or socioeconomic element will be damaged, destroyed or lost to a natural or technological hazard.
- *Disaster*: occurs when a hazard impacts a community and outstrips that community’s ability to cope with injury, death, property damage, or disruption to essential functions. It is the intersection of a hazard with the human environment that produces a disaster.

Since the purpose of the plan is to mitigate *disaster*, DEM reduced the hazard list to those with the potential to cause

- Single, infrequent events which cannot be anticipated or predicted, and whose potential for loss of life and property is significant to the community, and;
- Repetitive events that can be predicted with reliability within days or hours, and cause property damage and injury or death.

After assessing hazard maps produced by Pierce County’s computer mapping software and interviews with County officials and local hazard experts (See Appendix C for a list of experts and officials), abandoned mines, drought, tornadoes, natural subsidence and global warming were not consistent with the disaster criteria above. And while avalanches have been killers in Pierce County’s history, they primarily occur within Mt. Rainier National Park and do not impact the populated areas within the County. All these hazards will continue to be addressed in the HIVA; however, the list of potentially *disastrous* natural hazards to Pierce County was narrowed to these seven:

- Earthquakes
- Floods
- Severe Storms
- Volcanic (both eruptive and non-eruptive events)
- Landslides

- Tsunamis and Seiches
- Wildland/Urban Interface Fires

After the identification process of the hazards was complete, the description process followed with defining each hazard and categorizing the different types of each hazard.

Hazard Profile

After identifying the seven hazards through the above process, each hazard was profiled. The profile consists of defining the location and extent of the hazard with respect to the County, and an evaluation/depiction of the hazard's past and possible future occurrences. Maps illustrate the location and extent of each hazard. The Planning Team produced the maps using data from the following agencies: USGS; Pierce County Water Programs; Flood Insurance Rate Maps; WA DOE; WA DNR. The occurrence probabilities were calculated using routines established in the "Mitigation 20/20" software package and information from local hazard experts.

Vulnerability Assessment

The Planning Team also conducted a vulnerability assessment that speaks to Pierce County's unique characteristics and hazard risks. This assessment builds on the identification and profiling of hazards. The process examines more specifically how the identified hazard events would damage or disrupt the County, including any consequences of a disaster caused disruption.

The vulnerability assessment process for the Planning Team began with a profile of the County. Included in this profile is an analysis of the specific characteristics that contribute to the vulnerability of the structures, people, and functionality of that specific component. These characteristics were considered in determining how the County would be impacted by the various hazards, and its subsequent vulnerability to those hazards.

The Hazard Vulnerability Assessment table uses routines established in the "Mitigation 20/20" software package to rate each of these major hazards according to Impact Area, Probability, Health & Safety Impacts, Property, Environmental and Economic Damage. This table is the culmination of the risk assessment processes.

The Planning Team derived a "**Vulnerability Score**" using a qualitative process in which planners compiled their estimates of the impacted area, the probability of occurrence, the extent of the impacted area, and the likely consequences in terms of public safety, property damage, harm to valuable environmental resources, and economic impacts. Totaling the scores for the impacted area, health & safety, property, environment and economic factors, and multiplying that total by the probability of occurrence, produces the Vulnerability Score.

Total Vulnerability Score = (Total Score for Natural Hazards) X (Score for Probability of Occurrence)

The maximum score a hazard can receive is an eighty. The Vulnerability Score system is converted to a "Low", "Medium" and "High" scale:

0-26	→	Low Vulnerability Rating	(L)
27-53	→	Medium Vulnerability Rating	(M)
54-80	→	High Vulnerability Rating	(H)

In deriving these estimates of vulnerability, the Planning Team utilized available information for each hazard’s impact on the geographic, as well as population, infrastructure and facilities within those impacted areas. This includes inventories of valuable environmental resources and factors that are influential to the economic well being of the community.

In gathering information and deriving estimates and scores, it is often necessary to rely on the informed judgment of knowledgeable County officials, hazard experts, and the best available information and science. It must be emphasized, then, that in many cases detailed information is not fully available as it pertains to a specific hazard’s categorical ratings. Further, it has not been the Planning Team’s intent—nor have the funding resources been available—to conduct extensive new studies to obtain such information solely for the purposes of the development of this mitigation plan. The Planning Team believes that the available resources are more than sufficient to illustrate risk and vulnerability. The Team further believes that the County officials’ experiences within the County, as well as their capabilities to derive reasonable estimates of the geographic area at risk and the potential impacts of the hazard, is adequate for the purposes of this planning effort. Where the County has deemed the absence of hazard and risk-related data to be a significant limitation on the effectiveness of this planning process, the County has incorporated a proposed mitigation measure (“Recovery Plan” and “Response and Recovery Information Collection”) into the mitigation plan to request funding to develop such data.

Mitigation Strategy Process

The hazard mitigation strategy includes a description of mitigation goals to reduce or avoid long-term vulnerabilities to the hazards identified in the Risk Assessment. The mitigation strategy identifies and analyzes a comprehensive range of specific mitigation measures to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

The development of a mitigation strategy, described in more detail below, begins with a review of the **FEMA Mitigation Goal Categories**. To ensure that goals for Pierce County be community-specific, Pierce County's mission statement was applied to the FEMA categories, resulting in **Pierce County Mitigation Goals**. Based upon these goals, community-specific **Pierce County Mitigation Measures** were identified through the Risk Assessment and the Capability Identification. **Mitigation Measure Prioritization** was then achieved through a process that includes continual public participation, a concentration on Pierce County's unique needs and capabilities, and a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed measures and their associated costs.

FEMA Mitigation Goal Categories

The FEMA 386.3 document outlines six categories into which all mitigation measures can be grouped. They are as follows:

1. Prevention: Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.

2. Property Protection: Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.

3. Public Education and Awareness: Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

4. Natural Resource Protection: Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

5. Emergency Services: Actions that protect people and property during and immediately after a disaster or hazard event. Services include warning systems, emergency response services, and protection of critical facilities.

6. Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms.

Pierce County Mitigation Goals

The Planning Team localized the FEMA Mitigation Goal Categories by using Pierce County's mission statement. This union results in goals specific to the County that ensure the greatest benefit in hazard reduction. Pierce County's mission statement is:

"Pierce County government, in partnership with the citizens, will enhance the livability of our community through responsive services which address our current and future needs."¹⁶

The Planning Team considered Washington State Mitigation Plan Goals, the FEMA goal categories, community education, public understanding of risks, and the ability of the County to fund and implement mitigation measures. When applied to the Pierce County mission statement, the Planning Team developed the following natural hazard mitigation goals:

- **Protect Life and Property**
- **Ensure Emergency Services**

- **Increase Public Preparedness**
- **Establish and Strengthen Partnerships for Implementation**
- **Preserve or Restore Natural Resources**
- **Promote A Sustainable Economy**

The FEMA categories of “Prevention,” “Property Protection,” and “Structural Projects” were combined to a broader goal of “Protect Life and Property.” The remaining three categories generally remained. The County also added two other categories: “Establish and Strengthen Partnerships for Implementation” and “Promote A Sustainable Economy.” Because Pierce County is a “home rule” county, partnerships for implementation are important in ensuring that a coordinated effort in mitigation planning and implementation be undertaken. And because of Pierce County’s unique vulnerabilities, this Plan contains a goal for economic sustainability.

The Pierce County Plan goals describe the overall direction that the County and its citizens can take to work toward mitigating risk from natural hazards. These goals are stepping-stones between the broad direction of the plan purpose, the mitigation objectives, and the specific recommendations outlined in the subsequent mitigation measures.

Mitigation Measures: Identification and Evaluation

To help achieve each goal, the Pierce County Plan identifies mitigation measures—specific actions or projects that help mitigate risk for the County. The planning process of data-collection, research, and public participation leads to the development of these measures. This process ensures that the measures speak to the risks specific to Pierce County and that these measures be implementable. The Risk Assessment is central to the process of selecting mitigation measures from Pierce County’s goals.

The outcomes of the Risk Assessment, specifically the **Vulnerability Scores**, illustrate the hazards to which Pierce County has the most vulnerability. The Risk Assessment provides focus for Pierce County’s goals through identification of Pierce County’s vulnerability to specific hazards. Based on these hazards, the Planning Team identified specific mitigation measures.

Once the measures are identified, they are further defined in terms of the goals they address as well as the hazards they mitigate. Evaluation of the measures follows their identification and definition. Using the Capability Identification, the Planning Team evaluates the list of measures with regards to each measure’s ability to be implemented.

Through open public meetings, use of the Mitigation 20/20 tools, and review of other local mitigation plans¹⁷, the Planning Team selected the following eight categories to comprehensively evaluate each measure.

1. Goal(s) Addressed

What mitigation goals does the measure address?

2. Cost of Measure

How much will the measure cost to implement?

3. Funding Source and Situation

What is the potential funding source? Choose the statement(s) below that most accurately defines the funding situation for the proposal:

- Funding could be obtained through local budget.
- Funding could be obtained through state or federal grants.
- Funding could be accomplished with local budgets or grants.
- No potential funding sources can be readily identified.

4. Lead Jurisdiction(s)

Which jurisdiction(s) will be leading the implementation of the measure?

5. Timeline

How long will it take to implement? Measures include ongoing, short-term, and long-term activities. Each measure includes an estimate of the timeline for implementation:

- Ongoing measures are activities which Pierce County is already implementing.
- Short-term measures are activities which Pierce County is capable of implementing with existing resources and authorities within one to two years.
- Long-term measures may require new or additional resources or authorities, and may take between one and five years to implement.

6. Benefit

Does it benefit all of Pierce County and/or is it Facility Specific?

7. Life Expectancy of Measure

How long will the measure last?

8. Community Reaction

Choose the statement(s) that most accurately describes how the community would react to the implementation of the proposal:

- The proposal is likely to be endorsed by the entire community.
- The proposal would benefit those affected, with no adverse reaction from others.
- The proposal would be somewhat controversial.
- The proposal would be strongly opposed by most.
- The proposal would be strongly opposed by nearly all.

The evaluation process involved meetings in which the Planning Team discussed the measures with specific attention paid to their definitions, the ability of the measures to be implemented, the extent to which they address the hazards in the County, and their cost-effectiveness. Following the evaluation of mitigation measures is their prioritization.

Mitigation Measures: Prioritization

The measures having been identified, defined, and evaluated, the rest of the process involves prioritization. The process relies upon Pierce County’s identified risks and vulnerabilities, the planning team’s local expertise, public participation, and the County Executive’s authority and duty as the jurisdiction’s chief elected official. Over the course several weeks, the Planning Team presented, outlined, categorically defined, and ranked each mitigation measure.

In order to provide consistency, the evaluation process, including the eight categories, was used as the basis for the prioritization of measures. The process allows for emphasis on the extent to which each measure is cost-effective. While it may be important to emphasize a positive cost/benefit review in the prioritizing of mitigation measures, it is also important to emphasize the influence of local political factors, community needs and values, historic properties, and habitat and environmental issues upon the selection of specific mitigation measures. Therefore, the prioritization process addresses the County’s unique needs, expressed here in terms of the measure’s ability to be implemented and the extent to which it would mitigate one or more relevant hazards. The eight categories address these issues.

A measure’s ability to be implemented is illustrated in Categories 2 (Cost of Measure), 3 (Funding Source and Situation), 4 (Lead Jurisdiction(s)), and 5 (Timeline). The extent to which a measure would mitigate one or multiple hazards is addressed in Category 1 (Goals Addressed) which further helps to encapsulate Pierce County’s unique vulnerabilities and needs. The issue of the number of hazards addressed is also inherent in Category 6 (Benefit). For cost-benefit review, categories 2, 3, and 5 directly address cost. Categories 6 and 7 (Life Expectancy of Measure) directly address benefit. Category 8 (Community Reaction) indirectly considers both potential costs and potential benefits of the measure in terms of public opinion.

After presentation and discussion, the Planning Team ranked the potential mitigation measures based on goals addressed, with special attention paid to the measure’s cost-benefit review, its ability to be implemented, and the extent to which it would mitigate one or multiple relevant hazards. The Planning Team combined these rankings into one prioritized list, which the Team then presented to the public for comment. On May 25, 2004, at the Public Comment Meeting, the Planning Team presented each mitigation measure with its draft prioritization to the attendees.

The mitigation measures are organized for each jurisdiction by hazard vulnerability, with multi-hazard measures presented first, and further subdivided by implementation mechanism. The measures are prioritized within each implementation mechanism subset. A detailed description of each mitigation measure follows the table.

Each measure’s priority is presented in the following format using the acronyms above:

“Hazard(s) Addressed-Implementation Mechanism-Ranking”

For example, the Essential Records Protection measure is prioritized as follows:

“Priority: MH-PC- 5”

Thus it is the fifth ranked measure within the Planning Committee implementation mechanism for addressing multi-hazard vulnerabilities.

Critical Facility Process

The critical facilities section is not a required element of the local hazard mitigation plan requirements but it is instead optional. The Planning Team determined that this section would be developed in order to make the Plan a more comprehensive blueprint for reducing the potential losses identified in the Plan's risk assessment. The products of this process are the Critical Facility Mitigation Plans. Each facility's plan includes a profile, vulnerability assessment, and mitigation strategy. The Planning Team developed the section through: **Definition of Critical Facility; Identification of Pierce County's Critical Facilities; Critical Facility Profiles; Critical Facility Vulnerabilities; and Critical Facility Mitigation Measures.**

Definition

The Planning Team determined that the primary focus of the plan (to create a disaster resistant community) necessitated that the plan address critical facilities. The Planning Team determined that the plan should include, but not be limited to, the definition of critical facilities as expressed in the Critical Area Regulations of the County Comprehensive Plan. This broad definition identifies some disaster-critical facilities, but also large occupancy buildings, schools, and other congregate facilities. The definition is part of the County's land use regulations, regulating or restricting development in hazardous or environmentally critical areas. It does not include all facilities that might be construed by FEMA as critical, and includes others which might be defined by FEMA as "essential". The Critical Area definition is:

"Critical facilities" means those facilities occupied by populations or which handle dangerous substances including but not limited to hospitals, medical facilities; structures housing, supporting or containing toxic or explosive substances; covered public assembly structures; school buildings through secondary, including day-care centers; buildings for college or adult education; jails and detention facilities; and all structures with occupancy of greater than 5,000 people. 18E.10.050 PCC

Although adopting this definition by reference, the Plan specifically focuses on mitigation of the critical facilities as per FEMA's definition ("State and Local Mitigation Planning: Understanding Your Risks" Publication 386-2):

"Critical Facilities: Facilities that are critical to the health and welfare of the population and that are especially important following hazard events. Critical facilities include, but are not limited to, shelters, police and fire stations, and hospitals."

To delineate how critical a critical facility is, the Planning Team developed a "Criticality Rating" that ranks each facility based on how critical its operation is to disaster response and recovery activities. The Planning Team assigned these ranks based on the functions outlined in the

Comprehensive Emergency Management Plan and standard operating procedures for county-wide mitigation and recovery efforts. The ranks are defined as follows:

- **High (H):** The facility is critical and needs to be operational for the first 72 hours after a disaster.
- **Medium (M):** The facility is essential for the long-term continued operation of County services. While not essential, having these facilities operational during the first 72 hours after a disaster would be greatly beneficial to the County’s capabilities.
- **Low (L):** The facility, while useful in the post-disaster environment, is not essential for continued functioning of critical County operations during the first 72 hours after a disaster.

Identification

The Planning Team analyzed facilities throughout the County based on the agreed upon definition and in conjunction with the hazard identification. Over the course of several Planning Team meetings, the Planning Team identified a broad range of critical facilities, including some not in the County’s control. The Planning Team decided that critical facilities in the Plan would be organized into three ownership groups: **County Owned, County Leased, and Not Owned or Controlled by the County**. These create a more efficient structure for developing each facility’s mitigation plan as categorization centers on the implementing authority.

Having identified the facilities, and based on this categorization, the Planning Team identified individuals most knowledgeable of each critical facility, secured their support, and scheduled meetings regarding the development of critical facility-specific mitigation plans. Critical facility mitigation plans include: **profiles each facility; assesses its risks and determines its vulnerabilities, and outlines a prioritized list of mitigation measures specifically for each facility**. In order to develop these plans, the relied on “Mitigation 20/20” critical facility forms.

During the meetings, representatives from the Planning Team and facility representatives filled out the forms which in turn helped create the hazard identification and risk information for given locations. The assessment is not intended to require detailed engineering information or expensive studies and analysis or to necessarily require onsite inspections or measurements. It is simply intended to rely on the best judgment of the representative about the facility, its environment and its functioning.

Profile

Critical facilities “Mitigation 20/20” Profile Forms identify fundamental information about the critical facility. The form includes the following specific information: owner, year built, “criticality rating,” composite vulnerability rating (determined after completing the vulnerability assessment described below), critical facility function, location, and whether the facility has auxiliary power. The critical facilities were also defined based on the following categories: General Government, Health Care, Industrial, Private/Commercial, Public Health, Public Safety,

Transportation, and Utility. For County-leased critical facilities, the facility owner is identified after the name of the facility and before the construction date.

Vulnerability Assessment

The Planning Team also conducted numerous vulnerability assessments during the planning period. These assessments build on the identification of hazards, and the risk that they pose to the County’s critical facilities. The vulnerability assessment process examines more specifically how the identified hazard events would damage or disrupt these facilities. The Planning Team used a comprehensive vulnerability assessment process to evaluate the specific ways a disaster event would impact the critical facilities, including any consequences to the County from any disaster-caused disruption.

The Planning Team used Mitigation 20/20 Software routines to conduct vulnerability assessments for the County’s critical facilities. A total of eighteen qualitative numeric criteria were utilized in the assessments. These criteria include the seven hazards addressed in the Hazard Identification (Earthquake, Volcanic, Flood, Severe Storm, Landslide, Tsunami and Seiche, and WUI Fire) and eleven other criteria (Damage History, Power Outage, Water Supply, Sewer Out, Communications Failure, Community Services, Health & Safety Hazard, Road Blockage, Environment Impact and Psychological Hardship).

The eighteen qualitative numeric criteria were methodologically used to make estimates and judgments regarding the vulnerabilities. All of the Planning Team participants used the same criteria, resulting in a consistent approach to the vulnerability assessment throughout the planning process. Included in the assessment is a determination of potential property damage as a measure of vulnerability. The assessment is not intended to require detailed engineering information or studies, or to necessarily require onsite inspections or measurements. It is simply intended to rely on the best judgment of individual(s) knowledgeable about the building or system, its environment, and its functioning.

The composite vulnerability score was converted to a “Low”, “Medium”, and “High” scale based on the total potential vulnerability for all criteria (See Table 2). The maximum vulnerability score is fifty-four. The following scale was devised for the ratings:

0-18	→	Low Hazard Composite Vulnerability Rating	(L)
19-36	→	Medium Hazard Composite Vulnerability Rating	(M)
37-54	→	High Hazard Composite Vulnerability Rating	(H)

$$\text{Total vulnerability score} = (\text{Total Hazards Criteria Scores} + \text{Other Critical Criteria Scores})$$

The individual hazard vulnerability scores were converted to a “Low”, “Medium” and “High” scale based on the total potential vulnerability from that hazard (See Critical Facilities Vulnerability Assessments Section).The maximum vulnerability score is a three. The following scale was devised for the ratings:

0-1	→	Low Hazard Vulnerability Rating	(L)
2	→	Medium Hazard Vulnerability Rating	(M)

This scale portrays the level of vulnerability to each hazard for the County’s critical facilities.

Charts 6.1, 6.2, and 6.3 are the summary products compiled by the facility owners and the Planning Team showing the composite vulnerabilities score and ratings of each critical facility. For some critical facilities (in particular some County Leased facilities and Not Owned or Controlled by the County facilities) information was unable to be obtained due to time restraints and fiscal resources. This information will be gathered in the next five years. A “TBD” (To Be Determined) is used to show that the critical facility information will be gathered in the future. Within each of the three groups, the facilities are arranged alphabetically.

Facility Mitigation Measures

With the results of the critical facilities vulnerability assessments having been identified, “Mitigation 20/20” Mitigation Measure Forms were administered to the facility owners. The critical facility owners and Planning Team proposed, evaluated, and finally prioritized specific mitigation measures to mitigate the defined vulnerabilities. The measures were developed with the same eight categories that comprehensively evaluate each of the County’s broader mitigation measures (see Mitigation Strategy Section).

Plan Maintenance Process

The planning process was just the foundation of breaking the disaster cycle by planning for a disaster resistant Pierce County. The Planning Team decided to develop the Pierce County plan maintenance procedures around a “Pre Adoption Review” allowed by Washington State EMD and FEMA Region X. Washington State EMD and FEMA Region X will review the Pierce County Natural Hazard Mitigation Plan and, once approved, the Pierce County Council will then formally adopt the Plan. Furthermore, the Planning Team decided to establish a Pierce County Hazard Mitigation Committee that will be responsible for reviews and updates to the Plan.

The section details the formal process that will guarantee the Plan remains an active and relevant document. The section includes: a documentation of the Plan’s formal adoption; a process schedule of monitoring, evaluating, and updating within a five-year cycle; an explanation of how Pierce County intends to incorporate the mitigation strategies outlined in the County Plan into existing County mechanisms, and; how Pierce County will integrate public participation in the plan maintenance procedures.

Endnotes

¹ Clackamas

³ *Ibid*, Modified Clackamas County template.

⁴ <http://www.co.pierce.wa.us/pc/abtus/ourorg/dem/EMDiv/MitPlan2.htm>

¹¹ Clackamas County Hazard Mitigation Plan.

¹² Pitt County, North Carolina, Natural Hazard Mitigation Plan. 2000.

<http://www.co.pitt.nc.us/depts/planning/hazmit/hazmitplan.pdf>

¹³ Town of Wendell, North Carolina, Hazard Mitigation Plan.

http://www.dem.dcc.state.nc.us/mitigation/Library/wendell_assessment.pdf

¹⁴ Clackamas County, Oregon, Natural Hazard Mitigation Plan. September, 2002.

<http://www.co.clackamas.or.us/emergency/hmp.htm>.

¹⁶ County Executive, 2004 Mission Statement.

<http://www.co.pierce.wa.us/pc/abtus/ourorg/exec/execgoals2002.htm>.

¹⁷ The mitigation plans for Clackamas County, OR, Salem, OR, the Town of Wendell, NC, and Riverside Fire Protection District #14, WA, provided examples and models for the development of the eight Pierce County mitigation measure criteria. The Pierce County mitigation measure criteria are a hybrid of these, where sometimes only part of another jurisdiction's template criteria was used, and where other times the entire criteria was used.