UMATILLA COUNTY

NATURAL HAZARD MITIGATION PLAN

2009, Amended

Revision Date: April 17, 2014

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Umatilla County
Natural Hazards Mitigation Plan

Report for:
Umatilla County, Oregon

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Adopted by Board of Commissioners on April 17, 2014 via Board Order, BCC-2014-031.

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Other Special Thanks:
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Adopted by Board of Commissioners on June 30, 2009 via Board Order, BCC2009-042.

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Chapter 1. PLANNING PROCESS

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The Umatilla County Natural Hazard Mitigation Plan (hereafter known as "Mitigation Plan") includes resources and information to help assist the residents of the incorporated and unincorporated areas, public and private sector organizations and others interested in participating in planning for natural hazards.

Umatilla County, Oregon has an area of 3,231 square miles and a population of 75,889[1] two-thirds of whom are residents of one of the County's 12 incorporated cities. The purpose of this Mitigation Plan is to ensure a coordinated, integrated response with maximum use of all resources to mitigate the effects of any natural disaster impacting Umatilla County. This Mitigation Plan specifies, to the extent possible, the core actions to be taken by Umatilla County, municipalities and cooperating private institutions to respond to a disaster situation.

[1] Portland State University, Population Research Center, 2010.

The Mitigation Plan is designed around two of the four phases of Emergency Management[2]: planning (preparedness) and mitigation. This Mitigation Plan was written to identify means to prevent disasters, if possible, (planning); and to reduce the vulnerability to disasters and establish capabilities for protecting the public from the effect of disasters (mitigation).

1.01 Planning Participation

The Mitigation Plan is the result of a coordinated effort between the private sector and state and local government entities. The Mitigation Plan provides the information and process required by 44 CFR 201.6 to obtain FEMA approval.

Mitigation Plan Steering Committee

The Mitigation Plan Steering Committee (hereafter known as "Steering Committee) is comprised of 15 members representing various public and private agencies and interests in Umatilla County. Each Steering Committee meeting was open to the public. The Steering Committee's role was to develop/revise the Mitigation Plan mission, goals and actions items. Interests represented on the steering committee include citizen residents and visitors, property owners, business owners, cultural, environment and public agencies (city, county, special districts, state, federal and tribal)
Steering Committee Members:

[2] The four phases of Emergency Management (Planning, Mitigation, Response and Recovery) are addressed and implemented in the Umatilla County Emergency Operations Plan, adopted on December 17, 2003.

- Pat Hart, Fire Chief, Hermiston Fire and Emergency Services District
- John Buckman, Oregon Department of Forestry
- Les Miller, U.S. Army Corps. of Engineers
- John Standley, Public Member, County Planning Commission
- Dennis Hull, National Oceanic & Atmospheric Administration
- Brian Goff, Umatilla National Forest, Fire Staff Officer
- Tom Straughan, Oregon Department of Agriculture
- Craig Williams, Hermiston Foods
- Brian Wolcott, Walla Walla Watershed Council
- Doug Paine, Good Shepherd Health Systems/LEPC
- Gary Woodson, Pendleton Fire Chief
- Darrin Umbarger, Clear View Mediation and Disability Res Center
- Linda Hall, City of Milton Freewater
- Ray Denny, CTUIR Emergency Services (advisory)
- Larry Givens, Umatilla County Commissioner (advisory)

1.02 Multi-Jurisdictional Planning Effort

Umatilla County is dedicated to taking a regional approach to planning for natural hazards. Umatilla County during the 2009 plan formulation made the effort to include each incorporated city willing to participate in the planning process. Staff conducted public presentations at City Council meetings, inviting each city to provide a member to the Mitigation Plan Steering Committee and inviting each city to a hazard/resource mapping workshop and mitigation action item brainstorming session (see Appendix F) for agendas, participation and work products of the multi-jurisdictional effort). Each city that participated in the multi-jurisdictional effort has generated large maps identifying critical facilities, infrastructure and hazard prone areas. These maps will be incorporated into each city's addendum to this Mitigation Plan.

Also in the 2009 planning effort, to advance the multi-jurisdictional effort Umatilla County utilized funds made available by a Region 5 Pre-Disaster Mitigation Planning grant to retain a consultant to work with each incorporated city to create and implement an addendum to co-adopt the Mitigation Plan. Umatilla County Planning and Emergency Management staffs coordinated with the consultant at that time to ensure that the Mitigation Plan complimented the city plans.

During the 2009 Planning process Umatilla County, the Planning Office and Emergency Management Division sent Mitigation Plan surveys to each city, as well as stakeholders and the general public, as to increase public involvement in the planning process. Appendix E shows the survey results.

During the 2013 plan update County staff had direct communication with jurisdictions within Umatilla County to determine their level of participation. County Planning and Emergency Management staff sent special invitationas and notices of public meetings to each city, as well as stakeholders and persons of the general public, to increase public involvement in the 2013 update planning process. All schedule steering committee meetins were posted to the list of upcoming meetings provided the public on the County's website and in print. Draft copies of the plan as well as related

couments were posted to the County website througnout the process to allow any interested person access to the working documents.

Umatilla County Incorporated Cities

City of Adams	City of Pendleton
City of Athena	City of Pilot Rock
City of Echo	City of Stanfield
City of Helix	City of Ukiah
City of Hermiston	City of Umatilla
City of Milton-Freewater	City of Weston

Table 1-1: Umatilla County Incorporated Cities

Umatilla County has also been informally coordinating with the contractors completing the Hazard Mitigation Plan for the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). This is due to the fact that mitigation activities either on or off of the Umatilla Indian Reservation could directly or indirectly impact disaster resistance and resilience for both Umatilla County and the CTUIR.

1.03 Planning Process

The Umatilla County Emergency Management and Umatilla County Planning have facilitated the planning process for the update in 2013. County staff also utilized the expertise of the University of Oregon, Oregon Natural Hazards Workgroup (OPDR). Will Clark, University of Oregon, Resource Assistance to Rural Environments (RARE) assisted in the update as well as attending several meetings with the Steering Committee. Staff attended two trainings sponsored by the OPDR and consulted web sites and other resources developed by the OPDR.

The Mitigation Plan was initially adopted in 2009 in which Umatilla County Emergency Management and County Planning took the lead. County staff utilized the expertise of the University of Oregon, Oregon Natural Hazards Workgroup (OPDR). A Steering Committee was created to assist in the Mitigation Plan formulation and refinement.

1.04 Mission

To prevent loss and protect life, property and the environment from the risk of natural hazards through coordination and cooperation among public and private partners[3].

1.05 Mitigation Plan Goals

The goals of the Mitigation Plan are broad statements to help focus future mitigation efforts. Plan goals act as a bridge between the overall mission of the Mitigation Plan and the specific action items identified to reduce Umatilla County's risk from eight identified hazards (wildfire, flood, severe summer storms, severe winter storms, earthquake, landslide/debris flow, volcano and drought).

The Mitigation Plan goals were created through staff research of other mitigation plans, as well as input from stakeholders and the Steering Committee.

[3] Mitigation Plan Steering Committee, March 8, 2004

The six goals of the Mitigation Plan include:

Goal #1: Protect Life and Property

Goal #2: Public Outreach

Goal #3: Planned Prevention

Goal #4: Agency/Citizen Coordination

Goal #5: Natural Resource Protection

Goal #6: Emergency Service Planning

1.06 Mitigation Plan Facilitation

Coordinating Body

Two departments (Planning Department and Office of Emergency Management) have coordinated the Mitigation Plan planning process and will continue to coordinate and implement the Mitigation Plan.

Convener

A representative from the Umatilla County Planning Department served as convener to facilitate the Steering Committee meetings, and will assign tasks such as updating and presenting the Mitigation Plan to the members of the Steering Committee, as well as the Planning Commission, Umatilla County Board of Commissioners and other coordinating partners. Mitigation Plan implementation and evaluation will be a shared responsibility among all of the organizations identified as coordinators or partners in the action item matrix.

1.07 Mitigation Plan Adoption and Implementation

Mitigation Plan Adoption

Each participating governing body has the authority to promote sound public policy regarding natural hazards. The Umatilla County Board of Commissioners will be responsible for adopting, by county resolution, the multi-jurisdictional Mitigation Plan. The formal review and adoption process is as follows:

1. Umatilla County submits Mitigation Plan draft to OEM State Hazard Mitigation Officer for review.
2. OEM conducts review and returns Mitigation Plan to Umatilla County for final revisions.
3. Umatilla County makes final revisions and submits plan to FEMA for pre-adoption review through OEM.
4. FEMA reviews and issues an "Approvable Pending Adoption" (APA) letter or finds that further revisions are needed to meet CFR criteria.
5. Once APA letter is received by Umatilla County through OEM, Board of Commissioners adopts Mitigation Plan and provide promulgation document to FEMA through OEM.
6. FEMA then formally approves Mitigation Plan and sends approval letter to Board of Commissioners.
7. Draft city addenda may be submitted to OEM for review at any time during this process. Addenda should not be adopted by cities until they too have received an APA letter from FEMA.

8. One benefit to the county and cities in having a FEMA-approved Mitigation Plan is eligibility for various hazard mitigation grant programs.

Land Use Programs

Oregon Statewide Planning Goal 7 *Natural Hazards* requires local governments to mitigate development in known areas of natural disasters and hazards. Umatilla County addresses Statewide Planning Goals and legislative requirements through the Umatilla County Comprehensive Plan. Therefore, the Mitigation Plan will provide a series of recommendations that could influence existing goals, objectives and regulations of the Umatilla County Comprehensive Plan and Umatilla County Development Code. Examples of possible updates may include but are not limited to the following:

1. Updates to the findings and policies of Goal 7 (Chapter 10, *Natural Hazards*) of the Umatilla County Comprehensive Plan.
2. Updates to the findings and policies of Goal 5 (Chapter 8, *Open Space, Scenic and Historic Areas, and Natural Resources*) and Goal 6 (Chapter 9, *Air, Land and Water Quality*) chapters of the Umatilla County Comprehensive Plan.
3. Updates to the Umatilla County Development Code, Flood Hazard Overlay Zone.
4. Updates to the Umatilla County Development Code, Steep Slope Overlay Zone.
5. Updates to the Umatilla County Development Code for both resource zoned and non-resource zoned fire-siting standards.

State Administered Programs

Umatilla County does not currently administer a sanitation or building codes program. Those responsibilities fall under the jurisdiction of the State of Oregon. Umatilla County will use the Mitigation Plan to recommend updates to state regulatory policies implemented in Umatilla County, as well as guide local management decisions should the County choose to assume one or more programs currently administered by the State of Oregon

Umatilla County Emergency Management

Umatilla County currently has an approved Emergency Operations Plan that deals with mitigation and response of both manmade and natural disasters. The Mitigation Plan may recommend amendments to the existing policies of the Emergency Operations Plan. The amendments may be directly associated with natural hazard response and recovery.

Stakeholders

The Mitigation Plan process has identified multiple private and public agencies that can benefit from pre-disaster mitigation funding, planning and projects. The planning process has utilized the expertise of stakeholders to identify projects and planning not directly related too or under the jurisdiction of Umatilla County, but that could benefit the quality of life and safety of Umatilla County residents. Therefore, the Mitigation Plan will recommend on the ground and planning projects from other entities and jurisdictions that will benefit the overall disaster resistance and resilience of Umatilla County.

1.08 Monitoring, Evaluating and Updating the Mitigation Plan

Formal Review Process

The Mitigation Plan will be evaluated on a semi-annual basis to determine opportunities for making the Mitigation Plan more effective and to reflect changes that may affect mitigation and planning priorities. The Umatilla County Planning Department, as convener, will be responsible for contacting the Mitigation Plan Steering Committee members to organize an evaluation meeting.

Steering Committee members will be responsible for monitoring and evaluating the goals, action items and mitigation priorities of the Mitigation Plan to determine their relevance to changing situations in Umatilla County, as well as changes in State and Federal policy, to ensure that the Mitigation Plan is addressing current and expected conditions. The Steering Committee will also review the risk assessment portion of the Mitigation Plan to determine if information should be updated or modified, given any new or additional data. In addition to formal review by the Steering Committee, organizations responsible for the various action items implemented through the Mitigation Plan will also have the opportunity to report on the status of their projects and which mitigation strategies should be revised.

The Umatilla County Planning Department will update the Mitigation Plan every five years and will also coordinate with all holders of the Mitigation Plan when changes have been made. Every five years the updated Mitigation Plan will be submitted to the Oregon State Emergency Management Mitigation Officer and FEMA for review and approval.

City Addenda

Umatilla County estimates that all participating city jurisdictions will adopt addenda. Following adoption of addenda by all participating cities, the convener will facilitate a Steering Committee to review and recommend incorporating the addenda into the Mitigation Plan. The typical update process will be followed if necessary.

Semi-Annual Meeting

The Steering Committee will meet semi-annually (every six months – April and October) to review updates of the Risk Assessment data and findings, discuss methods of continued public involvement, and document successes and lessons learned based on actions that were accomplished during the preceding six months. The convener will be responsible for documenting the outcomes of the semi-annual meeting.

The Mitigation Plan's format allows the County to review and update sections when new data becomes available. New data can be easily incorporated, resulting in a natural hazards mitigation plan that remains current and relevant to Umatilla County and participating jurisdictions.

The first semi-annual meeting of the Steering Committee will take place after the formal adoption by the County of the Mitigation Plan. It is anticipated that the first semi-annual meeting will take place in the fall of 2014, with future roughly six months from the date of the first meeting.

Five-Year Review of Plan

This Mitigation Plan will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During this Mitigation Plan update, the following questions should be asked to determine what actions are necessary to update the Mitigation Plan. The convener will be responsible for convening the Steering Committee to address the questions outlined below.

- Are the Mitigation Plan goals still applicable?
- Do the Mitigation Plan's priorities align with State priorities?
- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the Mitigation Plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Do existing actions need to be reprioritized for implementation?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the Mitigation Plan accurately address the impacts of this event?

The questions above will help the Steering Committee determine what components of the Mitigation Plan need updating. The Steering Committee will be responsible for updating any deficiencies found in the Mitigation Plan based on the questions above.

The next five year review of the Mitigation Plan will take place approximately five years from the date of adoption (fall of 2018).

Continued Public Involvement

Umatilla County invited public input throughout the planning process of the Mitigation Plan, and is dedicated to involving the public directly in review and updates of the Mitigation Plan. The Steering Committee is responsible for participating in the semi-annual reviews of the Mitigation Plan and stakeholder members, including agency and city representatives will be encouraged to participate either directly or through additional surveys and public presentations.

A public meeting will be held for each semi-annual meeting/evaluation of the Mitigation Plan. The meetings will provide a public forum for expressing concerns, opinions or ideas about the Mitigation Plan. The Umatilla County Planning Department will be responsible for publicizing the public meetings and maintaining public involvement.

1.09 Mitigation Strategies

Mitigation Plan Action Items

The Mitigation Plan identifies action items developed through data collection and research, stakeholder questionnaires and the public participation process (i.e. meetings and workshops). Mitigation Plan activities may be considered for funding through federal and state grant programs, and when other funds are made available through the County or participating organization. Action items in the Mitigation Plan address hazard specific issues, as well as multi-hazard issues that could mitigate for several hazards. To help ensure activity implementation, each action item includes information on the timeline, coordinating organizations and partner organizations. Upon implementation, the coordinating organizations may look to partner organizations for resources and technical assistance. The following areas are specifically addressed with each identified action item:

1. Coordinating Organization: The coordinating organization is the entity that is willing and able to organize resources, find appropriate funding streams, and oversee activity implementation, monitoring and evaluation. Coordinating organizations may include local, county, state or regional agencies that are capable of or responsible for implementing activities and programs.

2. Partner Organization: Partner organizations are the local, county, state, regional and/or federal entities capable of providing technical and/or resource assistance to activities and programs. Partner organizations are not responsible for direct implementation and evaluation but are vitally important to ensuring a comprehensive Mitigation Plan.

3. Timeline: Each action item includes an estimate of the timeline for implementation.

4. Ideas for Implementation: Each action item includes ideas for implementation and potential resources, which may include funding streams and human resources.

5. Mitigation Plan Goals Addressed: The Mitigation Plan goals addressed by each action item are included as a way to monitor and evaluate how well the Mitigation Plan meets the plan goals once implementation begins. By addressing plan goals in each mitigation strategy, coordinating and partner organizations are more capable of maximizing Mitigation Plan efficiency.

Action Item Prioritization

Establishing and implementing a project prioritization process is important because it: (1) is a required element of the Disaster Mitigation Act of 2000, (2) can assist the Steering Committee make decisions about how to move forward and (3) can assist in directing the effective use of limited mitigation dollars.

The following prioritization process was developed by the Oregon Natural Hazard

Workgroup at the University of Oregon's Community Service Center. The four step process described below results in a priority score of high, medium, or low for each action. The priority scores are based on the following four factors:

1. a Risk Assessment;
2. the availability of funding;
3. a cost benefit analysis, and
4. Steering Committee recommendations

This methodology will be used by the Steering Committee to initially prioritize the Mitigation Plan's action items during the development of the Mitigation Plan and will also be used to update the action items during the semi- annual review and update.

Potential mitigation activities will often come from a variety of sources; therefore project prioritization process needs to be flexible. Mitigation actions may be identified by Steering Committee members, local government staff, other planning documents, or the Risk Assessment. Depending on the potential project's intent and implementation methods, several funding sources may be appropriate. Examples of mitigation funding sources include, but are not limited to: FEMA's Pre-Disaster Mitigation competitive grant program (PDM), Flood Mitigation Assistance (FMA) program, National Fire Plan (NFP), Title II funds, Title III funds, Community Development Block Grants (CDBG), local general funds, and private foundations, among others.

The Steering Committee has prioritized the Action Items for each identified hazard. The prioritization of Action Items assures the greatest opportunity of providing mitigation success and achieving plan goals.

Although prioritizing action items provides a guide to Mitigation Plan implementation, Umatilla County has the option to implement any of the action items at any time. This option to consider all action items for implementation allows Umatilla County to consider mitigation strategies as new situations arise, such as capitalizing on funding resources that could pertain to an action item that would be successful but that is not necessarily the highest priority in the Mitigation Plan.

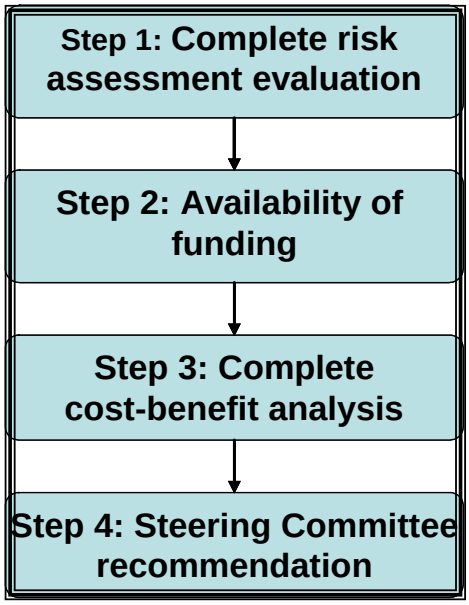

Figure 1-1: Project Prioritization Process Overview (Source: OPDR/CPW, 2005)

Economic Analysis of Mitigation Projects

The Federal Emergency Management Agency's accepted methods for determining the costs and benefits associated with natural hazard mitigation strategies, measures or projects falls into two general categories: benefit/cost analysis and cost-effectiveness analysis (See Appendix G, created by the University of Oregon, for a complete breakdown of the Economic Analysis processes). Conducting benefit/cost analysis for a mitigation activity can assist

communities in determining whether a project is worth undertaking now, in order to avoid disaster related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards can provide decision makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Given federal funding, Umatilla County will use a FEMA approved benefit/cost analysis approach to identify and prioritize mitigation action items. For other projects and funding sources, Umatilla County may use other approaches including the STAPLE/E approach[4] to understand the costs and benefits of each action item and develop a prioritized list.

Based on funding and extent of mitigation, the higher priority mitigation activities would be selected from this prioritized list. Using cost/benefit analysis is a primary decision making tool and will aid Umatilla County in selecting the best possible mitigation strategies in the future.

Seeking Grant Funding

The Steering Committee will utilize accepted FEMA principles to analyze the competitiveness of proposed action items for FEMA Pre-Disaster Mitigation Grants and other funding sources. The principles are described below:

[4] "Economic Analysis of Natural Hazard Mitigation Projects," Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon.

Step 1: Examine funding requirements

The Steering Committee will identify how best to implement individual actions into the appropriate existing plan, policy, or program. The Steering Committee will examine the selected funding stream's requirements to ensure that the mitigation activity would be eligible through the funding source. The Steering Committee may consult with the funding entity, Oregon Emergency Management, or other appropriate state or regional organization about the project's eligibility.

Step 2: Complete risk assessment evaluation

The second step in prioritizing the plan's action items was to examine which hazards they are associated with and where these hazards rank in terms of community risk. The Steering Committee will determine whether or not the Mitigation Plan's risk assessment supports the implementation of the mitigation activity. This determination will be based on the location of the potential activity and the proximity to known hazard areas, historic hazard occurrence, and the probability of future occurrence documented in the Plan. To rank the hazards, community's natural hazard risk assessment was utilized. This risk assessment identified various hazards that may threaten community infrastructure and population in a range from:

Low, Medium, High

Step 3: Complete quantitative and qualitative assessment, and economic analysis

The third step is to identify the costs and benefits associated with natural hazard mitigation strategies, measures, or projects. Two categories of analysis that are used in this step are: (1) benefit/cost analysis, and (2) cost-effectiveness analysis. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards can provide decision makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

If the activity requires federal funding for a structural project, the Steering Committee will use a Federal Emergency Management Agency- approved cost-benefit analysis tool to evaluate the appropriateness of the activity. A project must have a benefit cost ratio of greater than one in order to be eligible for FEMA grant funding.

For non-federally funded or nonstructural projects, a qualitative assessment will be completed to determine the project's cost effectiveness. The Steering Committee will use a multivariable assessment technique called STAPLE/E to prioritize these actions. STAPLE/E stands for Social, Technical, Administrative, Political, Legal, Economic, and Environmental. Assessing projects based upon these seven variables can help define a project's qualitative cost effectiveness.

Step 4: Steering Committee recommendation

Based on the steps above, the Steering Committee will recommend whether or not the mitigation activity should be moved forward. If the Steering Committee decides to move forward with the action, the coordinating organization designated for the activity will be responsible for taking further action and documenting success upon project completion. The Steering Committee will convene a meeting to review the issues surrounding grant applications and shared knowledge and or resources. This process will afford greater coordination and less competition for limited funds.

The Steering Committee and the community's leadership have the option to implement any of the action items at any time, (regardless of the prioritized order). This allows the Steering Committee to consider mitigation strategies as new opportunities arise, such as funding for action items that may not be of highest priority. This methodology is used by the Steering Committee to initially prioritize the Mitigation Plan's action items, in addition to maintaining the action list during annual review and update.

Chapter 2. UMATILLA COUNTY ACTION PLAN

Sections:

The Umatilla County Action Plan provides the guidance for implanting the various features of the Mitigation Plan. The following tables provide a summary of the action items, coordinating organizations, partner organizations, status, timeline and applicable goals. Chapter 5 provides the details behind the summary tables. References are provided for each action item.

The update completed in 2013 also provides a status for each action item. Some action items have been actively accomplished. Of course, many action items are an on-going effort to educate, inform or other similar activities. In these cases, the action item will always be a work in progress.

2.01 MULTI-HAZARD ACTION ITEM

Refer to *Section 5.01 MULTI-HAZARD* for more details on the background for this action plan category.

Action Item	Description	Coordinating Organization	Partner Organizations	Status as of 2013	Timeline	Ref. in Plan	**Plan Goals That Apply** 1	2	3	4	5	6
Short Term Multi-Hazard #1	Complete City Addendums to Umatilla County Natural Hazard Mitigation Plan.	Umatilla County Planning	Incorporated cities of Umatilla County	3 out of 12 city plans adopted	On-going	p. 114	✓	✓	✓	✓	✓	✓
Short Term Multi-Hazard #2	Develop and implement a Public Awareness Campaign regarding natural hazards and natural hazards safety and tools to achieve disaster resistance.	Umatilla County Emergency Management (UCEM)	OPDR, FEMA, OEM, ODOT, County/City EM, NWS, ACOE, Fire Corps, Citizen Group(s)	Actively worked on each year	On-going	p. 114	✓	✓	✓	✓	✓	
Short Term Multi-Hazard #3	Develop Storm Ready Rating Community.	UCEM	NOAA/NWS, Response Agencies	New Action Item in 2013	2 years	P. 115		✓		✓		
Long-Term Multi-Hazard #1	Utilize central location of Umatilla County EOC to create a regional emergency management and information hub for the Pacific Northwest.	UCEM	Counties, Cities, Response Agencies, Private EM Crews, FEMA, OEM, ARC, ODOT, ODF, DOGAMI, DSL, USACE, USFS, CTUIR	No progress	5-12 years	p. 115	✓	✓	✓	✓	✓	✓
Long-Term Multi-Hazard #2	Develop a County GIS Department to oversee map generation and upgrades of current and future hazard prone areas.	Umatilla County Planning	UCEM, CTUIR, DOGAMI, ODOT, City EM, Utilities and Transmission Companies, Special Districts, FEMA, OEM	Formed a GIS Dept. analysis underway	On-going	p. 116	✓		✓	✓	✓	✓

Long-Term Multi-Hazard #3	Develop an inventory/database of utility facilities located in the County.	Umatilla County Planning	UCEM, CTUIR, DOGAMI, ODOT, City EM, Utilities and Transmission Companies, Special Districts, FEMA, OEM	New Action Item in 2013	2 years Ongoing	p. 116	✓		✓	✓	✓	✓

Mitigation Plan Goals - #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning

Table 2-1: Multi Hazard Action Items

2.02 WILDFIRE ACTION ITEMS

Refer to *Section 5.02 WILDFIRE* for more details on the background for this action plan category.

Action Item	Description	Coordinating Organization	Partner Organizations	Status as of 2013	Timeline	Ref. in Plan	**Plan Goals That Apply** 1	2	3	4	5	6
Short-Term Wildfire #1	Work with agriculture and conservation groups to establish fire buffers between both forest and range wild land urban interface areas.	Fire Defense Board	OEM, NRCS, ODA, USDA, SWCD, County/City EM. agricultural community, UCEM	No progress	3-5 years	p. 126	✓	✓	✓	✓	✓	
Short-Term Wildfire #2	Seek funding for a full time County position to further fire prevention planning and education.	UCEM	ODF, USFS, CTUIR, Response Agencies, Private Fire Companies	No progress	1-2 years	p. 126	✓	✓	✓	✓	✓	
Long-Term Wildfire #1	Work with citizens of Umatilla County to ensure that all areas are protected under a rural fire district.	UCEM	ODF, County/City EM. Mgrs., CTUIR, BLM, USFS, BOC	No progress	1-2 years	p. 127	✓	✓		✓	✓	✓
Long-Term Wildfire #2	Identify substandard interface access roads and provide incentive funding to bring roads up to current fire & life safety standards. Begin with inventory of critical roads.	Fire Defense Board	ODOT, County Public Works, County Planning, CTUIR, OEM, UCEM, ODF, USFS	No progress	5-10 years	p. 127	✓	✓	✓	✓		✓
Long-Term Wildfire #3	Provide logistics and grant writing support to Meacham Volunteer Fire Department to build a fire station that allows all equipment to be stored at a central location.	Meacham Rural Fire Department	UCEM	No progress	5-10 years	p. 128	✓			✓		✓

Long-Term Wildfire #4	Complete feasibility studies of biomass potential on forest lands. Create incentive funding to test biomass technology in Umatilla County.	Umatilla County Economic Development	ODF, USFS, OECDD, State of Oregon, OEM, FEMA	No progress	5-10 years	p. 128						
Long-Term Wildfire #5	Support removal/reduction of biomass fire hazards on private and public lands.	ODF	UCEM, USFS, State of Oregon	New Action Item in 2013	On-going	p. 129	✓	✓		✓	✓	✓
Long Term Wildfire #6	Develop upland storage ponds for wildlife benefit and to be used during wild land fire suppression efforts.	ODFW, ODF	UCEM, OWRD, DSL, CTUIR, Landowners, Districts, WWBWC	No progress	On-going	p. 129	✓		✓	✓	✓	✓

Mitigation Plan Goals - #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning

Table 2-2: Wildfire Action Items

2.03 FLOOD ACTION ITEMS

Refer to *Section 5.03 FLOOD* for more details on the background for this action plan category.

Action Item	Description	Coordinating Organization	Partner Organizations	Status as of 2013	Timeline	Ref. in Plan	Plan Goals That Apply					
							1	2	3	4	5	6
Short-Term Flood #1	Develop conservation easements and riparian planting within mapped and unmapped floodplain areas and farmland with highly erodible soils.	Watershed Councils	SWCD, NRCS, ODA, USDA, CTUIR, Wheat League, FEMA	No progress	1-5 years	p. 140	✓	✓	✓	✓	✓	
Short-Term Flood #2	Identify areas able to absorb high-velocity stream flows w/o impacting investments (i.e. re-establish or create artificial floodplains). Establish connectivity and diversion infrastructure to be utilized during high water events to divert high water to these areas.	NRCS, SWCD, WWBWC	UBWC, CTUIR, ODF&W, USFWS, BOR, USACE, Special Districts, Landowners	No progress	1-5 years	P. 141	✓	✓	✓	✓	✓	
Short-Term Flood #3	Develop and maintain the database of all landowners within FEMA Special Flood Hazard Areas in the County. Use database to distribute outreach and emergency notices related to flooding.	Umatilla County Planning	County, FEMA, OEM, Cities	Database generated, outreach on-going	On-going	p. 142		✓	✓	✓		
Long-Term Flood #1	Identify and map canyons and draws, roads susceptible to high-water and flash flood event but not located on FEMA FIRM maps.	Umatilla County Planning	UCEM, GIS, FEMA, DSL, USACE, CTUIR, OEM, Response Agencies, NOAA	No progress	5 years	p. 142	✓	✓	✓	✓		

Long-Term Flood #2	Obtain funding to upgrade existing levees and berms to USACE standards in order to ensure continuing flood protection, including Umatilla River Levee through Pendleton and Walla Walla River Levee through Milton Freewater.	City of Pendleton, City of Milton-Freewater	FEMA, OEM, USACE, DSL, CTUIR, ODF&W, Special Districts, Umatilla County	Funding was obtained, levee work begun.	1-2 years	p. 143	✓	✓	✓	✓		
Long-Term Flood #3	Identify public and private bridges susceptible to collecting flash flood debris. Prioritize bridge improvements and/or replacement.	Umatilla County Public Works	ODOT, USACE, CTUIR, FEMA, DSL, UCEM, County Planning	No progress	5 years	p. 143	✓		✓	✓		✓

Mitigation Plan Goals - #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning

Table 2-3: Flood Action Items

2.04 SEVERE SUMMER STORM ACTION ITEMS

Refer to *Section 5.04 SEVERE SUMMER STORM* for more details on the background for this action plan category.

Action Item	Description	Coordinating Organization	Partner Organizations	Status as of 2013	Timeline	Ref. in Plan	**Plan Goals That Apply** 1	2	3	4	5	6
Short-Term Summer Storm #1	Complete necessary tasks to obtain a NOAA NWS Storm Ready rating.	UCEM	NOAA NWS, Dispatch	No progress	1-2 years	p. 151	✓		✓	✓		✓
Long-Term Summer Storm #1	Identify opportunities to advance NOAA NWS warning coverage via wireless and non-wireless infrastructure.	UCEM	NOAA NWS, OEM, OSP, ODOT, CTUIR, Landowners	Some progress by NOAA NWS	5 years	p. 151	✓		✓	✓		✓
Long-Term Summer Storm #2	Implement a NOAA Weather Radio (previously Tone Alert Radio) program to provide radios to all schools, communications stations and other interested private and public entities to increase advanced warning capabilities of NOAA NWS and UCEM.	UCEM	NOAA NWS, OEM, FEMA, OSP, CTUIR, Special Districts	No progress	5 years	p. 152	✓		✓	✓		✓

Mitigation Plan Goals- #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning

Table 2-4: Severe Summer Storm Action Items

2.05 SEVERE WINTER STORM ACTION ITEMS

Refer to *Section 5.05 SEVERE WINTER STORM* for more details on the background for this action plan category.

Action Item	Description	Coordinating Organization	Partner Organizations	Status as of 2013	Timeline	Ref. in Plan	Plan Goals That Apply					
							1	2	3	4	5	6
Short-Term Winter Storm #1	Complete necessary tasks to obtain a NOAA NWS Storm Ready rating.	UCEM	NOAA NWS, Dispatch	No progress	1-2 years	p. 161	✓		✓	✓		✓
Long-Term Winter Storm #1	Identify opportunities to advance NOAA NWS warning coverage via wireless and non-wireless infrastructure.	UCEM	NOAA NWS, OEM, OSP, ODOT, CTUIR, Landowners	Some progress by NOAA NWS	5 years	p. 161	✓		✓	✓		✓
Long-Term Winter Storm #2	Implement a NOAA Weather Radio (previously Tone Alert Radio) program to provide weather radios to all schools, communications stations and other interested private and public entities to increase advanced warning capabilities of NOAA NWS and UCEM.	UCEM	NOAA NWS, OEM, FEMA,	No progress	5 years	p. 162	✓		✓	✓		✓
Long Term Winter Storm #3	Determine snow removal capabilities of Umatilla County. Provide funding for snow removal equipment in areas with minimal or no snow removal capabilities.	UCEM	Cities, Response Agencies, Special Districts	No progress	5 years	p. 162	✓		✓	✓		✓

Mitigation Plan Goals- #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning

Table 2-5: Severe Winter Storm Action Items

2.06 EARTHQUAKE ACTION ITEMS

Refer to *Section 5.06 EARTHQUAKE* for more details on the background for this action plan category.

Action Item	Description	Coordinating Organization	Partner Organizations	Status as of 2013	Timeline	Ref. in Plan	**Plan Goals That Apply** 1	2	3	4	5	6
Short-Term Earthquake #1	Complete county-wide assessment of structures vulnerable to earthquake damage. Obtain funding to retro-fit high priority structures.	UCEM	OEM, FEMA, Cities, Special Districts	Assessment complete. No retro-fitting has occurred.	Ongoing	p. 172	✓		✓	✓		✓
Long-Term Earthquake #1	Support continuing work to identify all fault patterns in Umatilla County.	UCEM	DOGAMI, USGS, OWRD, CTUIR, County Planning	No progress	Ongoing	p. 172	✓		✓	✓		✓

Mitigation Plan Goals - #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning

Table 2-6: Earthquake Action Items

2.07 VOLCANO ACTION ITEMS

Refer to *Section 5.07 VOLCANO* for more details on the background for this action plan category.

Action Item	Description	Coordinating Organization	Partner Organizations	Status as of 2013	Timeline	Ref. in Plan	**Plan Goals That Apply** 1	2	3	4	5	6
Short-Term Volcano #1	Create volcano response protocols for protection from seismic activity and debris damage.	UCEM	FEMA, OEM, NOAA NWS, ODOT, OSP, CTUIR, Cities, Response Agencies, Special Districts	No progress	1 year Ongoing	p. 175	✓		✓	✓	✓	✓

Mitigation Plan Goals - #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning

Table 2-7: Volcano Action Items

2.08 LANDSLIDE/DEBRIS FLOW ACTION ITEMS

Refer to *Section 5.08 LANDSLIDE/DEBRIS FLOW* for more details on the background for this action plan category.

Action Item	Description	Coordinating Organization	Partner Organizations	Status as of 2013	Timeline	Ref. in Plan	Plan Goals That Apply 1	2	3	4	5	6
Short-Term Landslide #1	Update Goal 7 of the Umatilla County Comprehensive Plan and develop GIS maps designating landslide prone areas or areas where the Steep Slope Overlay Zone applies.	Umatilla County Planning	DOGAMI, UCEM, Landowners	No progress	1 year Ongoing	P. 179	✓		✓	✓	✓	✓
Long-Term Landslide #1	Identify and implement mitigation measures where important infrastructure for evacuation, emergency vehicle access, commodity transport, information dissemination and utilities may be prone to damage from site specific landslides.	UCEM	DOGAMI, Public Works, Cities, ODOT, CTUIR, ODF, USFS, Special Districts, Utilities	No progress	3-10 years	p. 179	✓		✓	✓	✓	✓

Mitigation Plan Goals- #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning

Table 2-8: Landslide/Debris Flow Action Items

2.09 DROUGHT ACTION ITEMS

Refer to *Section 5.09 DROUGHT* for more details on the background for this action plan category.

Action Item	Description	Coordinating Organization	Partner Organizations	Status as of 2013	Timeline	Ref. in Plan	**Plan Goals That Apply** 1	2	3	4	5	6
Short-Term Drought #1	Implement 2050 Water Management Plan for Umatilla Basin.	Umatilla County Planning	Task Force, USFWS, BOR, USACE, CTUIR, FEMA, NOAA, DSL, OWRD, ODA, OECDD, ODF&W, UBWC, Landowners, Special Districts	Water Plan has been adopted.	On-going	p. 186	✓	✓	✓	✓	✓	
Long-Term Drought #1	Utilize Columbia River water for replacement of certificated groundwater irrigation rights.	Umatilla Basin Water Commission	BOR, CTUIR, State of Oregon, OWRD, Landowners, Special Districts	A pilot project has developed.	10-20 years	p. 187	✓		✓	✓	✓	
Long-Term Drought #2	Obtain funds to develop groundwater plans, ensure water supply sustainability and implement recharge projects.	Umatilla Basin Water Commission	CTUIR, USGS, OWRD, Landowners, Special Districts	State funds have been secured.	5-10 years	p. 188	✓	✓	✓	✓	✓	
Long-Term Drought #3	Complete settlement of CTUIR water claims and maximize benefit of Phase III infrastructure.	Umatilla Basin Water Commission	CTUIR, BIA, BOR, Landowners, Special Districts	Federal negotiations have begun.	5-15 years	p. 189	✓	✓	✓	✓	✓	

Mitigation Plan Goals - #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning

Table 2-9: Drought Action Items

Chapter 3. Community Profile

Sections:

The following section describes Umatilla County from a number of perspectives in order to help define and understand its sensitivity and resilience to natural hazards. Sensitivity and resilience indicators are identified through the examination of community capitals which include natural environment, socio-demographic capacity, regional economy, physical infrastructure, community connectivity and political capital. The most fundamental definition of capital is a resource or asset that can be used, invested, or exchanged to create new resources. The concept of community capitals provides a useful framework for identifying the diverse resources and activities that make up a local economy.[5]

Sensitivity factors can be defined as those community assets and characteristics that may be impacted by natural hazards (e.g., special populations, economic factors and historic and cultural resources). Community resilience factors can be defined as the community's ability to manage risk and adapt to hazard event impacts by way of the governmental structure, agency missions and directives, as well as through plans, policies, and programs.

The information in this section represents a snapshot in time of the sensitivity and resilience factors in the county during the plan's most recent update. The information documented below, along with the hazard assessments located in *Section 3: Hazard Assessment Updates*, should be used as the local level rationale for the risk reduction action items identified in Appendix B. The identification of actions that reduce Umatilla County's sensitivity, and increase its resilience, assists in reducing overall risk, represented by the overlap in Figure 3-1 below.

[5] Cornelia Flora, Jan Flora, Susan Fey and Mary Emery, "Community Capitals Framework," English Language Learners Symposium.

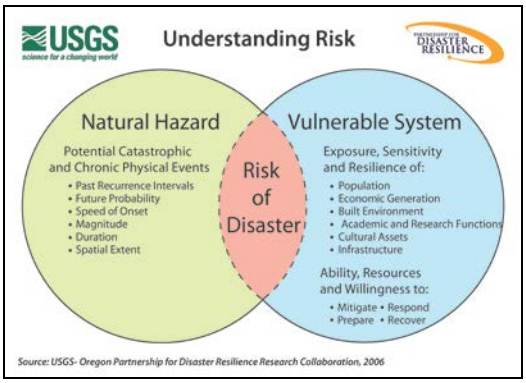

Figure 3-1: Understanding Risks

3.01 Why Plan for Natural Hazards in Umatilla County?

Natural hazards impact citizens, property, the environment and the economy of affected communities. Umatilla County residents and businesses could be exposed to incredible financial and emotional costs in the event of a natural disaster, whether from droughts, earthquakes, flooding, landslides, volcanoes, wildfires, or seasonal storms. The risk associated with natural hazards increases as more people move to areas that are subject to a higher rate of natural hazard incidence or probability. The inevitability of natural hazards and activity within the county create an urgent need to develop strategies, coordinate resources and increase public awareness to reduce risk and prevent loss from future natural hazard events. Identifying risks posed by natural hazards and developing strategies to reduce the impact of a hazard event can assist in protecting life and property of citizens and communities. Local residents and businesses should therefore work together with the county to keep the natural hazards mitigation plan updated. The Natural Hazards Mitigation Plan addresses the potential impacts of hazard events and allows the county to apply for certain funding from FEMA for pre and post disaster mitigation projects that would otherwise not be available if the county did not have an up to date Natural Hazards Mitigation Plan.

3.02 Natural Environment Capacity

Geography

Umatilla County, located near the northeast corner of Oregon, has a land area of 3,215 square miles, making it the eighth largest county in the state in terms of geographic area. It varies in width from 22 to 70 miles, and is approximately 70 miles in length from north to south. It is bounded on the west by Morrow County, on the south by Grant County, on the east by Wallowa and Union Counties, and on the north by Walla Walla and Benton Counties in the State of Washington.[6]

Private ownership is predominant in the Umatilla Basin, covering roughly 80 percent of the Basin land area (1,456,000 acres). The US Forest Service manages about 13 percent of the land area while approximately 12 percent lies within the boundaries of the Confederated Tribes of the Umatilla Indian Reservation. Agricultural and rangelands comprise more than 80 percent of the Basin area and the remainder consists of roughly 15 percent forest as well as 3 percent urban

[6] Umatilla County Flood Insurance Study, FEMA - http://www.co.umatilla.or.us/planning/FIS/41059CV001A.pdf

(the cities of Hermiston and Pendleton[7]) and other developed areas.[8]

A turbulent past created the land on which Umatilla now sits today. From about 16 million years ago to about 10 million years ago, massive volcanic eruptions spewed lava from fissures in the Earth's crust. About 300 separate lava flows poured out of the earth and cooled into basaltic rock during this time period. Since each flow ranged in thickness from 3 to 300 feet, the total thickness of all the flows is likely greater than 10,000 feet. These rocks, the remnants of those enormous eruptions, are collectively referred to as the Columbia River Basalts, or CRBs.

In the time between flows, weathering and erosion broke up the top layer of the hard, black basalt; as new flows surged over the old, they created layers of breccia, or rubbly, broken-up rock. Sedimentary deposits are present between some basalt flows. These layers were formed during periods of volcanic inactivity, when streams, lakes, and soil horizons formed on the basalt surface (Oberlander, 1981). While the middle of each basalt flow is dense and transmits little water, the interflow zones of breccia and sediment formed productive aquifers.

Around the same time that the Columbia River Basalts were being formed, regional uplifting began creating the Blue Mountains. Basins and uplands began to form, rivers and streams began to run, and in some places, the running water left sands, gravels, and boulders, materials known as alluvium. These places, past riverbeds and flood deposits, are today's alluvial aquifers.

Columbia Basin

As can be seen in Figure 3-2 below, Umatilla County is mainly within the Columbia Basin physiographic province, though a substantial section of the county lies within the Blue Mountains in the East and South. Also commonly referred to as the Deschutes-Columbia Plateau, the Columbia Basin is predominantly a volcanic province covering approximately 63,000 square miles in Oregon, Washington and Idaho.[9] The basin is surrounded on all sides by mountains, the Okanogan Highlands to the north, the Cascade Range to the west, the Blue Mountains to the south and the Clearwater Mountains to the east. Almost 200 miles long and 100 miles wide, the Columbia Basin merges with the Deschutes Basin lying between the High Cascades and Ochoco Mountains. The province slopes gently northward toward the Columbia River with elevations up to 3,000 feet along the south and west margins down to a few hundred feet along the river.[3]

Blue Mountains

The Blue Mountains range curves northeastward for 190 mi (310 km) from central Oregon to southeastern Washington. The range reaches a width of 68 miles and an average elevation of about 6,500 ft (2,000 m); it comprises an uplifted, warped, and dissected lava plateau, above which rise several higher mountain ridges, including Aldrich, Strawberry, and Elkhorn. The

[7] U.S. Census Bureau, 2010 Census, Oregon's 68 Urban Areas

[8] Umatilla River Basin Total Maximum Daily Load and Water Quality Management Plan, Oregon DEQ - http://www.ars.usda.gov/SP2UserFiles/person/6112/tmdl.pdf

[9] Western Oregon University. Oregon Physiographic Provinces. "Deschutes-Columbia Plateau". 1999. http://www.wou.edu/las/physci/taylor/eisi/orr_orr2.PDF.

highest peak is Rock Creek Butte (9,105 ft), on the Elkhorn Ridge. The mountains are drained by tributaries of the Columbia River, and their slopes are heavily forested with pine and Douglas fir. The mountains are within parts of the Umatilla, Whitman, and Malheur national forests. [10]

The Blue Mountains are a complex of mountain ranges that are lower and more open than the neighboring Cascades and Northern Rockies. Like the Cascades, but unlike the Northern Rockies, the Blue Mountains are mostly volcanic in origin. However, the core of the Blue Mountains and the highest ranges, the Wallowa and Elkhorn Mountains, are composed of granitic intrusive, deep sea sediments, and metamorphosed rocks.[11]

[10] Encyclopedia Britannica - http://www.britannica.com/EBchecked/topic/70305/Blue-Mountains

[11] Environmental Protection Agency. "Eco-regions of Oregon." ftp://ftp.epa.gov/wed/ecoregions/or/or_front.pdf.

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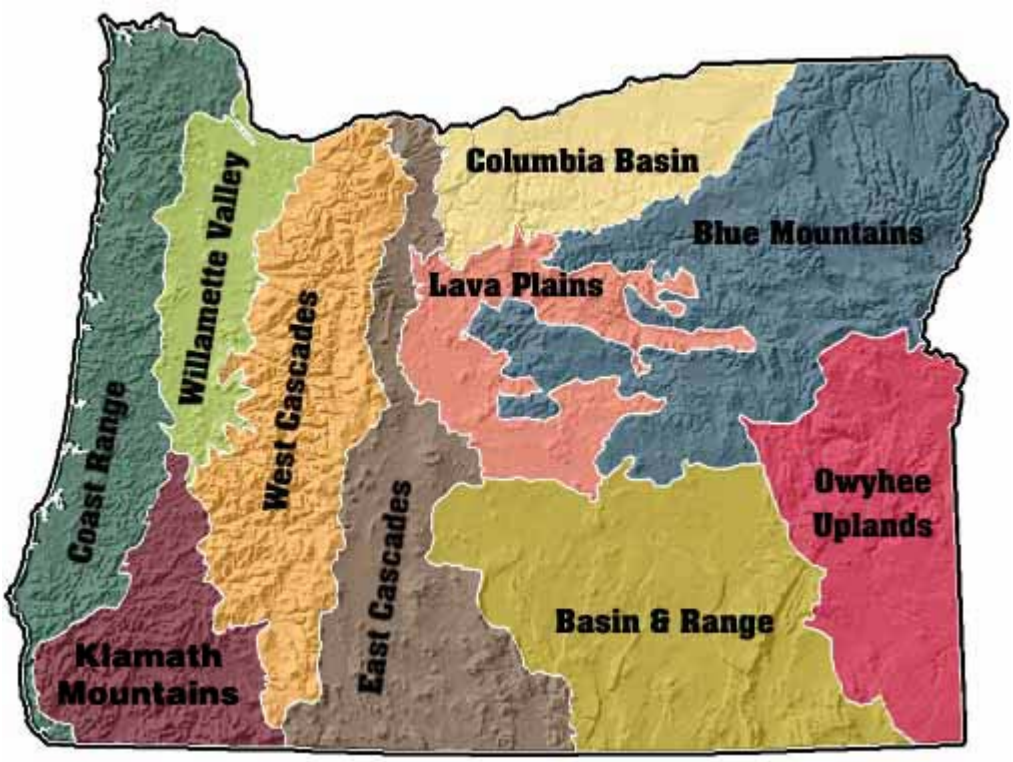


Physiographic Provinces, Oregon Habitat Joint Venture - http://www.ohjv.org/projects.html

Figure 3-2: Physiographic Provinces of Oregon

Level Four Eco-regions

"Eco-regions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources; they are designed to serve as a spatial framework for the research, assessment management, and monitoring of ecosystem components. By recognizing the spatial differences in the capacities and potentials of ecosystems, eco-regions stratify the environment by its probable response to disturbance."[12] There are eight level four eco-regions within the Columbia Basin and Blue Mountains that can be found in Umatilla County; the Pleistocene Lake Basin, the Umatilla Plateau, the Yakima Folds, the Deep Loess Foothills, the Umatilla Dissected Uplands, the Maritime-Influenced Zone, the Mesic Forest Zone, and the Cold Basins.

Pleistocene Lake Basins

The Pleistocene Lake Basins[13] once contained vast temporary lakes that were created by flood waters from glacial lakes Missoula and Columbia. In Oregon, the flood waters accumulated from the eastern entrance of the Columbia River Gorge upstream to the Wallula Gap to form ancient Lake Condon. Today, the region is the driest and warmest part of the Columbia Basin with mean annual precipitation varying from seven to ten inches. Native vegetation consists of bunchgrass and sagebrush. Major irrigation projects provide Columbia River water to this region, allowing the conversion of large areas into agriculture.

Umatilla Plateau

The nearly level to rolling, treeless Umatilla Plateau[14] eco-region is underlain by basalt and veneered with loess deposits. Areas with thick loess deposits are farmed for dry land winter wheat, or irrigated alfalfa and barley. In contrast, rangeland dominates more rugged areas where loess deposits are thinner or nonexistent. Mean annual precipitation is nine to fifteen inches and increases with increasing elevation. In uncultivated areas, moisture levels are generally high enough to support grasslands of bluebunch wheatgrass and Idaho fescue without associated sagebrush.

Yakima Folds

The Yakima Fields[15] eco-region consists of unforested anticlinal ridges composed of layer upon layer of basalt many thousands of feet thick. Loess blankets the south-facing slopes and supports dry land wheat farming. Steep, rocky north-facing slopes are commonly used for livestock grazing. The Eco-region receives an average of ten to twelve inches of rain per year. Sagebrush and bunchgrass associations dominate plan assemblages outside of heavily farmed or grazed areas.

Deep Loess Foothills

The Deep Loes Hoothills[16] eco-region has highly-productive, loess-rich soils. Moisture levels are high enough to support Idaho fescue and bluebunch wheatgrass grasslands. Today, the eco-region is dominated by non-irrigated winter wheat, barley, alfalfa, and

[12] Ibid.

[13] Ibid.

[14] Ibid.

[15] Ibid.

[16] Ibid.

green pea farming. Land use contrasts with the rangeland of the Umatilla Dissected Uplands. Perennial streams occur that are fed by precipitation that falls on the adjacent Blue Mountains.

Umatilla Dissected Uplands

The Umatilla Disected Uplands[17] eco-region is where the dry grasslands of the Columbia Basin meet the forested Blue Mountains. The steep, dissected hills and terraced uplands are covered with Idaho fescue, bluebunch wheatgrass, and Sandberg bluegrass. Near the Blue Mountains, some north-facing slopes have Douglas-fir and ponderosa pine. The eco-region is mostly used as rangeland because it lacks the thick, arable loess deposits that cover the agricultural Umatilla Plateau. Scablands, composed of arrays of earth mounds surrounded by rock polygons, are relics of Pleistocene glacial periods.

Maritime-Influenced Zone

This Maritime Influced Zone[18] is the portion of the Blue Mountains eco-region that directly intercepts marine weather systems moving east through the Columbia River Gorge. In addition, loess and ash soils over basalt retain sufficient moisture to support forest cover at lower elevations than elsewhere in the Blue Mountains. A dense and diverse shrub layer grows beneath the relatively open canopy of ponderosa pine and Douglas-fir which may delay tree regeneration following logging.

Mesic Forest Zone

The Mesic Forest Zone e[19] disjunct eco-region includes the highest forested areas in the western Wallowas and the Blue Mountains. The eco-region is marine-influenced with higher precipitation than other forested Blue Mountains eco-regions. The ashy soil holds moisture during the dry season and supports a productive spruce-fir forest. The boundaries of the eco-region correspond to the distribution of true fir forest before the modern era of fire suppression and high grade logging.

Cold Basins

The Cold Basins[20] eco-region contains high, wet meadows. The high meadows are often alluvial and have a high water table and silt or clay soils. Streams, if not channelized, are meandering and have a dynamic interaction with their flood plains. These unconstrained streams provide pool habitats that are important to salmonids. The short growing season and saturated soil make these basins unsuitable for most crops, except hay, but they are heavily grazed by cattle and elk.

[17] Ibid.

[18] Ibid.

[19] Ibid.

[20] Ibid.

Rivers

The Columbia River straddles about half of the county on its northwestern border. The Columbia River tributaries and main streams draining the area in the central and northwestern portions of the county are the Umatilla River, Birch Creek, East and West Forks Birch Creek, McKay Creek, Meacham Creek, Patawa Creek, Squaw Creek, Tutuilla Creek, and Wildhorse Creek.

The Walla Walla River is also a tributary of the Columbia River with sources in Umatilla County. Within the county, the river flows northwesterly to the city of Milton-Freewater and north to the Oregon-Washington State border line. Its tributaries include North and South Forks Walla Walla River, Pine Creek, and Mill Creek.[21]

Columbia River Basin

The Columbia River Basin is North America's fourth largest, draining a 259,000 square mile basin that includes territory in seven states (Oregon, Washington, Idaho, Montana, Nevada, Wyoming and Utah) and one Canadian province (British Columbia). The river flows for more than 1,200 miles, from the base of the Canadian Rockies in southeastern British Columbia to the Pacific Ocean at Astoria, Oregon, and Ilwaco, Washington. The Columbia River Basin includes a diverse ecology that ranges from temperate rain forests to semi-arid plateaus, with precipitation levels from six inches to 110 inches per year. Furthermore, the Columbia is a snow-charged river that seasonally fluctuates in volume. Its annual average discharge is 160 million acre-feet of water with the highest volumes between April and September and the lowest from December to February. From its source at 2,650 feet above sea level, the river drops an average of more than two feet per mile, but in some sections it falls nearly five feet per mile.[22]

The Columbia River Basin is the most hydroelectrically developed river system in the world.[23] The Federal Columbia River Power System (FCRPS) encompasses the operations of 14 major dams and reservoirs on the Columbia and Snake rivers, operated as a coordinated system. In addition, the U.S. Army Corps of Engineers operates nine of 10 major federal projects on the Columbia and Snake rivers. These federal projects are a major source of power in the region, and provide flood control, navigation, recreation, fish and wildlife, municipal and industrial water supply, and irrigation benefits.[24]

Umatilla River

The Umatilla River Basin is located in the northeastern part of Oregon, in the Middle Columbia Basin, occupying approximately 2,500 square miles, and is the major drainage basin in Umatilla County. The Umatilla River, a tributary of the Columbia River, originates in the conifer forests of the Blue Mountains at over 6,000 feet elevation. The river flows west through the Umatilla

[21] Umatilla County Flood Insurance Study, FEMA - http://www.co.umatilla.or.us/planning/FIS/41059CV001A.pdf

[22] Center for Columbia River History. "Columbia River". Written by: Bill Lang Professor of History Portland State University, Former Director, Center for Columbia River History. http://www.ccrh.org/river/history.htm.

[23] Ibid

[24] National Oceanic and Atmospheric Administration. Northwest Regional Office. "Columbia/Snake Basin". http://www.nwr.noaa.gov/Salmon-Hydropower/Columbia-Snake-Basin/.

Indian Reservation to Nolin, then northwest to Cottonwood Bend through the semi-arid shrub steppe of the Deschutes-Umatilla plateau. The river then flows north to its confluence with the Columbia River, entering at an elevation of 270 feet above sea level. This confluence occurs at the town of Umatilla, Oregon, about 300 miles upstream from the Pacific Ocean.[25]

The Umatilla River main stem begins at the confluence of its North and South Forks, forming an 89-mile reach of river that flows through a series of broad valleys that drain low rolling lands. The main stem Umatilla River has eight main tributaries: the North and South Forks of the Umatilla River and Meacham Creek in the upper sub-basin; Wildhorse, Tutuilla, McKay and Birch Creeks in the mid sub-basin; and Butter Creek in the lower sub-basin. These streams flow northerly and northwesterly. Wildhorse Creek, the only major north side tributary of the Umatilla River, flows southwesterly to its confluence with the Umatilla River. Much of the main stem and major tributaries have been straightened and or levied. [26]

Walla Walla River

The Walla Walla River Basin (WWRB) is located in southeast Washington and northeast Oregon. It is a fan-shaped basin encompassing 1,758 square miles. Of the total WWRB, 1,278 square miles or 73 percent is located in Washington, whereas 480 square miles or 27 percent is located in Oregon. The eastern one-fifth of the WWRB lies in the steep, lightly timbered western slopes of the Blue Mountains within the Umatilla National Forest. The remainder of the WWRB consists of moderate slopes and level terrain.

The WWRB is bordered by the Snake River Basin on the north, the Tucannon and Grande Ronde Basins to the east, and the Umatilla Basin to the south. The Walla Walla River originates in the Blue Mountains at an elevation of nearly 6,500 feet and flows through narrow, well-defined canyons. After it flows out of the mountains, it goes through broad valleys that drain to low, rolling lands.[27]

[25] Umatilla County Flood Insurance Study, FEMA - http://www.co.umatilla.or.us/planning/FIS/41059CV001A.pdf

[26] Umatilla River Basin Total Maximum Daily Load and Water Quality Management Plan, Oregon DEQ - http://www.ars.usda.gov/SP2UserFiles/person/6112/tmdl.pdf

[27] Walla Walla River Watershed Study Reconnaissance Report - http://www.nww.usace.army.mil/planning/er/studies/WWRBASIN/default.htm#2.01

Climate

Temperature, Precipitation and Topography

The climate of the Umatilla River basin is characterized by light to moderate precipitation and an extreme range in temperature. In general, the climate is subject to the moderating influence of the prevailing westerly flow of maritime air from the Pacific Ocean, but occasional influxes of polar air masses cause brief periods of extremely cold temperatures. Record extreme temperatures within the county are 119°F at Pendleton and -54°F at Ukiah. The Rocky Mountains partly shield the Umatilla Basin from strong arctic winds, so winters generally are cold but not severe. In summer, the Cascade Range inhibits winds from over the Pacific Ocean to the west. Days are hot, but nights are fairly cool.[28]

Umatilla County has a continental climate with a winter precipitation pattern. Precipitation levels vary from 8-10 inches along the Columbia River, to as high as 60 inches in the higher elevations of the Blue Mountains. Peak flows in the Umatilla River normally occur in the spring with high elevation snow melt, and diminish throughout the summer to the lows in August or September. The seasonal distribution of precipitation is similar to that generally observed over the interior in the Pacific Northwest, the greater portion falling during the winter.[29]

Table 3-1 highlights the average temperature, precipitation and snowfall in the City of Pendleton at the Radio KUMA measuring station. From 1981 to 2010, the average annual precipitation of Pendleton equaled 14.8 inches per year. Roughly half of the recorded annual precipitation falls from November to March. Snowfall amounts averaged 11.7 inches per year with the highest amounts occurring in December and January; however snowfall averages displayed in the table below are from over a century of observation, and thus may not be representative of current climate trends.

[28] Umatilla River Basin Total Maximum Daily Load and Water Quality Management Plan, Oregon DEQ - http://www.ars.usda.gov/SP2UserFiles/person/6112/tmdl.pdf

[29] Umatilla County Flood Insurance Study, FEMA - http://www.co.umatilla.or.us/planning/FIS/41059CV001A.pdf

Period of Record Climate Summary,
The City of Pendleton, OR, Radio KUMA

Month	Mean Maximum Temperature (deg F)	Mean Minimum Temperature (deg F)	Mean Temperature (deg F)	Mean Precipitation (inches)	Average Snowfall (inches)
January	44.5	27.8	36.2	1.6	4
February	49.3	28.9	39.1	1.2	3.1
March	58.5	33.8	46.2	1.4	0.8
April	65	38.5	51.7	1.5	0
May	73.1	45.4	59.2	1.7	0
June	80	51.4	65.7	1.2	0
July	89.9	55.9	72.9	0.4	0
August	89.3	54.4	71.8	0.5	0
September	80.3	46.1	63.2	0.7	0
October	66.6	37	51.8	1.1	0
November	52.2	32.4	42.3	1.9	0.9
December	42.4	26.8	34.6	1.5	2.9
Annual	**62**	**39.9**	**53**	**14.8**	**11.7**

Source: Western Regional Climate Center, Western US Climate Historical Summaries, http://www.wrcc.dri.edu/CLIMATEDATA.html – Temperature and precipitation data (1981-2010), snowfall data (1893-2011)

Table 3-1: Period of Record Climate Summary, the City of Pendleton, OR, Radio KUMA

The topography in Umatilla County ranges from mountainous terrain in the southern part to high, rolling prairies in the north. Most of the Basin area, including the Blue Mountain uplands, is gently sloping. Expansive plateaus, steppes and rolling hills are incised by the narrow and steep-walled valleys of the Umatilla River drainage.

Hazard Severity

There are many potential hazards that can occur within Umatilla County; however certain types are more frequent due to Umatilla County's geography. A history of weather emergencies within the region has consistently represented a primary threat to the county's populations and natural resources. Umatilla County has suffered severe winter storms, which can result in power outages and disrupt transportation. Some areas of the county are subject to risk from avalanche, though these areas are primarily in the high country of the Blue Mountains and pose minimal risk to most of the population. Umatilla County has also suffered from periods of drought in the past, as well as from windstorms and tornadoes. Wind storms can occur suddenly and can cause damage to homes and property and disrupt vital utilities. Tornadoes periodically touch down in Umatilla County but they have not been known to cause major damage.

The county faces additional risk from other natural hazards, though significantly less than from weather emergencies. These secondary hazards include fire, flooding, and earthquakes. Wildfire is less of a risk in most of Umatilla County compared to other parts of Oregon due to large areas of farm and rangeland, though approximately 12% of the county consists of forest land that constitutes a significant threat for forest fires, as do rapidly burning grassland and field fires across the county. Flooding is also less of risk than in other parts of the state, however major flooding could result from the Columbia River, dam failure or from the number of rivers and creeks that pass through the county. Likewise there are several known fault lines throughout Umatilla County with further geological analyses ongoing. Damage causing earthquakes have occurred in the county's history, and recent evaluation of earthquake potential for the region indicates that the threat of earthquakes has been underestimated.

Summary

Natural capital is essential in sustaining all forms of life, including human life, and plays an often under represented role in natural hazard community resiliency planning. With four distinct mild seasons, a slight mountainous terrain, and large sweeping prairies, Umatilla County historically has had to deal with habitual weather emergencies including winter storms, windstorms and drought, though flooding, wildfires, hazardous materials spills and earthquakes have also posed threats to county residents. By identifying potential hazards, temperature and precipitation patterns, along with natural capitals such as key river systems and eco-regions, Umatilla County can focus on key areas to better prepare, mitigate, and increase the resiliency of local communities.

3.03 Socio-Demographic Capacity

Population

According to the Census Bureau, the population of Umatilla County in 2010 equaled 75,889 and averaged 23.6 persons per square mile. The population in the State of Oregon increased by 12-percent from 2000 to 2010, while Umatilla County experienced an increase of 7.6-percent during the same time period. The county is primarily rural and currently the thirteenth most populated in the State of Oregon. The population is significantly larger than all neighboring counties in Oregon, and slightly larger than neighboring Walla Walla County, Washington, though less than half the size of nearby Benton County, Washington. Table 3-2 describes the population change in Umatilla County and nearby communities.

Regional Change in County Populations

County	Population (2010)	Population (2000)	Population Change (2000 - 2010)	Percent Change (2000 - 2010)	Average Annual Growth Rate
Umatilla	**75,889**	**70,548**	**5,341**	**7.6%**	**0.7%**
Benton, WA	175,177	142,475	32,702	23.0%	2.1%
Grant	7,445	7,935	490	-6.2%	-0.6%
Morrow	11,173	10,995	178	1.6%	0.2%
Union	25,748	24,530	1,218	5.0%	0.5%
Walla Walla, WA	58,781	55,180	3,601	6.5%	0.6%
Wallowa	7,008	7,226	218	-3.0%	-0.3%
Oregon	3,831,074	3,421,399	409,675	12.0%	1.1%

Source: U.S. Census Bureau, 2000 Census, 2010 Census

Table 3-2: Regional Change in County Populations

The four largest populated areas in Umatilla County are the cities of Pendleton, Hermiston, Milton Freewater and Umatilla, which contain over 60% of the county's residents. Table 3-3 describes the population change between 2000 and 2010 in the incorporated cities, along with the unincorporated areas of Umatilla County, compared to county as a whole. The City of Pendleton, located in the center of the county along Interstate 84, is the second largest of the county's cities, and had the smallest rate of growth both in terms of percent change in population and in actual population. The City of Hermiston grew at nearly four times the rate of the whole county from 2000 to 2010, made up over 67% of the Count's population gain, and is the largest city in the county. The City of Umatilla grew an astounding 38.7% during the time period, while Milton Freewater more closely matched the Oregon State average at 9%. The rest of the county's population is dispersed between smaller towns, unincorporated communities, and isolated dwellings.

Change in Umatilla County Population

Incorporated City	Population (2010)	Population (2000)	Population Change (2000 - 2010)	Percent Change (2000 - 2010)	Average Annual Growth Rate
Adams	350	297	53	1.8%	1.7%
Athena	1,126	1,221	-95	-7.8%	-0.8%
Echo	699	650	49	7.5%	0.7%
Helix	184	183	1	0.6%	0.1%
Hermiston	16,745	13,154	3,591	27.3%	2.4%
Milton-Freewater	7,050	6,470	580	9.0%	0.9%
Pendleton	16,612	16,354	258	1.6%	0.2%
Pilot Rock	1,502	1,532	-30	-2.0%	-0.2%
Stanfield	2,043	1,979	64	3.2%	0.3%
Ukiah	186	255	-69	-27.1%	-3.1%
Umatilla	6,906	4,978	1,928	38.7%	3.3%
Weston	667	717	-50	-7.0%	-0.7%
Unincorporated	21,819	22,758	-939	-4.1%	-0.4%
Umatilla County	75,889	70,548	5,341	7.6%	0.7%

Source: American FactFinder, U.S. Census Bureau, 2000 Census, 2010 Census

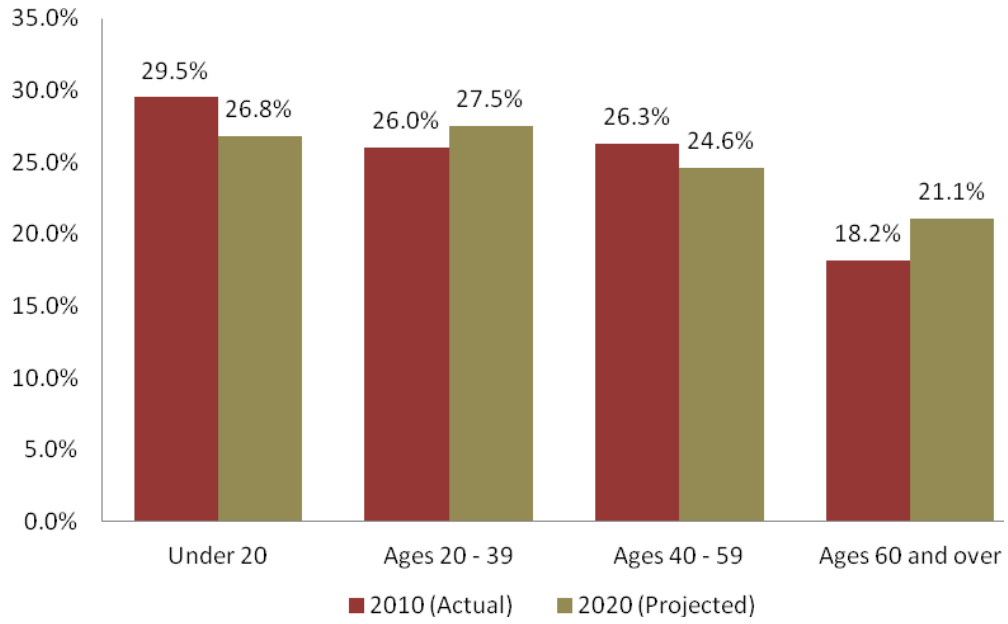
Table 3-3: Change in Umatilla County population

Population size itself is not an indicator of vulnerability. More important is the location, composition and capacity of the population within the community. Research by social-scientists demonstrates that human capital indices such as age, race, education, income, health and safety can greatly affect the integrity of a community, impacting its resilience to and ability to recover from, natural disasters.

Age

The age profile of an area has a direct impact both on what actions are prioritized for mitigation and how response to hazard incidents is carried out. Figure 3-3 illustrates the current and projected percentage of population by age groups within the county. Currently, about one fifth (21.1-percent) of the population in the county is over the age of 60, compared to 20.1-percent of the population for Oregon as a whole. The Office of Economic Analysis (OEA) projects that from 2010 to 2020 the percent of the county's population under the age of 20 will decrease by about three percent, while those over the age of 60 are set increase by roughly that amount.

Umatilla County Population by Age, 2010 and 2020



Source: 2010 (Actual), U.S. Census Bureau, 2010 Census

2020 (Projected), Office of Economic Analysis, Department of Administrative Services, State of Oregon, Released April 2004

Figure 3-3: Umatilla County Population by Age, 2010 to 2020

Figures 3-4 and 3.5 illustrate the percentage of population by various age groups in the incorporated cities of Umatilla County. The Cities of Pendleton and Athena have a much lower percentage of residents under the age of 20, and a substantially larger percentage of residents over the age of 40 compared to the other cities. People under the age of 20 make up around 35% of the populations in Echo, Helix, Hermiston, Milton Freewater and Stanfield, as opposed to Umatilla, where people aged 20 to 40 make up over 37% of the population.

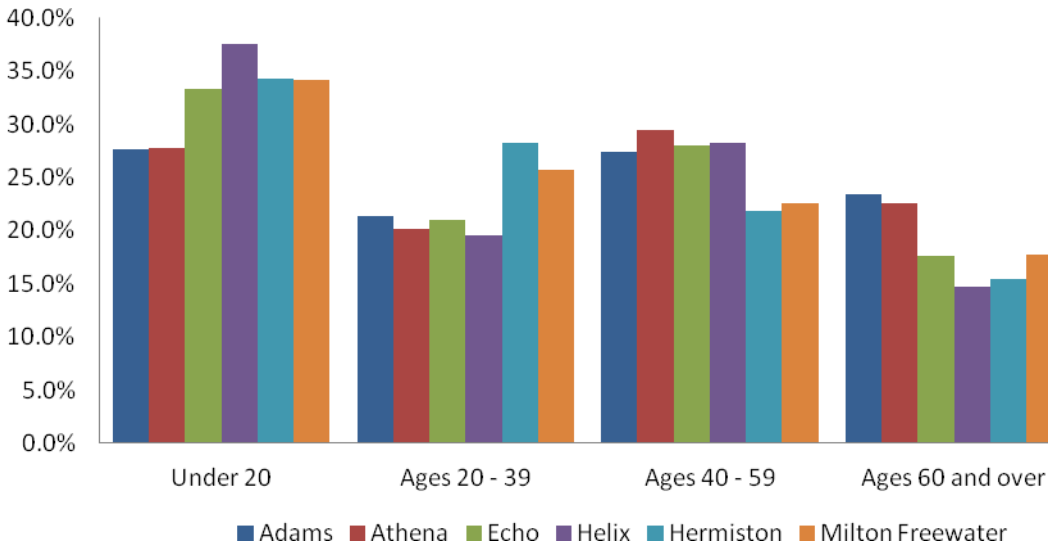
School age children rarely make decisions about emergency management. Therefore, a larger youth population in an area will increase the importance of outreach to schools and parents on effective ways to teach children about fire safety, earthquake response, and evacuation plans. Children are also more vulnerable to the heat and cold, have few transportation options and require assistance to access medical facilities.[30] The cities of Adams, Athena, Ukiah and Pilot Rock all have significantly larger proportions of people age 60 and over in their populations compared to the county as a whole. Older populations may require assistance in an evacuation due to limited mobility or health issues. Additionally,

[30] State of Oregon Natural Hazards Mitigation Plan, Region 4 Southwest Oregon Regional Profile.

older populations may require special medical equipment or medications and can lack the social and economic resources needed for post-disaster recovery.[31]

[31] Wood, Nathan. Variations in City Exposure and Sensitivity to Tsunami Hazards in Oregon. U.S. Geological Survey, Reston, VA, 2007.

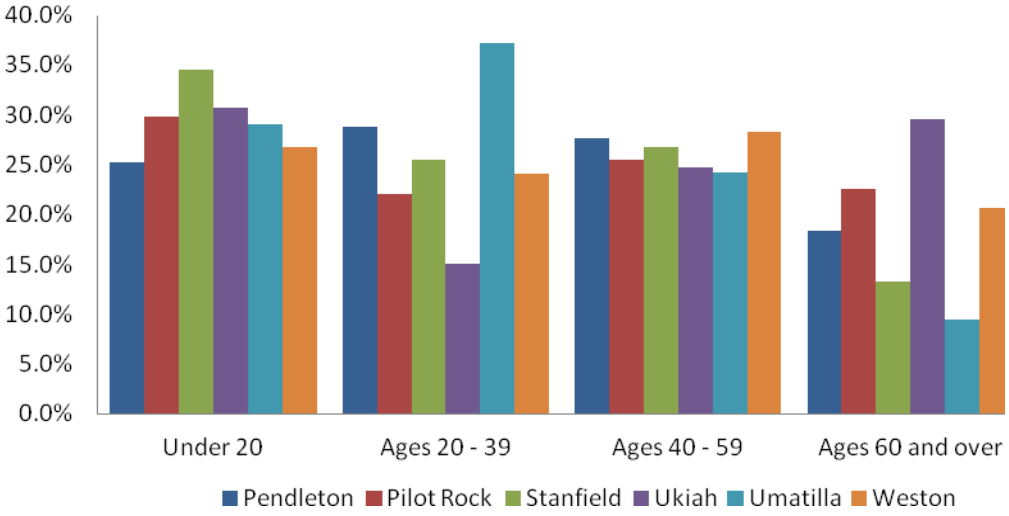
Umatilla County, City Population Distribution by Age, 2010



Source: U.S. Census Bureau, 2010 Census

Figure 3-4: Umatilla County, City Population Distribution by Age, 2010

Umatilla County City Population Distribution by Age, 2010



Source: U.S. Census Bureau, 2010 Census

Figure 3-5: Umatilla County, City Population Distribution by Age, 2010

Other important considerations for high risk populations are the number of households where persons over the age of 65 live alone as well as single parent households with children under 18. Tables 3-4 through 3-8 describe the high risk populations in each jurisdiction within Umatilla County for which data is available. Over twenty five percent of the 26,904 households in the county have individuals living in them who are 65 or older, and over a third of those are 65 or older householders that live alone. Additionally, over eleven percent of the households in the county are occupied by single parents with children under the age of 18. These groups are more heavily impacted because they may lack the necessary knowledge, skills, social support structures, or the mental and physical abilities necessary to take care of themselves. Historically, vulnerable populations present a special challenge to emergency managers and response agencies and they are more likely to be victims of a disaster.

Umatilla County High Risk Populations

High Risk Households	Umatilla County	Percent	Adams	Percent	Athena	Percent
Total households	26,904		133		446	
Households with individuals under 18	9,789	36.4%	43	32.3%	150	33.6%
Single householder with own children under 18	3,090	11.5%	11	8.3%	53	11.9%
Households with individuals 65 years and over	6,884	25.6%	40	30.1%	129	28.9%
Householder 65 years and over living alone	2,585	9.6%	17	12.8%	42	9.4%

Source: U.S. Census Bureau, 2010 Census, American FactFinder, DP-1

Table 3-4: Umatilla County High Risk Populations

Umatilla County High Risk Populations

High Risk Households	Echo	Percent	Helix	Percent	Hermiston	Percent
Total households	245		55		6,050	
Households with individuals under 18	100	40.8%	24	43.6%	2,543	42.0%
Single householder with own children under 18	37	15.1%	5	9.1%	893	14.8%
Households with individuals 65 years and over	72	29.4%	13	23.6%	1,350	22.3%
Householder 65 years and over living alone	22	9.0%	1	1.8%	602	10.0%

Source: U.S. Census Bureau, 2010 Census, American FactFinder, DP-1

Table 3-5: Umatilla County High Risk Populations

Umatilla County High Risk Populations

High Risk Households	Milton-Freewater	Percent	Pendleton	Percent	Pilot Rock	Percent
Total households	2,479		6,220		582	
Households with individuals under 18	995	40.1%	1,898	30.5%	199	34.2%
Single householder with own children under 18	279	11.3%	740	11.9%	72	12.4%
Households with individuals 65 years and over	671	27.1%	1,547	24.9%	182	31.3%
Householder 65 years and over living alone	310	12.5%	687	11.0%	66	11.3%

Source: U.S. Census Bureau, 2010 Census, American FactFinder, DP-1

Table 3-6: Umatilla County High Risk Populations

Umatilla County High Risk Populations

High Risk Households	Stanfield	Percent	Ukiah	Percent	Umatilla	Percent
Total households	682		79		1,634	
Households with individuals under 18	283	41.5%	20	25.3%	830	50.8%
Single householder with own children under 18	78	11.4%	7	8.9%	263	16.1%
Households with individuals 65 years and over	130	19.1%	27	34.2%	278	17.0%
Householder 65 years and over living alone	44	6.5%	8	10.1%	99	6.1%

Source: U.S. Census Bureau, 2010 Census, American FactFinder, DP-1

Table 3-7: Umatilla County High Risk Populations

Umatilla County High Risk Populations

High Risk Households	Weston	Percent
Total households	252	
Households with individuals under 18	87	34.5%
Single householder with own children under 18	34	13.5%
Households with individuals 65 years and over	82	32.5%
Householder 65 years and over living alone	35	13.9%

Source: U.S. Census Bureau, 2010 Census, American FactFinder, DP-1

Table 3-8: Umatilla County High Risk Populations

Race

The impact following a disaster in terms of losses and the ability of the community to recover may also vary among minority population groups. Studies have shown that racial and ethnic minorities can be more vulnerable to natural disaster events. Minorities are more likely to be isolated in communities, are less likely to have the savings to rebuild after a disaster, and less likely to have access to transportation and medical care. Additionally, minorities and the poor are more likely to rent than own homes, and in the event of a natural disaster, where homeowners would gain homeowner insurance, renters often do not have rental insurance.[32] Table 3-9 describes the population in Umatilla County by race and ethnicity.

[32] State of Oregon Natural Hazards Mitigation Plan, Region 5 Mid-Columbia Regional Profile.

Umatilla County Racial Composition

Race	Count	Percent
Total Population	75,889	
One Race	73,545	96.9%
White	59,995	79.1%
Black or African American	638	0.8%
American Indian or Alaska Native	2,662	3.5%
Asian	664	0.9%
Native Hawaiian and other Pacific Islander	101	0.1%
Other race	9,485	12.5%
Two or more races	2,344	3.1%

Source: U.S. Census Bureau, 2010 Census, American FactFinder, DP-1

Table 3-9: Umatilla County Racial Comparison

Umatilla County Hispanic Ethnicity

Hispanic or Latino Origin	Count	Percent
Total Population	75,889	
Hispanic or Latino (of any race)	18,107	23.9%
Not Hispanic or Latino	57,782	76.1%

Source: U.S. Census Bureau, 2010 Census, American FactFinder, DP-1

Table 3-10: Umatilla County Hispanic Ethnicity

The U.S. Census reports that over twenty percent of the Umatilla County population identifies with a non-white race. Similarly, nearly a quarter of the population is of Hispanic or Latino origin, primarily individuals who self-identify as Mexican. Thus, it is important to identify specific ways to support all segments of the community through hazard preparedness and response. Culturally appropriate and effective outreach includes both methods and messaging targeted to this diverse audience. For example, connecting to historically disenfranchised populations through trusted sources or providing preparedness handouts and presentations in the languages spoken by the population can increase community resilience.

Education

Educational attainment of community residents is also an influencing factor in socio demographic capacity. Table 3-11 and 3-12 describe educational attainment throughout the county and the state. Compared to the state, Umatilla County has a lower percentage of high school graduates and a significantly lower (nearly half) percentage of college graduates with a Bachelor's degree or higher.

Umatilla County Educational Attainment

Educational Attainment	Count	Percent
Population 25 and over	47,883	
High school graduate or higher	38,880	81.2%
Bachelor's degree or higher	6,990	14.6%

Source: U.S. Census Bureau, 2010 Census, American FactFinder, S1501

Table 3-11: Umatilla County Educational Attainment

Oregon Educational Attainment

Educational Attainment	Count	Percent
Population 25 and over	2,614,886	
High school graduate or higher	2,320,749	88.8%
Bachelor's degree or higher	751,803	28.8%

Source: U.S. Census Bureau, 2010 Census, American FactFinder, S1501

Table 3-12: Oregon Educational Attainment

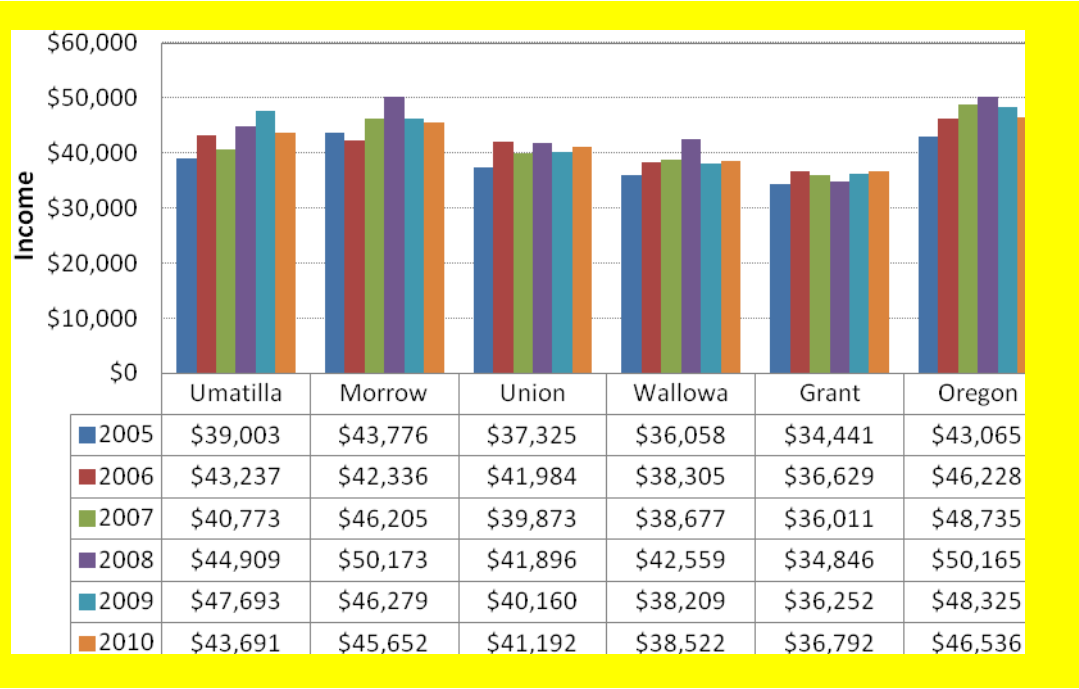
Educational attainment often reflects higher income and therefore higher self-reliance. Widespread educational attainment is also beneficial for the regional economy and employment sectors as there are potential employees for professional, service and manual labor workforces. An oversaturation of either highly educated residents or low educational attainment can both have negative effects on the resiliency of the community.

Income

Household income and poverty status levels are indicators of socio demographic capacity and the stability of the local economy. Household income can be used to compare economic areas as a whole, but does not reflect how the income is divided among the residents in the area.[33] Figure 3-6 illustrates changes in the median household income from 2005 to 2010 in Umatilla and surrounding Counties. In 2010 the median household income across Umatilla County equaled $43,691, roughly $3,000 lower than Oregon as a whole. Likewise, the county's twelve percent growth in median household income between 2005 and 2010 is substantially higher than the 8.1-percent growth indicated by the state as a whole over the same period of time.

[33] State of Oregon Natural Hazards Mitigation Plan, Region 4 Southwest Oregon Regional Profile.

Median Household Income, 2005-2010



	Umatilla	Morrow	Union	Wallowa	Grant	Oregon
2005	$39,003	$43,776	$37,325	$36,058	$34,441	$43,065
2006	$43,237	$42,336	$41,984	$38,305	$36,629	$46,228
2007	$40,773	$46,205	$39,873	$38,677	$36,011	$48,735
2008	$44,909	$50,173	$41,896	$42,559	$34,846	$50,165
2009	$47,693	$46,279	$40,160	$38,209	$36,252	$48,325
2010	$43,691	$45,652	$41,192	$38,522	$36,792	$46,536

Source: U.S. Census Bureau, Small Area Estimates Branch, 2005-2010

Figure 3-6: Median Household Income, 2005-2010

Income is a resiliency indicator as higher incomes are often associated with increased self-reliance and ability to prepare oneself if an emergency does occur. Figure 1.13 identifies both the number and the percentage of individuals living below the poverty level. In 2010, the national poverty guideline for a family of four equaled income levels at or below $22,050.[34] The Census Bureau estimates that over fifteen percent of the total population and twenty one percent of children live below the poverty level across the county as of 2010. As shown in Table 3-13 below, poverty levels of all ages remained roughly the same as a percentage between 2005 and 2010, but that of children living below the poverty level increased by about one percent from 2005 to 2010. Poverty limits the ability of households to engage in household level mitigation activities. In addition, the higher the poverty rate, the more assistance the community will likely need in the event of a disaster in the form of sheltering, medical assistance and transportation. Notably, the poverty estimates as a percentage were consistently higher in Umatilla County compared to state and national averages in 2005; however they are now below the state and close to the national average.

[34] U.S. Department of Health and Human Services. *Federal Register*, Vol. 75, No. 148, August 3, 2010, pp. 45628–45629

Individuals Living Below Poverty Level

	2005 Poverty All Ages (Estimate)	2010 Poverty All Ages (Estimate)	2005 Poverty Under 18 (Estimate)	2010 Poverty Under 18 (Estimate)
Umatilla County	10,677	11,172	3,850	4,232

	2005 Percent Poverty All Ages	2010 Percent Poverty All Ages	2005 Percent Poverty Under 18	2010 Percent Poverty Under 18
Umatilla County	15.5%	15.5%	20.4%	21.3%
Oregon	14.1%	15.8%	18.8%	21.7%
United States	13.3%	15.3%	18.5%	21.6%

Source: U.S. Census Bureau, Small Area Estimates Branch, 2005 Estimates, 2010 Estimates

Table 3-13: Individuals Living Below Poverty Level

Additionally, the number of school children eligible to receive free or reduced lunch has fluctuated but increased steadily from 2005 to 2010. As shown in Table 3-14 below, more than half of the students in the county qualified for the lunch program over the past five years, with nearly 60% qualifying in 2010.

Umatilla County Free or Reduced Price School Lunch Eligibility

	2005	2006	2007	2008	2009	2010
Percent of children eligible to receive free/reduced lunch during the school year	52.0%	56.3%	53.1%	55.8%	58.8%	59.3%

Source: Children First for Oregon, Status of Oregon's Children, 2005-2010

Table 3-14: Umatilla County Free or Reduced Price School Lunch Eligibility

The County has also seen an increase since 2008 in the number of individuals enrolling in assistance programs. As of August 2011, 22.8% of Umatilla County residents were receiving Food Stamps. This figure represents a 42% increase from January 2008 levels. Furthermore, the number of people receiving cash assistance as a part of Temporary Assistance to Needy Families (TANF) has increased to 2.2% of county residents, up 56% from January 2008 levels.[35] The TANF program provides cash assistance to low-income families with children while they strive to become self-sufficient with the goal of reducing the number of families living in poverty, through employment and community resources.[36] The current maximum monthly benefit for a family of three is $506.

[35] Oregon State University, Rural Studies Program, Oregon Agriculture and County Information System, 2008-2011 - http://osu.prognoz.com/CurrentRatesTable.aspx

[36] Oregon Department of Human Services. Food, Cash, Housing. Temporary Assistance for Needy Families. http://www.oregon.gov/DHS/assistance/cash/tanf.shtml

Health and Safety

Individual and community health play an integral role in community resiliency. It is recognized that those who lack health insurance have higher vulnerability to hazards and will likely require additional community support and resources. Table 3-15 identifies health insurance coverage across Umatilla County. The Census Bureau estimates in 2009 that the number of uninsured residents in Umatilla County under the age of 65 equaled 14,802, roughly 24-percent. It is important to note that the uninsured rate for persons under the age of 65 has been consistently higher in the county compared to the state over the past five years. Overall, the percent of uninsured residents in Umatilla County under age 65 was lower for about three years before surpassing 2005 levels in 2009. For people under age 19, the percentage of uninsured has gradually increased since 2005.

Umatilla County Health Insurance Coverage

		Percent Uninsured - Under Age 65	Margin of Error	Percent Uninsured - Under Age 19
2005	Umatilla County	23.1%	+/-3.6%	n/a
	Oregon	18.7%	+/-0.9%	n/a
2006	Umatilla County	20.7%	+/-3.3%	14.5%
	Oregon	19.1%	+/-0.9%	12.9%
2007	Umatilla County	21.2%	+/-2.8%	15.5%
	Oregon	18.8%	+/-0.9%	12.8%
2008	Umatilla County	21.1%	+/-1.5%	15.8%
	Oregon	18.0%	+/-0.4%	12.3%
2009	Umatilla County	23.6%	+/-1.7%	15.8%
	Oregon	19.4%	+/-0.4%	11.0%

Source: U.S. Census Bureau, Small Area Health Insurance Estimates, 2005-2009

Table 3-15: Umatilla County Health Insurance Coverage

The availability of law enforcement officials and professional medical care providers can serve to strengthen the resilience of a community and lessen the immediate impacts during and immediately following a major disaster. According to the Federal Bureau of Investigation, the rate of sworn police officers per 1,000 people in Umatilla County is less than half of the state rate. Similarly, the American Medical Association identifies that there are 1.35 physicians in patient care per 1,000 people, a little over half as much as the state overall.

Umatilla County Physicians and Sworn Police Officers

		Umatilla County	Oregon
2010	Number of Sworn Police Officers	49	6,035
	Rate per 1,000 population	0.65	1.6
2009	Number of Physicians	82	9,609
	Rate per 1,000 population	1.35	2.5

Source: Federal Bureau of Investigation, Uniform Crime Reports, Updated: November 17, 2010.

Oregon Health and Science University, Physicians in Oregon by county per 1,000 - http://www.ohsu.edu/xd/outreach/oregon-rural-health/data/publications/maps.cfm

Table 3-16: Umatilla County Physicians and Sworn Police Officers

Summary

Socio demographic capacity is a significant indicator of community hazard resiliency. The characteristics and qualities of the community population such as age, race, education, income, health and safety are significant factors that can influence the community's ability to cope, adapt to and recover from natural disasters. The current status of socio demographic capacity indicators can have long term impacts on the economy and general stability of a community, ultimately affecting an area's overall level of resilience.

3.04 Regional Economic Capacity

Economic resilience to natural disasters is far more complex than merely restoring employment or income to the local community. Building a resilient economy requires an understanding of how the component parts of employment sectors, workforce, resources and infrastructure are interconnected in any existing economic picture. Once inherent strengths or systematic vulnerabilities become apparent, both the public and private sectors can take action to increase the resilience of the local economy.

Regional Affordability

The evaluation of regional affordability supplements the identification of socio-demographic capacity indicators, i.e. median income, and is a critical analysis tool to understanding the economic status of a community. This information can capture the likelihood of individuals' ability to prepare for hazards, through retrofitting homes or purchasing insurance. If the community reflects high income inequality or housing cost burden, the potential for home owners and renters implementing mitigation can be drastically reduced. Regional affordability is a mechanism for generalizing the abilities of community residents to get back on their feet without Federal, State or local assistance.

Median Income

Median income can be used as an indicator of the strength of a region's economic stability. Table 3-17 shows that between 1999 and 2009 the median household income in Umatilla County has risen at a faster rate than both the state and nation as a whole, though the county's median income still hovers below state and national averages.

Median Household Income, 1999 and 2009

	1999	2009	Change	Average Annual Growth Rate
Umatilla County	$36,249	$47,693	$11,444	2.3%
Oregon	$40,916	$48,325	$7,409	1.7%
United States	$41,994	$50,221	$8,227	1.8%

Source: U.S. Census Bureau: Household Income 1999 – Census 2000 Brief; State and County Quick Fact – 2010 Census; American FactFinder – 2000 Census

Table 3-17: Umatilla County Physicians and Sworn Police Officers

Housing Affordability

Housing affordability is a measure of economic security gauged by the percentage of a metropolitan area's households paying less than 35% of their income on housing.[37] Households spending more than 35% are considered housing cost burdened. Table 3-19 displays the percentage of home owners and renters reflecting housing cost burden in Umatilla County as well as the averages for Oregon and the United States as a whole. In general, the population that spends more of their income on housing has proportionally fewer resources and less flexibility for alternative investments in times of crisis.[38]

High incidence of housing cost burden can impose serious challenges for a community recovering from a disaster, as housing costs may exceed the ability of local residents to repair or move to a new location. These populations may live paycheck to paycheck and are extremely dependent on their employer, and in the event that their employer is also impacted, it will further the detriment experienced by these individuals and families. In comparison to state and national levels, Umatilla County has significantly lower percentages of homeowners and renters paying more than 35% of their income on housing. This suggests that Umatilla County renters and homeowners may be in a better position than much of Oregon and the rest of the nation to weather an extensive natural hazard event.

Households Spending > 35% of Income on Housing

	Owners	Renters
Umatilla County	16.6%	36.2%
Oregon	25.7%	43.5%
United States	23.4%	40.4%

Source: U.S. Census Bureau, 2010 American Community Survey. B25070 Gross Rent as a Percentage of Household Income and B25091 Mortgage Status by Selected Monthly Owner Costs as a Percentage of Household Income 1 Year Estimates.

Table 3-18: Households Spending >35% of Income on Housing

Economic Diversity

Economic diversity is a general indicator of an area's fitness for weathering difficult financial times. One method for measuring

[37] University of California Berkeley, Building Resilient Regions, Resilience Capacity Index - http://brr.berkeley.edu/rci/

[38] Ibid.

economic diversity is through use of the Hachman Index, a formula that compares the composition of county and regional economies with those of states or the nation as a whole. Using the Hachman Index with the state of Oregon, a diversity ranking of 1 indicates the Oregon County with the most diverse economic activity compared to the state as a whole, while a ranking of 36 corresponds with the least diverse county economy. Umatilla County sits between Union County, a highly ranked county in terms of economic diversity, as well as several of the lowest ranked counties, with neighboring Morrow and Grant Counties ranked 32 and 33 respectively in the state overall. The Umatilla County economic diversity ranking is 18[39], exactly in the middle of Oregon's 36 counties. Umatilla County's regional neighbors ranked similarly on the Washington side of the Columbia River (compared to the state of Washington as a whole), where Walla Walla and Benton Counties ranked 20 and 22 in terms of economic diversity out of Washington's 40 counties.

[39] Oregon Employment Department – 2009 Hachman Index Scores by County

County Hachman Index Scores and Ranks

County	2009 Hachman Index Score	2009 State Rank	1999 State Rank
Umatilla	**0.357**	**18**	**12**
Grant	0.093	33	33
Morrow	0.103	32	32
Union	0.502	10	14
Wallowa	0.169	28	30
Benton, WA	0.362	22	29
Walla Walla, W.	0.387	20	15

Source: Oregon Employment Department, Washington Employment Security Department

Table 3-19: County Hachman Index Scores and Ranks

While illustrative, economic diversity is not a guarantor of economic vitality or resilience. For example as of 2010, though Umatilla and neighboring Union County are ranked highly in terms of economic diversity in the state as a whole, they are both listed as "economically distressed" by the Oregon Business Development Commission.[40] The economic distress measure is based on indicators of decreasing new jobs, average wages and income, and is associated with an increase of unemployment.

[40] Business Oregon – Oregon Economic Data "Distressed Communities List"

Employment and Wages

Data provided by the US Census in the 2010 American Community Survey indicate that Umatilla County's labor force (defined as the population of 16 and older which are in the labor force) increased from 36,595 to 39,422 between 2001 and 2010, a 7.7% increase. [41]

Though there was a rise in unemployment in Umatilla County from 2009 to 2010, reflecting national trends, unemployment dropped as low as 8.6% during spring of 2011 according to the Oregon Employment Department. [42] Many counties in the region experienced a drop in unemployment between 2009 and 2010, but most still remain near or above the state average overall. Unemployment in Umatilla County rose between 2009 and 2010 by 3.1% however the unemployment rate remained below the state average at just under 10%. As of October 2011, total non-farm employment for the county was 28,370 individuals,[43] and total employment in the county was 37,901.[44]

[41] Oregon Employment Department - "Local Area Employment Statistics", http://www.qualityinfo.org/olmisj/labforce

[42] Ibid.

[43] Oregon Employment Department – "Current Employment Statistics", http://www.qualityinfo.org/olmisj/CES

[44] Oregon Employment Department - "Local Area Employment Statistics" http://www.qualityinfo.org/olmisj/labforce

Regional Unemployment

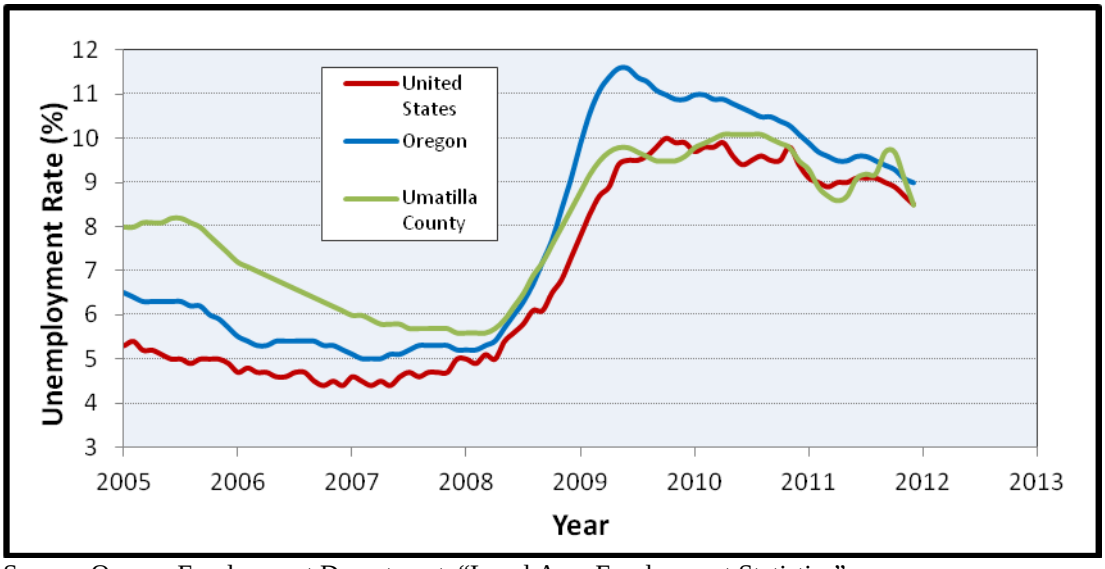
County	2005 Unemployment Rate	2011 Unemployment Rate	Percent Change from 2005
Umatilla	**7.9%**	**8.9%**	**12.7%**
Grant	9.8%	13.4%	36.7%
Morrow	7.6%	8.1%	6.6%
Union	6.9%	9.8%	42.0%
Wallowa	7.5%	11.3%	50.7%
Oregon	6.2%	9.5%	53.2%
Benton, WA*	6.5%	6.0%	-7.7%
Walla Walla, WA*	5.8%	6.7%	15.5%

* Washington Unemployment Data is from April 2010 and December 2005

Oregon Source: Oregon Employment Department, "Local Area Employment Statistics". http://www.qualityinfo.org/olmisj/labforce.
Washington Source: Access Washington, State of Washington - http://data.wa.gov/Economics/Unemployment-Rates-for-Washington-State-and-Counti/hvq3-y2jb

Table 3-20: Regional Unemployment

Seasonally Adjusted Unemployment Rates, 2005-2011



Source: Oregon Employment Department, "Local Area Employment Statistics". http://www.qualityinfo.org/olmisj/labforce.

Figure 3-7: Seasonal Adjustment Unemployment Rates, 2005-2011

As opposed to measurements of the labor force and total employment, Covered Employment provides a quarterly count of all employees covered by Unemployment Insurance. Table 3-22 displays the County Covered Employment and payroll figures for Umatilla and surrounding Counties in 2010.

2010 County Covered Employment and Payroll

County	Employees	Annual Payroll	Average Pay
Umatilla	**28,851**	**$983,141,286**	**$34,077**
Morrow	4,210	$160,090,590	$38,026
Union	9,490	$290,711,001	$30,633
Wallowa	2,334	$65,710,464	$28,154
Grant	2,351	$73,426,745	$31,232
Oregon	1,598,642	$66,613,214,679	$41,669

Source: Oregon Employment Department, County Covered Employment and Wages.

Table 3-21: 2010 County Covered Employment and Payroll

In 2009, there were 1,543 employment establishments operating in Umatilla County, and 89.1% of those establishments had fewer than 20 employees.[45] The prevalence of small businesses in the county is a partial indication of sensitivity to natural hazards, because small businesses are typically more susceptible to financial uncertainty. If a business is financially unstable before a natural disaster occurs, financial losses (resulting from both damage caused and the recovery process) may have a bigger impact than they would for larger and more financially stable businesses.[46]

[45] U.S. Census Bureau - 2009 County Business Patterns, http://censtats.census.gov/cgi-bin/cbpnaic/cbpsect.pl

[46] State of Oregon Natural Hazards Mitigation Plan, Region 4 Southwest Oregon Regional Profile

Industry

Major Regional Industry

Key industries are those that represent major employers and are significant revenue generators. Different industries face distinct vulnerabilities to natural hazards, as illustrated by the industry specific discussions below. Identifying key industries in the region enables communities to target mitigation activities towards those industries' specific sensitivities. It is important to recognize that the impact that a natural hazard event has on one industry can reverberate throughout the regional economy.[47]

This is of specific concern when the businesses belong to basic sector industries. Basic sector industries are those that are dependent on sales outside of the local community. The farm and ranch, information, and wholesale trade industries are all examples of basic industries. Non-basic sector industries are those that are dependent on local sales for their business, such as retail trade, construction, and health and social assistance.[48]

Employment by Industry

Economic resilience to natural disasters is particularly important for the major employment industries in the region. If these industries are negatively impacted by a natural hazard, such that employment is affected, the impact will be felt throughout the regional economy.[49]Thus, understanding and addressing the sensitivities of these industries is a strategic way to increase the resiliency of the entire regional economy.

Umatilla County generally specializes in farming, agricultural services, forestry, fishing, mining, construction, transportation and public utilities, retail trade, and both the federal and state/local government sectors. However, like many of the counties in northeastern Oregon and those along the Mid-Columbia River, government, retail, and health and social assistance industries form a crucial cross-section of the county's employment opportunities.

Table 3-23 identifies Covered employment in Umatilla County by industry. The four industries with the most employees, as of 2010, are government (25.1%), manufacturing (11.2%), retail (10.6%), and health and social assistance (10.1%). Umatilla County's primary employment industries are non-basic in nature (government, retail, health and social assistance), although two of the five largest industries in terms of overall employment (manufacturing and natural resources and mining) are of the basic nature and dependent to a large degree on sales outside of the local community. Basic industries encourage growth in non-basic industries and bring wealth into communities from outside markets. However, a high dependence on basic industries can lead to severe difficulties when recovering from a natural disaster if vital infrastructure or primary resource concentrations have been greatly damaged.

[47] Ibid.

[48] Ibid.

[49] Ibid.

2010 Total Covered Employment by Industry

Industry	Number Employed	Percent of Employment
Government	7,252	25.1%
Manufacturing	3,241	11.2%
Retail	3,069	10.6%
Health & Social Assistance	2,906	10.1%
Natural Resources and Mining	2,648	9.2%
Leisure and Hospitality	2,239	7.8%
Professional and Business Services	2,186	7.6%
Transportation, Warehousing & Utilities	2,014	7.0%
Construction	885	3.1%
Other Services	725	2.5%
Wholesale	720	2.5%
Financial Activities	701	2.4%
Information	203	0.7%
Education	59	0.2%
Private Non-Classified	4	0.1%
Total	**28,851**	

Source: Oregon Employment Department, Umatilla County Covered Employment and Wages.

Table 3-22: 2010 Total Covered Employment by Industry

The Oregon Employment Department estimates net employment growth between 2001 and 2010. In that time period, two of the county's four largest industries (not including agriculture), government, as well as education and health services, experienced notable employment growth (1.8% and 15.5% respectively). However the county generally experienced losses throughout most sectors of employment, and only four industries experienced net growth during the time period: government (1.8%), professional and business services (8.3%), education and health services (15.5%), and leisure and hospitality (3.2%).[50]

[50] Oregon Employment Department, Umatilla County Covered Employment and Wages. 2011

Total Nonfarm Employment by Industry, 2001 & 2010

Industry	2001	2010	Change 2001-2010		
			Number	Percent	Average Annual Growth Rate
Mining, logging and construction	1,440	940	-500	-34.7%	-4.6%
Manufacturing	4,000	3,260	-740	-18.5%	-2.3%
Wholesale	820	730	-90	-11.0%	-1.3%
Retail	3,230	3,110	-120	-3.7%	-0.4%
Transportation, Warehousing, and Utilities	2,720	2,530	-190	-7.0%	-0.8%
Information	320	200	-120	-37.5%	-5.1%
Financial activities	870	820	-50	-5.8%	-0.7%
Professional and business services	2,050	2,220	170	8.3%	0.9%
Education and health services	2,580	2,980	400	15.5%	1.6%
Leisure and hospitality	2,200	2,270	70	3.2%	0.4%
Other Services	770	700	-70	-9.1%	-1.1%
Government	7,380	7,510	130	1.8%	0.2%
Total Annual Average Nonfarm Employment	**28,380**	**27,270**	**-1110**	**-3.9%**	**-0.4%**

Source: Oregon Labor Market Information System - Current Employment Statistics

Table 3-23: 2010 Total Nonfarm Employment by Industry, 2001 & 2010

Overall the county had a net loss of 1,110 jobs, with four industries making up the bulk of losses: mining, logging and construction (-500), manufacturing (-740), retail (-120), and information (-120). Employment gains in the government sector came mostly from local level positions, though some federal positions were also gained during the nine year period.

Overall, there was a 3.9% decrease in Umatilla County non-farm employment between 2001 and 2010.

High Revenue Sectors

The three nonfarm sectors with the highest known revenue in 2007 were retail (60.6%), health care and social assistance (19.1%), as well as accommodation and food services (12.6%). Table 3-25 shows the revenue generated by each economic sector. All of the sectors combined generated more than $1.26 billion in revenue for the county in 2007, the most recent year for which data is available.

Revenue of Nonfarm Sectors in Umatilla County

Sectors	Sector Revenue ($1,000)	Percent of Total Revenue
Retail	763,606	49.4%
Wholesale	284,500	18.4%
Health care and social assistance	240,943	15.6%
Accommodation and food services	159,389	10.3%
Administrative and Support and Waste Management and Remediation Services	38,333	2.5%
Other services (except public administration)	33,442	2.2%
Real estate and rental and leasing	24,345	1.6%
Educational services	694	0.1%
Professional, scientific, and technical services*	NA	NA
Arts, entertainment, and recreation*	NA	NA
Manufacturing*	NA	NA
Total Revenue ($1,000)	**1,545,252**	

* Data incomplete, unavailable or withheld by U.S. Census Bureau

Source: U.S. Census Bureau, 2007 Economic Census. Economy-Wide Key Statistics, EC0700A1.

Table 3-24: Revenue of Nonfarm Sectors in Umatilla County

The retail trade sector of Umatilla County brought in the most revenue during 2007, generating more than $763 million. [51] The sector is highly dependent on tourism and importing of goods for sale in commercial establishments, tying it directly to the conditions of the county's transportation infrastructure, particularly Interstate 84. Depending on the severity of a natural disaster and the pace of recovery, revenue generated from this sector could be greatly impacted during a natural hazard event.

In 2007, the *health care and social assistance* sector generated nearly $241 million, making it the second highest earning non-farm sector in Umatilla County (for which data is available). The sector is a relatively stable revenue generator, and relies largely on the local presence of older residents and elderly facilities. It is likely that the populations that require such services on a daily basis will continue requiring assistance, such as those living in residential care facilities. However, in the event of a disaster medical needs may increase due to physical or stress induced injuries and trauma. The physical infrastructure of this sector will be essential for maintaining the capacity of service that it currently provides.

Accommodation and food services generated over $159 million in revenue during 2007. A large portion of the sector's revenue is generated through leisure and hospitality,

[51] U.S. Census Bureau, 2007 Economic Census. Table 1 Selected Statistics by Economic Sector.

serving regional residents with disposable income and tourists, and could be adversely affected by a disaster. The behavior of both demographics would be disrupted if tourists deter from visiting the impacted area, or local residents concentrate spending on essential items rather than luxury expenditures (e.g. dining out).

The majority of Umatilla County's revenue generating sectors are highly dependent upon transportation networks in order to receive shipped goods (e.g. food supplies and products), export goods to outside markets, and maintain accessibility to traveling motorists. Therefore disruption of the transportation system could have severe consequences for all of the before mentioned sectors.

In the event that any of the county's primary sectors are impacted by a disaster, particularly the healthcare and social assistance and retail sectors, Umatilla County may experience a significant disruption of economic productivity and should therefore plan accordingly.

Regional Industry Employment Forecast

Sectors that are anticipated to be major employers in the future also warrant special attention in the hazard mitigation planning process. Between 2010 and 2020, the largest employment growth in the region (which includes Umatilla and Morrow Counties) is anticipated in trade, transportation and utilities (including wholesale and retail trade), which are expected to grow by 15% and add 1,070 new positions. Education and health services are expected to grow by 31% and add 970 new positions during the same time period, while leisure and hospitality are projected to create 450 new positions and grow by 19%. The government sector is projected to lose 310 federal positions, but the sector is expected to create around 500 new jobs by 2020 overall, with the largest expected growth at the local level (12%).[52] Considering these projected industries are relatively reflective of the highest revenue generating industries in Umatilla County as of 2007, and all play a vital role in the resilience of the regional economy, the sensitivities of these industries should be incorporated into future hazard mitigation planning.

[52] Oregon Employment Department, Regional Employment Projections by Industry and Occupation http://www.qualityinfo.org/olmisj/PubReader?itemid=00003217

Labor and Commute Shed

Most hazards can happen at any time during the day or night. It may be possible to give advance warning to residents and first responders who can take immediate preparedness and protection measures, but the variability of hazards is one part of why they can have such varied impact. A snow storm during the work day will have different impacts than one that comes during the night. During the day, a hazard has the potential to segregate the population by age or type of employment (e.g., school children at school, office workers in downtown areas). This may complicate some aspects of initial response such as transportation or the identification of wounded or missing. Conversely, a hazard at midnight may occur when most people are asleep and unable to receive an advance warning through typical communication channels. The following labor shed and commute shed analysis is intended to document where county residents work and where people who work in Umatilla County reside.

As shown in Table 3-26, overall the workforce is fairly distributed between the cities of Umatilla County, and highly mobile within and among Counties in the surrounding region. While the majority of Umatilla County residents are employed within the county (68.8%), there are also a significant number of workers who commute to locations outside the county to work. Well over 10% of workers who live in Umatilla County travel north to counties in Washington for their job. Interestingly, a significant number of county residents are employed further afield in locations including La Grande and Baker City to the east, Portland and Salem to west, and even in communities along the southern Oregon coast. It is possible that these workers do not physically commute every day or on a regular basis and instead telecommute or otherwise have remote locations.

Commute Shed (Where workers are employed who live in Umatilla County), 2009

Location	Number	Percent
Umatilla County	19,357	68.8%
Pendleton	6,150	21.9%
Hermiston	4,609	16.4%
Milton-Freewater	1,284	4.6%
Umatilla	687	2.4%
Walla Walla County, WA	1,873	6.7%
Walla Walla	1,349	4.8%
Morrow County	1,096	3.9%
Benton County, WA	953	3.4%
Union County	582	2.1%
Multnomah County	519	1.8%
Malheur County	485	1.7%
Marion County	358	1.3%
Franklin County, WA	350	1.2%
All Other Locations	2,546	9.1%
Total	**28, 119**	

Source: U.S. Census Bureau, On the Map, All Jobs Area Profile Analysis, 2009

Table 3-25: Commute Shed (Where workers are employed who live in Umatilla County), 2009

Table 3-27 below tells the statistical story about where workers live who are employed in Umatilla County. The majority of workers employed in the county are also residents (68.8%). The locations outside of Umatilla County where the highest number of workers come from are neighboring Morrow, Walla Walla, WA and Benton, WA Counties. There is little geographical concentration among workers from Morrow County, but most workers from Walla Walla

County reside in the cities of Walla Walla and Kennewick. A substantial number of workers live farther afield, with large concentrations of Umatilla County workers residing in La Grande to the east and Portland to the west.

Labor Shed (Where workers live who are employed in Umatilla County), 2010

Location	Number	Percent
Umatilla County	19,357	68.8%
Pendleton	5,591	19.9%
Hermiston	4,291	15.3%
Milton-Freewater	1,437	5.1%
Umatilla	1,240	4.4%
Morrow County	1,042	3.7%
Walla Walla, WA	1,042	3.7%
Walla Walla	673	2.4%
Kennewick	549	2.0%
Benton County, WA	1,039	3.7%
Union County	745	2.6%
Multnomah County	639	2.3%
Franklin County, WA	364	1.3%
Washington County	325	1.2%
Baker County	299	1.1%
Deschutes County	272	1.0%
Marion County	269	1.0%
All Other Locations	2,743	9.8%
Total	**28,136**	

Source: U.S. Census Bureau, On the Map, All Jobs Area Profile Analysis, 2009

Table 3-26: Labor Shed (Where workers live who are employed in Umatilla County), 2010

In summary, the Labor Shed analysis and Commute Shed analysis reveal that there is a great deal of commuting and worker exchange between communities in the region. While 31% of Umatilla County workers maintain employment outside of the county, over 31% of Umatilla County workers live elsewhere, both east and west of Pendleton, as well as to the north across the Columbia River in various Washington counties.

Summary

Regional economic capacity refers to the present financial resources and revenue generated in the community to achieve a higher quality of life. Forms of economic capital include income equality, housing affordability, economic diversification, employment, and industry. The current and anticipated financial conditions of a community are strong determinants of community resilience, as a strong and diverse economic base increases the ability of individuals, families and the community to absorb disaster impacts for a quick recovery.

Umatilla County has a relatively stable unemployment rate, a diverse economy, a low level of housing cost burden and above average income equality. As such, the county is poised to experience a less difficult time in recovering from a natural disaster than many surrounding Counties, which already suffer from high unemployment levels and low economic diversity profiles.[53] However it is important to consider what might happen to the county economy if some of the largest revenue generators and employers (retail, manufacturing, and health care and social assistance industries), were heavily impacted by a disaster. To an extent, and to the benefit of Umatilla County, these particular industries are a mix of basic and non-basic in nature, dependent on both external markets and local residents.

[53] State of Oregon Natural Hazards Mitigation Plan, Region 4 Southwest Oregon Regional Profile.

It is imperative however that Umatilla County continues to recognize that economic diversification is a long-term issue. More immediate strategies and actions to reduce vulnerability from an economic perspective should focus on risk management for the county's dominant industries (e.g. business continuity planning) as well as the county's dependence on main transportation arteries.

3.05 Built Capacity

Housing Building Stock

Housing characteristics are an important factor in hazard mitigation planning, as some housing types tend to be less disaster resistant than others, and therefore warrant special attention. Table 3-28 identifies the type of housing most common throughout Umatilla County. Of particular interest are mobile homes and other non-permanent housing structures (including boats, RVs, vans, etc.), which account for nearly sixteen-percent of the housing in Umatilla County. Mobile structures are particularly vulnerable to certain natural hazards, such as windstorms, and special attention should be given to securing the structures as they are typically more prone to damage than wood-frame construction.[54]

It is also important to consider multi-unit structures, as they are more vulnerable to the impacts from natural disasters due to the increased number of people living in close proximity. In short, a structural weakness in a multiunit structure will have an amplified impact on the population. According to the data presented in Table 3-28, roughly eighteen-percent of housing in Umatilla County is made up of multi-family dwellings.

Umatilla County Housing Type Summary, 2009

Housing Type	Number	Percent
1 unit	19,577	66.2%
2 to 10 units	3,508	11.9%
10 to 19 units	886	3.0%
20 or more units	942	3.2%
Mobile home	4,509	15.2%
Boat, RV, van, etc.	164	0.6%
Total	**29,586**	

U.S. Census Bureau, American Community Survey, 5 year Estimates, 2006-2010; B25024

Table 3-27: Umatilla County Housing Type Summary, 2009

The previous table indicates that the majority of Umatilla County's housing stock is single-family homes. This trend is continuing with new construction, as approximately 95.7% of residential permits issued in 2010 were for single-family units.[55] This suggests that hazard mitigation and outreach should specifically address preparedness for detached housing structures.

Table 3-29 below shows that residential construction activity has fluctuated rapidly between 2008 and 2010. Between 2001 and 2004, the issuance of permits increased by 8.8%; however the number of permits steadily decreased between 2004 and 2010. Residential activity is a key indicator in community stability, and can demonstrate positive community growth. However, in recent years with the downfall of the residential market this is less of an accurate

[54] State of Oregon Natural Hazards Mitigation Plan, Region 4 Southwest Oregon Regional Profile.

[55] U.S. Census Bureau, Annual Building Permits, http://censtats.census.gov/bldg/bldgprmt.shtml

indicator as activity all across the nation has been impacted.

Annual Privately-Owned Residential Building Permits

	2010		2007		2004		2001	
Unite Type	Buildings	Units	Buildings	Units	Buildings	Units	Buildings	Units
Single Family	66	66	103	103	132	132	134	134
Two Family	2	4	8	16	12	24	0	0
Three and Four Family	0	0	1	4	5	18	2	8
Five or More Family	1	8	0	0	0	0	1	26
Total	69	78	112	123	149	174	137	168
Percent Change of Permits	**-38.4%**		**-24.8%**		**8.8%**		--	

U.S. Census Bureau, Reported Annual Building Permits. http://censtats.census.gov/bldg/bldgprmt.shtml

Table 3-28: Annual Privately-Owned Residential Building Permits

Age of housing is another characteristic that influences a structure's vulnerability to hazards. Generally the older a home is, the greater the risk of damage from natural disasters. This is because stricter building codes have only been implemented in recent decades, following improved scientific understanding of plate tectonics and earthquake risk. In Oregon, many structures built after the late 1960s began utilizing earthquake resistant designs and construction. Similarly, communities in the northwest began implementing flood elevation ordinances in the 1970s.[56] In 1990 Oregon again upgraded to stricter seismic standards that included earthquake loading in the building design.[57] Table 3-30 shows that just under 25% of the housing stock in Umatilla County was built after 1990 when the more stringent building codes were put in place, leaving about 75% with questionable seismic stability, and over 20% with very questionable seismic stability (percentage of homes built before 1960). [58] Thus knowing the age of the structure is helpful in targeting outreach regarding retrofitting and insurance for owners of older structures.[59]

[56] State of Oregon Natural Hazards Mitigation Plan, Region 4 Southwest Oregon Regional Profile.

[57] Wang Yumei and Bill Burns. "Case History on the Oregon GO Bond Task Force: Promoting Earthquake Safety in Public Schools and Emergency Facilities." National Earthquake Conference. January 2006.

[58] Source: U.S. Census Bureau, 2005-2009 American Community Survey. B25034 Year Structure Built 5 Year Estimate.

[59] State of Oregon Natural Hazards Mitigation Plan, Region 4 Southwest Oregon Regional Profile.

Umatilla County Housing Stock by Age, 2010

Year Structure Built	Number	Percent
Built 2005 or later	971	3.3%
Built 2000 to 2004	2,144	7.3%
Built 1990 to 1999	4,145	14.0%
Built 1980 to 1989	2,717	9.2%
Built 1970 to 1979	7,189	24.3%
Built 1960 to 1969	2,589	8.8%
Built 1950 to 1959	3,522	11.9%
Built 1940 to 1949	2,577	8.7%
Built 1939 or earlier	3,732	12.6%
Total housing units	**29,586**	

Source: U.S. Census, American Community Survey, 5 Year Estimates, 2006-2010; B25034

Table 3-29: Umatilla County Housing Stock by Age, 2010

Mitigation and preparedness planning should also consider type of occupancy when developing outreach projects or educational campaigns. Residents who own their own home are more likely to want to take steps to reduce the impact of natural hazards through mitigation or insurance methods. Renters may be less invested in physical improvements to the unit, but outreach around personal preparedness or renters insurance would benefit this population. As demonstrated in Table 3-31 below, approximately 34% of the occupied housing units in Umatilla County are renter-occupied.

Umatilla County Housing Unit Occupancy Summary, 2010

Housing Units	Number	Percent
Occupied housing	26,904	90.6%
Owner-occupied	16,916	57.0%
Renter-occupied	9,988	33.6%
Vacant housing	2,789	9.4%
Total	**29,693**	

Source: U.S. Census, American Community Survey, 2010; Census Summary File, QT-H1

Table 3-30: Umatilla County Housing Stock by Age, 2010

Physical Infrastructure

Physical infrastructure such as dams, roads, bridges, railways and airports support Umatilla County communities and economies. Critical facilities are facilities that are critical to government response and recovery activities; however the term may also refer to facilities or infrastructure that could cause serious secondary impacts when disrupted. Many things can be counted as critical infrastructure and facilities depending on the social, environmental, economic, and physical makeup of the area under consideration. Some examples include: Agriculture and food systems; communications facilities; critical manufacturing; dams; emergency services; energy generation and transmission; government facilities; healthcare and public health; information technology; transportation systems; and water. Due to the fundamental role that physical infrastructure plays both in pre and post-disaster, they deserve special attention in the context of creating resilient communities.[60]

[60] State of Oregon Natural Hazards Mitigation Plan, Region 4 Southwest Oregon Regional Profile.

Dams

Dam failures can occur at any time and are quite common. Fortunately most failures result in minor damage and pose little or no risk to life safety.[61] However, the potential for severe damage still exists. The Oregon Water and Resources Department has inventoried all dams located in Oregon and Umatilla County. There are three high hazard dams in the county as well as three others with significant hazard threat potential; the county's four largest dams are designated as having either a high or significant threat potential. Of the county's high hazard dams, only one has not been inspected since 2009, the McNary Dam on the Columbia River, which is Umatilla County's largest dam and was last inspected in 2000. The other two high hazard dams are the McKay and Indian Lake Dams. The dams at Cold Springs Reservoir, Meacham Lake and the Simplot Waste Lagoon #1 are all listed as significant hazards, but all have been inspected since 2009.

Umatilla County Dam Inventory and Threat Summary

Threat Potential	Number of Dams
High	3
Significant	3
Low	13

Oregon Water Resources Department, Dam Inventory, Query.
http://apps.wrd.state.or.us/apps/misc/dam_inventory/

Table 3-31: Umatilla County Dam Inventory and Threat Summary

[61] Ibid.

Rail Ways

Railroads are major providers of regional and national cargo trade flows. The Burlington Northern Santa Fe (BNSF) Railway, the Union Pacific Railroad, as well as the Palouse River and Coulee City Lines run through Umatilla County.[62] The BNSF Line in Umatilla County is limited to the stretch of tracks that follow I-84 and the Columbia River on the northern border of the county into the state of Washington. Three main Union Pacific lines converge in the northwestern corner of the county before moving towards the center of the state. One Union Pacific line splits south to Pilot Rock while the other runs through the City of Pendleton and eventually winds into Union County. The Palouse River and Coulee City Line crosses into Umatilla County from the state of Washington near the northeastern edge of the county, and runs south through the city of Milton-Freewater before ending in Weston.

Rails are sensitive to icing from winter storms that can occur in the Columbia Gorge region. For industries in the region that utilize rail transport, these disruptions in service can result in economic losses. The potential for rail accidents caused by natural hazards can also have serious implications for the local communities if hazardous materials are involved.[63] Sparks from rails have also been known to start wildfires.

[62] Oregon Department of Transportation, State of Oregon, Oregon Railways. http://www.oregon.gov/ODOT/TD/TDATA/gis/docs/statemaps/railroads.pdf?ga=t

[63] State of Oregon Natural Hazards Mitigation Plan, Region 4 Southwest Oregon Regional Profile.

Airports

Umatilla County has 11 private airports, including heliports at two of the county's hospitals and another at McNary Dam. There are two public airports in the City of Pendleton, the Hermiston Municipal Airport and the Eastern Oregon Regional Airport.[64] There are two other regional airports in the vicinity, the Walla Wall Regional Airport and the Tri-Cities Airport, which are both located in Washington. The Portland International Airport in Portland and the Seattle-Tacoma International Airport in Seattle are the closest international commercial service airports near Umatilla and surrounding Counties. Access to these airports faces the potential for closure from a number of natural hazards, including wind and winter storms common to the region.[65]

Power Generation

A substantial portion of the region's electricity is generated through hydropower, and the regions primary energy generating dams are situated on the Columbia River. There is one major hydroelectric dam in Umatilla County, The McNary Dam, which is located on the Columbia River just north of Hermiston. There are also two natural gas combustion facilities in the county: a 547 megawatt (MW) natural gas power plant located outside of Hermiston, which is operated by the Calpine Corporation; and the 468 MW Hermiston Generating Project, also located outside of Hermiston, which is owned by the Hermiston Generating Company and PacifiCorp, and operated by the U.S. Operating Services Corporation.

Historically, Umatilla County controlled a majority of Oregon's total wind energy, as in 2006 when the county held more than 70 percent of the state's total wind energy portfolio, with 186 Megawatts of capacity.[66] Currently, the county's three largest wind facilities include Vansycle Ridge (approximately 124 MW), a portion of the Stateline project (approximately 120 MW in Oregon), and the Combine Hills wind project (approximately 104 MW); however over 400 MW of additional capacity have been approved for installation in the near future, and 200 additional MW are currently in the permitting process.[67]

- Pacific Power serves customers in Southern Washington, Oregon, Northern California, Eastern Idaho, Utah and Wyoming. Pacific Power transmission lines that transmit power to customers across Oregon cross through Umatilla County from the McNary Dam.
- The Umatilla Electric Cooperative engages in energy transmission and distribution, providing electric service to customers in most of Umatilla County, as well as some coverage in Morrow and Union Counties.
- Milton-Freewater City Light & Power serves approximately 4550 customers with average annual sales of 118,000,000 KWH, and is the oldest municipal electric utilities in

[64] FAA Airport Master Record. 2011. http://www.faa.gov/airports/airport_safety/airportdata_5010/

[65] State of Oregon Natural Hazards Mitigation Plan, Region 4 Southwest Oregon Regional Profile.

[66] OSU Rural Studies Department, Special Report 1067 - http://ruralstudies.oregonstate.edu/sites/default/files/pub/pdf/umatilla_sr1067.pdf

[67] Renewable Northwest Project, Renewable Energy Projects - www.rnp.org/project_map/

the state. The power supplied by the utility is provided by the Bonneville Power Administration.[68]

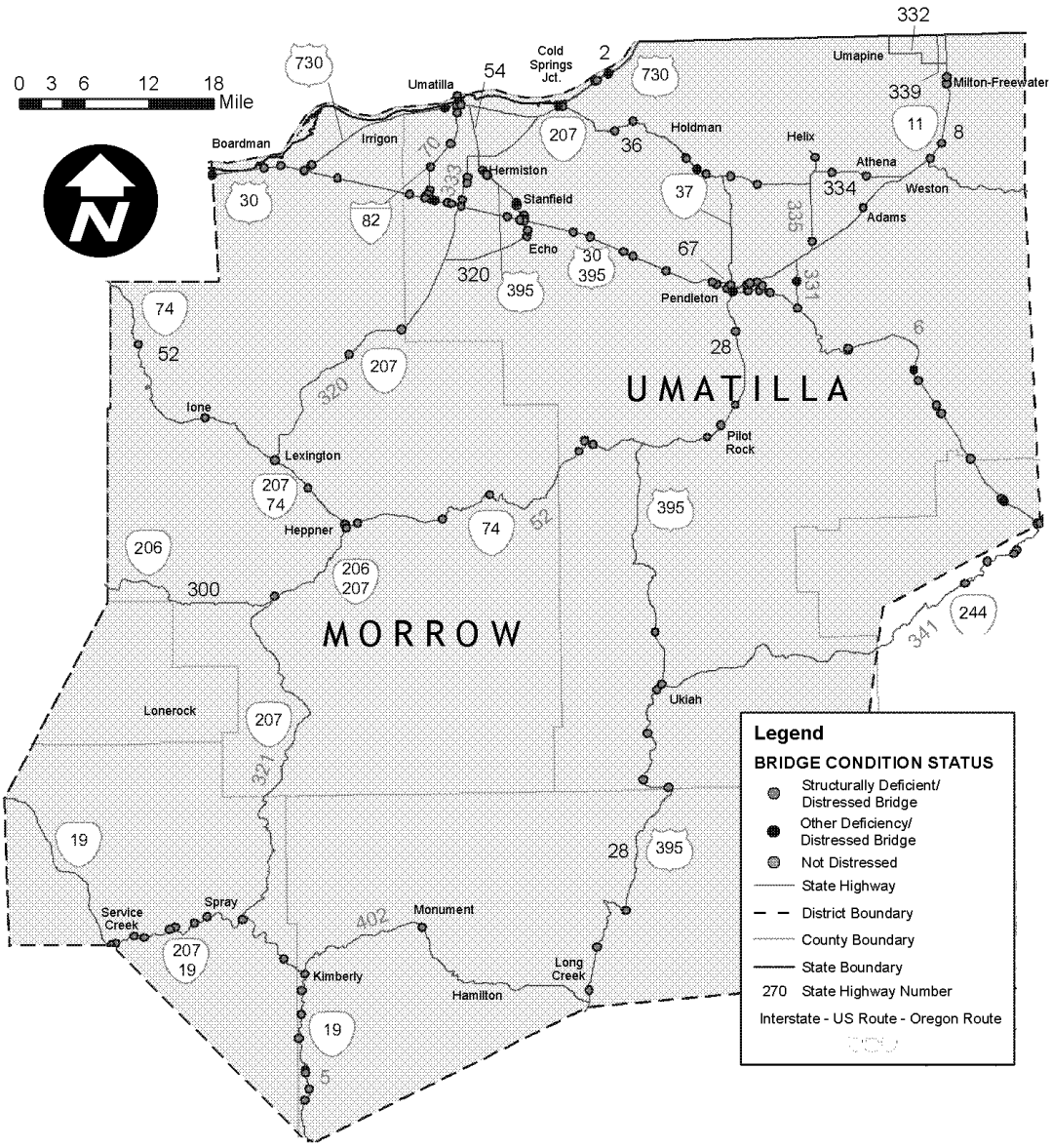
- Hermiston Energy Services is a municipally owned electric utility. The City of Hermiston acquired the electric facilities of Pacific Power and Light within the Hermiston city limits, and has contracted most of the operation to the Umatilla Electric Cooperative.

Roads and Bridges

The region's major expressway is Interstate 84. It runs from the Northwest corner of Umatilla County east towards Union County, and is the main passage for automobiles, buses and trucks traveling along northern Oregon to Idaho. Other major highways that service this region include:

- Interstate 82 runs south from Tri-cities in Washington, passing south near the Cities of Umatilla and Hermiston before connecting with I-84.
- US Highway 11 runs south from Walla Walla, Washington to the City of Milton Freewater before passing through the City of Pendleton.
- US Highway 395 runs south from the City of Pendleton through Pilot Rock and Long Creek before merging with Highway 26 at Mt Vernon in Grant County.
- US Highway 730 splits north from Interstate 84 just before the Umatilla Army Depot and runs northeast along the Columbia River until it passes into Washington.
- Highway 207 splits south from Highway 730 near Hat Rock State Park. It passes southwest through Hermiston before merging with Highway 74 at Lexington in Morrow County.
- Highway 74 splits from Highway 395 just west of Pilot Rock before intersecting with US Highway 207 again at Heppner in Morrow County.

[68] The official website for Milton-Freewater, Oregon - http://mfcity.com/electric



Source: 2011 Bridge Condition Report, Oregon Department of Transportation

Figure 3-8: Umatilla County Bridge Inventory, ODOT

Daily transportation infrastructure capacity in Umatilla County is moderately stressed by maintenance, congestion, and oversized loads, however peak loads and congestion can materialize during major construction projects, but can also fluctuate by season. Natural hazards tend to further disrupt automobile traffic and create gridlock; this is of specific concern in periods of evacuation during an emergency.[69]

The existing condition of bridges in the region is also a factor that affects risk from natural hazards. Bridge failure can have immediate and long term implications in the response and recovery of a community. Incapacitated bridges can disrupt traffic and exacerbate economic losses due to the inability to transport products and services in and out of the area.[70] The Umatilla County Public Works Department is responsible for maintenance of 321 bridges around the county (includes 172 National Bridge Inventory (NBI) bridges (20' or longer), and 149 non-NBI bridges (less than 20')).[71] Table 3-33 represents the condition of nearby NBI bridges, and highlights the number of distressed bridges in ODOT's Region 5, District 12. The region encompasses all of Umatilla and Morrow Counties.

The NBI identifies four distressed bridges, and concludes that 20% of all the bridges in the region exhibit some form of structural or other deficiency. The classification of a distressed bridge does not imply the bridge is unsafe; however in the event of seismic activity these bridges are of higher vulnerability to failure. A county bridge over the Walla Walla River at 15th avenue in Milton-Freewater is not in compliance with Corps and FEMA flood capacity standards. Work is scheduled this summer to correct this issue.

Umatilla County Bridge Condition and Deficiency Overview

Deficiency	Number	Percent
Structurally Deficient – Distressed Bridges	8	5.0%
Other Deficiency – Distressed Bridges	11	6.8%
Not Distressed	143	88.3%
Total	**162**	

Oregon Department of Transportation, 2011 Bridge Condition Report; Region 5, District 12

Table 3-32: Umatilla County Bridge Condition and Deficiency Overview

Utilities

Utilities are the resources that the public relies on daily, (i.e., electricity, fuel and communication lines). If these lines fail or are disrupted, the essential functions of the community can become severely impaired. Utilities are closely related to physical infrastructure, (i.e., dams and power plants) as they transmit the power generated from these facilities.

The network of electricity transmission lines running through the region is operated by Pacific Power and Light, the Umatilla Electric Cooperative, the Bonneville Power Administration, and several other entities that facilitate local energy production and distribution in the area. It is further

[69] Ibid.

[70] Ibid.

[71] Umatilla County Public Works Department, http://www.co.umatilla.or.us/road.htm

disseminated through local utility distribution lines.

Gas Service

There are two natural gas transmission lines that intersect in Umatilla County near the city of Stanfield.[72] The lines service local communities and feed the county's two natural gas fired cogeneration facilities. Cascade Natural Gas Corporation controls the Williams/Northwest pipeline that crosses the Columbia River into Umatilla County from its northwestern border before it moves to Union County in the southeast. The Gas Transmission Northwest Pipeline, controlled by TransCanada, passes into Umatilla County from the north near Walla Walla before moving east into Morrow County. Most of the natural gas Oregon uses originates in Alberta, Canada, and Avista Utilities owns the main natural gas transmission pipeline.[73] These lines are potentially vulnerable to severe, but infrequent natural hazards, such as earthquakes, which could disrupt service to natural gas consumers across the region. Both Ferrell Gas and Ameri Gas distribute pressurized natural gas to communities in Oregon and Washington. Umatilla County has access to the services of both companies through service centers in nearby Walla Walla, WA.

Telecommunications

There are many telecommunication providers in Umatilla County, including CenturyLink and Charter Communications, the third and fourth largest telecommunications companies in the United States. Eastern Oregon Telecom, Comcast, US Cellular and other telecommunication companies also serve the county.

Sewer, Land Fill and Industrial Waste

There are ten community wastewater systems permitted in the county, however the cities of Pendleton and Hermiston both have additional permits that allow them to dispose of industrial waste. There are 54 similar permits granted to independent facilities across the county, and residential septic tanks are prevalent across the region.[74]

There are three sanitary landfills available to Umatilla County Residents: Pendleton Sanitary Services and Tribal Environmental Recovery in Pendleton; and Walla Walla Regional Landfill in Walla Walla, WA. Various collection entities provide services to Umatilla County communities and dump at these landfills.

An industrial waste line that services industries in the region runs through the city of Milton-Freewater.

[72] TransCanada, GTN System Map - http://www.gastransmissionnw.com/downloads/documents/system_map.pdf

[73] Loy, W. G., ed. 2001. Atlas of Oregon, 2nd Edition. Eugene, OR: University of Oregon Press.

[74] Department of Environmental Quality, Pendleton Office

Critical Facilities

Critical facilities are those facilities that are essential to government response and recovery activities (e.g., hospitals, police, fire and rescue stations, school districts and higher education institutions).[75] The interruption or destruction of any of these facilities would have a debilitating effect on incident management. Though the number of county hospitals and official count of beds is listed, this does not reflect the number of beds that might be available during an emergency event, or county capacity to address the surge of additional patients that could result from a major natural disaster. Critical facilities in Umatilla County are identified in Table 3-34 below.

Critical Facilities in Umatilla County

	County Total
Hospitals (number of beds)	3 (110)*
Police / Sheriff's Offices	15
Fire & Rescue Stations	14
Dams	19
Bridges	321
School Districts &Colleges	10 districts, 1 Community College
Airports	11
Public Airport	*2*
Private Airport	*6*
Private Helipad	*3*

*Total includes one psychiatric hospital with a 60-bed capacity
Sources: Good Shepherd Medical Center and St. Anthony Hospital, Umatilla Emergency Management Plan, Oregon Department of Forestry, Oregon Water Resources Department, Umatilla County Public Works Department, Oregon Department of Education, FAA Airport Master Record

Table 3-33: Critical Facilities in Umatilla County

Umatilla County is served by the Oregon State Police Department and the Umatilla County Sheriff's Office. Local Police Departments also provide services within the city limits of most Umatilla communities, except for the cities of Adams, Echo, Helix and Ukiah. There are fourteen fire response districts of various geographical extent and coverage operating in Umatilla County. The districts are a mixture of tribal, county, municipal, and other various regionally affiliated entities. The Oregon Department of Forestry and various Federal Agencies also oversee multiple fire protection boundaries.[76]

[75] State of Oregon Natural Hazards Mitigation Plan, Region 4 Southwest Oregon Regional Profile.

[76] Umatilla County Emergency Operations Plan – Umatilla County Emergency Management

The County Courthouse, located in Pendleton, houses many of the administrative offices for Umatilla County including the Planning Department as well as space for public hearings. The Courthouse also includes administrative offices for the State Courts. The Umatilla County 911 Office is located at Criminal Justice Center in Pendleton, along with the County Sheriff's office. There are three National Guard Armories in Umatilla County (located in Hermiston, Pendleton, and Milton-Freewater) that could be activated and utilized during a natural hazard or emergency event.

Perhaps the most important facility with relation to natural hazards and other emergencies is the Umatilla County Emergency Operations Center (EOC), which houses many of the organizations that would direct and execute response efforts during an emergency event. During such an event, most emergency operations would be coordinated from the EOC, as would communications within the county and to relevant entities outside of the county. During large-scale emergencies the EOC will become the seat of government for the duration of the crisis. In the future, it is possible that the EOC could be operated as a regional hub for disasters in the Pacific Northwest.

Dependent Facilities

In addition to the critical facilities mentioned in Table 3-34, there are other vital services delivered in the county that must be accounted for when planning for natural disaster response and recovery. Assisted living centers, nursing homes, residential mental health facilities, and psychiatric hospitals are important to identify within the community because of the dependent nature of the residents. Such facilities can also serve as secondary medical facilities during an emergency, as they are equipped with nurses, medical supplies and beds.

In Umatilla County there are five adult residential care facilities and three registered nursing homes. The facilities are primarily located in Pendleton, Hermiston, and Milton Freewater. There are also twenty live-in care facilities around the county that have a resident capacity of five or less, where seniors and people with disabilities live and have care provided for them.[77] There is also a Psychiatric Hospital located in Milton-Freewater that has a 60 bed capacity and offers a range mental health related services and programs.

Correctional Facilities

Correctional facilities are incorporated into physical infrastructure as they play an important role in everyday society by maintaining a safe separation of the public from potentially dangerous human elements. There are several correctional facilities located in Umatilla County, including the Umatilla County Jail, Umatilla County Corrections and Oregon Youth Authority in Pendleton, and the Two River Correctional Institute in Umatilla. While correctional facilities are built to code to resist structural failure and typically have back up power to sustain regulation of inmates following the immediate event of an emergency, logistical planning becomes more of a challenge when the impacts of the event continue over a long duration.

[77] Ibid.

Summary

Built capacity refers to the built environment and infrastructure that supports a community. The various forms of built capital mentioned throughout this section play significant roles in the event of a disaster. Physical infrastructure, including utility and transportation lines, is critical to maintain as these are essential for proper functioning and response during a disaster. Community resilience is directly affected by the quality and quantity of built capital and lack of or poor condition of infrastructure can negatively affect a community's ability to cope, respond and recover from a natural disaster. Initially following a disaster, communities may experience isolation from surrounding cities and counties due to infrastructure failure. These conditions force communities to rely on local and immediate resources.

Around 15% of Umatilla County's housing stock is made up of mobile

homes and other non-permanent housing structures (including boats, RVs, vans, etc.), while roughly eighteen-percent is made up of multi-family dwellings, types of housing that may significantly amplify the human costs of natural hazards and disasters due to the density of occupants. Likewise over 75% of the county's housing was built before 1990, the year Oregon upgraded its seismic building standards to include seismic loading. In terms of infrastructure, Umatilla County's four largest dams are classified as high or significant threat potentials, including The McNary Dam, which was last inspected in 2000. Over 88% of bridges in the region are not distressed, but eight are structurally deficient, and eleven exhibit some other form of deficiency. Most of the county's critical facilities and vital infrastructure are located in Pendleton, Hermiston and Milton Freewater. Aside from I-84 there are a number of alternative highways and roads that may provide service access to people outside of urban areas, or serve as evacuation routes away from the county if necessary in case of an emergency.

3.06 Community Connectivity Capacity

Social Organizations

Social organizations can play an important role in promoting hazard mitigation and in aiding recovery efforts following a natural disaster. These organizations are uniquely suited to reach vulnerable populations, which have a tendency to be more at-risk in the event of a disaster. Social organizations take a number of forms, but are often community oriented programs that provide social and community-based services for the public. In promoting hazard awareness, Counties should work with such programs to help distribute information and educate the public as to proper hazard mitigation practices.

Below are a few methods that social organizations located throughout Umatilla County can use to become involved in hazard mitigation.

- Education and Outreach – Organizations can partner with the community to educate the public or provide outreach assistance and materials on natural hazard preparedness and mitigation.

- Information Dissemination – Organizations can partner with the community to provide and distribute hazard-related information to target audiences.

- Plan/Project Implementation – Organizations may have plans and/or policies that may be used to implement mitigation activities or the organization can serve as the coordinating or partner organization to implement mitigation actions.

Civic Engagement

Civic engagement and involvement are important indicators of community connectivity. Whether it is engagement through volunteerism or through local, state, and national politics, you can gauge the connection people have to their community by their willingness to help out.

Residents who want to become involved in their community through volunteering have a number of opportunities available to them throughout the region. Residents can contact the Department of Human Services or search online through a variety of volunteer opportunities around the region, and choose one that fits their skills, interests and schedule.[78] These programs, among many others, allow residents to give back to their community.

Those who are more invested in their community may also have a higher tendency to vote in political elections. Below, Table 3-35 outlines voter participation and turnout percentages from the 2008 Presidential General Election compared to the 2010 State Representative General Election. The 2008 Presidential General Election resulted in an 80.1% voter turnout in the county, while the 2010 State Representative General Election resulted in a turnout of about 63.6% voter

[78] www.oregon.gov/DHS/children/beyondfc/docs/umatilla-volunteer.pdf?ga=t

participation.[79] These results are fairly proportional with voter participation reported across the State; however Umatilla County had a considerably lower turnout in both the 2008 and 2010 General Elections than the state as a whole.[80]

[79] Umatilla County Election Results, Accessed 12 January 2012 – http://www.co.umatilla.or.us/elec-results.htm

[80] Oregon Blue Book, Accessed 15 December 2011 – http://bluebook.state.or.us/state/elections/elections04.htm

Umatilla County Election Results, 2008 and 2010

	2008 Presidential General Election		2010 State Representative General Election	
	Umatilla County	**Oregon**	**Umatilla County**	**Oregon**
Total - Registered Voters	32,231	2,153,914	31,611	2,068,798
Total - Ballots Cast	25,813	1,845,251	20,101	1,487,210
Voter Turnout Percentage	80.1%	85.7%	63.6%	71.9%

Source: Umatilla County Election Results; Oregon Blue Book Election Results

Table 3-34: Umatilla County Election Results, 2008 and 2010

Cultural Resources

Cultural resources provide residents with a sense of belonging and can be used to teach current residents about the histories and lives of past residents. Historic sites, museums, and libraries are just a few of the resources that give residents and visitors a sense of cultural connectivity to a place. These resources celebrate history and help define an area that people call home.

Historic Places

The National Register of Historic Places lists all types of facilities and infrastructure that help define a community. Whether it is the first schoolhouse in town or even just the home of a resident who played a vital role in the success of the community, the *Register* lists all types of historic features that characterize the area. Table 3-36 categorizes the 39 different National Historic Sites located throughout Umatilla County by their distinction and function.

These places provide current residents, youth, and visitors with a sense of community. Because of the history behind these sites, and their role in defining a community, it is important to protect these *historic sites* from the impacts natural disasters might have on them.

National Register of Historic Sites in Umatilla County

Type of Structure	Number of Structures
Parks /Outdoor Sites	1
Cabins, Estates, Farms, Houses, Huts, Lodges, Log Cabins	12
Banks	1
Masonic Buildings	2
Hotels	3
Churches	3
College	1
Historic Districts	2
Buildings, Halls, City Structures	14
Total	**39**

Source: National Register of Historic Places - http://nrhp.focus.nps.gov/natregadvancedsearch.do

Table 3-35: National Register of Historic Sites in Umatilla County

Libraries and Museums

Libraries and Museums are other facilities which a community can use to stay connected. There are 13 public libraries of various sizes spread throughout Umatilla County, including the Blue Mountain Community College Library, as well as facilities in most of the county's cities. These facilities serve a critical function in maintaining a sense of community, however library buildings should also be considered as a common place for members of communities to gather during a disaster or hazard event.

Museums can also function in maintaining a sense of community as they provide residents and visitors with the opportunity to explore the past and develop cultural capacity. The Umatilla County Historical Society oversees the operation and development of the Heritage Station Museum in downtown Pendleton. The Umatilla County Historical Society was organized in 1974 to collect and preserve historical objects and stories unique to the Umatilla County region, and use them to strengthen present and future generations' understanding of that history through exhibits and diverse programming. [81]

The Tamástslikt Cultural Institute, located near the City of Pendleton on the Confederated Tribes of Umatilla Indian Reservation, is a unique interpretive center on the historic Oregon Trail, owned and operated by the people now known as the Cayuse, Umatilla, and Walla Walla Tribes. The Cultural Institute embodies the Tribes' effort to bring about understanding, and offers the perspective of the native inhabitants of the Oregon territory during the

[81] Umatilla County Heritage Station Museum - http://www.heritagestationmuseum.org/index.html

period when the US was expanding its territory westward.[82]

Several other museums are available throughout the region, which cover additional aspects of the county and surrounding area's history. As with public libraries, it is important to consider museums in the mitigation process for community resilience. These structures should be protected in critical times to preserve cultural heritage, but may also serve as a place of refuge for community members during a disaster event.

[82] Tamástslikt Cultural Institute - http://www.tcimuseum.com/

3.07 Community Stability

Residential Geographic Stability

Geographic stability often results in a feeling of connectedness to one's community and is a measure of one's rootedness. A person's place attachment refers to this sense of community and can often magnify efforts to help revitalize a community.[83] Regional residential stability is important to consider in the mitigation process as those who have been in one place for a while are more likely to have a vested interest in the area and should be more likely to help with hazard mitigation efforts. Table 3-37 estimates residential stability across the region. It is calculated by the number of people who have lived in the same house and/or county for more than a year, compared to the percentage of people who have not. As of 2010, Umatilla County is estimated to have had 92.1% of its residents live in the same house or within county boundaries generally for more than a year, just higher than all nearby counties but slightly lower than the state average.

Regional Residential Stability

County	Geographic Stability
Umatilla	**92.1%**
Benton, WA	91.4%
Grant	95.2%
Morrow	89.1%
Union	92.0%
Walla Walla, WA	88.9%
Wallowa	94.6%
Oregon	92.5%

Source: US Census Bureau, American Community Survey, 2006-2010; B07003

Table 3-36: Regional Residential Stability

Homeownership

Another measure of community stability and place attachment is homeownership. One does not typically seek to be a homeowner in a place they don't feel safe and secure. Residents who become homeowners search for a place in which they are happy, protected, and can afford. Homeownership is an indicator that residents will most likely return to a community post-disaster, as these people are economically and socially invested in the community. Similarly, homeowners are more likely to take necessary precautions in protecting their property. Table 3-38 identifies the percentage of homeownership across the region, where the remaining households are renters. Umatilla County's home ownership rate is just higher than the state average, but is considerably lower than other counties in the region, aside from Walla Walla County in Washington.

[83] Susan Cutter, Christopher Burton, and Christopher Emrich, "Disaster Resilience Indicators for Benchmarking

Baseline Conditions," Journal of Homeland Security and Emergency Management 7, no. 1 (2010): 9.

Regional Homeownership

County	Home Owners
Umatilla	**64.0%**
Benton, WA	69.7%
Grant	72.7%
Morrow	71.2%
Union	66.0%
Walla Walla, WA	61.8%
Wallowa	74.7%
Oregon	63.8%

Source: US Census Bureau, American Community Survey, 2006-2010; B25003

Table 3-37: Regional Homeownership

Summary

Community connectivity capacity places a strong emphasis on social structure, trust and norms, and the cultural resources within a community. In terms of community resilience, these emerging elements of social and cultural capital will be drawn upon to stabilize the recovery of the community. Social and cultural capitals are present in all communities; however, it is dramatically different from one town to the next as they reflect the specific needs and composition of the community residents. A community with low residential stability may hinder the full potential of social and cultural resources, adversely affecting the community's coping and response mechanisms in the event of a disaster.

Place attachment can be determined through a variety of outlets. Umatilla County has a wide range of resources in the form of social organizations, civic engagement, and cultural capital that help retain a sense of community and add to regional stability. Umatilla County voter turnout is considerably below state levels; however regional stability and regional homeownership indicators closely match state norms and regional trends. As such, the county should continue to invest time informing and supporting its residents to build more resilient and better prepared communities, as they are more likely to return in the event of a disaster. Likewise, it is important to consider the roles such services and facilities can and will provide to residents during a disaster event.

3.08 Political Capital

Government Structure

Umatilla County is governed by a Board of Commissioners consisting of three elected individuals, appointed to four year, overlapping terms, who oversee all county activities with the exception of the Sheriff and the District Attorney. The Commissioners are responsible for preparing and monitoring the county budget; making membership appointments to the numerous county committees and overseeing their activities; as well as adopting and enacting ordinances and policies.

They work closely with other agencies on issues directly affecting agriculture, environment, and economics within Umatilla County as well as providing support and direction to the Umatilla County management team who strive to bring a quality service to the citizens of the county. The Commissioner's office maintains an "open door policy" and welcomes citizens to stop by and share their comments and concerns on any issue relating to Umatilla County livability. The Board of County Commissioners normally meets on the first and third Wednesdays of each month at Pendleton Courthouse to conduct county business.

The County Courthouse at 216 SE Fourth Street in downtown Pendleton houses many of the departmental offices for Umatilla County including the County Administrator, Planning and Building Services, Human Resources, Elections, Records and Assessment, and space for public meetings. The County Courthouse also houses the District Attorney and the Civil Division of the Sherriff's office. Public Works and the Road Department are housed in the building at 3920 Westgate Street, while the Sheriff's Office, County Corrections, Emergency Management and the Umatilla County 911 Office are all located in the facility at 4700 NW Pioneer Place in Pendleton.[84]

Beyond Emergency Management and Planning, all the departments within the county governance structure have some degree of responsibility in building overall community resilience. Each plays a role in ensuring that the county functions, and that normal operations resume and the needs of the population are met after an incident. Some divisions and departments of Umatilla County government that have a more prevalent role in hazard mitigation include:

Commission on Children and Family: The Commission on Children and Families is a 14 member body of community volunteers that are appointed to 4-year terms by the Umatilla County Board of Commissioners. The Commission plans, advocates, and mobilizes the community to act on behalf of children, youth, and families; promoting their health, safety, and wellbeing. In addition, the Commission receives and manages grant resources, such as state, federal, and private foundation grants for distribution to community based agencies, organizations, and individuals. Because this department is in frequent contact with families and children, often thought of as vulnerable populations due to increased sensitivity to the impacts of hazard incidents, it should be a natural partner in mitigation actions for outreach efforts and to build the county's awareness of the needs of children and families.

[84] Umatilla County Website, Departments - http://www.co.umatilla.or.us/Departments.htm

Emergency Management: Umatilla County's Emergency Management prepares for, coordinates response, logistical support and mitigation for all natural and man-made emergencies and disasters. During an emergency, the department provides direction, control, and management of county emergency operations, and allocation/coordination of resources to support local response and recovery activities. Emergency Management is its own primary agency, but receives support from local fire departments/districts and the Umatilla County Sheriff's Department. However in response and recovery operations, the Umatilla County Board of Commissioners is the county's primary decision-maker. The county may declare a State of Emergency, make the services and resources of county agencies available, and take any actions deemed necessary.[85] The scope of the emergency management system includes cities, service districts, volunteer agencies, schools, and other organizations with emergency responsibilities. County emergency planners work closely with the Local Emergency Planning Committee (LEPC), an entity that develops contingency plans for local and regional emergencies.

Fair Ground Facilities: The fairground facilities serve as a year round entertainment venue but should also be considered as a staging site for response efforts. Mitigation could include specific actions to ensure the facilities can be used during an emergency response; such as extra power should it need to be used as a shelter. The fairgrounds are currently located adjacent to Hermiston High School, but are scheduled to be relocated adjacent to the Hermiston Airport. The fairgrounds will be co-located with the Eastern Oregon Trade and Event Center (EOTEC). This co-location provides a shared opportunity for emergency response efforts such as a staging area, temporary shelter, food distribution, evacuation site, etc.

Health and Human Services: The goals of Umatilla County Public Health are to understand specific health issues, investigate health problems and threats, prevent and or minimize communicable disease outbreaks caused by unsafe food, water, chronic diseases, environmental hazards, injuries, and risky health behaviors throughout Umatilla County. The department works actively in the development of response plans in the event of a public health emergency, and also works closely with local responders and the state. Umatilla County Public Health has partnerships with public and private health care providers, community and government agencies that are all working toward the betterment of the community. [86]

Planning: The Umatilla County Planning Department is responsible for comprehensive land use planning for Umatilla County. Information, assistance and regulatory permits can also be obtained from the department. The type of permits that are processed are burning permits, conditional use permits, comprehensive plan changes, zoning and development permits, and rural addressing. The department also houses the Code Enforcement Office.[87]

[85] Umatilla County Emergency Operations Plan – Umatilla County Emergency Management

[86] Umatilla County Public Health - http://www.co.umatilla.or.us/health.htm

[87] Umatilla County Land Use Planning - http://www.co.umatilla.or.us/planning/index.htm

Public Works: The Road Department is responsible for maintaining all county roads and bridges within Umatilla County. The 44 employees include road, shop crew, office personnel, county surveyor, and weed department crew. The department has five employees at each of its two satellite offices in Milton-Freewater and Stanfield. Umatilla County Public Works maintains approximately 1700 miles of road of which 500 miles are paved, along with 344 bridges of various sizes. The Road Department is funded with Gas Tax, Vehicle Registration Fees, and Forest Service revenues based on timber harvested in Umatilla, Wallowa and Whitman National Forests. Timber sales have declined significantly in recent years, and due to the loss of revenues, Umatilla County is basically in a maintenance mode.[88] However the Public Works Department and its employees have important information about the resilience of the physical aspects of the community. As such the Department can help to prioritize projects for mitigation and should be a key partner in implementation as well.

Sheriff's Office: The mission of the Umatilla County Sheriff's Office is to consistently earn the public's trust by providing the highest quality law enforcement services possible on behalf of community safety and the overall economic development, economic growth and economic stability of Umatilla County. Umatilla County Law Enforcement is faced with providing safety in a variety of terrain stretching for 70 miles from border-to-border. County Law Enforcement is responsible for patrolling over two million acres where 96% of the county is cropland and forest acres of vast canyons, mountain ranges and home to nearly 76,000 citizens. The Umatilla County Sheriff's Office oversees Patrol (including marine and snow), Criminal Investigations, Animal Control, 911 Communications, the County Jail, and Search and Rescue.[89]

Existing Plan & Policies

Communities often have existing plans and policies that guide and influence land use, land development and population growth. Such existing plans and policies can include comprehensive plans, zoning ordinances and technical reports or studies. Plans and policies already in existence can have the benefit of support from local residents, businesses and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs.[90] The Umatilla County Natural Hazards Mitigation Plan includes a range of recommended action items that, when implemented, should reduce the county's vulnerability to natural hazards. Many of these recommendations are consistent with the goals and objectives of the county's existing plans and policies. Linking existing plans and policies to the Natural Hazards Mitigation Plan helps identify what resources already exist that can be used to implement the action items identified in the Plan. Implementing the natural hazards mitigation plan's action items through existing plans and policies increases their likelihood of being supported and getting updated, and maximizes the county's resources. The following are a list

[88] Umatilla County Public Works - http://www.co.umatilla.or.us/road.htm

[89] Umatilla County Sheriff's Office - http://www.co.umatilla.or.us/sheriff.htm

[90] Burby, Raymond J., ed. 1998. Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities.

of plans and policies already in place in Umatilla County:

- Umatilla County Hazard Vulnerability Analysis Adopted: December 17, 2003, Revised: October 2008

- Umatilla County Comprehensive Plan Adopted: May 9, 1983, Amended: December 2, 198

- Umatilla County Emergency Operations Plan Created: November 2011

- Umatilla County Transportation System Plan Created: April 2002

- Umatilla County Community Wildfire Protection Plan Created: June 16, 2005

- West Umatilla County Community Wildfire Protection Plan Created: June 28, 2009

- Umatilla County Code of Ordinances Initial Ordinance Adopted: May 9, 1983, Amended: March 13, 2012

- Umatilla County FEMA Flood Insurance Study Created: September 3, 2010

- Umatilla River Basin Total Maximum Daily Load and Water Quality Management Plan Developed: March 2001

- Walla Walla River Basin Total Maximum Daily Load and Water Quality Management Plan Developed: August 2005

- Milton-Freewater Water Control district Flood Response plan in development

Summary

Political capital is recognized as the government and planning structures established within a community. In terms of hazard resilience, it is essential for political capital to encompass diverse government and non-government entities in collaboration; as disaster losses stem from a predictable result of interactions between the physical environment, social and demographic characteristics and the built environment.

Chapter 4. RISK ASSESSMENT

Sections:

4.01 Definition of a Risk Assessment

Conducting a risk assessment can provide information on the location of hazards, the value of existing land and property in hazard locations, and an analysis of risk to life, property, and the environment that may result from natural hazard events. Risk assessments are subject to the availability of hazard-specific data.

4.02 Federal Requirements for a Risk Assessment

Recent federal regulations for hazard mitigation plans outlined in 44 CFR Part 201.6 (c) (2) includes a requirement for risk assessment. This risk assessment requirement is intended to provide information that will help communities to identify and prioritize mitigation activities that will reduce losses from the identified hazards. The federal criterion for risk assessments and information on how the Mitigation Plan meets those criteria is outlined in Table 4-1 below.

Federal Criteria for Risk Assessment

Section 322 Requirement	How is this addressed?
Identifying Hazards	Umatilla County has generated maps which is the result of mapping exercises at the EOC and meetings with each city and special district willing but unable to attend mapping exercises.
Profiling Hazard Events	The hazard sections of the Umatilla County Natural Hazard Mitigation Plan provide documentation for all of the large-scale hazard events affecting the region. Where data is available, Umatilla County has provided local impacts from historical hazard events.
Assessing Vulnerability: Identifying Assets	Appendix A and large scale maps housed at the Umatilla County Emergency Operations Center documents the community assets that are vulnerable to natural hazards.
Assessing Vulnerability: Estimating Potential Losses	Using the best available data, an estimate of potential losses from natural hazards is located in the hazard specific sections or in an appendix to this plan.
Assessing Vulnerability: Analyzing Development Trends	The Community Profile Section of this plan provides a description of development trends.

Table 4-1: Federal Criteria for Hazard Assessment

4.03 Components of the Risk Assessment

Hazard Identification identifies the geographic extent and intensity of the hazard, the intensity of the hazard, and the probability of its occurrence. Maps are frequently used to display hazard identification data. Umatilla County identified eight major hazards that consistently affect this geographic area. These hazards – floods, landslides, wildfires, earthquakes, severe storms: summer and winter, volcanoes and drought – were identified through an extensive process that utilized input from Umatilla County Emergency Management and the Mitigation Plan Steering Committee. The geographic extent of each of the hazards has been identified by Umatilla County using the best available data and local knowledge. The extent of each hazard is included in the hazard specific sections later in this document.

Vulnerability Assessment/Inventorying Assets combines hazard identification with an inventory of the existing (or planned) property and population exposed to a hazard. A complete listing of the community assets in Umatilla County is included in Appendix A. Additionally, a more detailed description of the vulnerability of these assets is located in the specific hazard sections.

Risk Analysis/Estimating Potential Losses involves estimating the damage, injuries, and financial losses likely to be sustained in a geographic area over a given period of time. This level of analysis involves using mathematical models. The two measurable components of risk analysis are magnitude of the harm that may result and the

likelihood of the harm occurring. Describing vulnerability in terms of dollar losses provides the community and the state with a common framework in which to measure the effects of hazards on assets. A brief risk analysis was completed for Critical/Essential Facilities, Critical Infrastructure and Vulnerable Populations in regards to the natural hazards of wildfire, flood and severe winter storm (the most common natural hazards in Umatilla County).

4.04 Risk Assessment Analysis

Critical/Essential Facilities

Critical/Essential Facilities are those necessary for government response and recovery activities (i.e. life safety and property, property and environmental protection, etc.) and must be protected to assure adequate management of emergency situations. These facilities include:

- 911/dispatch centers
- Emergency operation centers
- Police and fire stations
- Public works facilities
- Sewer and water facilities
- Corrections centers
- Public service buildings (courthouses, city halls, etc.)

Critical/Essential Facilities were mapped to determine if important services such as water, sewer, etc. will be provided during natural hazards.

A complete listing of all Critical/Essential Facilities in Umatilla County was compiled in Appendix A. As is shown in the listing there are 28 facilities composed of fire stations, water and sewer facilities that make up the critical/essential facilities within the County (outside of city limits and urban growth boundaries).

Possible Impacts to Critical/Essential Facilities from Natural Hazards

A brief analysis of whether or not these facilities may be impacted by the three most common natural hazard event for the County (wildfire, flood and severe winter storm) is provided in Appendix A. The analysis answered the question, "Will this facility be directly impacted by the natural hazard?" Or in other words, if the natural hazard occurs will there be a disruption in service because of the effects of the natural hazard.

The only facilities that would be affected by wildfire are within the forested areas around Meacham (post office and fire station). Thus, if a wildfire occurred in the Meacham area most likely these facilities would be directly impacted. In terms of impacts from flooding, most facilities have been built outside of the floodplain, except for those facilities that are water control structures such as dams. Of course, in times of flooding water control structures will play an important role in controlling excess water flows. The Umatilla County Road Department's Stanfield office /yard is located in a flood zone making it difficult for workers to access road equipment and other vehicles during high water events. Severe Winter Storm will impact the functionality of any facility that requires human interaction. For example, all fire stations were noted as being impacted by a severe winter storm because in order for that facility to function properly fire fighters must be able to respond to emergencies by traveling on roadways. Large accumulations of snow and ice may prevent the movement of emergency vehicles and medical

equipment. Other facilities such as dams, water tanks and sewer families can continue to function properly for short periods of time without any direct human activity. Fortunately, severe winter storms are typically brief and internment and after the initial impact most facilities can recover quickly and resume normal operations within a matter of days.

Critical Infrastructure

Critical infrastructure includes those systems necessary for the day to day operation of Umatilla County. This infrastructure includes:

- Electricity transmission
- Natural gas and other utilities
- Arterial transportation including rail, air, auto and water

Critical infrastructure was mapped to determine if lines for commerce remain open during times of emergency. Critical infrastructure was also mapped to determine evacuation routes and emergency vehicle access routes during times of emergency.

A complete listing of all Critical Infrastructure in Umatilla County was compiled in Appendix A. As is shown in the listing there are 16 facilities composed of transmission lines, highways and pipelines that make up the critical infrastructure within the County (outside city limits and urban growth boudnaries).

Possible Impacts to Critical Infrastructure from Natural Hazards

A brief analysis of whether or not these facilities may be impacted by the three most common natural hazard event for the County (wildfire, flood and severe winter storm) is provided in Appendix A. The analysis answered the question, "Will this facility be directly impacted by the natural hazard?" Or in other words, if the natural hazard occurs will there be a disruption in service because of the effects of the natural hazard.

Several of the facilities may be impacted by wildfire since some of these facilities traverse forested areas in the County. Many of the transmission lines and highways are in close proximity to large stands of trees and if a wildfire were to occur would impact the facility directly by limiting its use or even damage it severely. It is no mistake that the vast majority of these facilities are not within a flood zone. Major transportation routes will remain open during flood events. Standards are in place for the construction of bridges that support the travel lanes across rivers and streams to ensure that if flooding does occur the roadway will remain intact. Thus, although most of these facilities go across flood zones, a certain level of protection is provided during the planning, engineering and construction process. Severe winter storm will affect every transportation facility to some degree. Typically, during winter storms the owner/manager of the roadway will plow, sand and otherwise maintain the travel surface to allow safe and efficient movement of vehicles. There are times, however, with the storm is so severe that the roadway is closed. Thus, along Interstate 84 there are several closure gates to limit entrance during times of severe storms.

Vulnerable Populations

Vulnerable populations include those facilities that house or could receive

individuals with special needs to conduct day to day activities. These areas include:

- Hospitals and care centers
- Schools
- Nursing homes and assisted living facilities

These types of facilities were mapped to determine their level of vulnerability during hazard events. If the facility such as an adult foster care home may be subject to damage or harm during a natural hazard event then mitigation acitiives may be necessary to prevent a crisis.

A complete listing of all Vulnerable Population Centers in Umatilla County was compiled in Appendix A. As is shown in the listing there are 17 facilities composed of adult foster care homes, schools and churches that make up the vulnerable population centers within the County (outside of city limits and urban growth boundaries).

Possible Impacts to Vulnerable Population Centers from Natural Hazards

A brief analysis of whether or not these facilities may be impacted by the three most common natural hazard event for the County (wildfire, flood and severe winter storm) is provided in Appendix A. The analysis answered the question, "Will this facility be directly impacted by the natural hazard?" Or in other words, if the natural hazard occurs will there be a disruption in service because of the effects of the natural hazard.

Both the natural hazards of wildfire and flood will not have direct impact on the various foster care homes and schools in the County. These facilities are not within areas prone to wildfire and are not within flood zones. The most pervasive natural hazard that affects most every type of development is severe winter storm. The effects of power outages, limited use of transportation facilities and the increased cost of heating systems for the vulnerable population centers (homes and care facilities) can be very detrimental to their functionality. Thus, every facility was shown to be impacted by severe winter storm.

Cultural or Historical Assets

Cultural and Historical Assets are those features in Umatilla County that have played an important part of the history of the County and of its people. Cultural and historical assets such as the Oregon Trail, historical settlements or buildings are important to the story of Umatilla County. A complete listing of historical assets in Umatilla County can be provided by Oregon State Historic Preservation Office. Protection of cultural and historic assets may increase quality of life and economic sustainability in Umatilla County.

Economic Assets

Economic Assets are businesses that employ large numbers of people, and provide economic security to residents of Umatilla County. If damaged, the loss of these economic centers could significantly affect economic stability and prosperity and therefore require mitigation measures to prevent natural hazards from affecting their future success.

Most economic assets in Umatilla County are located within the incorporated limits or urban growth boundaries of a city. This is

primarily due to Oregon land use laws and goals, but some uses are within the direct jurisdiction of Umatilla County either due to grandfathered development or development that is better suited to rural areas (e.g. Hinkle switchyard and Calpine energy center).

Environmental Assets

Environmental assets are those parks, open spaces, green spaces, wetlands, and rivers that provide an aesthetic and functional service for the community. Due to the fact that the unincorporated area of Umatilla County is predominantly open space and/or in resource protection the environmental assets were not all mapped.

Water quality and quantity are the primary environmental concern in Umatilla County. These environmental assets have a direct impact on the quality of life and economic sustainability and are described in the drought section of this document.

Hazardous Materials

This hazard results from the use of chemicals and materials that pose a serious threat to life, property and the environment. These materials, many of which are used in agricultural, industrial, and other modern technologies, are becoming increasingly complex. Accidents involving the release of hazardous materials may occur during the handling at industrial facilities that use such materials or during transportation of such materials by rail, highway, or river barge.

4.05 Community Hazard Risk Assessment Summary

Hazard Definitions[91]

All areas of Umatilla County are subject to the effects of natural and man-caused disasters including, but not limited to the following:

1. Natural Disasters

a. Weather emergencies – thunderstorms, winter storms, floods, wind storms, dust storms, drought, snow, ice, avalanche, or tornado.

b. Geological emergencies – earthquake, landslide, or subsidence.

c. Epidemiological emergencies – infection of humans, animals, or agricultural products.

2. Human-caused Disasters

a. Fire and explosion emergencies – industrial, structural, forest and range, or transportation-related incidents.

b. Transportation emergencies – incidents involving aircraft, rail

[91] Hazard Risk Assessment completed for the Umatilla County Emergency Operations Plan, Adopted December 17, 2003.

systems, watercraft, motor vehicles, or gasoline delivery pipelines.

c. Hazardous materials emergencies – gases, explosives, corrosives, flammable liquids and solids, oxidizers, poisons, chemical warfare agents, or radioactive materials in incidents at fixed sites or while in transport.

d. Civil disturbance emergencies – unlawful demonstrations, riots.

e. Utility emergencies – failure or disruption of electrical, telephone, water, natural gas or fuel pipelines, sewer or sanitation systems.

f. Nuclear emergencies – the accidental or deliberate detonation of nuclear weapons, deposition of radioactive materials (such as from an accident at the Hanford Nuclear Reservation or the Columbia Generating Station), or an incident involving the use or transportation of radiological materials.

g. Acts of terrorism or sabotage.

Acts of Terrorism or Sabotage: Hazards Analysis Criteria

Acts of terrorism or sabotage became important concerns following the intentional bombing of the Murrah building in Oklahoma City. In 1995, following the Presidential Decision Directive 39 (PDD-39), specific measures were undertaken by the Federal Government to enhance interagency cooperation and implement measures to reduce U.S. vulnerabilities to such actions. As part of the planning process, the Department of Justice, Office of Domestic Preparedness prepared a detailed terrorism hazard vulnerability assessment process. A terrorist act is defined as an act planned by an individual or individuals "whoever knowingly possesses any biological agent, toxin or delivery system of a type or in a quantity that under any circumstances is not reasonably justified by a prophylactic, protective, bona fide research, or other peaceful purpose. In this subsection, the terms "biological agent" and toxin do not include any biological agent or toxin that is in its naturally-occurring environment, if the biological agent or toxin has not been cultivated, collected or otherwise extracted from its natural resource."[92]

Risk Assessment Rating Criteria

In analyzing the risk posed by specific hazards, rating criteria and weighting factors have been used. This point-value formula is based on the following[93]:

- High = 10 points
- Moderate = 5 points
- Low = 1 point

Weighting factors are determined by the following:

1. **Event History** is based on the number of incidents equivalent to a major emergency. **Weighting Factor is 2.**

[92] U.S. Department of Justice 28 CFR Section 0.85(k)(1)

[93] Umatilla County Emergency Operations Plan Dec 2003

- High = 4 or more events in last 100 years = 20
- Moderate = 2 or 3 events in last 100 years = 10
- Low = 1 or 0 events in last 100 years = 2

2. **Vulnerability** is based on the percentage of population or property likely to be affected. Weighting Factor is 5.

    - High = More than 10% of population affected = 50
    - Moderate = 1-10% of population affected = 25
    - Low = Less than 1% of population affected = 5

3. **Maximum Threat** is based on the percentage of population or property that could be affected in a worst-case incident. Weighting Factor is 10.

    - High = > 25% of population potentially affected = 100
    - Moderate = 5-25% of population potentially affected = 50
    - Low = < 5% of population potentially affected = 10

4. Probability is based on the likelihood of an occurrence happening within a specified **period of time. Weighting Factor is 7.**

    - High = One incident within a 10-year period = 70
    - Moderate = One incident within a 50-year period = 35
    - Low = One incident within a 100-year period = 7

Umatilla County Risk Analysis Matrix (updated July 2012)

	History (Weighting Factor=2)	Vulnerability (Weighting Factor=5)	Max Threat (Weighting Factor=10)	Probability (Weighting Factor=7)
Weather Emergencies (Total Score 240)	High 20	High 50	High 100	High 70
Wildfire (Total Score 190)	High 20	Moderate 30	Moderate 70	High 70
Flood (Total Score 165)	High 20	Moderate 25	Moderate 50	High 70
Hazardous Materials (Total Score 165)	High 20	Moderate 25	Moderate 50	High 70
Earthquake (Total Score 149)	Low 10	Moderate 25	High 100	Low 14
Transportation (Total Score 165)	High 20	Moderate 25	Moderate 50	High 70
Nuclear Incident (Total Score 159)	Low 2	High 50	High 100	Low 7
Radiological Incident (Total Score 159)	Low 2	High 50	High 100	Low 7
Chemical Weapons (Total Score 134)	Low 2	Moderate 25	High 100	Low 7
Civil Disturb. /Terrorism (Total Score 130)	High 20	Moderate 25	Moderate 50	Moderate 35

Scoring: High = 10 points Moderate = 5 points Low = 1 point

Table 4-2: Umatilla County Hazards Analysis Matrix (updated July 2012)

Identified Hazards

Based on the hazards analysis criteria shown above, the following hazards are considered to be of greatest risk to Umatilla County. Note that levels of risk are based on major emergency events, not worst-case incidents.

Weather Emergencies 240 points (Excludes flooding)

Winter storms generally involve severe snow and ice storms which can result in power outages and disrupt transportation. The characteristics of weather hazards are determined by a variety of meteorological factors such as amount of snow or rainfall, air temperature, wind velocity and temperature, ground saturation or snow-pack conditions. Umatilla County has suffered severe winter storms in the past and there is no reason to believe that the situation will change. Some areas of Umatilla County are also subject to risk from avalanche; however these areas are primarily in the high country of the Blue Mountains and pose minimal risk most of the population.

Summer Storms occur periodically and are characterized by severe heat combined with thunder and lightning. Severity of the storms depends on the duration of the severe temperature and annual precipitation. Summer storms cause fires in the mountains but also in the lower elevations.

Drought involves a period of prolonged dryness resulting from a lack of precipitation or diversion of available water supplies. Umatilla County has suffered periods of drought in the past; however the main impact of drought has been on agriculture, fish, and wildlife, as well as an increased fire risk. A severe drought could require strict water conservation measures to ensure an adequate supply of potable water.

Other hazards related to weather may include windstorms or tornadoes. Windstorms may occur suddenly and can cause damage to homes and property and disrupt vital utilities. Dust storms may occur as well. In 1999, seven people in Umatilla County were killed when a dust storm caused traffic accidents on I-84. A 1995 wind and hail storm in the western part of the county caused millions of dollars of damage to vehicles, structures and crops. Tornadoes periodically touch down in Umatilla County but they have not caused major damage.

Wildfire 190 points

Umatilla County's urban areas face structural fire hazards typical of jurisdictions with a mix of residential, business and industrial areas. No high-rise buildings are located in the County; however, large numbers of people could be threatened at public-gathering places. Approximately 12% of the County consists of forest land used by the timber industry and for recreation. This land constitutes a significant threat for forest fires. In addition, the County faces the threat of wild lands/urban interface fires from large areas of rangeland and dry land crops coming in contact with continuing residential construction in the interface zones in the County.

Flood 165 points

This hazard generally involves a rise in rivers or creeks resulting from heavy rain or rapid melting of the annual snow pack. The Columbia River is located on the northern edge of Umatilla County. Major flooding

could also result from failure of a dam. Umatilla County has a number of rivers and creeks that could be subject to flooding. Specific response plans have been written for a general flood response.

Hazardous Materials 165 points

This hazard results from the use of chemicals and materials that pose a serious threat to life, property, and the environment. These materials, many of which are used in agricultural, industrial, and other modern technologies, are becoming increasingly complex. Accidents involving the release of hazardous materials may occur during the handling at industrial facilities that use such materials or during transportation of such materials by rail, highway, or river barge. Union Pacific Railroad's main line carries thousands of rail cars filled with hazardous materials through Umatilla County each year, and its rail yard south of Hermiston at Hinkle receives, reconfigures, and dispatches 40 to 50 trains per day.

Earthquake 149 points

Earthquakes are created by tectonic movement within the earth's crust. This movement is manifested as localized ground shaking with possible soil liquefaction. After the initial seismic event, tremors or aftershocks can occur for an extended period of time resulting in continued structural damage. There are several known fault lines throughout Umatilla County with further geological analyses ongoing. An earthquake measuring 5.8 occurred on July, 1936 and caused damage throughout the county, especially in the Milton-Freewater area. Recent evaluation of the earthquake potential in the Pacific Northwest indicates that the earthquake threat has been underestimated and the seismic rating for the area may be increased in the near future.

Transportation 165 points

This hazard may include major incidents involving motor vehicles, trains, aircraft, or water vessels. Primary risk from this hazard would be posed if such incidents included a release of hazardous materials, fire or explosion, or large numbers of casualties. An airline crash, train derailment, or other mass casualty incident could result in a major transportation emergency or disaster. U.S. Interstate (I) 84 travels through Pendleton; I-82 proceeds north from Hermiston. All Interstate routes are heavily used by the trucking industry in addition to motorists.

Nuclear Incident 159 points

The Hanford Nuclear Reservation and Columbia Generating Station are located northwest of Umatilla County. If there was a release of radioactive material, Umatilla County is located in the ingestion zone.

While the probability of a nuclear incident occurring in Umatilla County is low, the maximum threat posed by an accidental or intentional release of radioactive material, or intentional detonation of a nuclear device is extremely high. Risk is posed not only by the direct effects (such as blast and heat), but also by the lingering effects of radioactive fallout.

Radiological Incident 159 points

A conventional explosive device incorporating radioactive materials, sometimes referred to as a "dirty" bomb, poses a threat to county persons and property. Explosive and incendiary devices are relatively simple to construct. Acquisition of radiological material such as cesium is also possible. Dirty bombs theoretically will cause large scale contamination of an area, and potentially expose people, livestock and agriculture. The greatest impact of a radiological incident is the fear which would be generated within the public (terrorism). A radiological incident could also occur during the ground transportation of radiological waste as part of Waste Isolation Pilot Plant (WIPP) shipments.

Civil Disturbance/Terrorism 130 points

This hazard might include riots, protests, strikes, demonstrations, or acts of terrorism that may result in the hostage taking, damage to property, or sabotage and extortion. Terrorism events might include arson, bomb threats or events, and other unlawful activities. Umatilla County's risk for civil disturbance and terrorism was rated at 13 in the Department of Justice (DOJ) Risk Assessment conducted in Fiscal Year (FY) 2001.[94]

[94] See U.S. Department of Justice Website at <http://www.usdoj.gov/>. Accessed September 17, 2003.

Chapter 5. NATURAL HAZARDS PROFILE

Sections:

This section provides information on the process used to develop goals and action items that pertain to the eight natural hazards addressed in the Mitigation Plan. It also describes the framework that focuses the Mitigation Plan on developing successful mitigation strategies. The framework is made up of three parts: the *Mission*, *Goals*, and *Action Items*.

The Mission and Goals of the Mitigation Plan were described earlier in Chapter 1 and pertain to all natural hazards experienced in Umatilla County. This section provides background of each identified natural hazard and an overview of existing mitigation resources and identified *Action Items* that could improve disaster resistance and resilience in the rural, unincorporated area of Umatilla County. Some of these action items will also be coordinated with special districts and incorporated cities to increase disaster resistance.

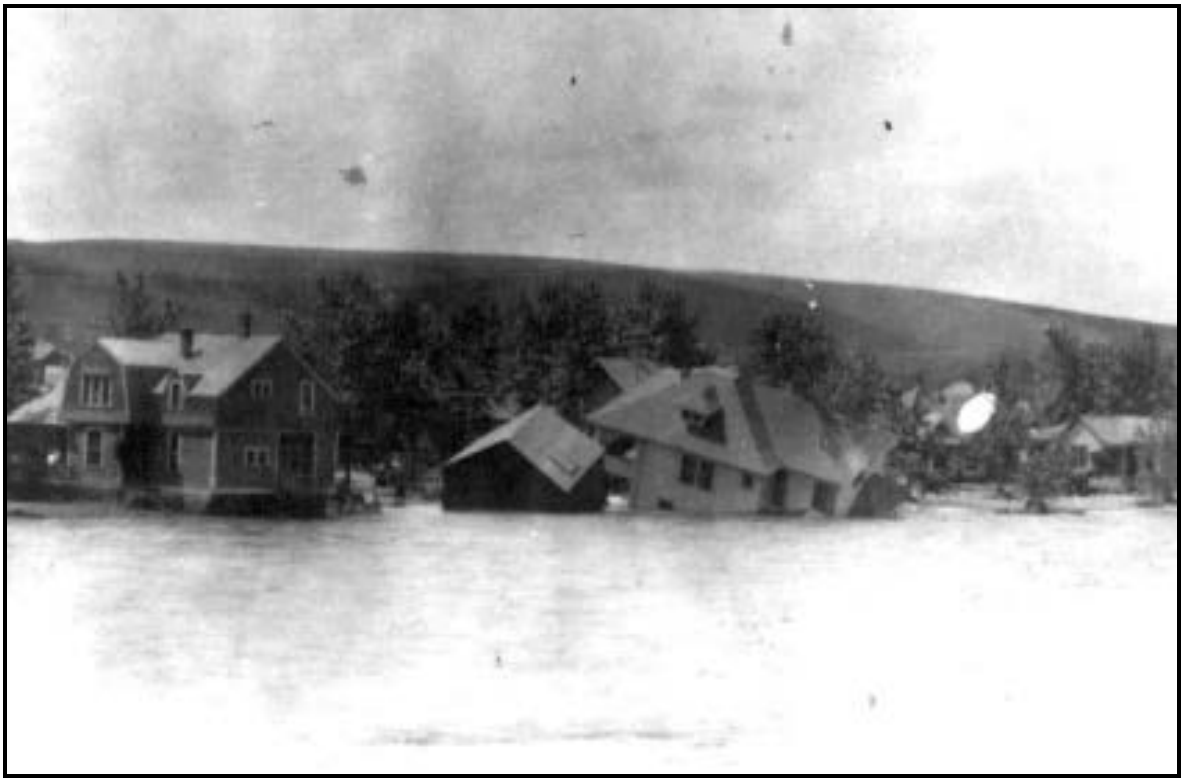


Figure 5-1: Umatilla River Flooding near Pendleton in the 1960s (US Army Corps of Engineers)

5.01 MULTI-HAZARD

Multi-hazard action items are those activities that could provide mitigation tools for a combination of seven of the eight hazards in the Mitigation Plan: wildfire, flood, severe summer storm, severe winter storm, earthquake, landslide/debris flow and volcanic eruption. As will be covered later, hazards associated with drought require hazard specific mitigation activities not required by other natural hazards.

As stated in the introduction, Umatilla County encompasses a vast network of utility and transportation infrastructure including natural gas, electricity, and fiber optic transmission as well as multi-model transportation via freeway, highway, air, rail and barge. This infrastructure is vital to the economic sustainability of Umatilla County, as well as other areas of the state and nation. This infrastructure is also vulnerable to multiple hazards in Umatilla County.

The information and transportation infrastructure of Umatilla County is vitally important to emergency response and public safety when natural hazards occur. Due to the rural nature of Umatilla County, access to hospitals, shelters and health care centers is not as readily available as predominantly urban counties and usually requires transport via ambulance or private vehicle on one of the County's rural or highway road systems. Additionally, some of the inhabited areas of Umatilla County have only one access road for emergency response vehicles to get into or for residents to utilize during hazard events requiring evacuation. To ensure public safety during times of emergency these access routes must remain open.

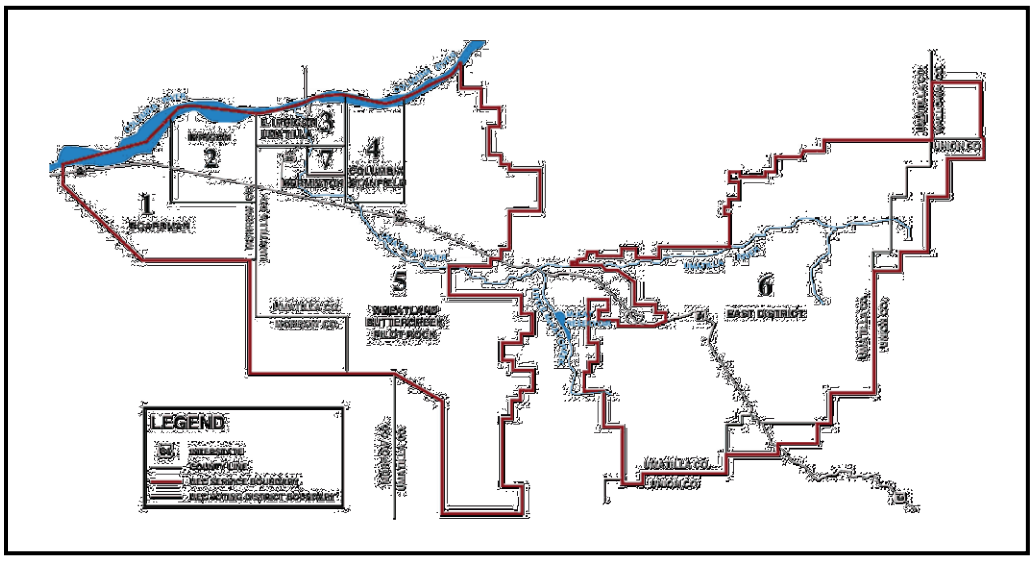


Figure 5-2: Umatilla Electric Cooperative Service Area[95]

[95] www.ueinet.com

Existing Multi-Hazard Programs, Response and Mitigation Activities

Umatilla County Emergency Operations Center

Part of the legacy of the Umatilla Chemical Depot and the Chemical Stockpile Emergency Preparedness Program (CSEPP) was to leave Umatilla County with a sophisticated and technologically advanced emergency communication and coordination system. Although the CSEPP no longer exists, some of the infrastructure is still in place. This system includes wireless communication, reader boards and other systems to help manage an emergency. The emergency response system is coordinated through Umatilla County Emergency Management and the Umatilla County Emergency Operations Center (EOC) and Joint Information Center (JIC).

While most of the CSEPP staff trained in emergency response are no longer employed by the County, in the event of an emergency the EOC and JIC can be activated to provide information, logistic, and technical support to response agencies and personnel. Once activated, the EOC can monitor and map events, track response, catalogue resources and coordinate activities through the use of weather stations, river flow gauges, water quality stations, 450 and ARES communications, road reader boards, etc. Maps of existing resources available to the EOC can be found in Appendix A. The EOC also provides a central location for all agencies to coordinate mitigation and response activities.

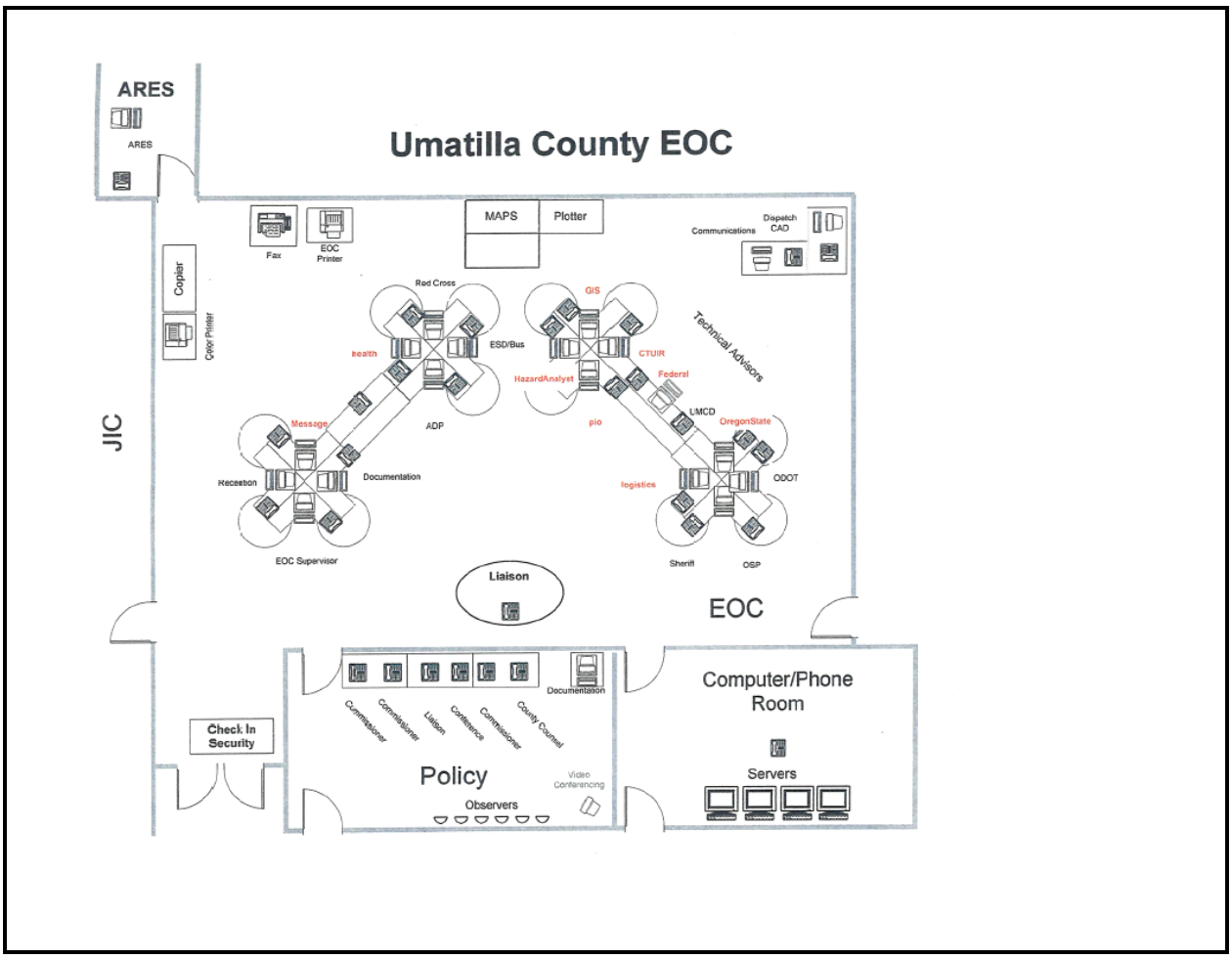


Figure 5-3: Layout of Umatilla County Emergency Operations Center

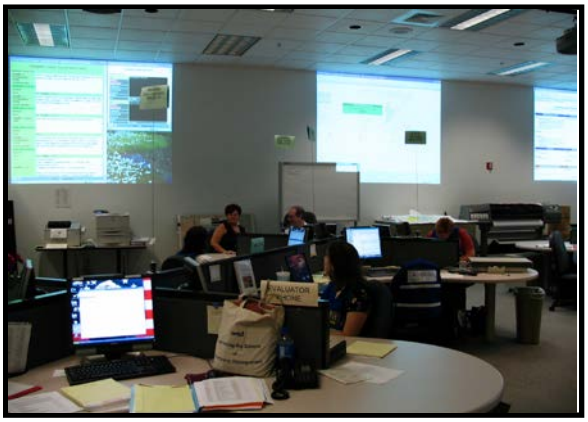


Figure 5-4 Umatilla County EOC and JIC

A priority of Umatilla County is to maximize the potential that the EOC and JIC have to offer the region. Although the CSEPP program and staff no longer exist, the EOC and JIC facility remains and can be populated in the future to serve as a regional emergency management hub.

Hazard Management Plans

Most utility companies are required to maintain hazard management plans. Plans for gas and electric utility companies in Umatilla County are proprietary due to security reasons but are housed at the Umatilla County EOC to be utilized as resources during the event of an emergency.

Survey Results

Survey results in 2009 revealed the following mitigation/response tools that may be utilized for multiple hazard applications:

- Irrigation districts have equipment to help with sandbagging, response, etc. Irrigation districts can also assist with public outreach through newsletters and public district meetings.
- ODOT currently has manpower and equipment dedicated to traffic control and road maintenance/clearing.
- OSP handles public safety during hazard events and has boats to assist during emergencies requiring assistance via watercraft.
- DOGAMI has existing resources dedicated to floodplain stability projects and mine site slope stability.
- Rural fire districts provide multi-hazard emergency response and are a valuable outreach mechanism for first aid, fire safe construction, location awareness and 911 procedures.

Survey results can be found in Appendix E.

Multi-Hazard (MH) Action Items

Multi-hazard action items are those activities that pertain to all seven hazards in the mitigation plan: wildfire, flood, severe summer storm, severe winter storm, earthquake, landslide/debris flow, volcanic eruption.

ST -MH[96]#1: Complete City Addendums to Umatilla County Natural Hazard Mitigation Plan.

Ideas for Implementation:

- Umatilla County coordinate with contractor hired with Pre-Disaster Mitigation Grant funds or other grant funds to complete city addendums.
- Utilize planning process as an outreach tool to organize City Council and special district meetings to address area specific natural hazard probability and mitigation.
- Obtain funding for cities to complete cost/benefit analysis on high priority mitigation projects.

Coordinating Organization: Umatilla County Planning
Timeline: On-going, uncertain at this time. Individual cities will need to follow through on adoption procedures.
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning
Priority: High
Cost/Benefit Outlook: No longer funded by FEMA.
Status: Three out of the 12 cities have adopted addendums to the County Mitigation Plan - Adams, Pilot Rock and Umatilla. Most of the other cities had a draft plan complied, but were not finalized through adoption.

ST –MH #2: Develop and implement a Public Awareness Campaign regarding natural hazards and natural hazards safety and tools to achieve disaster resistance.

Ideas for Implementation:

- Obtain funding to generate a County wide handout outlining hazard prone areas, as well as other visual handouts and objects.
- Work with interest groups and special districts to introduce final Mitigation Plan and schedule workshops and presentations regarding natural hazard awareness.
- Obtain funding for response agencies to conduct hazard safety education include outreach materials
- Utilize response agencies to provide education materials relating to what the public should do in the event of an emergency.
- Develop a "what to do in case of emergency" brochure complete with contact information for response agencies, shelters, utilities, hospitals, dispatch, etc.

Coordinating Organization: Umatilla County Emergency Management
Timeline: On-going
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination
Priority: High
Cost/Benefit Outlook: Fair due to modest funding requirements and multiple potential funding sources
Status: This goal is being carried out on a regular basis.

[96] Short Term Multi-Hazard Action Item

ST – MH #3: Develop Storm Ready Rating Community.

Ideas for Implementation:

- Obtain checklist from NOAA
- Provide weather radios in required areas, e.g. schools, hospitals, city halls, EOC, critical facilities.
- Research grant funds for development of storm ready community rating.
- Research insurance implications
- Coordinate with Media

Coordinating Organization: Umatilla County Emergency Management
Timeline: 2 years, depends on funding for radios
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination
Priority: Medium
Cost/Benefit Outlook: Good due to low cost and high informational awareness to community
Status: This action item is new in 2013.

LT –MH #1[97]: Utilize central location of Umatilla County EOC to create a regional emergency management and information hub for the Pacific Northwest.

Ideas for Implementation:

- Continue communications with local, state and federal parties interested in locating all or part of their logistics and support personnel at a central location.
- Pursue MOAs and MOUs to formalize a regional emergency and information response hub
- Obtain funding to add vehicle and storage space for absentee responders or first responders.

Coordinating Organization: Umatilla County Emergency Management
Timeline: 5-12 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning
Priority: High
Cost/Benefit Outlook: Poor due to uncertainty of coordination and support from other agencies.
Status: No progress has been made on this action item.

[97] Long-Term Multi-Hazard Action Item

LT –MH #2: Develop a County GIS Department to oversee map generation and upgrades of current and future hazard prone areas.

Ideas for Implementation:

- Obtain funds to fully digitize property and zoning maps of Umatilla County.
- Develop and maintain a GIS inventory of all critical facilities, major employers, public areas, shelters, lifelines (transportation, etc.) and major transmission facilities.
- Develop digital overlays of natural hazard prone areas and potential hazard mitigation project areas
- Utilize GIS to continually evaluate asset vulnerability by comparing existing and proposed developments with hazard-prone areas.
- Obtain funding for on-going GIS maintenance and pursue agreements to cost share GIS program

Coordinating Organization: Umatilla County Planning
Timeline: On-going
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning
Priority: High
Cost/Benefit Outlook: Start-Up Funded. Maintenance fair unless formal agreements completed to cost share program.
Status: A County GIS Department has been formed. The County has several layers that can be used to map and analyze data. These layers include parcels, zoning, roads, streams, floodplain, steep slopes, NRCS soils. Hazard prone areas can be mapped and analyzed. County General Fund and recording fees have been dedicated to fund the GIS Department.

LT – MH #3: Develop an inventory/database of utility facilities located in the County.

Ideas for Implementation:

- Contact all utility companies and request a map and description of facilities.
- Develop and maintain a GIS map of all utilities.

Coordinating Organization: Umatilla County Planning
Timeline: 2 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning
Priority: Moderate
Cost/Benefit Outlook: Moderate if utilities provide access to information.
Status: This action item is new in 2013.

5.02 WILDFIRE

Umatilla County's urban areas have the potential for structural fire hazards typical of jurisdictions with a mix of residential, business and industrial areas. No high-rise buildings are located in the county, except for the new high rise hotel (10 stories) located next to the Wildhorse Resort and Casino on the Umatilla Indian Reservation. However, large numbers of people could be threatened at public-gathering places, for example during County fair or the Pendleton Round up. Approximately 12% of the County consists of forest land used by the timber industry and for recreation. This land constitutes a significant threat for forest fires. In addition, the County faces the threat of wild lands/urban interface fires from large areas of rangeland and dry land crops coming in contact with continuing residential construction in the interface zones in the County.

Two Community Wildfire Protection Plans were completed in Umatilla County in 2006. These plans give a complete hazard history of wild land fires in the forested areas of Umatilla County and have been included as part of this plan in Appendix B. Due to these plans a hazard history was not recreated in this chapter in the 2009 version of the plan. Updated tables of information have been brought into the 2013 update showing wildland fire history for the forested areas in the Umatilla National Forest (1970-2013) and the areas protected by the Oregon Department of Forestry (1990-2013).

Wildfires 1970-2013
Umatilla National Forest
Umatilla County

Cause of Fire	Total Number of Fires	Total Number of Acres
Lightning	819	73,542.5
Equipment Use	21	447
Smoking	24	13
Campfire	218	770
Debris Burning	16	422
Railroad	8	5,714
Arson	8	26
Children	3	1
Miscellaneous	58	2,266
TOTAL FIRES	1,159	82,779

Source: Umatilla National Forest Database, Pendleton Office, 2013

Table 5-1: Wildifres on Umatilla National Forest within Umatilla County, 1970-2013

Wildfires 1990-2013
Oregon Department of Forestry
Umatilla County

Cause of Fire	Total # of Fires	Total # of Acres	Total # ODF Protected Acres
Lightning	348	83,207	19,457
Railroad	28	6,498	1,200
Equipment Use	90	4,786	3,331
Recreation	63	1,592	930
Smoking	13	42	42
Debris Burning	78	1,159	1,081
Arson	12	287	287
Juvenile	4	1,040	255
Miscellaneous	39	1,565	501
TOTAL FIRES	675	100,177	27,084

Source: Oregon Department of Forestry Database, Pendleton Office, 2013

Table 5-2: Wildifres on ODF Protected Areas within Umatilla County, 1990-2013

Figure 5-5 : 2006 Sharps Ridge Fire near Ukiah, Oregon (Umatilla National Forest)

Existing Wildfire Protection and Mitigation Activities

Rural Fire Protection Districts

Eleven Rural Fire Protection Districts and one private fire department provide wild land urban interface fire protection to most inhabited areas in Umatilla County. Some areas not covered by rural fire districts may fall within the fire protection boundaries of the Oregon Department of Forestry or may not be protected. Other areas are not covered by a fire protection district.

Senate Bill 360

Umatilla County has worked with the Oregon Department of Forestry on Oregon Senate Bill 360 plan implementation to regulate existing and proposed non-resource zoned development in wild lands/urban interface areas. The program is designed to promote defensible space and fire free areas around structures.

Umatilla County Development Code

Oregon Administrative Rule requires fire sighting safety standards for all dwellings placed in the Grazing Farm (Forest Zone) of Umatilla County. These fire sighting standards are codified in the Umatilla County Development Code under Section 152.089.

In addition to fire standards required by OAR, Umatilla County requires that all new development meet specific access standards and conform to recommendations of a rural fire protection district if the development is within the boundaries of that district.

Community Wildfire Protection Plans

The Blue Mountain/Foothills Region and Mill Creek Community Wildfire Protection Plans (CWPP) include action items for fire disaster mitigation. These CWPPs also include an evaluation of existing mitigation and response resources and identify areas for improvement.

The action items identified by the CWPPs are co-adopted by this plan via Appendix B. Umatilla County Emergency Management and Planning Departments plan to work with the Oregon Department of Forestry to obtain grant funding to complete the action items addressed in the CWPPs. In addition to the action items identified in the CWPPs, action items have been identified in the Mitigation Plan to utilize an additional funding source for projects unsuitable for CWPP funding sources.

City Hazard Analysis

The table below identifies wildfire hazards and their rankings for the individual cities. The same methodology was used for ranking as utilized in the risk assessment. Local information was included into the rankings to provide a realistic view of the hazard.

City Hazard (Wildfire) Analysis Ranking

Hazard Fire	Location	History	Vulnerability	Maximum Threat	Probability	(Mitigation Measures)
City of Umatilla						
Wildfire	Old town site	High	High	High	High	Build fire breaks, manage site –cut brush
Wildfire	Industrial site east of town	High	High	High	High	Fire Breaks, Manage site
Wildfire	Cemetery, Mormon Church	High	High	High	High	Fire Breaks, Manage site
City of Stanfield						
Wildfire	River Road	High	Moderate	Moderate	High	Manage site, remove dead brush., UPRR spark arrestors
City of Echo						
Wildfire	UPRR tracks, west city limit	High	High	High	High	Manage right of way, sparking
Wildfire	Along Umatilla River	High	Moderate	Moderate	High	Manage site
Wildfire	Golf course hill	Moderate	Moderate	Moderate	High	Steep hillside manage site
City of Pilot Rock						
Wildfire	Wheat fields, southwest	Moderate	Moderate	Moderate	High	Plow fire breaks
City of Helix						
Smoke from wildfires	Roads in and out	Moderate	Moderate	Moderate	Moderate	

City of Adams						
Fire	Wheat fields surrounding	High	High	High	High	Fire breaks around town
City of Pendleton						
Wild fire	West side of town	High	Moderate	Moderate	High	Fire breaks, field fire equipment
City of Athena						
Wildfire	City is surrounded	High	High	High	High	Maintain existing agreements with farmers to till crop land right after harvest

Table 5-3: City Hazard Analysis (Wildfire) Ranking

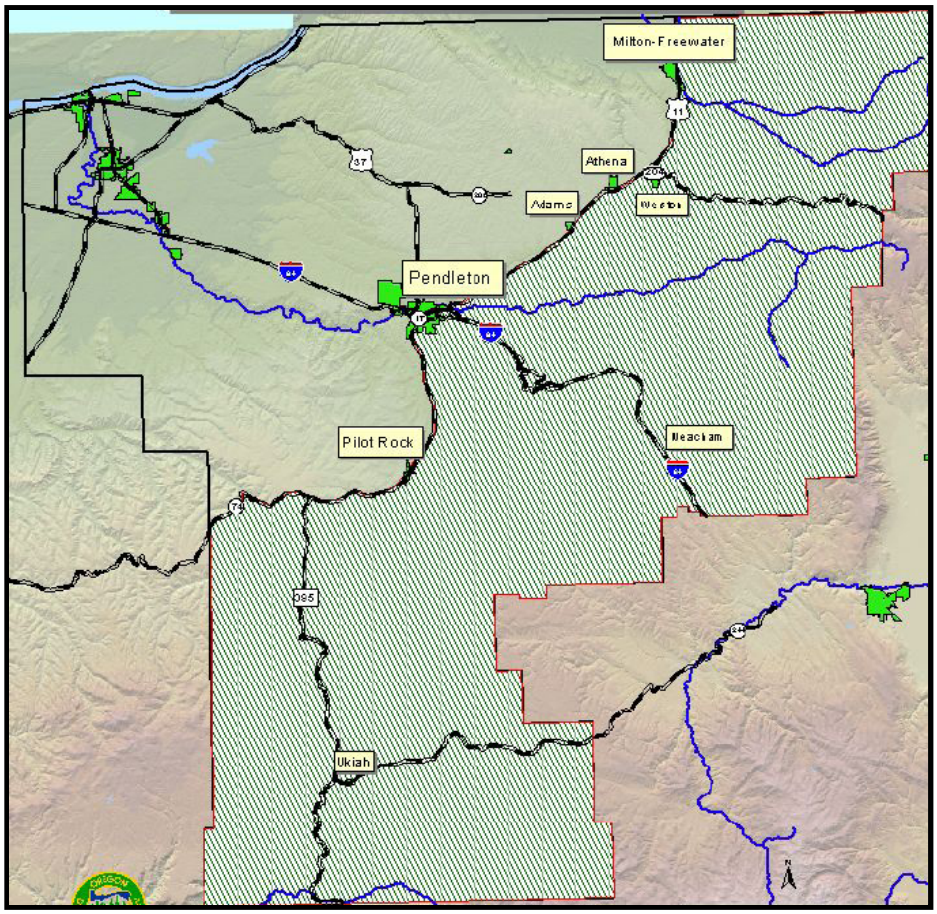


Figure 5-6: Area Covered by Oregon Department of Forestry Community Wildfire Protection Plans

Umatilla County Weed Ordinance[98]

The control of noxious weeds is a total community effort, requiring all landowners/operators to control the growth and spread of noxious weeds on their land and to prevent the infestation of adjacent lands. The Umatilla County Weed Control Board is dedicated to promoting Integrated Vegetation Management (IVM), specifically regarding noxious weed control. Voluntary compliance with the State Noxious Weed Control Law and Umatilla County Weed Control Ordinance is the preferred outcome. In the interest of keeping up to date with changes and progresses in laws, products, management strategies, and the like, the Supervisor, and staff maintain membership in industry related organizations. Weed Control staff or a representative can visit property if request to help identify weeds or to see if weeds need to be managed. They can make recommendations based on the use of land, native vegetation, soil types, elevation, and proximity to water sources, and more. This inspection is provided free of charge on an as time permits basis. Umatilla County Weed Control, phone 541-278-5462, E-mail: ucwd@bmi.net

The Umatilla County Board of Commissioners adopted a Weed Control Ordinance (Chapter #97 of the Umatilla County Code of Ordinances) to implement the Weed Control program.

Umatilla County Fire Prevention and Protection and Smoke Management Ordinances

Chapters 91 and 95 of the Umatilla County Code of Ordinances include provisions for regulating all agricultural and non-agricultural burning outside of fire districts. These ordinances generally relate to air quality concerns but provide legal authority for the Board of Commissioners to ban burning during times of the year when dangerous fire weather conditions exist.

Survey Results

Survey results in 2009 revealed the following mitigation/response tools that may be utilized for wildfire hazard applications:

- ODOT has manpower and equipment dedicated to traffic control and road maintenance.
- Rural fire districts currently promote fire safe education and other related outreach, as well as encourage landowners to observe Oregon Department of Forestry fire prevention practices.

Wildfire (WF) Action Items

Wildfire action items are those activities that pertain to mitigation of fire related hazards in Umatilla County.

[98] http://www.co.umatilla.or.us/index.htm

ST –WF[99] #1: Work with agriculture and conservation groups to establish fire buffers between both forest and range wild land urban interface areas.

Ideas for Implementation:

- Map existing range and forest interface areas where buffering could be a mitigation tool.
- Obtain funding to hire contractors to design and complete fire buffers.
- Work with Federal agencies assigned to conservation programs to assure that landowners remain compensated even when agreeing to install fire buffers.
- Dedicate funding to on-going operation and maintenance of fire buffers to ensure benefits.

Coordinating Organization: Fire Defense Board
Timeline: 3 - 5 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection
Priority: High
Cost/Benefit Outlook: Moderate, minimal implementation and O&M costs of buffers.
Status: No progress has been made on this action item.

ST –WF #2: Seek funding for a full time position to further fire prevention planning and education.

Ideas for Implementation:

- Utilize central location and resources to develop a fire outreach campaign.
- Work with response agencies to identify areas and individuals needing outreach and information.
- Obtain funding to publish outreach materials and mail them to identified individuals.

Coordinating Organization: Umatilla County Emergency Management
Timeline: 1-2 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection
Priority: High
Cost/Benefit Outlook: Moderate due to minimal cost but modest staffing commitment. Need some support on the effectiveness of outreach activities.
Status: No progress has been made on this action item.

[99] Short-Term Wildfire Action Item

LT–WF[100] #1: Work with citizens of Umatilla County to ensure that all areas are protected under a functioning rural fire district.

Ideas for Implementation:

- Utilize central location and resources of Umatilla County Emergency Management to develop a fire outreach campaign identifying the benefits of being located within a rural fire district.
- Map areas that are not within a rural fire district and identify options to consider most efficient ways to include those properties.
- Obtain funding to publish outreach materials and mail them to identified individuals
- Gauge public interest and support prior to formally introducing the concept.
- Obtain funding for start-up costs (equipment, etc.) and utilize special assessment options to cover annual operation costs.

Coordinating Organization: Umatilla County emergency Management
Timeline: 1-2 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #4: Agency/ Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning
Priority: High
Cost/Benefit Outlook: Unknown - lack of information on equipment, personnel needs and public support.
Status: No progress has been made on this action item.

LT –WF #2: Identify substandard interface access roads and provide incentive funding to bring roads up to current fire & life safety standards. Begin with inventory of critical roads.

Ideas for Implementation:

- Coordinate with ODF and rural fire districts to map existing substandard access roads.
- Develop inventory of public roads.
- Work with response agencies to identify areas and individuals needing outreach and information to explain the improvement program.
- Identify and obtain funding to publish outreach materials and mail them to identified individuals.
- Secure funding to provide cost share and incentive funding to those people that participate in road upgrades.

Coordinating Organization: Fire Defense Board
Timeline: 5-10 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning
Priority: High
Cost/Benefit Outlook: Unknown until mapping of substandard roads is completed.
Status: No progress has been made on this action item.

[100] Long Term Wildfire Action Item

LT –WF #3: Provide logistics and grant writing support to Volunteer Fire Departments for construction of a fire station and central location for equipment storage.

Ideas for Implementation:

- Utilize Pre-Disaster Mitigation Grant funding to complete upgrades to or construct a new fire station in Meacham or other RFPD.
- Provide technical and logistical support to Meacham if needed.

Coordinating Organization: Meacham Volunteer Fire Department
Timeline: 5-10 years
Plan Goals Addressed: #1: Protect Life and Property, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: High
Cost/Benefit Outlook: Unknown until Meacham Volunteer Fire Department submits documentation of need.
Status: No progress has been made on this action item.

LT –WF #4: Complete feasibility studies of biomass potential on forest lands. Create incentive funding to test biomass technology in Umatilla County.

Ideas for Implementation:

- Work with timber industry and agencies to complete assessment of biomass potential on private, state and federal forest lands
- Identify potential areas to implement biomass technology
- Obtain funding to complete feasibility studies and to develop an incentive program to implement pilot biomass technology projects

Coordinating Organization: Umatilla County Economic Development
Timeline: 5-10 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #4: Agency/ Citizen Coordination, #5: Natural resource Protection, #6: Emergency Service Planning
Priority: Moderate
Cost/Benefit Outlook: Unknown. May not be eligible for pre-disaster mitigation grants. May be eligible for National Fire Plan funding.
Status: No progress has been made on this action item.

LT-WF #5: Support removal/reduction of biomass fire hazards on private and public lands.

Ideas for Implementation:

- Public/landowner education
- Promote use of grant programs
- Host 'learn-to-burn' training
- SB 360

Coordinating Organization: Oregon Department of Forestry
Timeline: On-going
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: Moderate
Cost/Benefit Outlook: Difficult to estimate
Status: No progress has been made on this action item.

LT –WF #6: Develop upland storage ponds for wildlife benefit and to be used during wild land fire suppression efforts.

Ideas for Implementation:

- Work with ODFW to identify need and location for storage ponds.
- Obtain funding to complete feasibility studies and to develop an incentive program. NRCS and SWCD are potential partners.

Coordinating Organization: Oregon Department of Fish & Wildlife, Oregon Department of Forestry
Timeline: On-going
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning
Priority: Moderate
Cost/Benefit Outlook: Unknown. May not be eligible for pre-disaster mitigation grants. May be eligible for National Fire Plan funding.
Status: No progress has been made on this action item.

5.03 FLOOD

This hazard generally involves a rise in rivers or creeks resulting from heavy rain or rapid melting of the annual snow pack. The Columbia River is located on the northern boundary of Umatilla County and could pose a flood risk if main stem Columbia River Dams were damaged or breached. Major flooding could also result from failure of an irrigation dam on one of the rivers within Umatilla County or the dam at Cold Springs Reservoir.

Figure 5-7: 1997 Flood damage on Mill Creek (University of Oregon, Community Planning Workshop)

In addition to floods resulting from manmade activities (i.e. failure of dams) Umatilla County has a number of rivers and creeks that have a history of flooding with various threats to public health, safety and investment.

Flood History

Besides the Columbia River, the two larger rivers of Umatilla County are the Umatilla River and Walla Walla River. Southern Umatilla County encompasses a small portion of the John Day Watershed, although very little development impact or natural disaster potential has been identified for this segment of the main stem John Day River system within Umatilla County.

The Umatilla River and Walla Walla River meander directly through 6 of the 12 incorporated cities in Umatilla County. Each of the 12 incorporated cities have frontage on one of Umatilla County's many small and large streams. The Umatilla River, Walla Walla River and their tributaries are the primary flood concerns in Umatilla County.

Records of past flooding in Umatilla County vary greatly depending on location. For example, records of flooding on McKay Creek and Mill Creek have been kept since the late 1800s while records on streams like Wildhorse Creek and Squaw Creek rely on anecdotal information from long term residents. This is due to the fact that river gages are typically installed in areas where a waterway runs close to structures or heavily settled areas. Gages are maintained by many different authorities, including the United States Geographical Survey (USGS), the National Weather Service (NWS), the Bureau of Reclamation (USBR) and local water control and irrigation districts. Gages are owned by various authorities as well, including USGS, USBR, and the Bureau of Indian Affairs (BIA).

The Table 5-2 provides a review of gage information from sites on the Umatilla and Walla Walla Rivers. This table shows that most of the heaviest flooding takes place from December through February. The gage on the Umatilla River, located at Pendleton, has provided flood data for more than 100 years. Currently, bankfull stage in Pendleton is 6.4 feet and flood stage begins at 7.8 feet. The Umatilla River will cause moderate flooding at 8.0 feet and major flooding when the gage reads 11.0 feet (NWS, 1997). Table 5-2 shows the ten highest flood stages and water flow levels ever taken from the Pendleton gage. For comparison purposes, the crest of the Umatilla River during the February 1996 floods was measured at 11.0 feet.

The Walla Walla River near Touchet, Washington includes water drained from Mill Creek, Couse Creek, Pine Creek, Dry Creek, and others in Oregon. Of course, much of the land drained by the Walla Walla River is in Washington. Bankfull stage of the Walla Walla at Touchet is 10.0 feet and flood stage is considered 13.0 feet. Table 5-2 shows the five worst floods on record since 1951 when continuous gaging began at his location.

High water events listed in Tables 52 does not necessarily represent the most devastating floods in terms of damage claims and property loss. For example, according to the Farm Services Agency, flooding in 1995 was much more costly in terms of crop damages than the higher water events of 1996 and 1997 (K. Jordan, pers. comm., 1997). Flash floods, mudslides, and concentrated rainfall have produced a great deal of flood damage which was never included in a disaster declaration and may not have even been recognized as a “flood event”. Despite this, the disaster declarations of the late 1990s have focused attention on county-wide flood problems and have highlighted some of the deficiencies in dealing with these problems.

Worst Floods in Umatilla County

Date of Flood Measurement	Stage (Feet)	Flow (Cubic Feet per Second)
Umatilla River at Pendleton		
December 14, 1882	12.5	17,000
May 30, 1906	12.1	15,500
January 30, 1965	12.1	15,500
February 22, 1949	12.1	15,400
December 12, 1946	11.6	13,700
December 29, 1945	11.6	12,400
January 25, 1975	11.5	14,082
April 1, 1931	11.5	13,500
December 23, 1964	11.4	12,300
February 8, 1997	11.2	13,432
Bank Full Level	6.4	3,380
Flood Stage	7.8	6,139
Walla Walla River near Touchet, Washington		
December 22, 1964	18.9	33,400
January 30, 1965	13.7	15,800
January 6, 1969	14.1	14,600
February 12, 1985	15.5	12,200
February 24, 1986	14.9	10,100
Bank Full Level	10.0	3,780
Flood Stage	13.0	7,220

Source: National Weather Service River Forecast Points Summary, 1997.

Table 5-4: Worst Floods in Umatilla County

In addition to the primary streams and their tributaries, Umatilla County is impacted from upland soil erosion, property damage and gravel deposition in the many upland gullies, draws and plateaus during high water/snowmelt events.

Repetitive Loss Structures

While flooding does occur in several areas of Umatilla County, currently, Umatilla County does not have any Severe Repetitive Loss (SRL) structures on file. Continued compliance with the FEMA National Flood Insurance Program (NFIP) will assure that Umatilla County continues to prevent structures that could, in the future, be impacted at a repetitive rate.

National Flood Insurance Program (NFIP)
Policies, Coverage and Premiums
Umatilla County Jurisdctions 2013

Jurisdiction	Population	FIRM Status	FIRM Date	NFIP Status	# NFIP Policies 2013	Total Coverage	Total Premium	# NFIP Claims
County	21,386	Revised	9-10-13	Participates	261	$45,619,200	$139,561	13
Adams	330	Revised	9-10-13	Participates	19	$2,795,800	$15,356	0
Athena	1,270	Revised	9-10-13	Participates	34	$6,163,400	$24,619	1
Echo	705	Revised	9-10-13	Participates	7	$1,471,400	$10,763	0
Helix	160	Revised	9-10-13	Participates	29	$4,777,900	$38,184	2
Hermiston	16,080	Revised	9-10-13	Participates	1	$350,000	$414	0
Milton-Freewater	6,580	Revised	9-10-13	Participates	929	$150,331,000	$312,801	0
Pendleton	17,310	Revised	9-10-13	Participates	53	$11,196,300	$36,198	10
Pilot Rock	1,560	Revised	9-10-13	Participates	17	$3,127,700	$20,802	0
Stanfield	1,820	Revised	9-10-13	Participates	12	$629,900	$2,570	11
Ukiah	250	Revised	9-10-13	Participates	0	$140,000	$310	0
Umatilla	6,495	Revised	9-10-13	Participates	0	0	0	0
CTUIR		Original		Participates	11	$1,875,000	$12,786	0
Weston	745	Revised	9-10-13	Participates	12	$1,289,800	$6,386	4
TOTALS					1,071	$175,189,000	$441,214	27

Source: Community Information system, FEMA, provided by DLCD, December 2013.

Table 5-5: National Flood Insurance Program (NFIP): Policies, Coverage and Premsums in Umatilla County 1978-2013

National Flood Insurance Policy (NFIP)
Claims and Repetitive Loss
Umatilla County Jurisdctions 1978 - 2013

Jurisdiction	# NFIP Claims 1978-2013	Total Paid 1978-2013	# SRL Properties-Validated	# SRL Properties-Pending	# CAVs	Last CAV-Open Date	Last CAV-Closed Date
County	13	$203,243	0	0	2	July 11	August 11
Adams	0	0	0	0	3	Mar 99	Apr 99
Athena	1	$5,937	0	0	3	May 97	Nov 99
Echo	0	0	0	0	1	Jul 89	Jul 90
Helix	2	$11,355	0	0	1	May 94	Mar 95
Hermiston	0	0	0	0	0	NA	NA
Milton-Freewater	0	0	0	0	0	NA	NA
Pendleton	10	$13,862	0	0	4	May 94	May 94
Pilot Rock	0	0	0	0	2	Sep 92	Sep 92
Stanfield	11	$25,219	0	0	2	May 00	Jan 11
Ukiah	0	0	0	0	0	NA	NA
Umatilla	0	0	0	0	2	Aug 11	Jan 12
CTUIR	0	0	0	0	0	NA	NA
Weston	4	$24,246	0	0	4	Mar 99	Apr 11
TOTALS	27	$74682	0	0	24		

Source: Community Information system, FEMA, provided by DLCD, December 2013.

Abbreviations:
SRL = Severe Repetitive Loss, RL = Repetitive Loss, CAV = Community Assistance Visits

Table 5-6: National Flood Insurance Program (NFIP): Claims and Repetivie Loss in Umatilla County 1978-2013

Existing Flood Protection and Mitigation Activities

Umatilla County Flood Mitigation Plan

After county wide flood events occurred in 1996/1997 Umatilla County was awarded a HUD grant to complete flood mitigation and outreach plan (Flood Plan). The plan was completed in August of 1997 but many of the identified action items were never pursued or funded. Some modest flood mitigation projects were implemented along Mill Creek in the northeast region of the county. Umatilla County has not experienced other 100 year flood events since the Flood Plan was completed and many of the conditions in Umatilla County have not changed.

In 2010, the Army Corps of Engineers decertified the flood control levee on the Walla Walla River in the Milton-Freewater area. As a result of the decertification, FEMA remapped the area which resulted in a large portion of the City of Milton Freewater being added to the 100 year flood plain. A local effort of city, county, state and federal agencies and numerous individuals convened to remedy the structural problems with the levee and then to file with FEMA to recertify the levee. A CLOMR has been filed and was approved in 2013. The approved CLOMR removed most of the City of Milton-Freewtater and several properties in the County form the Special Flood Hazard Area. Additionally, there were some properties that remain or were added to the Special Flood Hazard Area because of the indepth study. The new Flood Insurance Rate Maps for the Milton-Freewater area became effective on September 20, 2013.

Action items are identified in this Mitigation Plan in order to identify potential funding and logistical resources necessary to complete flood mitigation projects. The Flood Plan included as Appendix C is co-adopted as part of the NHMP. Flood mitigation projects identified since the adoption of the Flood Plan are included in the action item section below.

United States Army Corps of Engineers

In July of 2000 the United States Army Corps of Engineers (USACE) completed a document entitled "Report of Flood Fight Potential Sites in Umatilla County, Oregon." The study was updated by USACE July 25, 2000. The original document and revisions are included as Appendix D.

The USACE flood fight study documents flood fight potential and potential mitigation opportunities in areas where USACE may be able to demonstrate economic justification. The study focused primarily on urban infrastructure such as hospitals, water treatment plants and other critical infrastructure as well as residential areas where benefits to more than one or two dwellings may be realized through flood fight and/or mitigation. Many of the mitigation recommendations have been included in the mitigation Action Items of this plan.

Umatilla County Comprehensive Plan and Development Code

The Umatilla County Comprehensive Plan and Development Code implement the policies and laws of the National Flood Insurance Rate Program (NFIP). Chapter 152.351 of the Umatilla County Development Code implements a Flood Hazard (FH) Overlay Zone which limits development within the floodplain and floodway and regulates permitted development based upon NFIP design standards. All parcels within the mapped 100-year flood plain of Umatilla County are regulated by the FH Overlay Zone.

In 2010, FEMA issued new Flood Insurance Rate Maps (FIRM) maps for the entire County. Umatilla County adopted the maps, which became effective September 3, 2010. The approval of the CLOMR along the Walla Walla River updated several Flood Insurance Rate Maps (FIRM) with an effective date of September 20, 2013.

Additionally, in order to comply with new FEMA regulations, Umatilla County updated the Development Code to implement new mandatory regulations of the NFIP. The Code provisions became effective August 3, 2010.

NOAA NWS and Umatilla County Emergency Management

The National Weather Service (NOAA NWS) has the ability to predict severe weather events that may trigger prolonged or flash flood events. NOAA NWS is able to issue notices to response agencies and to the public via television, radio, internet and Weather Radios (formerly Tone Alert Radios) when the potential for flooding is likely.

Umatilla County Emergency Management (UCEM) coordinates with NOAA NWS when notices may be required to inform response agencies and the general public of potential flooding events. UCEM response and coordination is outlined in the Umatilla County EOP and usually involves disseminating materials addressing shelter locations, sand bag locations, response contact information and flood fight information. Should a flood event become severe UCEM is capable of activating the EOC and JIC to coordinate flood fights, emergency response, evacuation and the dissemination of important public safety information.

ODOT

ODOT has a “Trip Check” link on its website that provides information to help the public detour away from hazard areas during times of emergency. The “Trip Check” link also has road camera images to inform the public of road conditions prior to making a trip.

Survey Results

Survey results in 2009 revealed the following mitigation/response tools that may be utilized for wildfire hazard applications:

- ODOT has manpower & equipment dedicated to traffic control and road maintenance
- Rural fire districts can promote public safety through outreach and provide disaster response to protect life and property
- OSP can provide a public safety outreach and also has boats and

other resources available during flood events

- OWRD operates and maintains stream gauges that can be used to predict flood events as an advanced warning tool for UCEM and NOAA/NWS
- DOGAMI completes flood stability projects
- Hudson Bay District Improvement Co. Inc. has the only water measurement station on the Walla Walla River within Oregon.
- The City of Stanfield is currently doing ditch work and has filed a LOMA with FEMA due to flood mitigation activities inside and outside of its City Limits
- Irrigation districts can help during flood events with sand bagging and equipment use, as well as diversion of water before it reaches populated areas.

Flood (FL) Action Items

Flood action items are those activities that pertain to mitigation of flood related hazards in Umatilla County.

ST –FL[101]#1: Develop conservation easements and riparian planting within mapped and unmapped floodplain areas and farmland with highly erodible soils.

Ideas for Implementation:

- Map existing, undeveloped flood plain areas where easements and riparian programs could be established without extensive improvements.
- Work with conservation groups to identify and establish benefit packages that would encourage landowners to forego development within floodplains.
- Identify funding to hire contractors to design and complete riparian buffers and legal formation of easements
- Work with Federal agencies assigned to conservation programs to develop outreach and competitive incentive programs.
- Support watershed council efforts to improve riparian areas, to mitigate erosion and to restore water storage.
- Dedicate funding to on-going operation and maintenance of conservation easements to assure benefits.

[101] Short-Term Flood Action Item

Coordinating Organization:
Watershed Councils
Timeline: 1-5 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #5: Natural Resource Protection
Priority: Moderate
Cost/Benefit Outlook: Good due to existing organizational efforts. Need to address federal conservation programs and willingness of landowners to participate. Could be more beneficial if tied to re-establishing flood plain function for water quality.
Status: No progress has been made on this action item.

ST –FL #2: Identify areas able to absorb high-velocity stream flows w/o impacting investments (i.e. re-establish or create artificial floodplains). Establish connectivity and diversion infrastructure to be utilized during high water events to divert high water to these areas.

Ideas for Implementation:

- Complete a study to determine where high velocity stream flow occurs and areas available to absorb these flows if diverted.
- Obtain funding to complete the study and have agreements with landowners to allow division of stream flows.

Coordinating Organization:NRCS, SWCD, WWBWC
Timeline: 1-5 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #5: Natural Resource Protection
Priority: High
Cost/Benefit Outlook: Funding for study and establishment of landowner agreements is necessary.
Status: No progress has been made on this action item.

ST – FL # 3: Develop and maintain the database of all landowners within FEMA Special Flood Hazard Areas in the County. Use database to distribute outreach and emergency notices related to flooding.

Ideas for Implementation:

- Utilize County GIS to overlay tax lot information with FEMA flood plain boundaries.
- Obtain funding to distribute flood outreach information.

Coordinating Organization: Umatilla County Planning
Timeline: On-going
Plan Goals Addressed: #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination
Priority: High
Cost/Benefit Outlook: Good due to minimal financial need.
Status: The database of landowners within the Special Flood Hazard Areas in the County has been developed. No outreach materials have been distributed.

LT –FL #1[102]: Identify and map canyons, draws and roads susceptible to high-water and flash flood events but not located on FEMA FIRM Maps.

Ideas for Implementation:

- Inventory flood prone areas not included in the existing Flood Hazard Overlay Map.
- Obtain funding to make improvements to roads on inventory.

Coordinating Organization: Umatilla County Planning
Timeline: 5 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/ Citizen Coordination
Priority: Moderate
Cost/Benefit Outlook: Depends on availability of staffing
Status: No progress has been made on this action item.

[102] Long-term Flood Action Item

LT –FL #2: Obtain funding to upgrade existing levees and berms to USACE standards in order to ensure continuing flood protection, including Umatilla River Levee through Pendleton and Walla Walla River Levee through Milton Freewater.

Ideas for Implementation:

- Work with USACE to address existing discrepancies and weak spots in the current Umatilla County flood protection systems on the Umatilla and Walla Walla Rivers.
- Identify most efficient ways to mitigate existing problems
- Secure funding to hire contractors to design and fix problems.
- Support City of Pendleton and City of Milton Freewater and Walla Walla Water Control District in their efforts to restore and maintain levees.
- Develop a formal maintenance program to prevent future occurrences of failing flood protection systems.

Coordinating Organization: City of Pendleton, City of Milton-Freewater
Timeline: 1-2 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/ Citizen Coordination
Priority: Very high due to potential threat and new NFIP regulations
Cost/Benefit Outlook: High due to existing city efforts
Status: Pendleton's levee has been re-certified and Milton-Freewater has submitted final paperwork to FEMA.

LT –FL #3: Identify public and private bridges susceptible to collecting flash flood debris. Prioritize bridge improvements and/or replacement

Ideas for Implementation:

- Work with USACE to synthesize existing data related to public and private bridges.
- Request bridge inventory from State of Oregon Department of Transportation.
- Prioritize bridge improvements or replacement utilizing existing, defensible information.
- Identify any data gaps or new bridges that need a formal assessment.
- Identify and obtain funding for cost share or full payment of bridge upgrades or replacement.

Coordinating Organization: Umatilla County Public Works
Timeline: 5 – 10 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: Moderate to High
Cost/Benefit Outlook: Assessment may not require funding. Some bridges already included in Umatilla County Transportation System Plan. Cost/Benefit unknown until cost of repairs/replacement completed.
Status: No progress has been made on this action item.

5.04 SEVERE SUMMER STORM

Severe summer storms generally involve intense wind, hail, rain, thunder and lightning storms and dust storms which can result in movement of debris, property damage and disrupted public facilities and services. Large amounts of rain causes flash floods, high winds can cause damage to structures and natural vegetation, thunderstorms and lightening can start fires and disrupt power and dust storms can cause property damage and disrupt transportation systems. Some areas of Umatilla County have more frequent severe storm activity. Since severe summer storms can cause so many adverse impacts, storm warning systems are important to have in place to alert the public to prepare for these severe storms.

Dust Storms

A dust storm is a strong, violent wind that carries fine particles such as silt, sand, clay, and other materials, often for long distances. The fine particles swirl around in the air during the storm. A dust storm can spread over hundreds of miles and rise over 10,000 feet. They have wind speeds of at least 25 miles per hour.

Dust storms usually arrive with little warning and advance in the form of a big wall of dust and debris. The dust is blinding, making driving safely a challenge. A dust storm may last only a few minutes at any given location, but may often leave serious car accidents in their wake.

The arid regions of Central and Eastern Oregon can experience sudden dust storms on windy days. These are produced by the interaction of strong winds, fine-grained surface material, and landscapes with little vegetation. The winds involved can be as small as "dust devils" or as large as fast moving regional air masses.

Severe Summer Storm History

The following gives a brief description of severe summer storms occurring in the Mid-Columbia area:

History of Mid-Columbia
Severe Summer Storms, 1931 - 1999

Date	Description of Events
April 21-23, 1931	Mid-Columbia Region Dust from this event blew on an east wind into the Willamette Valley, Central Oregon Region both down the Gorge and over the Cascade Mountains.
May 23, 1975	Near Echo, Oregon Winds up to 45 mph blew dust from nearby plowed fields, resulting in a (Mid-Columbia Region) seven-car accident on a Friday afternoon in the eastbound lanes of Interstate 80 (now I-84), four injured
March 24, 1976	Near Stanfield, Oregon Eighteen vehicles piled-up in two separate accidents on Interstate 80, (Mid-Columbia Region)now I-84; these accidents killed one and injured 20 people; they were caused by a dust storm (referred to in the press as a sand storm) that produced "near zero" visibility; one of the pile-ups was a fiery accident involving a loaded fuel tanker truck, two other trucks, and two cars; this dust storm also caused road closures both south and north of Hermiston, and caused other accidents on Highway 207 about nine miles south of I-80 (84)
July 9, 1979	Near Stanfield; This dust storm caused two deaths and six injuries in a freeway pile-up on I-80 (84) very close to the location of the previous event; winds near 60 mph; some of the injured were hit as pedestrians while trying to assist those already injured or pinned in automobiles
July 9, 1995	A wind and hail storm in western Umatilla County caused millions of dollars' worth of damage to vehicles, structures and crops
Sept. 25, 1999	Near Echo high winds blowing dust set off a chain-reaction of crashes that killed eight people and injured more than twenty. In all, more than forty vehicles crashed in separate pileups in both freeway directions between Hermiston and Pendleton. Parts of Interstate 84 were blocked from mid-morning until nearly midnight. [103]

Table 5-7: History of Mid-Columbia Severe Summer Storms, 1931-1999

[103] State of Oregon, Natural Hazards Plan August 2004

NOAA Severe Summer Storm
Events 1950-2012

Severe Storm Event History	Hail	Funnel Cloud	Flash Flood	Thunderstorm
Adams				
Athena				
Echo	1	1		1
Helix	1		1	
Hermiston	1		1	3
Hermiston Airport				1
Indian Lake	1			
Lamb-Weston	1			
Lehman	1			1
Meacham	4			1
Milton Freewater	3	1		
Mission	1	1		
Pendleton	1	2		3
Pendleton Airport	1			
Pilot Rock	1	1	1	
Stanfield	2			1
Tollgate	6			
Ukiah	8			
Umatilla				1
Umapine	1			
Weston	1	1		1
County (unspecified)	12	1		7
	47	8	3	20

Table 5-8: NOAA Severe Summer Storm Events 1950-2012

Existing Summer Storm Protection and Mitigation Activities

Summer storms may impact existing above ground infrastructure and structures. In Umatilla County most of the damage resulting from summer storms occurs when motorists interact with the hazard event. Therefore, aside from some structural standards and response from power and transmission companies the bulk of the mitigation activities deal with advanced warning to the public.

NOAA NWS

NOAA NWS has the potential to issue severe weather warnings including wind, rain, lighting and dust storms in Umatilla County. These warnings can be disseminated via radio, television, internet and TARs. These warnings can then be utilized by UCEM, ODOT and local response agencies to warn the public and prepare for emergency response.

Umatilla County Emergency Management

Once UCEM receives warning of a potential dust storm they can utilize the JIC to inform response agencies and the general public of the threat. UCEM can utilize the same information sources that NOAA NWS utilizes for emergency alerts, but can also utilize amateur radio operators, road reader boards and the emergency communications systems. UCEM can also coordinate with 911 dispatch and other response agencies to prepare for emergency situations and may activate the EOC if conditions warrant.

Conservation Reserve Program (CRP)

CRP is a federal program that converts eligible cropland from agricultural production and plants the land to permanent grass cover that reduces erosion and benefits wildlife populations. CRP establishes permanent cover that reduces windblown dust and has been effective in reducing soil erosion in the areas most prone to wind erosion. In Umatilla County, NRCS has designated an area near I-84 as a wind erosion priority area to influence enrollment into the Conservation Reserve Program (CRP).

No-Till Cropping

SWCDs have been actively promoting direct seeding technology through education and incentives. Direct seeding or no-till cropping systems utilize technologically advanced equipment that places seed and fertilizer into undisturbed soil and residue from the previous crop. This results in minimal soil disturbance and reduced potential for wind and water erosion. Research on the Columbia Plateau has demonstrated that continuous annual no-till cropping can significantly reduce predicted dust emissions during severe winds.

The research shows that continuous annual no-till cropping can reduce predicted dust emissions by 94% during severe wind events, compared to conventional wheat-fallow. Research continues on measuring dust emissions from fields on the Columbia Plateau, a 50,000 square-mile region in

Washington, Oregon, and Idaho containing one of the driest, yet most productive, rain-fed wheat regions in the world. [104]

No-till only works for some crops under certain conditions and even in situations where it does work, some farmers find that they need to till the soil periodically to reduce diseases and redistribute soil moisture.

Wind Erosion Hazard Index

Representatives from the Agricultural Research Service, located at the Columbia Plateau Conservation Research Center in Pendleton, collaborated with the staff from the National Weather Service to develop a wind erosion hazard index to improve dust storm prediction models used in forecasting weather conditions that could lead to dust storms. In the future, this information could lead to a more advanced warning system for the public and emergency responders.

Real-Time Video[105]

ODOT has installed a microwave system and roadside camera tower near the Lorenzen Road Interchange ten miles west of Pendleton. The microwave and camera structures are located south of the freeway, opposite the Rew Grain Elevator. Two cameras are currently mounted on a metal tower next to the microwave tower. One provides a snapshot of the freeway and is posted on the "Trip Check" Web site. The other camera provides a real-time image, viewed by ODOT District 12 office personnel only. A weather station and visibility meter have also been added to the camera tower to monitor blowing dust conditions during high winds. The real-time camera can be panned and tilted to check eastbound and westbound traffic as well as scan the nearby fields.

ODOT Highway Advisory Radio

Three transmitters have been installed for Highway Advisory Radio along Interstate 84 in Morrow and Umatilla counties: one at the Boardman Safety Rest Area, another at the District 12 maintenance station, and the third near Mission. When an emergency occurs, the ODOT District 12 office selects the appropriate pre-recorded message on the system and transmits it via radio. At the same time, ODOT activates yellow flashing beacons. Motorists seeing the signs and flashing lights can tune to the appropriate radio station to hear the messages.

Also installed in the system is the ability to re-broadcast National Weather Service (NWS) weather information. NWS Weather Radio is re-broadcast on a continuous basis unless there is an emergency. An emergency broadcast then overrides the Weather Radio service.

Restricted Access to Interstate 84 during Hazardous Conditions

ODOT has installed six gates within Umatilla County for I-84 closures. The gates were funded by CSEPP.

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104 http://www.csrees.usda.gov/nea/nre/sri/air_sri_dust.html

105 State of Oregon, Emergency Management Plan – Volume II, http://www.oregon.gov/OOHS/OEM/docs/library/or_emp_volum_2_emerg_oper.pdf

ODOT, I-84 Road Closure Gates

Exit No.	Location	Direction EB = Eastbound WB = Westbound
159	Tower Road	Both Directions
165	Port of Morrow	Both Directions
188	HWY 395 at Stanfield	Both Directions
193	Echo Road	Both Directions
202	Barnhart Road	WB only
216	HWY 331	EB only

Table 5-9: ODOT, I-84 Road Closure Gates

State and local law enforcement officers and ODOT highway workers can close the gates, restricting access to I-84 due to hazardous dust conditions or other situations that make highway travel dangerous.

Survey Results

No additional tools were identified in 2009 by collected surveys.

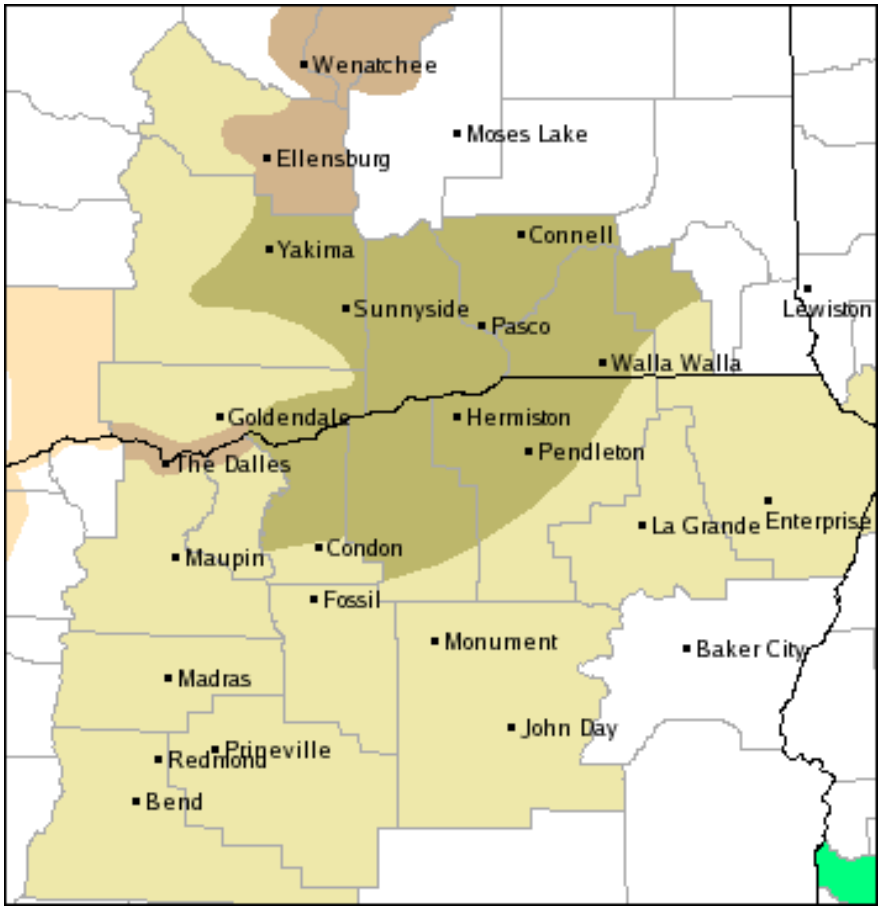


Figure 5-8: Severe Weather Outlook and Blowing Dust Warning (NOAA NWS)[106]

[106] http://www.wrh.noaa.gov

Severe Summer Storm (SS) Action Items

ST –SS[107] #1: Complete necessary tasks to obtain a NOAA NWS Storm Ready rating.

Ideas for Implementation:

- Establish or verify a 24 hour warning point or emergency operations center.
- Verify more than one way to receive severe weather warnings and broadcast them to the public.
- Create a system that monitors weather locally.
- Promote the importance of public readiness through seminars.
- Develop a formal hazardous weather plan, including the training and activation of weather spotters and annual emergency exercises.

Coordinating Organization: Umatilla County Emergency Management
Timeline: 1-2 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: High
Cost/Benefit Outlook: Moderate due to modest costs necessary to implement, depends on availability of staffing
Status: No progress has been made on this action item.

LT –SS #1[108]: Identify opportunities to advance NOAA NWS warning coverage via wireless and non-wireless infrastructure.

Ideas for Implementation:

- Utilize existing NOAA NWS service maps to identify areas where infrastructure is necessary
- Identify public lands or landowners willing to allow infrastructure development.
- Identify and secure funding for construction and identify funding sources for long-term operation and maintenance to assure benefits.

Coordinating Organization: Umatilla County Emergency Management
Timeline: 5 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: High
Cost/Benefit Outlook: Construction costs must be considered before an accurate cost/benefit ratio could be established.
Status: Some progress has been made by NOAA NWS for wireless and non-wireless warning alerts.

[107] Short-Term Summer Storm Action Item

[108] Long-Term Summer Storm Action Item

LT –SS #2: Implement a NOAA Weather Radio (previously Tone Alert Radio) program and provide radios to all schools, communications stations and other interested private and public entities to increase advanced warning capabilities of NOAA NWS and UCEM.

Ideas for Implementation:

- Utilize existing NOAA NWS service maps to identify areas where weather radios could assist advanced warning capability.
- Identify stakeholders willing to participate in the program.
- Identify and secure funding to purchase and distribute weather radios and conduct training.
- Complete a public outreach campaign to demonstrate the effectiveness of weather radios if used properly.

Coordinating Organization: Umatilla County Emergency Management
Timeline: 5 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: Moderate
Cost/Benefit Outlook: Unknown until needs assessment completed. Cost share by stakeholders may assist in attaining necessary funding
Status: No progress has been made on this action item.

5.05 SEVERE WINTER STORM

Winter storms generally involve severe snow and ice storms which can result in power outages and disrupt transportation. The characteristics of weather hazards are determined by a variety of meteorological factors such as amount of snow or rainfall, air temperature, wind velocity and temperature, ground saturation or snow-pack conditions. Some areas of Umatilla County are also subject to risk from avalanche; however these areas are primarily in the high country of the Blue Mountains and pose minimal risk to most of the population or investments.

Heavy snow or rainfall coupled with high winds can cripple most of the communities and impact natural resources. The Blue Mountains experience the most snowfall in the county, snowfall averages 6-8' per year at the higher elevations.

Freezing rain and fog plagues the entire county most of the winter but concentrates most heavily along the foothills from Pilot Rock heading northeast toward Milton Freewater. Storms systems tend to move east-northeast impacting the communities of Pilot Rock, Pendleton, Adams, Helix, Athena, Weston and Milton Freewater. Interstate 84 runs east-west through this area and is closed to all through traffic several times per year. Interstate I-82 which runs north south parallel to Hermiston, Stanfield and Umatilla experiences significant traffic problems when hit with freezing rain. Finally, State Highway 11 which running east/west is shut down frequently during the year for auto accidents caused by icy roads.

Rain on snow weather events create conditions which impact water quality conditions, severe soil erosion, destroys crops and create mud flows that chokes streams, culverts, bridges and block roads. Particularly the cropland surrounding Pendleton and extending through the foothill area are impacted. When the ground is frozen and covered with snow and a warmer wet air mass moves through soil moves off cropland and into streams and roads.

Severe Winter Storm History

Several small towns and rural areas are more susceptible to environmental and structural damage from severe winter storms.

Blue Mountains – in the past ten years, the Blue Mountains have experienced wind damage that has impacted the forest and structures in the wild land interface. The development of micro bursts creates dramatic damage in a small area. Hundreds of acres of private and public forest has been blown over at the root or snapped off in the middle. Oregon State Highway 204 between Weston and Elgin is closed annually by fallen trees blocking traffic.

Pilot Rock – The City of Pilot Rock lies at the base of the Blue Mountains ten miles due south of Pendleton. Its location in the foothills of the Blue Mountains subjects it to strong south winds created by moving storm fronts.

Umatilla/Hermiston/Stanfield – The close proximity to the Columbia River provides a conduit for high winds, microbursts and small tornados. The Stanfield area along Interstate I-84 has been the scene of multiple fatality car accidents in 1976, 1979 and 1999.

Severe Winter Storms - Data by NOAA national Climatic Data Center

Zone	Date	Weather	Locations
44	Jan 23 2000	Heavy Snow - 4"	Hermiston, Stanfield
	Nov 24 2000	Snow and Ice	Umatilla
	Jan 06-07 2004	Heavy Snow -6"	Umatilla, Stanfield, Hermiston, Echo
	Jan 08-09 2004	Freezing Rain/Ice	Umatilla, Stanfield, Hermiston, Echo
	Dec 08 2005	Extreme Cold	Umatilla, Stanfield, Hermiston, Echo
	Jan 15 2005	Snow and Sleet	Umatilla, Stanfield, Hermiston, Echo
	Jan 17-18 2005	Freezing Rain/Ice	Umatilla, Stanfield, Hermiston, Echo
	Jan 26-27 2008	Heavy Snow - 6"	Umatilla, Stanfield, Hermiston, Echo
	Dec 15 2009	Ice Storm 1/4"	Stanfield, Hermiston
	May 3 2010	Dust Storm 1 injury	I-84 near Stanfield
	Nov 21-23, 2010	Heavy Snow 5"	Hermiston
	Nov 24, 2010	Extreme Cold -8F	Hermiston
	Jan 19, 2012	Ice Storm	5” Echo, 2.5” Umatilla
	Feb 22, 2012	High Wind, 60 mph	3 miles northeast of Hermiston
	Feb 25, 2012	High wind, 60 mph	3 miles northeast of Hermiston and trees down west of Hermiston
	Oct 2, 2012	High wind	Trees down in Umatilla
501	Nov 28 2007	Heavy Snow 4"-18"	Pendleton, Helix, Pilot Rock, Weston, Athena, Adams, Milton Freewater
	Dec 06 2007	Heavy Snow 4'-6"	Pendleton, Helix, Pilot Rock, Weston, Athena, Adams, Milton Freewater
	Jan 26-27 2008	Heavy Snow 6" - 9"	Pendleton, Helix, Pilot Rock, Weston, Athena, Adams, Milton Freewater
	March 31, 2009	High Wind	73 mph Pendleton, 61 mph Helix
	Dec 12-13, 2009	Heavy snow	Athena 5.5", Pendleton 5"
	May 3, 2010	High wind	Pendleton 61 mph, Helix 60 mph, Downed trees at BMCC and 1 mile south of Stanfield, local dust with visibility near zero.
502	Mar 01 2007	Heavy Snow 6"-16"	Tollgate, Meacham
	Dec 19 2007	Heavy Snow 10"-12"	Tollgate
	Dec 26 2007	Heavy Snow 8' - 10"	Tollgate, Meacham
	Dec 27-28 2007	Heavy Snow 8" - 12"	Tollgate, Meacham
	Jan 08-09 2008	Heavy Snow 8" - 10"	Tollgate, Meacham
	Jan 19 2008	Heavy Snow 8" - 10"	Tollgate, Meacham
	Jan 26-27 2008	Heavy Snow 6" - 14"	Tollgate, Meacham
	Mar 24-25, 2009	Heavy Snow	Meacham 11", 4 miles north of Bingham Springs 10"
	April 1-3, 2009	Heavy Snow	Tollgate 18", 2 miles east of Meacham 8.5"
	Dec 12-13, 2009	Heavy Snow	Meacham 12", 4 miles north of Bingham Springs 10"
	Dec 14-16, 2009	Heavy Snow	Meacham 14", 4 miles north of Bingham Springs 14"

	Jan 22-23, 2010	Heavy Snow	Emigrant Springs SP 12", Tollgate 12", Meacham 10.5"
	March 12-13, 2010	Heavy Snow,	Tollgate 12", Meacham 10"
	April 27-28, 2010,	Heavy snow	Tollgate 6"
	Nov 24, 2010	Extreme cold	-24F Meacham
	Nov 30, 2010	Heavy snow	Meacham 10.4"
	Dec 27-30, 2010	Heavy Snow	Meacham 40", 10 miles east of Weston 12"
	Feb 7, 2011	Heavy Snow	Meacham 10.2", Tollgate 13"
	Feb 22-24, 2011	Heavy Snow	Tollgate 18"
	Jan 17-18, 2012	Heavy Snow,	Meacham 10"
	Feb 27, 2012	Dense Freezing	Fog, 12-vehicle crash near Deadman's Pass
	Dec 8, 2012,	Heavy snow	Meacham 8", Tollgate 18"
	Dec 20, 2012	High Wind	Trucks blown over on I-84
503	Jan 27 2008	Heavy Snow 6" - 8"	Ukiah
	Jan 08-09 2008	Heavy Snow 8" - 10"	Ukiah
	March 12-13, 2010	Heavy Snow	4 miles north of Ukiah 6.5"
	Dec 27-30, 2010	Heavy Snow	10 miles north of Ukiah 7"
	Jan 8-9, 2011	Heavy Snow	10 miles north of Ukiah 9"
	March 13, 2011	High Wind	Tree downed 8 miles southeast of Pilot Rock
	Jan 17-18, 2012	Heavy Snow	Ukiah 7"
507	Nov 16, 2010	High wind	Helix 58 mph, Pendleton 67 mph, 8 miles WSW Echo 58 mph
	Nov 21-23, 2010	Heavy snow	Helix 7", Weston 8"
	Nov 24, 2010	Extreme cold	Pendleton -7F
	Jan 17-18, 2012	Heavy Snow	Cayuse 4", Pendleton 4"
	Jan 19, 2012	Ice Storm	Pendleton .38"
	Feb 22, 2012	High Wind	Pendleton 59 mph
	Feb 25, 2012	High wind	Pendleton 59 mph
	Nov 19, 2012	High wind	6 miles southeast of Pendleton 60 mph

Table 5-10: Severe Winter Storms - Data by NOAA national Climatic Data Center

Zone 044 - Northwest section of the county. Communities in this public forecast zone are City of Umatilla, Stanfield, Hermiston and Echo
Zone 501 – Center section of the county near the foothills of the Blue Mountains. Communities include Pendleton, Helix, Pilot Rock, Adams, Athena, Weston and Milton Freewater.
Zone 502 – Northeast section of the county, primarily located in the Blue Mountains. The small communities of Tollgate and Meacham are located in this area.
Zone 503 – Southeast section of the county, primarily located in the Blue Mountains. The community of Ukiah is located in this zone.
Zone 507 – Cene4r section of the county near the foothills of the Blue Mountains . Communities include Pendleton, Helix.

Existing Winter Storm Response and Mitigation Activities

Winter storms may impact existing above ground infrastructure and structures. In Umatilla County most of the damage resulting from winter storms occurs when motorists interact with the hazard event. Therefore, aside from some structural standards and response from power and transmission companies the bulk of the mitigation activities deal with advanced warning to the public.

NOAA NWS

NOAA NWS has the potential to issue severe weather warnings including dust storms in Umatilla County. These warnings can be disseminated via radio, television, internet and TARs. These warnings can then be utilized by UCEM, ODOT and local response agencies to warn the public and prepare for emergency response. Currently NOAA NWS cannot serve the entire county and must construct new infrastructure to be able to provide all portions of the county with advanced warning.

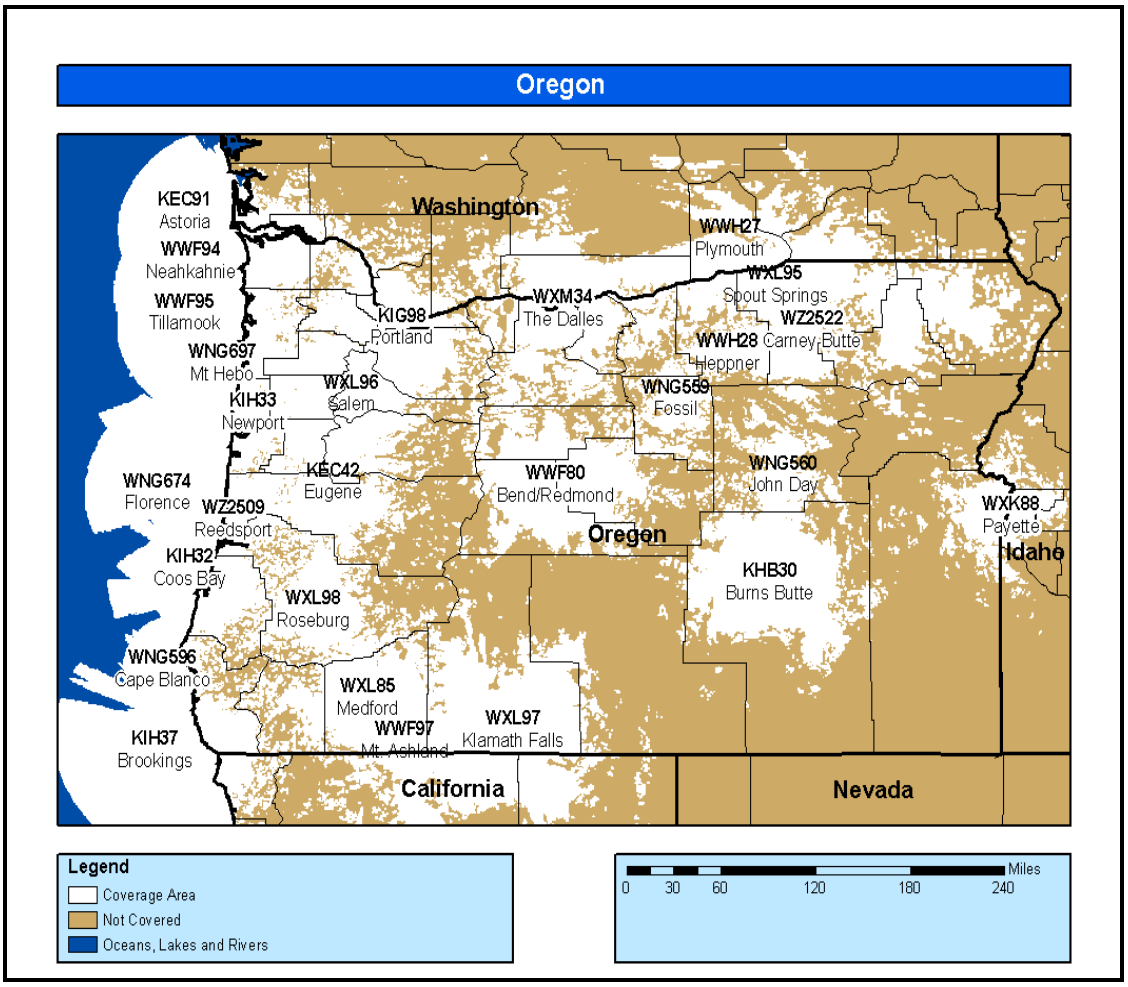


Figure 5-9: NOAA NWS Weather Warning Coverage (NOAA NWS)

Once UCEM receives warning of a potential winter storm they can utilize the JIC to inform response agencies and the general public of the threat. UCEM can utilize the same information sources that NOAA NWS utilizes for emergency alerts, but can also utilize amateur radio operators, road reader boards and the emergency communications systems. UCEM can also coordinate with 911 dispatch and other response agencies to prepare for emergency situations and may activate the EOC if conditions warrant.

Real-Time Video, "Trip Check" Cameras and Weather Outlooks[109]

ODOT has installed a microwave system and roadside camera tower near the Lorenzen Road Interchange ten miles west of Pendleton. The microwave and camera structures are located south of the freeway, opposite the Rew Grain Elevator. Two cameras are currently mounted on a metal tower next to the microwave tower. One provides a snapshot of the freeway and is posted on the "Trip Check" Web site. The other camera provides a real-time image, viewed by ODOT District 12 office personnel only. A weather station and visibility meter have also been added to the camera tower to monitor blowing dust conditions during high winds. The real-time camera can be panned and tilted to check eastbound and westbound traffic as well as scan the nearby fields.

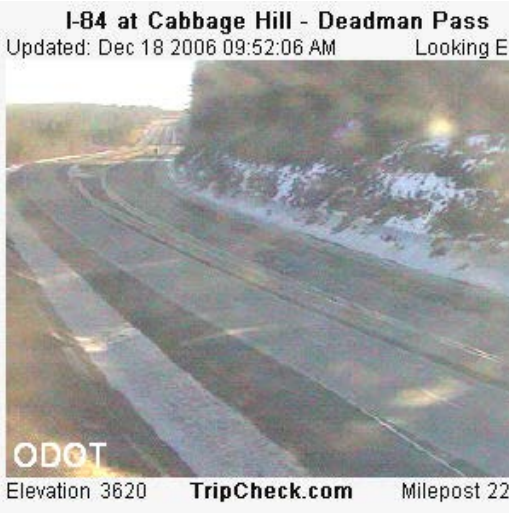


Figure 5-10: ODOT Trip Check Camera at Deadpan's Pass (ODOT)[110]

ODOT also has "Trip Check" weather cameras at Battle Mountain, Pendleton, Deadpan's Pass, Tollgate and Meacham. In addition to the cameras, ODOT has site specific road conditions on the "Trip Check" website that can be utilized by the public to monitor road conditions 24 hours a day.

ODOT Highway Advisory Radio

Three transmitters have been installed for Highway Advisory Radio along Interstate 84 in Morrow and Umatilla counties: one at the Boardman Safety Rest Area, another at the District 12 maintenance station, and the third near Mission. When an emergency occurs, the ODOT District 12 office selects the appropriate pre-recorded message on the

[109] State of Oregon, Emergency Management Plan – Volume II, http://www.oregon.gov/OOHS/OEM/docs/library/or_emp_volum_2_emerg_oper.pdf

[110] http://www.tripcheck.com/Pages/RCMap.asp?mainNav=RoadConditions&curRegion=3

system and transmits it via radio. At the same time, ODOT activates yellow flashing beacons. Motorists seeing the signs and flashing lights can tune to the appropriate radio station to hear the messages.

Also installed in the system is the ability to re-broadcast National Weather Service (NWS) weather information. NWS Weather Radio is re-broadcast on a continuous basis unless there is an emergency. An emergency broadcast then overrides the Weather Radio service.

Restricted Access to Interstate 84 during Hazardous Conditions

ODOT has installed two gates for I-84 closures. The gates were funded by CSEPP. The gates are at on-ramps at the eastbound I-84 on-ramp at exit 165 (Port of Morrow, just east of Boardman) and the westbound on-ramp at exit 202 (Barnhart Road, just west of Pendleton). State and local law enforcement officers and ODOT highway workers can close the gates, restricting access to I-84 due to hazardous conditions or other situations that make highway travel dangerous.

Survey Results

No additional tools were identified in 2009 by collected surveys

Severe Winter Storm (WS) Action Items

ST –WS[111] #1: Complete necessary tasks to obtain a NOAA NWS Storm Ready rating.

Ideas for Implementation:

- Establish or verify a 24 hour warning point or emergency operations center.
- Verify more than one way to receive severe weather warnings and broadcast them to the public.
- Create a system that monitors weather locally.
- Promote the importance of public readiness through seminars.
- Develop a formal hazardous weather plan, including the training and activation of weather spotters and annual emergency exercises.

Coordinating Organization: Umatilla County Emergency Management
Timeline: 1-2 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: High
Cost/Benefit Outlook: Modest due to minimal costs necessary to implement.
Status: No progress has been made on this action item.

LT –WS[112] #1: Identify additional opportunities to advance NOAA NWS warning coverage via wireless and non-wireless infrastructure.

Ideas for Implementation:

- Utilize existing NOAA NWS service maps to identify areas where infrastructure is necessary.
- Identify public lands or landowners willing to allow infrastructure development.
- Obtain funding to complete necessary feasibility and environmental assessments.
- Obtain funding for construction and identify funding sources for long-term operation and maintenance to assure benefits.

Coordinating Organization: Umatilla County Emergency Management
Timeline: 5 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: Moderate
Cost/Benefit Outlook: Construction costs must be considered before an accurate Cost/Benefit ratio could be established.
Status: Some progress has been made by NOAA NWS for wireless and non-wireless warning alerts.

[111] Short-Term Winter Storm Action Item

[112] Long-Term Winter Storm Action Item

LT –WS #2: Implement a NOAA Weather Radio (previously Tone Alert Radio) program to provide weather radios to all schools, communications stations and other interested private and public entities to increase advanced warning capabilities of NOAA NWS and UCEM.

Ideas for Implementation:

- Utilize existing NOAA NWS service maps to identify areas where weather radios could assist advanced warning capability.
- Identify stakeholders willing to participate in the program.
- Identify and secure funding to purchase and distribute weather radios and conduct training.
- Complete a public outreach campaign to demonstrate the effectiveness of radios if used properly.

Coordinating Organization: Umatilla County Emergency Management
Timeline: 5 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: Moderate
Cost/Benefit Outlook: Unknown until needs assessment completed. Cost share by stakeholders may assist in attaining necessary funding
Status: No progress has been made on this action item.

LT –WS #3: Determine snow removal capabilities of Umatilla County. Provide funding for snow removal equipment in areas with minimal or no snow removal capabilities.

Ideas for Implementation:

- Work with ODOT, county, city and special district personnel to catalogue the amount and quality of snow removal equipment.
- Obtain funding to cost share or pay for additional snow removal equipment where existing capabilities prove to be inadequate.

Coordinating Organization: Umatilla County Emergency Management
Timeline: 5 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: Moderate
Cost/Benefit Outlook: Poor due to high cost of equipment and difficulty of quantifying benefits.
Status: No progress has been made on this action item.

5.06 EARTHQUAKE

Earthquakes are created by tectonic movement within the earth's crust. This movement is manifested as localized ground shaking with possible soil liquefaction. After the initial seismic event, tremors or aftershocks can occur for an extended period of time resulting in continued structural damage. There are five main categories of hazards associated with earthquakes. These hazards include shaking, differential settlement, fault displacement, landslides, and searches.

There have been nearly 100 earthquakes in the Columbia Basin over the last 95 years. Fortunately, most have been minor. The largest recorded earthquake registered 6.1 in the City of Athena in 1936. Almost all of the earthquake epicenters have been in or near population centers and McNary, McKay and Cold Springs Dams.
There are several known fault lines throughout Umatilla County with further geological analyses ongoing. An earthquake measuring 5.8 occurred in July 1936 and caused damage throughout the county, especially in the Milton-Freewater area. This earthquake was associated with the 845c Hite fault system.

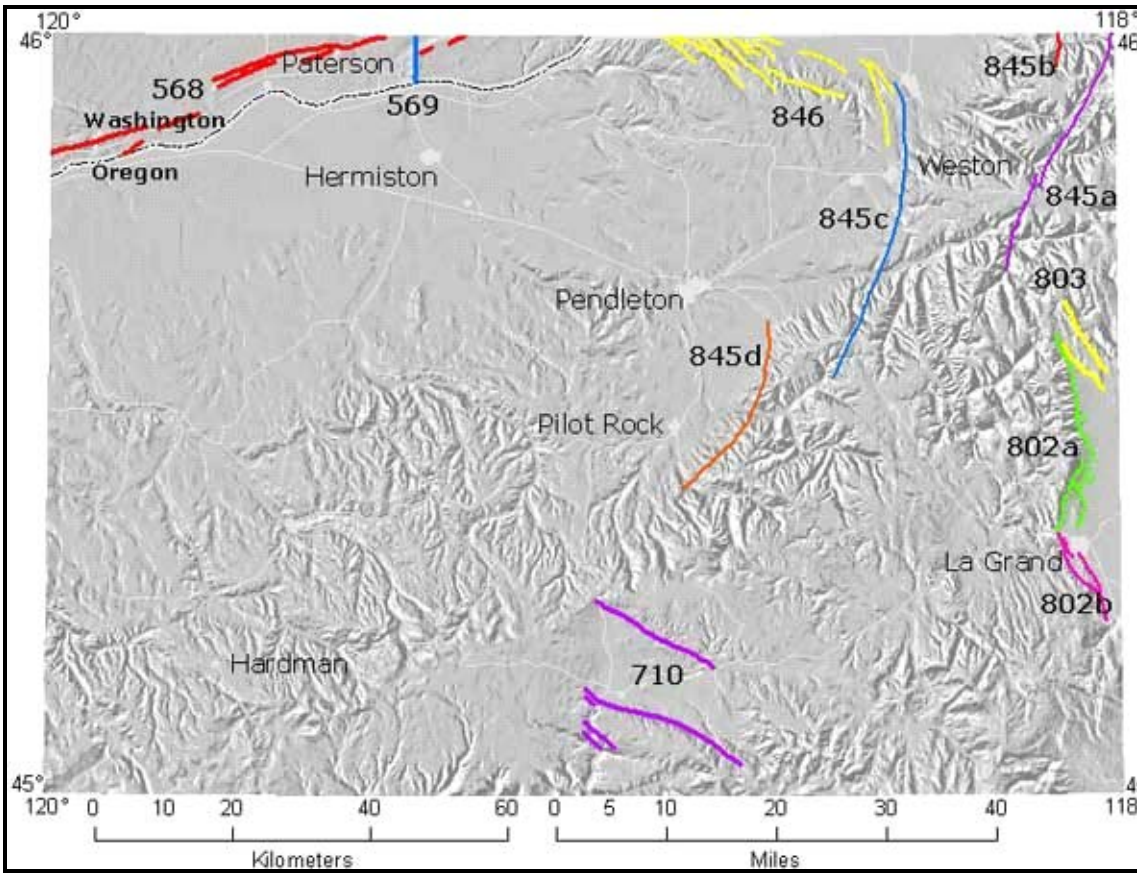


Figure 5-11: Earthquake Map of Umatilla County

Fault Number and Name

568 Columbia Hills Structures 569 Unnamed fault north of Service Anticline 710 Ukiah Valley faults 802a West Grande Ronde Valley fault zone, Mount Emily section 802b West Grande Ronde Valley fault zone, La Grande section 803 East Grande Ronde Valley fault zone 845a Hite fault system, Hite section 845b Hite fault system, Kooskooskie section 845c Hite fault system, Thorn Hollow section 845d Hite fault system, Agency section 846 Wallula fault system

Earthquake History

Multiple small and large earthquakes have been recorded in Umatilla County. A damaging earthquake occurred at 11:08 PM PST on July 15, 1936, near the State line between Milton-Freewater, Oregon, and Walla Walla, Washington. The magnitude 5.75 shock affected an area of about 272,000 square kilometers in the two States and adjacent Idaho. Ground cracking was observed about 6.5 kilometers west of Freewater, and there were marked changes in the flow of well water (VII). Many chimneys were damaged at the roof level in Freewater; in addition, plaster was broken, and walls cracked. Similar damage was reported from Umapine. Total damage amounted to $100,000. There were numerous aftershocks up to November 17; more than 20 moderate shocks occurred during the night, and stronger ones were felt (V) on July 18 and August 4 and 27.[113]

[113] United States Geological Survey, http://earthquake.usgs.gov/regional/states/oregon/history.php

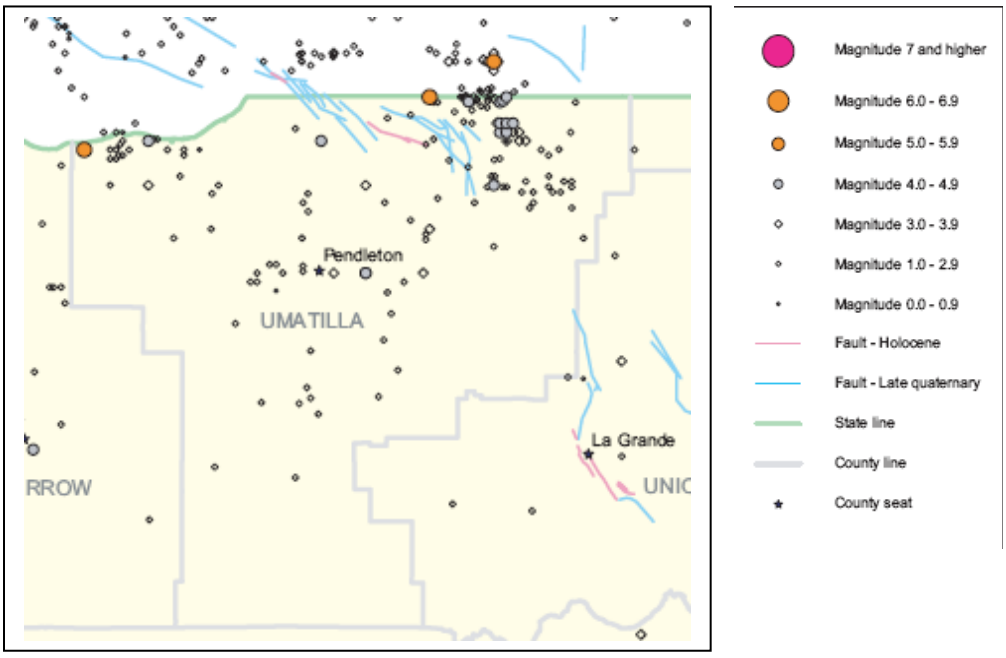


Figure 5-12: Earthquake History in Umatilla County (DOGAMI)

Existing Earthquake Response and Mitigation Activities

Oregon State Building Codes

New Construction: The Oregon Structural Specialty Code, based on 2004 additions to the 2003 IBC, designates Umatilla County as a Seismic Design Category C. According to a local Building Official, Seismic Design Category C is the least restrictive design category of the Oregon Structural Specialty Code with a seismic design category determination of C=0.331<5ds=0.50g.[114]

Earthquake Vulnerability Assessment

In 2007 the Oregon Department of Geology and Mineral Industries for the Oregon Legislature conducted a STATEWIDE SEISMIC NEEDS ASSESSMENT: IMPLEMENTATION OF OREGON 2005 SENATE BILL 2 RELATING TO PUBLIC SAFETY, EARTHQUAKES, AND SEISMIC REHABILITATION OF PUBLIC BUILDINGS. The public buildings included in the survey are schools, community colleges, fire stations, hospitals, and police stations.

The information is available within the study for all of the sites in Umatilla County. The following tables display the results from assessments made in Umatilla for public schools, Blue Mountain Community College and some fire department buildings.

[114] Oral communication with Brett Cook, Building Official, City of Boardman on 01/10/06

Umatilla County
Earthquake Vulnerability Assessment

District	Facility Name	Collapse Potential
Hermiston	Highland Hills Elementary School	2.6 Low (<1%)
	Highland Hills Elementary School	2.6 Low (<1%)
	Highland Hills Elementary School	0.3 High (>10%)
	Rocky Heights Elementary School	(0.1) Very High (100%)
	Rocky Heights Elementary School	(0.1) Very High (100%)
	Sandstone Middle School	Low (<1%)
	Sunset Elementary School	0.3 High (>10%)
	Sunset Elementary School	2.6 Low (<1%)
	Sunset Elementary School	2.6 Low (<1%)
	Sunset Elementary School	2.6 Low (<1%)
	West Park Elementary School	(0.1) Very High (100%)
	West Park Elementary School	2.4 Low (<1%)
	West Park Elementary School	2.4 Low (<1%)
	West Park Elementary School	1.7 Moderate (>1%)
	Armand Larive Middle School	(0.1) Very High (100%)
	Armand Larive Middle School	(0.1) Very High (100%)
	Armand Larive Middle School	0.3 High (>10%)
	Armand Larive Middle School	0.3 High (>10%)
	Armand Larive Middle School	0.3 High (>10%)
	Desert View Elementary School	Low (<1%)
Pendleton	Lincoln Primary School	0.7 High (>10%)
	Lincoln Primary School	1.8 Moderate (>1%)
	Lincoln Primary School	5.9 Low (<1%)
	McKay Creek Elementary School	0.5 High (>10%)
	McKay Creek Elementary School	2.1 Low (<1%)
	Pendleton High School	0.3 High (>10%)
	Pendleton High School	(0.1) Very High (100%)
	Pendleton High School	0.8 High (>10%)
	Pendleton High School	0.3 High (>10%)
	Pendleton High School	0.3 High (>10%)
	Sherwood Heights Elementary School	1.1 Moderate (>1%)
	Sherwood Heights Elementary School	1.1 Moderate (>1%)
	Sherwood Heights Elementary School	1.1 Moderate (>1%)
	Sherwood Heights Elementary School	1.1 Moderate (>1%)
	Sherwood Heights Elementary School	2.9 Low (<1%)
	Sunridge Middle School	1.1 Moderate (>1%)
	Washington Elementary School	(0.9) Very High (100%)
	Washington Elementary School	5.0 Low (<1%)
	Washington Elementary School	0.3 High (>10%)
	West Hills Intermediate	0.3 High (>10%)
	West Hills Intermediate	2.8 Low (<1%)

Umatilla	Clara Brownell Middle School	0.3 High (>10%)
	Clara Brownell Middle School	0.3 High (>10%)
	McNary Heights Elementary School	(0.1) Very High (100%)
	Umatilla High School Moderate	Low (<1%)
Stanfield	Stanfield Elementary School	Low (<1%)
	Stanfield Secondary School	2.7 Low (<1%)
Pilot Rock	Pilot Rock Elementary School	3.1 Low (<1%)
	Pilot Rock Elementary School	3.6 Low (<1%)
	Pilot Rock Elementary School	1.1 Moderate (>1%)
	Pilot Rock Elementary School	1.1 Moderate (>1%)
	Pilot Rock High School	1.0 High (>10%)
	Pilot Rock High School	0.5 High (>10%)
	Pilot Rock High School	1.1 Moderate (>1%)
	Pilot Rock High School	1.1 Moderate (>1%)
	Pilot Rock High School	1.1 Moderate (>1%)
Milton Freewater	Central Middle School	1.7 Moderate (>1%)
	Central Middle School	(0.1) Very High (100%)
	Central Middle School	1.9 Moderate (>1%)
	Central Middle School	(0.1) Very High (100%)
	Ferndale Elementary School	(0.1) Very High (100%)
	Ferndale Elementary School	0.3 High (>10%)
	Ferndale Elementary School	0.3 High (>10%)
	Freewater Elementary School	0.2 High (>10%)
	Freewater Elementary School	(0.5) Very High (100%)
	Freewater Elementary School	0.4 High (>10%)
	Grove Elementary School	0.6 High (>10%)
	Grove Elementary School	0.3 High (>10%)
	Grove Elementary School	0.3 High (>10%)
	McLoughlin High School	0.2 High (>10%)
	McLoughlin High School	0.0 Very High (100%)
	McLoughlin High School	0.0 Very High (100%)
	McLoughlin High School	2.0 Moderate (>1%)
	McLoughlin High School	Very High (100%)
	McLoughlin High School	Moderate (>1%)
Helix	Helix School	High (>10%)
	Helix School	High (>10%)
	Helix School	Low (<1%)
	Helix School	High (>10%)
Echo	Echo School	High (>10%)
	Echo School	High (>10%)
	Echo School	High (>10%)
	Echo School	High (>10%)
	Echo School	Low (<1%)

Table 5-11: Umatilla County Earthquake Vulnerability Assessment

City Hazard Analysis

The table below identifies earthquake hazards and their rankings for the individual cities. The same methodology was used for ranking as utilized in the risk assessment. Local information was included into the rankings to provide a realistic view of the hazard. The cities of Adams, Helix and Milton-Freewater were the only towns to list earthquake as a hazard of concern. It should be noted all three of these towns are located near the Hite Fault System described above.

City Hazard Analysis (Earthquake) Ranking

City	History	Vulnerability	Maximum Threat	Probability
City of Adams				
Earthquake	Low	High	High	High
City of Helix				
Earthquake	High	Low	Low	Low
City of Milton-Freewater				
Earthquake	Low	High	High	Moderate

Table 5-12: City Hazard Analysis (Earthquake) Ranking

Earthquake (EQ) Action Items

ST –EQ [115]#1: Complete a county-wide inventory of structures with high risk/ high vulnerability to earthquake damage. Identify funding sources available to retro-fit high priority structures.

Ideas for Implementation:

- Utilize certified individuals to assess and map vulnerable structures in rural and incorporated areas of Umatilla County.
- Update list of vulnerable structures and identify high priority vulnerable structures.
- Assess retro-fit costs on identified structures
- Identify and obtain funding for the design and construction of retro-fit projects.

Coordinating Organization: Umatilla County Emergency Management
Timeline: Ongoing (Retro-Fit Construction)
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: High
Cost/Benefit Outlook: Funding for retro-fit projects depends upon the functional classification and use of each structure.
Status: The vulnerability assessment has taken place. No retro-fitting projects have been completed.

LT –EQ[116] #1: Support continuing work to identify earthquake fault patterns in Umatilla County.

Ideas for Implementation:

- Support efforts to identify and obtain funding to complete geo-referenced fault maps of the County.
- Overlay property ownership on fault maps to help in outreach efforts.

Coordinating Organization: Umatilla County Emergency Management
Timeline: Ongoing
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #6: Emergency Service Planning
Priority: Moderate
Cost/Benefit Outlook:
DOGAMI working to complete this action item.
Status: No progress has been made on this action item.

[115] Short-Term Earthquake Action Item

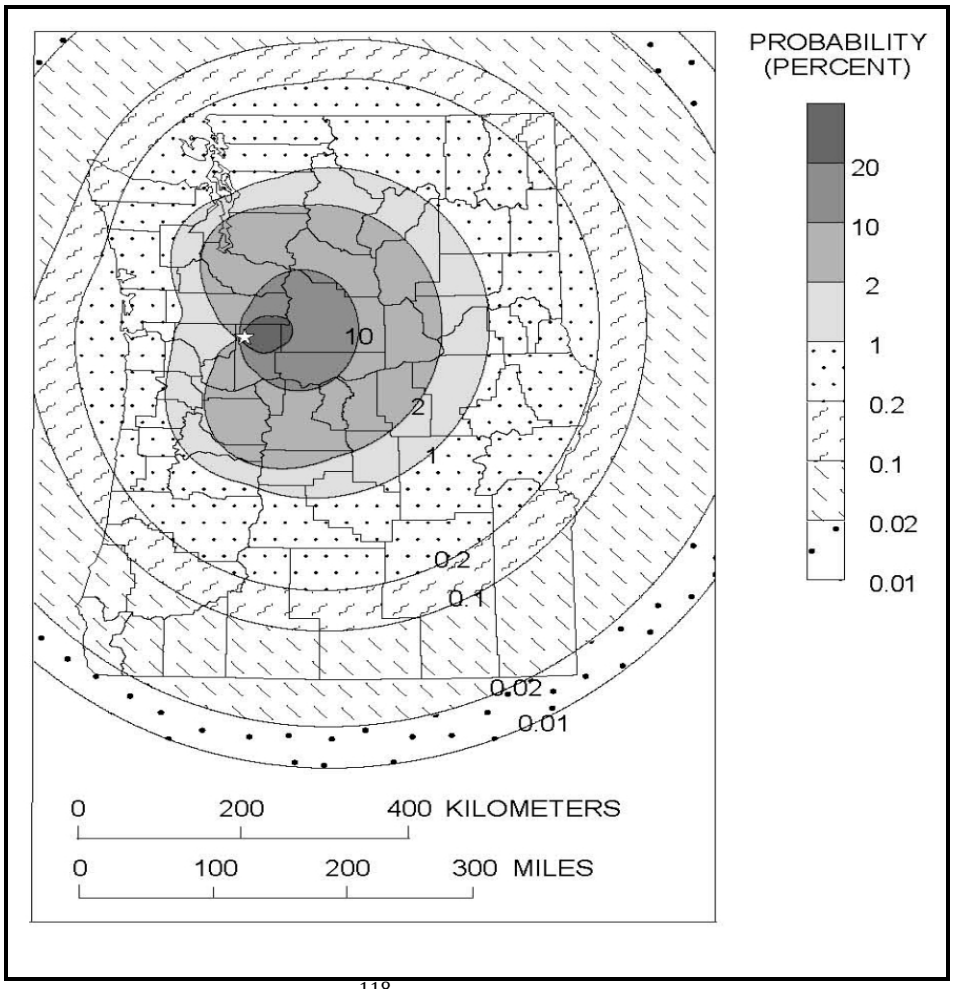
[116] Long-Term Earthquake Action Item

5.07 VOLCANO

On May 18, 1980 Mount St. Helens erupted with a major lateral blast that claimed several lives and forever changed the landscape around the Mountain. While Mount St. Helens is more than 200 miles from Umatilla County it remains a potential hazard that could affect the lives of County residents.

Volcanic eruptions are random events, while the likelihood of an eruption can be predicted, the exact time and volume of such an event is unknown. While Mount St Helens continues to vent steam and occasionally produce lava flows within the crater the likelihood of ash or Tephra Fall in Umatilla County is relatively remote. The chart below illustrates the statistical probability at 1% annually. The State Hazard Assessment for damage resulting from Volcanic Eruption is "moderate".[117]

[117] Wolfe, Edward W. and Pierson, Thomas C. 1995 Volcanic-Hazards Zonation for Mount St. Helens, Washington, 1995 Open-File Report 95-497



Volcano Impact Probability[118]

Figure 5-13: Volcano Impact Probability

[118] Wolfe, Edward W. and Pierson, Thomas C. 1995 Volcanic-Hazards Zonation for Mount St. Helens, Washington, 1995 Open-File Report 95-497

Existing Volcano Response and Mitigation Activities

Potential hazards resulting from a volcanic eruption include damage from seismic activity and damage to health and property resulting from ash deposits. Therefore, when addressing existing response and mitigation activities to mitigate potential damage from volcanic events we must include the activities associated with hazard response, advanced warning and seismic protection. These activities have been addressed in the Multi-Hazard, Severe Summer and Winter Storms and Earthquake chapters above and will not be reiterated in this chapter.

Volcano (VC) Action Items

ST –VC[119] #1: Create volcano response protocols for protection from seismic activity and debris damage.

Ideas for Implementation:

- Assess response vulnerabilities to a catastrophic event such as a volcanic eruption
- Identify potential public health risks.
- Identify opportunities for response needs likely in Umatilla County, including secondary effects such as debris removal, auto filters, etc.
- Identify projects to fix vulnerabilities and assign responsible agencies.

Coordinating Organization: Umatilla County Emergency Management
Timeline: 1 year (Assessment) Ongoing (Response exercises)
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #5: Natural Resource Protection, #6: Emergency Service Planning
Priority: Low
Cost/Benefit Outlook: Minimal funding necessary to conduct table top and/or live volcanic response exercises.
Status: No progress has been made on this action item.

[119] Short-Term Volcano Action Item

5.08 LANDSLIDE/DEBRIS FLOW

Landslide or subsidence, is the down-slope movement of rock, soil or other debris, or the opening of sinkholes. These hazards are often associated with other events, such as floods or earthquakes. Because of the moderate-to-high relief characteristics of the County's river beds, along with hill and mountainous terrain in rural areas, the chance of landslides occurring is high but is not deemed to present a serious threat to people or property.

Landslide History

Little documentation exists relaying landslide history in Umatilla County. Due to the fact that most landslide prone areas in Umatilla County are located in areas with little or no development many of the small and moderate slides have not been documented. Little or no damage costs resulting from landslides have occurred in Umatilla County.

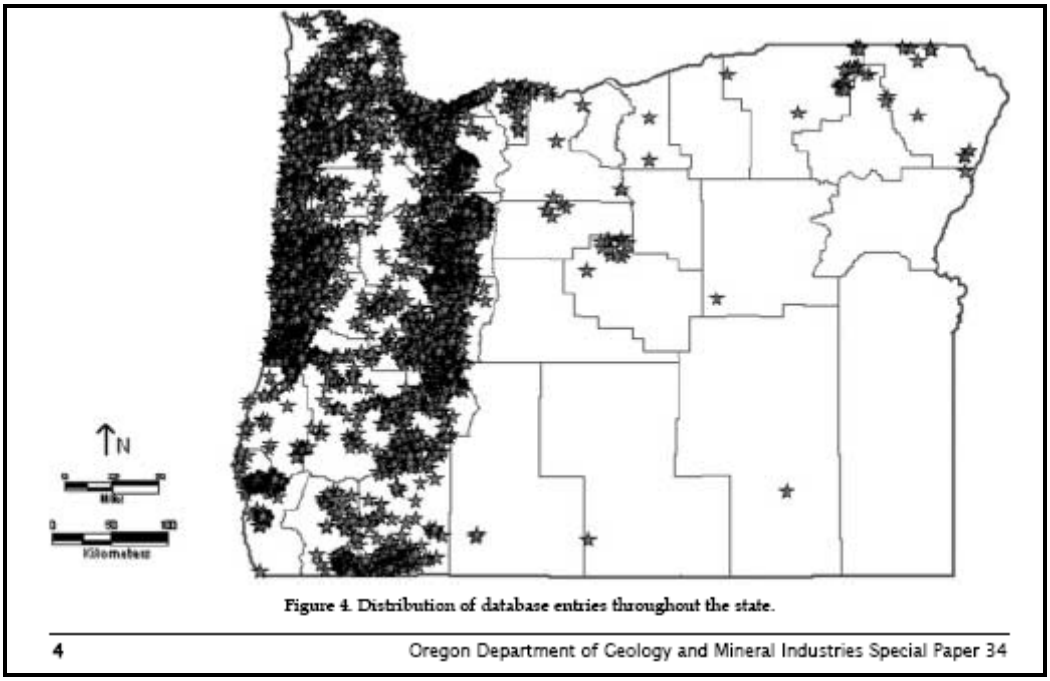


Figure 4. Distribution of database entries throughout the state.

4 Oregon Department of Geology and Mineral Industries Special Paper 34

Figure 5-14: Distribution of Landslides in the State of Oregon (DOGAMI)

Existing Landslide Response and Mitigation Activities

Umatilla County Comprehensive Plan and Development Code

Chapter 10 of the Umatilla County Comprehensive Plan entitled *Natural Hazards* includes a policy to monitor development in the Multiple Use Exception Areas where slopes are greater than 25%. Chapter 152.503 of the Umatilla County Development Code implements the Comprehensive Plan policy through a "Steep Slope (SS)" Overlay Zone. The Steep Slope Overlay Zone is only applicable to the Multiple Use Forest Exception Areas. In addition to structural development restrictions, the Steep Slope Overlay Zone implements road development standards on areas prone to landslides as well as limits excavation and removal of vegetation to encourage soil stability.

The Steep Slope Overlay Zone is a good attempt to prevent development in harm's way, but Umatilla County has lacked sufficient funds to accurately map areas that the zone would apply too. The lack of mapping technology requires staff to rely on a signed affidavit from an applicant that states that the development will meet the Steep Slope Overlay standards. More accurate information is necessary to assure that the development code is protecting the intent of the Comprehensive Plan.

DOGAMI

DOGAMI implements standards to assure that aggregate operations maintain safe slopes during the mining operation and after an aggregate site has been exhausted. Some sites are exempt from DOGAMI standards, though, and may require mitigation funding to reclaim the grandfathered sites to a safe condition.

Survey Results

Survey results in 2009 revealed the following mitigation/response tools that may be utilized for landslide hazard applications:

- ODOT has manpower & equipment dedicated to traffic control and road maintenance
- Rural fire districts can promote public safety through outreach and provide disaster response to protect life and property.
- OSP can provide a public safety outreach and also has boats resources available to respond to evacuation or search and rescue events that may result from a landslide.

Landslide (LS) Action Items

ST –LS[120] #1: Update Goal 7 of the Umatilla County Comprehensive Plan and develop GIS maps designating landslide prone areas or areas where the Steep Slope Overlay Zone applies.

Ideas for Implementation:

- Utilize DOGAMI, County and contract GIS agencies to map slopes over 25% within existing Multiple Use Forest zones.
- Identify areas that may see development pressures in the next five years and map slope severity in those areas.
- Overlay property ownership maps to assist in outreach efforts and permitting processes should development be proposed.

Coordinating Organization: Umatilla County Planning
Timeline: 2 – 3 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #5 Natural Resource Protection, #6: Emergency Service Planning
Priority: Moderate
Cost/Benefit Outlook: Good due to minimal funding requirements and potential for cost share.
Status: No progress has been made on this action item.

LT-LS[121] #1: Identify and implement mitigation measures where important infrastructure for evacuation, emergency vehicle access, commodity transport, information dissemination and utilities may be prone to damage from site specific landslides.

Ideas for Implementation:

- Utilize DOGAMI, County and contract GIS agencies to map landslide prone areas.
- Determine mitigation measures to protect the described important features from landslide prone areas.

Coordinating Organization: Umatilla County Emergency Management
Timeline: 3-10 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #5 Natural Resource Protection, #6: Emergency Service Planning
Priority: Moderate
Cost/Benefit Outlook: Good to complete assessment costs. Mitigation depends on value of infrastructure protected.
Status: No progress has been made on this action item.

[120] Short-Term Land Slide Action Item

[121] Long-Term Land Slide Action Item

5.09 DROUGHT

Drought is defined by a period of prolonged dryness resulting from a lack of precipitation or diversion of available water supplies. Umatilla County has suffered periods of drought in the past; however the main impact of drought has been on agriculture, fish, and wildlife, as well as an increased fire risk. A severe drought could require strict water conservation/regulatory measures to ensure adequate supplies of raw and treated/potable water.

In addition to drought that impacts surface water supplies, Umatilla County has experienced another form of water shortages, not commonly referred to as a drought but just as damaging to the long term economic and resource sustainability of the region. Umatilla County encompasses four of six State of Oregon Designated Critical Groundwater Areas due to extreme water declines in the regions' alluvial and deep basalt groundwater aquifers.

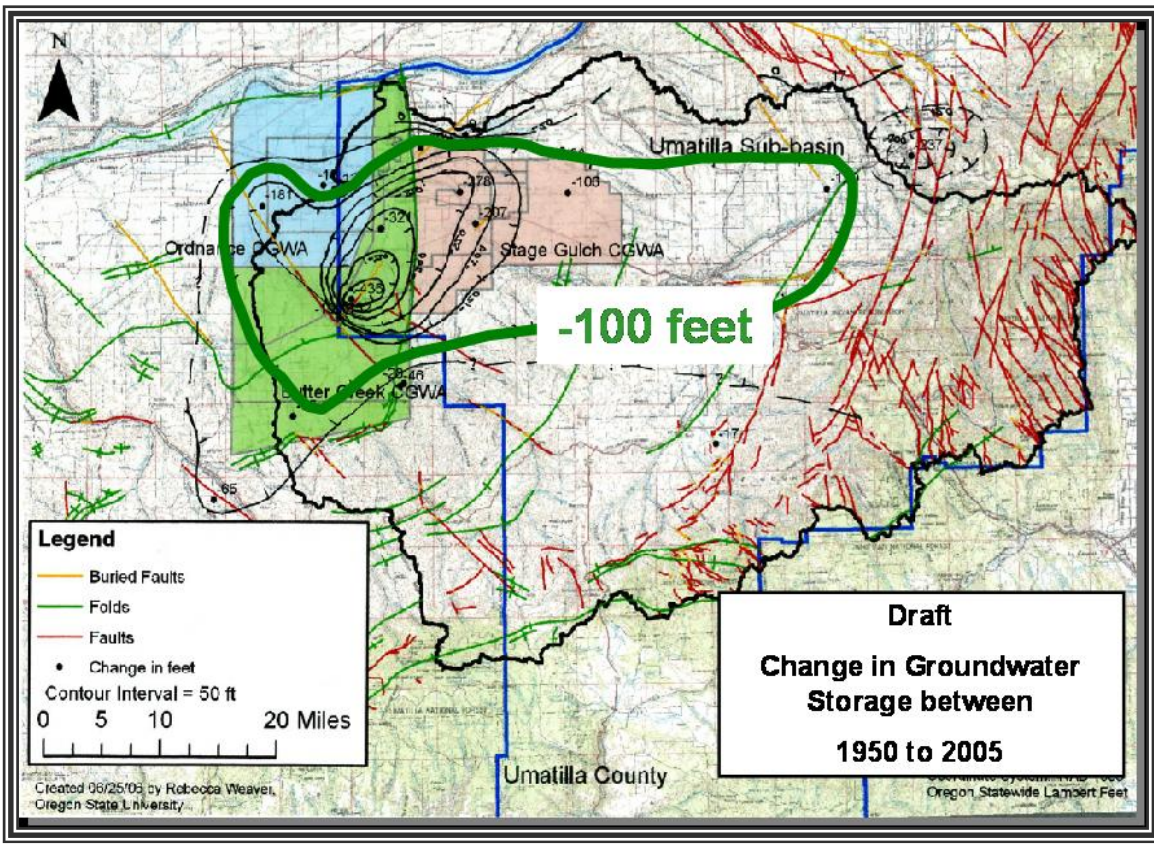


Figure 5-15: Groundwater Contour Map Showing Groundwater Declines in Umatilla County (Oregon State University, Institute for Natural Resources)

Drought History

A letter in 2009 to Governor Ted Kulongoski, the Oregon Office of Rural Policy sited 44 states of emergency declarations for drought and low water conditions in 23 of Oregon's 36 counties over the last five years. Umatilla County submitted emergency declarations due to low water conditions and drought in 2002 and 2005.

In addition to the surface water drought, the western part of Umatilla County has had approximately 104,000 acre-feet of groundwater rights curtailed due to groundwater declines. These groundwater declines have directly impacted fisheries, the aquatic environment, economic development and long-term rural and urban economic security. A chronological water history of Umatilla County is as follows:

Umatilla Couty Water Chronology[122]

Year	Description of Event
1855	Treaty with the Walla Walla, Cayuse and Umatilla Tribes and the United States government -- treaty reserved rights for tribes to hunt, fish and gather traditional foods
1859	Treaty ratified by Congress
1862	Irrigation begins in Umatilla County
1880-920	population increase
1890	Umatilla Meadows and Butter Creek Canal Company organized to enlarge and extend ditch diverting water from Umatilla River to irrigate land across the river from Echo -- becomes Hinkle Ditch Company
1893	Intention of Water Use (first State of Oregon water allocation law)
1903	Bureau of Reclamation (BOR) begins investigations to determine feasibility of irrigating lands around the Umatilla River
1903	Gaging station established on Umatilla River -- two miles upstream from mouth of the river
1903	Hinkle Ditch Company begins irrigating land south and east of Hermiston by diverting water from Umatilla River
1905	Furnish Ditch Company begins construction of system to irrigate several thousand acres near Stanfield by diverting water from Umatilla River
1906	BOR construction of projects begins after Congressional approval
1908	Winters v. United States (legal basis for reserved water rights for tribes)
1908	Hermiston Irrigation District created
1908	Cold Springs Dam and Reservoir, Feed Canal Diversion Dam and Feed Canal completed -- to supply supplemental irrigation water to the Hermiston Irrigation District
1909	Furnish Dam completed
1912	Maxwell Diversion Dam completed
1913-17	Three Mile Falls Diversion Dam and West Extension Main Canal built to provide water to West Extension Irrigation District
1916	Adjudicated decree of water rights to use waters of Umatilla River and its tributaries (1953 supplemental findings and order of determination identified inchoate rights to be allowed)
1917	West Extension Irrigation District created
1920 - 1940	Population and economic decline (summer water shortages and soils unsuited for irrigation). Decline in irrigated acreage continued until 1949, when trend reversed
1925	First well (125 feet) in Butter Creek area
1926	State fish and wildlife experts report that there were no Chinook or Coho left in the Umatilla River
1927	McKay Dam and Reservoir completed -- to supplement water supplies for Stanfield and Westland Irrigation Districts
1938	Bonneville Dam completed
1940	BOR Pendleton Project initiated
1940-2000	Population increase due to Federal projects (Umatilla Depot, McNary Dam construction) and manufacturing/processing plants
1949 - 1959	Alfalfa production increases 45% (more irrigated alfalfa and less non-irrigated hay land)
1950s	Irrigation from groundwater begins
1951	BOR report on McNary Gravity Investigation concluded to no irrigation facilities were required in McNary Dam and recommended additional study of potential irrigation development areas in the Plymouth Bench area
1952	First deep well (554 feet) in Butter Creek Area (deepened to 840 feet in 1961)
1954	Pendleton Project Investigation by BOR. Identified several plans for storage and utilization of surplus Umatilla River waters. Concluded that potential irrigable land far exceeded

[122] Catherine Howells, Oregon State University, Institute for Water and Watersheds

	available water supply. No plans were financially feasible in terms of full repayments of reimbursable costs within 40 years (report released locally as an information document to aid local planning)
1955	Oregon Groundwater Act: No water rights needed for stock watering, irrigating lawns or non-commercial gardens of 1/2 acre, for single or group domestic purposes not exceeding 15,000 gallons per day , or for single industrial or commercial purpose not to exceed 5,000 gallons per day
1958	First reports of water table decline in Butter Creek area
1959	BOR determines available water storage based on adjudicated rights and permits on the Umatilla River
1960	Groundwater level monitoring begins in Butter Creek area
1960s	Groundwater levels dropping in Battle Creek
1963	BOR report on possible Birch Creek Diversion Unit -- reanalyzed canal plan and concluded construction still unwarranted
1963	OWRD produces map showing location of 480 sub-basin water rights; reports on scarcity of groundwater and minimal recharge
1963	OWRD reports that fish life will probably take an increasing non-consumptive use of water in the Umatilla River
1963	ODFW conducts survey of steelhead and Chinook spawning habitat on the upper Umatilla River
1964	Based on local and state concerns, BOR begins study to provide comprehensive analysis of multiple-purpose development potential on basin-wide scale (results published in 1970)
1964	Oregon Water Resources Commission adopts Umatilla Basin program
1966	Groundwater use for center pivot irrigation begins
1966	Congressional authorization for Secretary of the Interior to conduct feasibility investigation to expand irrigation base and address anadromous fishery needs in the Umatilla Basin
1969	BOR constructs pumping plant on Columbia River to lift water into West Extension Canal
1970	BOR reports that any significant increase in pumping from basalt aquifers would likely result in accelerated decline of water tables
1972	72 irrigation wells in Butter Creek area (depth 665-1500 feet)
1972	Federal Clean Water Act
1973	Oregon Senate Bill 100 signed by Governor McCall. Creates Oregon statewide planning program with the Land Conservation and Development Commission (LCDC) and the Department of Land Conservation and Development (DLCD).
1974	Oregon LCDC adopts 14 statewide planning goals
1974	Eastern Central Oregon Association of Counties completes Regional Water System Feasibility Study for Hermiston-Boardman, Oregon
1975	Port of Umatilla proposes a regional water system based on their permit for the project of 155 cfs from the Columbia River
1976	OWRD designates Butter Creek a Critical Groundwater Area (remanded until 1986)
1976	Critical Groundwater Area designated by OWRD for Ordnance Basalt
1976	Critical Groundwater Area designated by OWRD for Ordnance Gravel
1977	Lost Lake/Depot well owners initiated project to artificially recharge shallow gravel aquifer using existing canal system
1980	CTUIR initiates Umatilla Salmon Recovery Project
1980	ODFW initiates a steelhead supplementation program
1980s	Coalition formed between CTUIR and local irrigators to recover salmon populations -- BOR, BPA, OWRD and ODFW participate
1980	ODFW begins hatchery outplanting program on Umatilla River to supplement natural production
1983	Umatilla County Comprehensive Plan recognizes that availability of water is a key resource for economic growth
1983	ODFW and ODEQ submit minimum stream flow requirements for Umatilla Basin to State

	Water Resources Board
1984	Umatilla Chemical Depot placed on EPA's National Priorities List because of soil and groundwater contamination
1984	Formation of Umatilla Basin Project Steering Committee
1985	Umatilla River and tributaries withdrawn from further appropriation by Oregon Water Resources Commission and minimal perennial stream flows adopted by Umatilla River and Birch Creek
1985	Umatilla Basin Fish Resource Improvement Committee (UBFRIC) adopts plan. Developed in cooperation with CTUIR, ODFW, National Marine Fisheries Service, Fish and Wildlife Service, BOR and Forest Service (funding for plan from BPA)
1986	Critical Groundwater Area designated by OWRD for Buttercreek Basalt
1986	Report to the Governor, Umatilla Basin Ground Water Task Force (identifies water use concerns and suggests alternatives)
1987	Oregon Instream Water Rights Act -- recognizes instream uses as beneficial
1988	Umatilla Basin Project authorized and funded by Congress (developed by CTUIR and irrigators coalition -- allows irrigators to exchange Umatilla River water for Columbia River water)
1988	Oregon Water Resources Commission approves Oregon Water Plan: Umatilla Basin Sections
1989	Oregon Groundwater Quality Protection Act
1990	Classified Groundwater Area designated by OWRD for Ella Butte (exempt uses only)
1990	ODEQ declares 352,000 acres in Umatilla and Morrow counties as a groundwater management area (GWMA) after discovering elevated levels of nitrates in wells -- leads to the Lower Umatilla Basin GWMA Voluntary Plan
1991	Critical Groundwater Area designated by OWRD for Stage Gulch Basalt
1991	OWRD enforces compliance against waterspreading
1992	Oregon DEQ and EPA conduct sampling to characterize regional groundwater quality -- Lower Umatilla Basin identified as area of elevated nitrate in groundwater
1994	Salmon return to the Umatilla River (first time in seventy years)
1995	Columbia River Intertribal Fish Commission (CRITFC) develops anadromous fish restoration plan for Columbia River Basin
1997	Oregon Plan for Salmon and Watersheds
2003	Umatilla County ranked fifth in state in agricultural commodity sales at $200 million
2003	Oregon Water Resources Department report published -- Ground Water Supplies in the Umatilla Basin
2003	Aquifer Storage and Recovery (ASR) Pilot Testing in for City of Pendleton
2004	Umatilla County Critical Groundwater Task Force created by the Umatilla County Board of Commissioners in order to develop a “2050 Plan” to assure adequate groundwater for broad community needs through the year 2050
2004	Northwest Power and Conservation Council (NWPCC) adopts Umatilla Subbasin Plan
2005	Board of Commissioners of Umatilla County adopt Exempt Well Resolution until 2050 plan is authorized

Table 5-13: Umatilla County Water Chronology

Existing Drought Response end Mitigation Activities

Oregon Water Resource Department

OWRD has statutory authority (ORS and OAR) to implement special "drought rules" during times of surface water shortage. These rules allow higher use of supplemental groundwater rights and temporary, emergency water rights transfers to ensure that crops are not lost due to lack of water. While this program works during times of surface water shortages it allows the extended use of groundwater aquifers that are already depleted, some of which have declined over 400 feet.

Umatilla County Critical Groundwater Task Force

Groundwater aquifers underlying Umatilla County have been documented as declining since 1958. Few actions have been implemented to restore the water or decrease the decline. In 2004, the Umatilla County Board of Commissioners chartered the Umatilla County Critical Groundwater Task Force. The Task Force's mission was to "[I]dentify and implement technically and economically feasible measures to enhance and protect groundwater quantity and quality through the year 2050, as an essential natural resource necessary to assure continued economic development in Umatilla County, especially in designated Critical Groundwater Areas.[123]" The Task Force convened in January, 2004 and met for several years. The Task Force adopted a final plan in 2007, which concluded that groundwater and surface water are interconnected and basin wide concerns will be resolved with the implementation of a basin wide plan. The Task Force established four concepts to assure long term water sustainability. These concepts are included as drought action items below.

Umatilla County Watershed Councils

The Umatilla Basin and Walla Walla Basin Watershed Councils were established to promote environmental restoration along the tributaries and mainstem Umatilla and Walla Walla Rivers. These councils have completed projects ranging from recharge of alluvial aquifers to riparian planting and federal conservation projects.

Drought (DR) Action Items

ST –DR[124] #1: Implement 2050 Water Management Plan for Umatilla Basin.

Ideas for Implementation:

- Identify opportunities to restore the full irrigation season groundwater supply in the Critical Groundwater Areas.
- Address methods to prevent further declines in groundwater levels throughout the entire Umatilla Basin.
- Utilize available Columbia River water to relieve water supply deficits in the Umatilla Basin.
- Minimize use of Umatilla River flows and groundwater in the

[123] Umatilla County Critical Groundwater Task Force

[124] Short-Term Drought Action Item

lower basin so these water supplies are available for upper basin uses, including Umatilla Tribes' unquantified water claims, where use of Columbia River water is currently not feasible.
- Restore stream flow in the Umatilla River during low-flow period.
- Develop water supplies for future uses throughout the basin.
- Obtain the necessary scientific data to manage water resources for sustainability and to meet the water needs for multiple beneficial uses as determined by the local community.
- Reach parity amongst all Columbia River Basin water users.
- Obtain funding to continue outreach campaign stressing the importance of long range water supply planning and projects.

Coordinating Organization: Umatilla County
Timeline: Ongoing (Outreach, Projects and Regulation)
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/Citizen Coordination, #5: Natural Resource Protection
Priority: High
Cost/Benefit Outlook: Good due to collaborative effort and commitment by governing agencies.
Status: The Water Plan has been adopted and now features of the Plan are being implemented.

LT-DR[125]#1. Utilize Columbia River water for replacement of certificated groundwater irrigation rights.

This approach would deliver Columbia River water to replace the certificated groundwater rights in the CGAs. The purpose would be to fulfill 100% of certificated irrigation water rights and to guarantee water for the entire crop year. This would significantly reduce groundwater pumping and may allow the aquifer to recharge. Evidence suggests, however, that groundwater recharge is very limited and further study is needed to determine sustainable use of the aquifers. Groundwater recharge may not be adequate to meet existing demand for other uses, including exempt (domestic) wells and municipal and industrial uses. This approach would complement existing artificial recharge and other environmental restoration projects in the basin.

About 125,000 acre feet of surface water is needed to meet certificated or currently permitted groundwater irrigation rights in the CGAs in Umatilla County.

Ideas for Implementation:

- Obtain authorization to optimize existing BOR infrastructure for multi-beneficial use water projects.
- Obtain state and federal funding to complete infrastructure and storage projects.
- Deliver 73,000 acre-feet in existing Phase II or other infrastructure.

[125] Long-Term Drought Action Item

- Complete Stage Gulch Storage Project (20,000 - 30,000 acre-feet).
- Expand Cold Springs Storage (20,000 – 30,000 acre-feet).
- Balance of need (~20-25,000 acre feet) to be met by aquifer recharge (storage) in the alluvial aquifer and by direct supply.
- Utilize existing and new infrastructure to distribute 52,000 acre-feet of water into the CGAs.
- Utilize regulation to assure that aquifers remain fee of excessive pumping to allow natural recharge to begin.

Coordinating Organization: Umatilla County
Timeline: 10-20 years
Plan Goals Addressed: #1: Protect Life and Property, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #5: Natural Resource Protection
Priority: High
Cost/Benefit Outlook: Good to complete assessment costs. Mitigation depends on value of infrastructure protected.
Status: A pilot project has been completed. As funding is available more work will be completed to implement this action item.

LT-DR #2 Obtain funds to develop groundwater plans, ensure water supply sustainability and implement recharge projects.

Ideas for Implementation:

- Complete a comprehensive groundwater study by the USGS with optimization modeling (analysis of the short and long-term effects of various water-management alternatives).
- Utilize completed studies to develop defensible scientific data on the basin's hydrology.
- Develop agreements and coordination to ensure that water managers and stakeholders make informed decisions on how water is managed in the Basin.
- Funding from the State of Oregon and stakeholders would be required to generate match funding to complete the study.

Coordinating Organization: Umatilla County
Timeline: 5-10 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #5: Natural Resource Protection
Priority: High
Cost/Benefit Outlook: Dependent upon State of Oregon or local government to generate cost share to match any federal commitment.
Status: State funding has been secured and awaiting federal program money.

LT-DR #3. Complete settlement of CTUIR water claims and maximize benefit of Phase III exchange infrastructure.

Ideas for Implementation:

- Support efforts by the CTUIR, Westland Irrigation District (WID), and State of Oregon to plan and implement Phase III of the Umatilla Basin Project.
- Coordinate to assure that the Phase III project would provide Columbia River water to WID and others in a bucket-for-bucket exchange for the district's McKay Reservoir and Umatilla River water.
- Investigate the possibility that McKay and Umatilla River water could be used by the CTUIR for fishery augmentation and for consumptive use on the Reservation to meet CTUIR water needs.
- Investigate an added feature to Phase III for the use of the infrastructure to deliver and store Columbia River water to help offset some of the water deficits in the CGAs. Such use of the infrastructure could increase the benefits of the Phase III project and distribute the financial obligation among more users.

Coordinating Organization: Umatilla County
Timeline: 5-15 years
Plan Goals Addressed: #1: Protect Life and Property, #2: Public Outreach, #3: Planned Prevention, #4: Agency/ Citizen Coordination, #5: Natural Resource Protection
Priority: High
Cost/Benefit Outlook: High cost of project (+/- $250 million) may impact cost benefit potential.
Status: Federal negotiations have begun to settle the water claims.

Chapter 6. GLOSSARY

ARC: American Red Cross

BIA: United States Bureau of Indian Affairs

BLM: United States Bureau of Land Management

CFR: Certificate of Federal Record

CGA: State of Oregon designated Critical Groundwater Area

CSEPP: Chemical Stockpile Emergency Preparedness Program

CTUIR: Confederated Tribes of the Umatilla Indian Reservation

DHS: Department of Homeland Security

CWPP: Community Wildfire Protection Plan

Dispatch: Umatilla County 911 Dispatch

DLCD: Oregon Department of Land Conservation and Development

DOGAMI: Oregon Department of Geology and Mineral Industries

DSL: Oregon Department of State Lands

EM: Emergency Management

EOC: Umatilla County Emergency Operations Center

FEMA: Federal Emergency Management Agency

FEMIS: Federal Emergency Management Information System

FIRM: Flood Insurance Rate Map

GIS: Global Information Systems

JIC: Umatilla County Joint Information Center

NOAA: National Oceanic and Atmospheric Administration

NOAA NWS: National Oceanic and Atmospheric Administration, National Weather Service

NRCS: United States Natural Resource Conservation Service

OAR: Oregon Administrative Rule

OECDD: Oregon Economic and Community Development Department

ODA: Oregon Department of Agriculture

ODOT: Oregon Department of Transportation

ODF: Oregon Department of Forestry

ODF&W: Oregon Department of Fish and Wildlife

OEM: Oregon Office of Emergency Management

OPDR: Oregon Partnership for Disaster Resilience
ORS: Oregon Revised Statute

OSP: Oregon State Police

OWRD: Oregon Water Resources Department

Phase III: Phase III of the Umatilla Basin Project

Response Agencies: Departments and agencies directly involved with emergency response

RS&D: Umatilla County Department of Resource Services and Development

Special Districts: Districts that were formed or operate for a specific purpose (e.g. Irrigation Districts)

SWCD: Umatilla County Soil and Water Conservation District

TAR: Tone Alert Radio

Task Force: Umatilla County Critical Groundwater Task Force

UBWC: Umatilla Basin Watershed Council

UCEM: Umatilla County Emergency Management

USACE: United States Army Corps of Engineers

USBR: United States Bureau of Reclamation

USDA: United States Department of Agriculture

USFS: United States Forest Service

USFWS: United States Fish and Wildlife Service

USGS: United States Geological Survey

Wheat League: Oregon Wheat League

WWBWC: Walla Walla Basin Watershed Council

Chapter 7. RESOURCE DIRECTORY

The following directory includes local, regional, state and federal resources for some of the hazards addressed in the plan. The directory also includes key publications and additional resources. This directory was developed by the Community Service Center's Oregon Natural Hazards Workgroup at the University of Oregon for use by Pre-Disaster Mitigation Communities.

State Resources

Department of Land Conservation and Development (DLCD)

DLCD administers the state's Land Use Planning Program. The program is based on 19 Statewide Planning Goals, including Goal 7, related to natural hazards, with flood as its major focus. DLCD serves as the federally designated agency to coordinate floodplain management in Oregon. They also conduct various landslide related mitigation activities. In order to help local governments address natural hazards effectively, DLCD provides technical assistance such as conducting workshops, reviewing local land use plan amendments, and working interactively with other agencies.

Contact: Natural Hazards Program Manager, DLCD
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website: http://www.oregon.gov/LCD/HAZ/index.shtml
Oregon Floodplain Coordinator: (503) 373-0050 ext. 250

Oregon State Police (OSP)-Office of Emergency Management (OEM)
OEM administers FEMA's Hazard Mitigation Grant Program, which provides post-disaster monies for acquisition, elevation, relocation, and demolition of structures located in the floodplain. OEM also administers FEMA's Flood Mitigation Assistance Program. This program provides assistance for NFIP insured structures only. OEM also helps local jurisdictions to develop hazard mitigation plans. OEM is heavily involved in flood damage assessment and works mainly with disaster recovery and hazard mitigation programs. OEM provides training for local governments through workshops on recovery and mitigation. OEM also helps implement and manage federal disaster recovery programs.

Contact: Office of Emergency Management
Address: PO Box 14370, Salem, OR 97309-5062
Phone: (503) 378-2911
Fax: (503) 373-7833
Website: http://www.oregon.gov/OOHS/OEM/index.shtml
OEM Hazard Mitigation Officer: (503) 378-2911 ext. 22247
Recovery and Mitigation Specialist: (503) 378-2911 ext. 22240

Oregon Department of Geology and Mineral Industries (DOGAMI)

The mission of the Department of Geology and Mineral Industries is to serve a broad public by providing a cost-effective source of geologic information for Oregonians and to use that information in partnership to reduce the future loss of life and property due to potentially devastating earthquakes, tsunamis, landslides, floods, and other geologic hazards. The Department has mapped earthquake hazards in most of western Oregon.

Contact: Deputy State Geologist, Seismic, Tsunami, and Coastal Hazards Team Leaders
Address: 800 NE Oregon St., Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: http://www.oregongeology.com

Federal Resources

Federal Emergency Management Agency (FEMA)
FEMA provides maps of flood hazard areas, various publications related to flood mitigation, funding for flood mitigation projects, and technical assistance. FEMA also operates the National Flood Insurance Program. FEMA's mission is “to reduce loss of life and property and protect the nation's critical infrastructure from all types of hazards through a comprehensive, risk-based, emergency management program of mitigation, preparedness, response and recovery.” FEMA Region X serves the northwestern states of Alaska, Idaho, Oregon, and Washington.
Contact: FEMA, Federal Regional Center, Region 10
Address: 228th St. SW, Bothell, WA 98021-9796
Phone: (425) 487-4678
Website: http://www.fema.gov

United States Geological Survey (USGS)
The USGS website provides current stream flow conditions at USGS gauging stations in Oregon and throughout the Pacific Northwest. The Oregon USGS office is responsible for water-resources investigations for Oregon and part of southern Washington. Their office cooperates with more than 40 local, state, and federal agencies in Oregon. Cooperative activities include water-resources data collection and interpretive water-availability and water-quality studies.
Contact: USGS Oregon District Office
Address: 10615 S.E. Cherry Blossom Dr., Portland, OR 97216
Phone: (503) 251-3200
Fax: (503) 251-3470
Website: http://oregon.usgs.gov
Email: dc_or@usgs.gov

National Oceanic and Atmospheric Administration (NOAA)
NOAA's historical role has been to predict environmental changes, protect life and property, provide decision makers with reliable scientific information, and foster global environmental stewardship.
Contact: National Oceanic and Atmospheric Administration
Address: 14th Street & Constitution Avenue, NW, Room 6013, Washington, DC 20230
Phone: (202) 482-6090
Fax: (202) 482-3154
Website: http://www.noaa.gov
Email: answers@noaa.gov

National Weather Service, Insert appropriate bureau location here (Portland, Medford, Pendleton, Boise)
The National Weather Service provides flood watches, warnings, and informational statements for rivers in Umatilla County. Determine and identify which NWS Bureau serves your community.
Contact: National Weather Service, Portland Bureau
Address: P.O. Box 2946, Portland, OR 97208-2946
Phone: (503) 261-9246 or (503) 261-9247
Fax: (503) 808-4875
Website:
http://www.wrh.noaa.gov/pqr/

Contact: National Weather Service, Medford Bureau
Address: 4003 Cirrus Drive, Medford, OR 97504-4198
Phone: (541) 776-4303
Website:
http://www.wrh.noaa.gov/mfr/

Contact: National Weather Service, Pendleton Bureau
Address: 2001 NW 56th Drive, Pendleton, OR 97801
Phone: (541) 276-7832
Website:
http://www.wrh.noaa.gov/pdt/

Contact: National Weather Service, Boise Bureau
Address: NIFC Building 3807, Boise, ID 83705-5354
Phone: (208) 334-9860
Website:
http://www.wrh.noaa.gov/

Additional Resources

American Red Cross

The American Red Cross is a humanitarian organization, led by volunteers, that provides relief to victims of disasters and helps people prevent, prepare for, and respond to emergencies. The Oregon Trail Chapter was chartered as a Red Cross unit in 1917. The chapter serves the residents of Clackamas, Columbia, Multnomah, Washington, Yamhill, and Tillamook counties. The Oregon Trail Chapter provides a variety of community services which are consistent with the Red Cross mission and meet the specific needs of this area, including disaster planning, preparedness, and education. To find the contact information for your location Red Cross Chapter, see:
http://www.redcross.org/where/chapts.html#OR
Contact:
Address:
Phone:
Fax:
Website:
Email:

Institute for Business & Home Safety (IBHS)
IBHS was created as an initiative of the insurance industry to reduce damage and losses caused by natural disasters. This website provides educational resources and on-line publications for insurers, businesses, and homeowners who are interested in taking the initiative to minimize future damages and losses.
Contact: Institute for Business and Home Safety
Address: 4775 E. Fowler Avenue, Tampa, FL 33617
Phone: (813) 286-3400
Fax: (813) 286-9960
E-mail: info@ibhs.org
Website: http://www.ibhs.org/

Flood Mitigation Resources

County Resources

Insert community flood mitigation resources and contact information

Regional Resources

Insert regional flood mitigation resources and contact information

State Resources

Oregon Department of Fish and Wildlife (ODFW)

ODFW's mission is to protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations. ODFW regulates stream activity and engages in stream enhancement activities.

Contact: ODFW
Address: 3406 Cherry Avenue N.E., Salem, OR 97303
Phone: (503) 947-6000
Website: http://www.dfw.state.or.us/
Email: Odfw.Info@state.or.us

Oregon Department of State Lands (DSL)

DSL is a regulatory agency, responsible for administration of Oregon's Removal-Fill Law. This law is intended to protect, conserve, and make the best use of the state's water resources. It generally requires a permit from DSL to remove, fill, or alter more than 50 cubic yards of material within the bed or banks of waters of the state. Exceptions are in state scenic waterways and areas designated essential salmon habitat, where a permit is required for all in-stream activity, regardless of size. DSL and the US Army Corps of Engineers may issue these permits jointly.

Contact: Department of State Lands
Address: 775 Summer Street NE, Suite 100, Salem, OR 97301-1279
Phone: (503) 378-3805
Fax: (503) 378-4844
Website: http://statelands.dsl.state.or.us/
Assistant Director: (503) 378-3805, ext. 279
Western Region Manager: (503) 378-3805, ext. 246

Oregon Water Resources Department (WRD)

The WRD's mission is to serve the public by practicing and promoting wise long-term water management. The WRD provides services through 19 water master offices throughout the state. In addition, five regional offices provide services based on geographic regions. The Department's main administration is performed from the central office in Salem.

Contact: WRD
Address: 725 Summer Street NE, Suite A, Salem, OR 97301-1271
Phone: (503) 986-0900
Website: http://www.wrd.state.or.us/OWRD/index.shtml

Federal Resources

Bureau of Reclamation

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. The Bureau of Reclamation owns Scoggins Dam in Washington County and prepares emergency action plans for events at the dam.

Contact: Bureau of Reclamation, Pacific Northwest Region
Address: 1150 N. Curtis Road, Boise, ID 83706

Phone: (208) 378-5012
Website:
http://137.77.133.1/pn/index.html

Army Corps of Engineers
The Corps of Engineers administers a permit program to ensure that the nation's waterways are used in the public interest. Any person, firm, or agency planning to work in waters of the United States must first obtain a permit from the Army Corps of Engineers. In Oregon, joint permits may be issued with the Division of State Lands. The Corps is responsible for the protection and development of the nation's water resources, including navigation, flood control, energy production through hydropower management, water supply storage and recreation.
Contact: US Army Corps of Engineers-Portland District, Floodplain Information Branch
Address: P.O. Box 2946, Portland, OR 97208-2946
Phone: (503) 808-5150
Website:
http://www.nwp.usace.army.mil/

Natural Resources Conservation Service (NRCS), US Department of Agriculture (USDA)
NRCS provides a suite of federal programs designed to assist state and local governments, and landowners in mitigating the impacts of flood events. The Watershed Surveys and Planning Program and the Small Watershed Program provide technical and financial assistance to help participants solve natural resource and related economic problems on a watershed basis. The Wetlands Reserve Program and the Flood Risk Reduction Program provide financial incentives to landowners to put aside land that is either a wetland resource or experiences frequent flooding. The Emergency Watershed Protection Program (EWP) provides technical and financial assistance for clearing debris from clogged waterways, restoring vegetation, and stabilizing riverbanks. The measures taken under the EWP must be environmentally and economically sound and generally benefit more than one property. Insert Local NRCS contact information; see the following website for local information: http://offices.sc.egov.usda.gov/locator/app?agency=nrcs
Contact: USDA-NRCS
Address:
Phone:
Fax:
Website:
Additional Resources

The National Flood Insurance Program
The National Flood Insurance Program (NFIP) Website is a subsection of the Federal Emergency Management Agency (FEMA) site (http://www.fema.gov). The NFIP information is intended for both the general public and the many organizations and agencies participating in the program. It includes information about the NFIP and other flood disaster assistance available from the Federal Government. It also provides access to the newly revised NFIP booklet: Answers to Questions about the National Flood Insurance Program.
Contact: The National Flood Insurance Program
Phone: (888) FLOOD29 or (800) 427-5593

Website:
http://www.fema.gov/business/nfip/index.shtm

The Association of State Floodplain Managers
The Association of State Floodplain Managers is an organization of professionals involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning, and recovery. ASFPM fosters communication among those responsible for flood hazard activities, provides technical advice to governments and other entities about proposed actions or policies that will affect flood hazards, and encourages flood hazard research, education, and training. The ASFPM Web site includes information on how to become a member, the organization's constitution and bylaws, directories of officers and committees, a publications list, information on upcoming conferences, a history of the association, and other useful information and Internet links. List any community staff that are members of ASFPM.

Contact: The Association of State Floodplain Managers
Address: 2809 Fish Hatchery Road, Madison, WI 53713
Phone: (608) 274-0123
Website: http://www.floods.org
USGS Water Resources
This web page offers current US water news; extensive current (including real-time) and historical water data; numerous fact sheets and other publications; various technical resources; descriptions of ongoing water survey programs; local water information; and connections to other sources of water information.

Contact: USGS Water Resources
Phone: (503) 251-3200
Website: http://or.water.usgs.gov/
Email: info-or@usgs.gov
Office of Hydrologic Development, National Weather Service
The National Weather Service's Office of Hydrologic Development (OHD) and its Hydrological Information Center offer information on floods and other aquatic disasters. This site offers current and historical data including an archive of past flood summaries, information on current hydrologic conditions, water supply outlooks, an Automated Local Flood Warning Systems Handbook, Natural Disaster Survey Reports, and other scientific publications on hydrology and flooding.

Contact: Office of Hydrologic Development, National Weather Service
Website:
http://www.nws.noaa.gov/oh/
The Floodplain Management Association
The Floodplain Management website was established by the Floodplain Management Association (FMA) to serve the entire floodplain management community. It includes full-text articles, a calendar of upcoming events, a list of positions available, an index of publications available free or at nominal cost, a list of associations, a list of firms and consultants in floodplain management, an index of newsletters dealing with flood issues (with hypertext links if available), a section on the basics of floodplain management, a list of frequently asked questions (FAQs) about

the Website, and, of course, a copious catalog of Web links.

Contact: Floodplain Managers Association
Website: http://www.floodplain.org
Email: admin@floodplain.org
Northwest Regional Floodplain Managers Association (NORFMA)
This site is a resource for floodplains, fisheries, and river engineering information for the Northwest. This site provides technical information, articles, and Internet links in the field of floodplain and fisheries management
.
Contact: Northwest Regional Floodplain Managers Association
Website: http://www.norfma.org/

Publications
Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).
Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and plan evaluation tools. The document was written for local government employees and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. This document is available online. You can also write, call, or fax to obtain this document:

Contact: Natural Hazards Program Manager, Department of Land Conservation and Development
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website:
http://www.oregon.gov/LCD/HAZ/publications.shtml

NFIP Community Rating System Coordinator's Manual. FEMA/NFIP. Indianapolis, IN.
This informative brochure explains how the Community Rating System works and what the benefits are to communities. It explains in detail the CRS point system, and what activities communities can pursue to earn points. These points then add up to the "rating" for the community, and flood insurance premium discounts are calculated based upon that "rating." The brochure also provides a table on the percent discount realized for each rating (1-10). Instructions on how to apply to be a CRS community are also included.
Contact: NFIP Community Rating System
Phone: (800) 480-2520 or (317) 848-2898
Website:
http://training.fema.gov/EMIWeb/CRS/ (select resources)

Floodplain Management: A Local Floodplain Administrator's Guide to the NFIP. FEMA-Region 10. Bothell, WA.
This document discusses floodplain processes and terminology. It contains floodplain management and mitigation strategies, as well as information on the NFIP, CRS, Community Assistance

Visits, and floodplain development standards.
Contact: National Flood Insurance Program
Phone: (800) 480-2520
Website:
http://www.oregon.gov/LCD/HAZ/docs/floods/localofficial_4th.pdf

Reducing Losses in High Risk Flood Hazard Areas: A Guidebook for Local Officials, (February 1987), FEMA-116.
This guidebook offers a table on actions that communities can take to reduce flood losses. It also offers a table with sources for floodplain mapping assistance for the various types of flooding hazards. There is information on various types of flood hazards with regard to existing mitigation efforts and options for action (policy and programs, mapping, regulatory, non-regulatory). Types of flooding which are covered include alluvial fan, areas behind levees, areas below unsafe dams, coastal flooding, flash floods, fluctuating lake level floods, ground failure triggered by earthquakes, ice jam flooding, and mudslides.
Contact: Federal Emergency Management Agency
Phone: (800) 480-2520
Website:
http://www.fema.gov/hazard/flood/pubs/lib116.shtm

Oregon Model Flood Damage Prevention Ordinance, (January 1999), FEMA/DLCD.
This is an example of how to write an ordinance that complies with NFIP/FEMA standards. Communities can simply adopt this ordinance, word for word, filling in the blanks specific to their community or jurisdiction.
Contact: Department of Land Conservation and Development
Phone: (503) 373-0050
Website:
http://www.oregon.gov/LCD/HAZ/docs/floods/floodord.pdf

Wildfire Resource Directory
County Resources
Insert community wildfire mitigation resources and contact information
Regional Resources
Insert regional wildfire mitigation resources and contact information
State Resources

Oregon Department of Consumer and Business Services
The Building Codes Division of Oregon's Department of Consumer and Business Services is responsible for administering statewide building codes. Its responsibilities include adoption of statewide construction standards that help create disaster-resistant buildings, particularly for flood, wildfire, wind, foundation stability, and seismic hazards. Information about wildfire-related building codes is found through this department.
Contact: Building Codes Division
Address: 1535 Edgewater St. NW, P.O. Box 14470, Salem, OR 97309
Phone: (503) 373-4133
Fax: (503) 378-2322
Website:
http://www.cbs.state.or.us/external/bcd

Oregon Department of Forestry (ODF)
ODF's Fire Prevention Unit is involved in interface wildfire mitigation and provides information about Oregon's Wildfire Hazard Zones. The Protection

From Fire section of the ODF website includes Oregon-specific fire protection resources. Wildfire condition reports can be accessed on the website as well. ODF's Protection from Fire Program works to do the following:

- Clarify roles of ODF, landowners, and other agencies in relation to wildland fire protection in Oregon;
- Strengthen the role of forest landowners and the forest industry in the protection system;
- Understand and respond to needs for improving forest health conditions and the role/use of prescribed fire in relation to mixed ownerships, forest fuels and insects and disease; and
- Understand and respond to needs for improving the wildland/urban interface situation.

Contact: Oregon Department of Forestry, Fire Prevention Unit
Address: 2600 State Street, Salem, Oregon 97310
Phone: (503) 945-7440
Website: http://www.oregon.gov/ODF/FIRE/fire_protection.shtml

Office of the State Fire Marshal (OSFM)
The Prevention Unit of Oregon's Office of the State Fire Marshal contains 19 Deputy State Fire Marshals located in various regions. The responsibilities of these deputies include public education for local fire districts and inspection of businesses, public assemblies, schools, daycare centers, and adult foster homes. The State Fire Marshal's Community Education Services unit works to keep Oregonians safe from fires and injury by providing them with the knowledge to protect themselves and their property.

Contact: Oregon State Fire Marshal
Address: 4760 Portland Road NE, Salem, Oregon 97305-1760
Phone: (503) 378-3473
Fax: (503) 373-1825
Website: http://159.121.82.250/
Oregon Laws on Fire Protection: http://159.121.82.250/SFM_Admin/firelaws.htm
Email: Oregon.sfm@state.or.us

Federal Resources and Programs

Federal Wildland Fire Policy, Wildland/Urban Interface Protection
This is a report describing federal policy and interface fire. Areas of needed improvement are identified and addressed through recommended goals and actions.
Website: http://www.fs.fed.us/fire/management/policy.html

National Fire Protection Association (NFPA)
This is the principal federal agency involved in the National Wildland/Urban Interface Fire Protection Initiative. NFPA has information on the Initiative's programs and documents. Other members of the initiative include: the National Association of State Foresters, the US Department of Agriculture Forest Service, the US Department of the Interior, and the United States Fire Administration.
Contact: Public Fire Protection Division
Address: 1 Battery March Park, P.O. Box 9101, Quincy, MA 02269-9101
Phone: (617) 770-3000
Website: www.nfpa.org

National Interagency Fire Center (NIFC)
The NIFC in Boise, Idaho is the nation's support center for wildland firefighting. Seven federal agencies work together to coordinate and support wildland fire and disaster operations. These agencies include the Bureau of Indian Affairs, Bureau of Land Management, Forest Service, Fish and Wildlife Service, National Park Service, National Weather Service, and Office of Aircraft Services.
Contact: National Interagency Fire Center
Address: 3833 S. Development Avenue, Boise, Idaho 83705-5354
Phone: (208) 387-5512
Website: http://www.nifc.gov/

United States Fire Administration (USFA) of the Federal Emergency Management Agency (FEMA)
As an entity of the Federal Emergency Management Agency, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies through leadership, advocacy, coordination, and support.
Contact: USFA, Planning Branch, Mitigation Directorate
Address: 16825 S. Seton Ave., Emmitsburg, MD 21727
Phone: (301) 447-1000
Website:
http://www.fema.gov/hazard/wildfire/index.shtm - Wildfire Mitigation Planning

http://www.usfa.fema.gov/index.htm - USFA Homepage

http://www.usfa.fema.gov/wildfire/- USFA Resources on Wildfire

United States Forest Service (USFS)
The USFS is a federal land management organization established to manage the nation's federally owned forests. As part of the Department of Agriculture, it provides timber for people, forage for cattle and wildlife, habitat for fish, plants, and animals, and recreation lands throughout the country.
The USFS offers a possible link from local jurisdictions to federal grant programs.
Contact: USDA Forest Service - Pacific Northwest Region
Address: 333 SW First Avenue, Portland, Oregon 97204-3440;
P.O. Box 3623, Portland, OR 97208-3623
Phone: 503-808-2468
Website:
http://www.fs.fed.us/r6/welcome.htm
Additional Resources
FireFree Program to Promote Home Safety
In a pioneering effort to address wildfire danger in Bend, Oregon, four local agencies and a Fortune 500 corporation joined together to create "FireFree! Get In The Zone," a public education campaign designed to increase resident participation in wildfire safety and mitigate losses. Spearheaded by SAFECO Corporation, the partnership includes the Bend Fire Department, Deschutes County Rural Fire Protection District #2, Bend City Planning, and The Deschutes National Forest. The Oregon Department of Forestry and a number of local government agencies and businesses have joined the program.
Contact: FireFree
Address: 63377 Jamison St., Bend, OR 97701
Phone: (541) 318-0459
E-mail: dcrfpd2@dcrfpd2.com

Website: http://www.firefree.org

Firewise – The National Wildland/Urban Interface Fire program
Firewise maintains a Website designed for people who live in wildfire- prone areas, but it also can be of use to local planners and decision makers. The site offers online wildfire protection information and checklists, as well as listings of other publications, videos, and conferences.
Contact: Firewise
Address: PO Box 9101, Quincy, MA 02269-9101
Phone: (617) 984-7056
E-mail: firewise@firewise.org
Website: http://www.firewise.org/

Publications
National Fire Protection Association Standard 299: Protection of Life and Property from Wildfire. National Wildland/Urban Interface Fire Protection Program, (1991). National Fire Protection Association, Washington, D.C.
This document, developed by the NFPA Forest and Rural Fire Protection Committee, provides criteria for fire agencies, land use planners, architects, developers, and local governments to use in the development of areas that may be threatened by wildfire. To obtain this resource:
Contact: National Fire Protection Association Publications
Phone: (800) 344-3555
Website: http://www.nfpa.org or http://www.firewise.org

An International Collection of Wildland-Urban Interface Resource Materials (Information Report NOR-X-344). Hirsch, K., Pinedo, M., & Greenlee, J. (1996). Edmonton, Alberta: Canadian Forest Service.
This is a comprehensive bibliography of interface wildfire materials. Over 2,000 resources are included, grouped under the categories of general and technical reports, newspaper articles, and public education materials. The citation format allows the reader to obtain most items through a library or directly from the publisher. The bibliography is available in hard copy or diskette at no cost. It is also available in downloadable PDF form. To obtain this resource:
Contact: Canadian Forest Service, Northern Forestry Centre, I-Zone Series
Phone: (780) 435-7210
Website: http://www.pfc.cfs.nrcan.gc.ca/cgi-bin/bstore/catalog_e.pl?catalog=11794
Wildland/Urban Interface Fire Hazard Assessment Methodology. National Wildland/Urban Interface Fire Protection Program, (1998), NFPA, Washington, D.C. To obtain this resource:
Contact: Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
Website: http://www.firewise.org

Fire Protection in the Wildland/Urban Interface: Everyone's Responsibility. National Wildland/Urban Interface Fire Protection Program. (1998). Washington, D.C.: Author. To obtain this resource:
Contact: Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
Website: http://www.firewise.org

Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).

Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and plan evaluation tools. The document was written for local staffs and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. This document is available online. You can also write, call, or fax to obtain this document:
Contact: Natural Hazards Program Manager
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website: http://www.oregon.gov/LCD/HAZ/index.shtml

Burning Questions. A Social Science Research Plan for Federal Wildland Fire Management, Machlis, G., Kaplan, A., Tuler, S., Bagby, K., and McKendry, J. (2002) National Wildfire Coordinating Group.
The plan covers a wide range of topics and questions related to the human dimensions of federal wildland fire management. Both the beneficial and harmful affects of wildland fire are considered. The plan includes research in the social sciences or anthropology, economics, geography, psychology, political science, and sociology, as well as interdisciplinary fields of research. The plan is national in scale but recognizes the importance of regional variation in wildland fire issues.
Contact: Cooperative Park Studies Unit
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (208) 885-7054
Fax: (503) 378-6033
Website: http://www.psu.uidaho.edu/

Severe Weather Event Resource Directory
County Resources
Insert community multi-hazard mitigation resources and contact information
Regional Resources
Insert community multi-hazard mitigation resources and contact information
State Resources
Oregon Climate Service
The Oregon Climate Service collects, manages, and maintains Oregon weather and climate data. OCS provides weather and climate information to those within and outside the state of Oregon and educates the citizens of Oregon on current and emerging climate issues. OCS also performs independent research related to weather and climate issues.
Contact: Oregon Climate Service
Address: Oregon Climate Service, Oregon State University
Strand Ag Hall Room 316, Corvallis, OR 97331-2209
Phone: (541) 737-5705
Website: http://www.ocs.orst.edu
Email: oregon@oce.orst.edu

Additional Resources
Public Assistance Debris Management Guide, Federal Emergency Management Agency (July 2000).

The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and county emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The Public Assistance Debris Management Guide is available in hard copy or on the FEMA website.

Contact: FEMA Distribution Center
Address: 130 228th Street, SW, Bothell, WA 98021-9796
Phone: (800) 480-2520
Fax: (425) 487-4622
Website: http://www.fema.gov/government/grant/pa/dmgtoc.shtm

Landslide Resource Directory

County Resources

Insert community multi-hazard mitigation resources and contact information

Regional Resources

Insert community multi-hazard mitigation resources and contact information

State Resources

Oregon Department of Forestry (ODF)

The mission of the Oregon Department of Forestry is to serve the people of Oregon through the protection, management, and promotion of a healthy forest environment, which will enhance Oregon's livability and economy for today and tomorrow. ODF regulates forest operations to reduce the risk of serious injury or death from rapidly moving landslides related to forest operations, and assists local governments in the siting review of permanent dwellings on and adjacent to forestlands in further review areas.

Contact: Oregon Department of Forestry
Address: 2600 State Street, Salem OR 97310
Phone: (503) 945-7212
Website: http://www.odf.state.or.us

Oregon Department of Forestry Debris Flow Warning Page

The ODF debris flow warning page provides communities with up-to-date access to information regarding potential debris flows. As the lead agency, ODF is responsible for forecasting and measuring rainfall from storms that may trigger debris flows. Advisories and warnings are issued as appropriate. Information is broadcast over NOAA weather radio and on the Law Enforcement Data System. DOGAMI provides additional information on debris flows to the media that convey the information to the public. ODOT also provides warnings to motorists during periods determined to be of highest risk for rapidly moving landslides along areas on state highways with a history of being most vulnerable. Information is available on the ODF website at www.odf.state.or.us.

Oregon Department of Geology and Mineral Industries (DOGAMI)

DOGAMI is an important agency for landslide mitigation activities in Oregon. Some key functions of DOGAMI are development of geologic data, producing maps, and acting as lead regulator for mining and drilling for geological

resources. The agency also provides technical resources for communities and provides public education on geologic hazards. DOGAMI provides data and geologic information to local, state, and federal natural resource agencies, industry, and private groups.
Contact: DOGAMI
Address: 800 NE Oregon Street, Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: www.oregongeology.com
Email: info@naturenw.org

Nature of the Northwest
Oregon Department of Geology and Mineral Industries and the USDA Forest Service jointly operate the Nature of the Northwest Information Center. The Center offers a selection of maps and publications from state, federal, and private agencies.
Contact: The Nature of the Northwest Information Center
Address: 800 NE Oregon Street #5, Suite 177, Portland, Oregon 97232
Phone: (503) 872- 2750
Fax: (503) 731-4066
Website: http://www.naturenw.org
Email: Nature.of.Northwest@state.or.us

Oregon Department of Transportation (ODOT)
ODOT provides warnings to motorists during periods determined to be of highest risk of rapidly moving landslides along areas on state highways with a history of being most vulnerable to rapidly moving landslides. ODOT also monitors for landslide activity and responds to slide events on state highways.
Contact: ODOT Transportation Building
Address: 355 Capitol St. NE, Salem, OR 97310
Phone: (888) 275-6368
Website: http://www.odot.state.or.us

Portland State University, Department of Geology
Portland State University conducts research and prepares inventories and reports for communities throughout Oregon. Research and projects conducted through the Department of Geology at Portland State University include an inventory of landslides for the Portland metropolitan region after the 1996 and 1997 floods and a subsequent susceptibility report and planning document for Metro in Portland.
Contact: Portland State University, Department of Geology
Address: 17 Cramer Hall; 1721 SW Broadway, Box 751, Portland, OR 97207
Phone: (503) 725-3389
Website: http://www.geol.pdx.edu

Federal Resources
Natural Resource Conservation Service (NRCS)
The NRCS produces soil surveys. These may be useful to local governments who are assessing areas with potential development limitations including steep slopes and soil types. They operate many programs dealing with the protection of natural resources.
Contact: NRCS, Oregon Branch
Address: 101 S.W. Main Street, Suite 1300, Portland, OR 97204
Phone: (503) 414-3200
Fax: (503) 414-3103
Website: http://www.or.nrcs.usda.gov

US Geological Survey, National Landslide Information Center (NLIC)
The NLIC website provides good information on the programs and resources regarding landslides. The page includes information on the National Landslide Hazards Program Information Center, a bibliography, publications, and current projects. USGS scientists are working to reduce long-term losses and casualties from landslide hazards through better understanding of the causes and mechanisms of ground failure both nationally and worldwide.
Contact: National Landslide Information Center
Phone: (800) 654-4966

Website:
http://www.usgs.gov/hazards/landslides/

Additional Resources

American Planning Association (APA)
The APA's research department embarked on a program to bring together solutions from multiple disciplines into a single source. It will help serve local planning efforts in identifying landslide hazards during the planning process so as to minimize exposure to landslide risks. The APA's website highlights planning efforts to reduce risk and loss from landslides.
Contact: Principal Investigator, Landslides Project
Address: Research Department, American Planning Association
122 S. Michigan Ave., Suite 1600
Chicago, Illinois 60603-6107
Phone: (312) 431-9100
Fax: (312) 431-9985

Website:
http://www.planning.org/landslides
Email: landslides@planning.org

State of Washington, Department of Ecology
The Washington State Department of Ecology has a landslide website with tips for reducing risk, warning signs, and maps.
Contact: Department of Ecology
Address: PO Box 47600, Olympia, WA 98504-7600
Website:
http://www.ecy.wa.gov/programs/sea/landslides
Email: hshi461@ecy.wa.gov

Publications

Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).
Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and plan evaluation tools. The document was written for local government employees and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. You can write, call, fax, or go on-line to obtain this document.
Contact: Natural Hazards Program Manager, DLCD

Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website:
http://www.oregon.gov/LCD/HAZ/index.shtml

Mileti, Dennis, Disasters by Design: A Reassessment of Natural Hazards in the United States (1999) Joseph Henry Press.

This book offers a way to view, study, and manage hazards in the United States that will help foster disaster-resilient communities, higher environmental quality, inter- and intragenerational equity, economic sustainability, and an improved quality of life. The volume provides an overview of what is known about natural hazards, recovery, and mitigation; reveals how research findings have been translated into policies and programs; and advances a sustainable hazard mitigation research agenda.

Olshansky, Robert B., Planning for Hillside Development (1996) American Planning Association.

This document describes the history, purpose, and functions of hillside development and regulation and the role of planning, and provides excerpts from hillside plans, ordinances, and guidelines from communities throughout the US.

Olshansky, Robert B. & Rogers, J. David, Unstable Ground: Landslide Policy in the United States (1987) Ecology Law Quarterly.

This is about the history and policy of landslide mitigation in the US.

Public Assistance Debris Management Guide (July 2000) Federal Emergency Management Agency

The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and county emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The Guide is available in hard copy or on the FEMA website.

Contact: FEMA Distribution Center
Address: 130 228th Street, SW, Bothell, WA 98021-9796
Phone: (800) 480-2520
Website:
http://www.fema.gov/government/grant/pa/dmgtoc.shtm

USGS Landslide Program Brochure. National Landslide Information Center (NLIC), United States Geologic Survey

The brochure provides good, general information in simple terminology on the importance of landslide studies and a list of databases, outreach, and exhibits maintained by the NLIC. The brochure also includes information on the types and causes of landslides, rockfalls, and flows.

Contact: USGS- MS 966, Box 25046
Address: Denver, Federal Center, Denver, CO 80225
Phone: (800) 654-4966
Web: http://geohazards.cr.usgs.gov/

Earthquake

County Resources

Insert community multi-hazard mitigation resources and contact information

Regional Resources
Insert community multi-hazard mitigation resources and contact information

State Resources

Oregon Department of Consumer & Business Services-Building Codes Division

The Building Codes Division (BCD) sets statewide standards for design, construction, and alteration of buildings that include resistance to seismic forces. BCD is active on several earthquake committees and funds construction related continuing education programs. BCD registers persons qualified to inspect buildings as safe or unsafe to occupy following an earthquake and works with OEM to assign inspection teams where they are needed.

Contact: Building Codes Division
Address: 1535 Edgewater St. NW, P.O. Box 14470, Salem, Oregon 97309
Phone: (503) 378-4133
Fax: (503) 378-2322
Website: http://www.cbs.state.or.us/external/bcd/

The Nature of the Northwest Information Center

The Nature of the Northwest Information Center is operated jointly by the Oregon Department of Geology and Mineral Industries and the USDA Forest Service. It offers selections of maps and publications from state, federal, and private agencies. DOGAMI's earthquake hazard maps can be ordered from this site.

Address: Suite 177, 800 NE Oregon Street # 5, Portland, Oregon 97232
Phone: (503) 872-2750
Fax: (503) 731-4066
Email: Nature.of.NW@state.or.us
Website: http://www.naturenw.org/geo-earthquakes.htm

Federal Resources

US Geological Survey (USGS)

The USGS is an active seismic research organization that also provides funding for research. (For an example of such research, see Recommended Seismic Publications below).

Contact: USGS, National Earthquake Information Center
Address: Box 25046; DFC, MS 967; Denver, Colorado 80225
Phone: (303) 273-8500
Fax: (303) 273-8450
Website: http://neic.usgs.gov

Building Seismic Safety Council (BSSC)

The Building Seismic Safety Council (BSSC), established by the National Institute of Building Sciences (NIBS), deals with complex regulatory, technical, social, and economic issues and develops and promotes building earthquake risk mitigation regulatory provisions for the nation.

Address: 1090 Vermont Avenue, NW, Suite 700, Washington, DC 20005
Phone: (202) 289-7800
Fax: (202) 289-1092
Website: http://www.bssconline.org/

Western States Seismic Policy Council (WSSPC)

The WSSPC is a regional organization that includes representatives of the earthquake programs of thirteen states (Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon Utah, Washington, and Wyoming), three U.S. territories

(American Samoa, Commonwealth of the Northern Mariana Islands and Guam), one Canadian Province (British Columbia), and one Canadian Territory (Yukon). The primary aims of the organization have been: to improve public understanding of seismic risk; to improve earthquake preparedness; and, to provide a cooperative forum to enhance transfer of mitigation technologies at the local, state, interstate, and national levels.
The mission of the Council is to provide a forum to advance earthquake hazard reduction programs throughout the western region and to develop, recommend, and present seismic policies and programs through information exchange, research and education.
Contact: WSSPC, Executive Director
Address: 121 Second Street, 4th Floor, San Francisco, CA 94105
Phone: (415) 974-6435
Fax: (415) 974-1747
Email: wsspc@wsspc.com
Website: http://www.wsspc.org/

Cascadia Region Earthquake Workgroup (CREW)
CREW provides information on regional earthquake hazards, facts and mitigation strategies for the home and business office. CREW is a coalition of private and public representative s working together to improve the ability of Cascadia Region communities to reduce the effects of earthquake events. Members are from Oregon, Washington, California, and British Columbia. Goals are to:

- Promote efforts to reduce the loss of life and property.
- Conduct education efforts to motivate key decision makers to reduce risks associated with earthquakes.
- Foster productive linkages between scientists, critical infrastructure provides, businesses and governmental agencies in order to improve the viability of communities after an earthquake.

Contact: CREW, Executive Director
Address: 1330A S. 2nd Street, #105, Mount Vernon, WA 97273
Phone: (360) 336-5494
Fax: (360) 336-2837
Website: http://www.crew.org/
Additional Resources
Publications
Planning for Natural Hazards: The Oregon Technical Resource Guide, Department of Land Conservation and Development (July 2000).
Produced by the Community Planning Workshop for the Department of Land Conservation and Development, this is a natural hazards planning and mitigation resource for Oregon cities and counties. It provides hazard-specific resources and plan evaluation tools. The document was written for local government employees and officials. The Technical Resource Guide includes a natural hazards comprehensive plan review, a hazard mitigation legal issues guide, and five hazard-specific technical resource guides, including: flooding, wildfires, landslides, coastal hazards, and earthquakes. You can write, call, fax, or go on-line to obtain this document.
Contact: Natural Hazards Program Manager, DLCD
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033

Website:
http://www.oregon.gov/LCD/HAZ/index.shtml

Environmental, Groundwater and Engineering Geology: Applications for Oregon – Earthquake Risks and Mitigation in Oregon, Yumei Wang, (1998) Oregon Department of Geology and Mineral Industries, Star Publishing.
This paper deals with earthquake risks in Oregon, what is being done today, and what policies and programs are in action to help prevent loss and damage from seismic events. This article also gives a good list of organizations that are doing work in this field within the state. This article is somewhat technical but provides vital information to communities around the state.

Contact: DOGAMI
Address: 800 NE Oregon St., Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: www.oregongeology.com

Special Paper 29: Earthquake damage in Oregon: Preliminary estimates of future earthquake losses, Yumei Wang, Oregon Department Of Geology And Mineral Industries.
Wang, a geotechnical engineer, analyzed all faults with a 10% chance of causing an earthquake in the next 50 years and projected potential damage. Wang stresses that these are preliminary figures. "There are two things we could not incorporate into this study that would significantly increase these figures. One is a tsunami. The other is an inventory of unreinforced brick or masonry buildings."

Contact: DOGAMI
Address: 800 NE Oregon St., Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: www.oregongeology.com
Land Use Planning for Earthquake Hazard Mitigation: A Handbook for Planners, Wolfe, Myer R. et. al., (1986) University of Colorado, Institute of Behavioral Science, National Science Foundation.
This handbook provides techniques that planners and others can utilize to help mitigate for seismic hazards. It provides information on the effects of earthquakes, sources on risk assessment, and effects of earthquakes on the built environment. The handbook also gives examples on application and implementation of planning techniques to be used by local communities.
Contact: Natural Hazards Research and Applications Information Center
Address: University of Colorado, 482 UCB, Boulder, CO 80309-0482
Phone: (303) 492-6818
Fax: (303) 492-2151
Website:
http://www.colorado.edu/UCB/Research/IBS/hazards
Using Earthquake Hazard Maps: A Guide for Local Governments in the Portland Metropolitan Region; Evaluation of Earthquake Hazard Maps for the Portland Metropolitan Region Spangle Associates, (1998/1999) Urban Planning and Research, Portola Valley, California.
These two publications are useful for local governments concerned with land use in earthquake hazard areas. The proximity of Washington County to Portland and their interactive

communities make these guides applicable to the County. The publications are written in clear and simplistic language and address issues such as how to apply earthquake hazard maps for land use decisions.
Contact: DOGAMI
Address: 800 NE Oregon St., Suite 965, Portland, Oregon 97232
Phone: (971) 673-1555
Fax: (971) 673-1562
Website: www.oregongeology.com

Public Assistance Debris Management Guide, Federal Emergency Management Agency (July 2000).
The Debris Management Guide was developed to assist local officials in planning, mobilizing, organizing, and controlling large-scale debris clearance, removal, and disposal operations. Debris management is generally associated with post-disaster recovery. While it should be compliant with local and county emergency operations plans, developing strategies to ensure strong debris management is a way to integrate debris management within mitigation activities. The Public Assistance Debris Management Guide is available in hard copy or on the FEMA website.
Contact: FEMA Distribution Center
Address: 130 228th Street, SW, Bothell, WA 98021-9796
Phone: (800) 480-2520
Fax: (425) 487-4622
Website: http http://www.fema.gov/government/grant/pa/dmgtoc.shtm

Chapter 8. FEMA Change Memo 2013

The FEMA Change Memo provides a brief discussion of what was changed from the 2009 Umatilla County Mitigation Plan to the update completed in 2013. The Memo is on the next several pages and appears on County letterhead.

Umatilla County

Department of Land Use Planning

DIRECTOR
TAMRA MABBOTT

LAND USE
PLANNING,
ZONING AND
PERMITTING

CODE
ENFORCEMENT

SOLID WASTE
COMMITTEE

SMOKE
MANAGEMENT

GIS AND
MAPPING

RURAL
ADDRESSING

LIAISON,
NATURAL
RESOURCES &
ENVIRONMENT

Memo

To: Federal Emergency Management Agency
From: Umatilla County Department of Land Use Planning
Date: June 2013
Re: List of changes to the 2009 Umatilla County NHMP for the 2012-2013 Plan Update

Purpose

This memo describes the changes made to the 2009 Umatilla County Natural Hazards Mitigation Plan (NHMP) during the 2012-2013 plan update process. Major changes are documented by plan section.

Project Background

In May 2012, Umatilla County partnered with the Oregon Partnership for Disaster Resilience (OPDR) to update the 2009 Umatilla County Natural Hazards Mitigation Plan (NHMP). The Disaster Mitigation Act of 2000 requires communities to update their mitigation plans every five years to remain eligible for Pre-Disaster Mitigation (PDM) program funding, Flood Mitigation Assistance (FMA) program funding, and Hazard Grant Mitigation Program (HMGP) funding. Members of OPDR and the plan coordinator met with members of the Umatilla County steering committee in October and November (2012), January, March, and June (2013) to update all content within the county's NHMP. OPDR and the committee made several changes to the 2009 NHMP. Major changes are documented and summarized in this memo.

2012-2013 Plan Update Changes

The sections below only discuss *major* changes made to the 2009 Umatilla County NHMP during the 2012-2013 plan update process. Major changes include replacement or deletion of large portions of text and new additions to the plan. If a section is not addressed in this memo, then it can be assumed that no significant changes occurred.

216 S.E. 4th Street • Pendleton, OR 97801 • Ph: 541-278-6252 • Fax: 541-278-5480
Website: www.umatillacounty.net/planning • Email: planning@umatillacounty.net

Front Pages

1. The plan's cover has been updated.
2. Acknowledgements have been updated to include the 2012-2013 project partners and planning participants.
3. The Table of Contents was reformatted – the whole document was reformatted to allow ease of updating the TOC.

NHMP Plan

The overall plan framework for the 2012-2013 NHMP update provides the guidelines for hazard mitigation for Umatilla County. The plan contains the following chapters: 1) Planning Process; 2) Umatilla County Action Plan 3) Community Profile; 4) Hazard Assessment, 5) Natural Hazards Profile, 6) Glossary, and 7) Resource Directory.

Chapter 1: Planning Process

Chapter 1 introduces the concept of natural hazards mitigation planning and the process to develop and implement the plan. Additionally, Chapter 1 summarizes the 2012-2013 plan update process, and provides an overview of how the plan is organized. Major changes to Chapter 1 include the following:

1. Most of Chapter 1 includes new information that replaces out of date text found in the 2009 NHMP. The text describes the planning process, the mission and goals of the mitigation plan.

2. Chapter 1 of the 2009 NHMP discussed the methodology for developing a plan and how the plan was organized. OPDR and the plan update coordinator replaced this information with text that summarized the development of the 2009 NHMP and added new text to describe the 2012-2013 plan update process, including plan update meetings, public outreach efforts, and final plan review and adoption processes.

Chapter 2: Umatilla County Action Plan

This section provides the basis and justification for the mitigation actions identified in the NHMP. Major changes to Chapter 2 include the following:

1. The Action Item Matrix was modified during the plan update. The status of each action item was indicated and the time frame for completing the action item was modified for several items. There were also changes in regard to the coordinating agency for some action items. The Umatilla County Action Item Matrix, a set of summary tables describing

the county's action items, was also changed to reflect updates to the plan by the steering committee.

2. Three (3) action items were added and several action items were modified.

On November 15, 2012, the Umatilla County Steering Committee met to review the 2009 NHMP action items. The Umatilla County steering committee reviewed and identified which of the 2009 NHMP's 35 action items had been completed or not, or whether the action item should be deleted or deferred. Action items were deleted for a number of reasons, including not meeting basic action item criteria such as being measurable, assignable, or achievable. Action items that were deferred had not yet been addressed or were only partially addressed over the previous three years, but the Steering Committee decided they were still worthy of being continued through the 2012-2013 update. Most of the action items that were not completed were modified in some way to make them more achievable, accurate, or actionable. After deciding which actions to defer and/or modify, the steering committee formulated three (3) new action items for the 2012-2013 Natural Hazard Mitigation Plan. These new action items are based upon continuous community needs, deferred action items, and current needs based upon the community risk assessment. The action items are designed to be feasibly accomplished within the next five years.

The following action item summary tables are provided to show:

- Status of each 2009 NHMP action item,
- Reason for the status,
- New action items for the 2012-2013 NHMP update.

Multi-Hazard Action Items

Action Item	Description	Status as of 2013	Comment
Short Term Multi-Hazard #1	Complete City Addendums to Umatilla County Hazard Mitigation Plan.	Deferred/Modified 3 out of 12 city plans adopted	Lack of Funding
Short Term Multi-Hazard #2	Create a public awareness campaign regarding natural hazards and tools to achieve disaster resistance.	Modified Actively worked on each year	On-going effort
Short Term Multi-Hazard #3	Promote hazard safety education	Removed as a separate action item and combined with Short Term #2 above.	On-going effort
Short Term Multi-Hazard #3	Develop Storm Ready Rating Community.	New Action Item in 2013	To be completed.
Long-Term Multi-Hazard #1	Utilize central location of Umatilla County EOC to create a regional emergency management and information hub.	No progress	Lack of Funding
Long-Term Multi-Hazard #2	Develop a County GIS Department to oversee map generation and upgrades of current and future hazard prone areas.	Formed a GIS Dept. analysis underway (flood hazard and steep slopes)	On-going effort

Long-Term Multi-Hazard #3	Develop an inventory/database of utility facilities located in the County.	New Action Item in 2013	To be completed.

Wildfire Action Items

Action Item	Description	Status as of 2013	Comment
Short-Term Wildfire #1	Work with agriculture and conservation groups to establish fire buffers between both forest and range wild land urban interface areas.	No progress	Lack of Funding
Short-Term Wildfire #2	Utilize UCEM to dedicate resources to full time fire prevention planning and education.	Modified. No progress	Lack of Funding
Long-Term Wildfire #1	Work with citizens of Umatilla County to assure that all areas are protected under a rural fire district.	No progress	Lack of Funding
Long-Term Wildfire #2	Identify substandard interface access roads and provide incentive funding to bring roads up to current fire & life safety standards.	No progress	Lack of Funding
Long-Term Wildfire #3	Provide logistics and grant writing support to Meacham Volunteer Fire Department to build a fire station that allows all equipment to be stored at a central location.	No progress	Lack of Funding
Long-Term Wildfire #4	Complete feasibility studies of biomass potential on forest lands. Create incentive funding to test biomass technology in Umatilla County.	No progress	Lack of Funding
Long-Term Wildfire #5	Support removal/reduction of biomass fire hazards on private and public lands.	New Action Item in 2013	To be completed
Long Term Wildfire #6	Complete Upland Storage Ponds for wildlife benefit and to be used during wild land fire suppression efforts.	No progress	Lack of Funding

Flood Action Items

Action Item	Description	Status as of 2013	Comment
Short-Term Flood #1	Seek landowners willing to develop conservation easements and riparian planting within mapped and unmapped flood plain areas.	Modified No progress	Lack of Funding
Short-Term Flood #2	Identify areas able to absorb high-velocity stream flows w/o impacting investments (i.e. re-establish or create artificial floodplains). Establish connectivity and diversion infrastructure to be utilized during high water events to divert high water to these areas.	No progress	Lack of Funding
Short-Term Flood #3	Develop a database of all landowners within FEMA FIRM designated areas in the county. Use database to distribute outreach information and emergency notices related to flooding.	Database generated, outreach on-going	On-going effort
Long-Term Flood #1	Identify and map canyons and draws, roads susceptible to high-water and flash flood event but not located on FEMA FIRM maps.	Modified No progress	On-going effort
Long-Term Flood #2	Obtain funding to upgrade existing levees and berms to USACE standards in order to ensure continuing flood protection, including Umatilla River Levee through Pendleton and Walla Walla River Levee through Milton Freewater.	Modified Funding was obtained, levee work begun.	On-going effort
Long-Term Flood #3	Identify public and private bridges susceptible to collecting flash flood debris. Prioritize bridge improvements and/or replacement.	No progress	Lack of Funding

Severe Summer Storm Action Items

Action Item	Description	Status as of 2013	Comment
Short-Term Summer Storm #1	Complete necessary tasks to obtain a NOAA NWS Storm Ready rating.	No progress	Lack of Funding
Long-Term Summer Storm #1	Identify opportunities to advance NOAA NWS warning coverage via wireless and non-wireless infrastructure.	Some progress by NOAA NWS	On-going effort
Long-Term Summer Storm #2	Implement a Tone Alert Radio program to provide TARs to all schools, communications stations and other interested private and public entities to increase advanced warning capabilities of NOAA NWS and UCEM.	Modified No progress	Lack of Funding

Severe Winter Storm Action Items

Action Item	Description	Status as of 2013	Comment
Short-Term Winter Storm #1	Complete necessary tasks to obtain a NOAA NWS Storm Ready rating.	No progress	Lack of Funding
Long-Term Winter Storm #1	Identify opportunities to advance NOAA NWS warning coverage via wireless and non-wireless infrastructure.	Some progress by NOAA NWS	Lack of Funding
Long-Term Winter Storm #2	Implement a Tone Alert Radio program to provide TARs to all schools, communications stations and other interested private and public entities to increase advanced warning capabilities of NOAA NWS and UCEM.	Modified No progress	Lack of Funding

Long Term Winter Storm #3	Asses snow removal capabilities of Umatilla County. Provide funding for snow removal equipment in areas with minimal or no snow removal capabilities.	No progress	Lack of Funding

Earthquake Action Items

Action Item	Description	Status as of 2013	Comment
Short-Term Earthquake #1	Complete county wide assessment of structures vulnerable to earthquake damage. Attain funding to retro-fit high priority structures.	Assessment complete. No retro-fitting has occurred.	Ongoing
Long-Term Earthquake #1	Support continuing work to identify all fault patterns in Umatilla County.	No progress	Ongoing

Volcano Action Items

Action Item	Description	Status as of 2013	Comment
Short-Term Volcano #1	Create volcano response protocols for protection from seismic activity and debris damage.	No progress	Lack of Funding

Landslide/Debris Flow Action Items

Action Item	Description	Status as of 2013	Comment
Short-Term Landslide #1	Update Goal 7 of the Umatilla County Comprehensive Plan with maps designating landslide prone areas or areas where the SS Overlay Zone applies.	No progress	Lack of Funding

Long-Term Landslide #1	Identify and implement mitigation measures where important infrastructure for evacuation, emergency vehicle access, commodity transport, information dissemination and utilities may be prone to damage from site specific landslides.	No progress	Lack of Funding

Drought Action Items

Action Item	Description	Status as of 2013	Comment
Short-Term Drought #1	Complete 2050 Water Management Plan.	Modified Water Plan has been adopted.	On-going
Long-Term Drought #1	Utilize Columbia River water for replacement of certificated groundwater irrigation rights.	A pilot project has developed.	On-going
Long-Term Drought #2	Provide funds for groundwater studies to ensure water resource sustainability.	Modified State funds have been secured.	5-10 years
Long-Term Drought #3	Complete settlement of CTUIR water claims and maximize benefit of Phase III infrastructure.	Federal negotiations have begun.	On-going

Chapter 3: Community Profile

Chapter 3 describes the community in a variety of ways. This section highlights geographic, demographic, employment, housing, transportation, and land use characteristics. The community profile was included in the 2009 NHMP as Chapter 3, Community Profile. Though this update of the community profile is consistent with the Community Profile from the 2009 NHMP, the entire section has been updated and modified in terms of scope and information, expanding from 5 to 69 pages.

Chapter 4: Hazard Assessment

Chapter 4 describes the hazard assessment for the County. Conducting a hazard assessment provides information on the location of hazards, the value of existing land and property in hazard locations, and an analysis of risk to life, property, and the environment that may result from natural hazard events. Hazard assessments are subject to the availability of hazard-specific data. This chapter did not receive extensive updates.

Chapter 5:

This chapter provides greater details on each natural hazard type (i.e. multi-hazard, wildfire, flood, etc.) and the action items that go with each natural hazard.

1. Tables were updated with more current data. For example, more recent severe winter storms.

2. The details of each action item were reviewed and updated. The status of each action item was added to the text. Other action items were modified slightly and a few were actually deleted.

Chapter 9. Appendix

The following documents were helpful in the compilation of the County's Mitigation Plan and are included to provide background details. Several of the items are actual plans that were formulated to provide guidance for wildfire and flood. The seven appendix items titles will be placed on separate pages to provide reference to and a place holder for the scanned document. The actual appendix document will be scanned and added to the final PDF version of the Mitigation Plan.

APPENDIX A: Critical/Essential Facilities, Infrastructure and Vulnerable Population Centers Risk Analysis

APPENDIX B: Community Wildfire Protection Plans: Blue Mountains CWPP, Mill Creek CWPP and West County CWPP

APPENDIX C: Umatilla County Flood Mitigation Plan 2006

APPENDIX D: Flood Fight Report and 2003 Revisions

APPENDIX E: Stakeholder Surveys – Collected in 2009

APPENDIX F: Natural Hazard Mitiliggation Plan – Planning Chornology

APPENDIX G: OPDR Economic Analysis of Natural Hazard Mitigation Projects in 2009

APPENDIX A: Critical/Essential Facilities, Infrastructure and Vulnerable Population Centers Risk Analysis

Facilities within the County jurisdiction excluding city limits and urban growth areas within city planning jurisdiction.

Critical/Essential Facilities

Critical/Essential facilities are those necessary for government response and recovery activities (i.e. life safety and property, property and environmental protection, etc.) and must be protected to assure adequate management of emergency situations. These facilities include:

- 911/dispatch centers
- Emergency operation centers
- Police and fire stations
- Public works facilities
- Sewer and water facilities
- Corrections centers
- Public service buildings (courthouses, city halls, etc.)

	Facility	Nearest Community	Latitude	Longitude	*Will These Natural Hazards Impact the Facility?		
					Wildfire	Flood	Severe Winter Storm
1.	Adams Fire Station #2	Adams	45.865374	-119.192786	No	No	Yes
2.	Adams Water Tank	Adams	45.463154	-118.34416	No	No	No
3.	Athena Water Tank #1	Athena	45.474913	-118.274143	No	No	No
4.	Athena Water Tank #2	Athena	45.475040	-118.291854	No	No	No
5.	Boyd Dam	Hermiston	45.823141	-119.322835	No	No	No
6.	Cold Springs Dam	Hermiston	45.846496	-119.131221	No	No	No
7.	Echo Fire Station #2	Echo	45.692500	-118.935000	No	No	Yes
8.	Echo Sewer Facility	Echo	45.452519	-119.123755	No	No	No
9.	Helix Fire Station - Juniper	Helix	45.903900	-118.810000	No	No	Yes
10.	Helix Water Tank	Helix	45.511448	-118-393587	No	No	No
11.	Hermiston Fire Station	Hermiston	45.803500	-119.373000	No	No	Yes
12.	McKay Creek Reservoir/Dam	Pendleton	45.561856	-118.772213	No	Yes	No
13.	McNary Dam	Hermiston	45.927803	-119.293702	No	Yes	No
14.	Meacham Post Office	Meacham	45.510200	·118.422000	Yes	No	Yes

15.	Meacham Volunteer Fire Station	Meacham	45.509008	-118.421957	Yes	No	Yes
16.	Milton-Freewater Private Rural Fire Station	Milton-Freewater	45.964800	-118.375000	No	No	Yes
17.	Pilot Rock Water Tank	Pilot Rock	45.284994	-118.503095	No	No	No
18.	Pilot Rock Sewer Facility	Pilot rock	45.304269	-118.485949	No	No	No
19.	Port of Umatilla Water Tank	Umatilla	45.551559	-119.163298	No	No	No
20.	Power City Water Co-Op Tower	Umatilla	45.907500	-119.306000	No	No	No
21.	Stanfield Sewer Facility	Stanfield	45.470807	-119.135614	No	Yes	No
22.	Three Mile Dam	Hermiston	45.881651	-119.322738	No	Yes	No
23.	Ukiah Sewer Facility	Ukiah	45.075957	-118.545352	No	No	No
24.	Umapine Fire Station	Umapine	45.976550	-118.495456	No	No	No
25.	Umatilla County Road Department – Milton-Freewater	Milton-Freewater	45.948104	-118.431980	No	No	Yes
26.	Umatilla County Road Department - Stanfield	Stanfield	45.778003	-119.227578	No	Yes	Yes
27.	Weston MTN Fire Station	Weston	45.787800	-118.251000	Yes	No	Yes
28.	Weston Water Tank	Weston	45.481774	-118.251511	No	No	No

*Note: The Impact Analysis reviewed each facility and where it is located and whether the facility could be directly impacted by a wildfire, flood or severe winter storm. In many cases, the facility is near areas that have the possibility of having a wildfire, flood or severe winter storms and so was marked as being impacted. The degree of impact is not being assessed at this time.

Critical Infrastructure

Critical infrastructure includes those systems necessary for the day to day operation of Umatilla County. This infrastructure includes:

- Electricity transmission
- Natural gas and other utilities
- Arterial transportation including rail, air, auto and water

	Facility	Nearest Community	Latitude	Longitude	*Will These Natural Hazards Impact the Facility?		
					Wildfire	Flood	Severe Winter Storm
1.	Bonneville Power Administration Transmission	County Wide			Yes	No	No
2.	Hinckle Rail Yards	Hermiston			No	No	No
3.	Idaho Power Transmission	County Wide			Yes	No	No
4.	Interstate 82	West County			No	No	Yes
5.	Interstate 84	County Wide			Yes	No	Yes
6.	OR Highway 11	East County			No	No	Yes
7.	OR Highway 204	East County			Yes	No	Yes
8.	OR Highway 244	Ukiah			Yes	No	Yes
9.	OR Highway 207	West County			No	No	Yes
10.	OR Highway 730	West County			No	No	Yes
11.	Pacific Corp Transmission	Umatilla			No	No	No
12.	Port of Umatilla docks	Umatilla	45.920092	-119.266104	No	Yes	Yes
13.	Stanfield Rest Stop, I-84	Stanfield	45.769591	-119.255209	No	Yes	Yes
14.	Umatilla Electric Transmission	County Wide			Yes	No	No
15.	US 395 North	Hermiston			No	No	Yes
16.	US 395 South	Pilot Rock/Ukiah			Yes	NO	Yes

* Note: The Impact Analysis reviewed each facility and where it is located and whether the facility could be directly impacted by a wildfire, flood or severe winter storm. In many cases, the facility is near areas that have the possibility of having a wildfire, flood or severe winter storms and so was marked as being impacted. The degree of impact is not being assessed at this time.

Vulnerable Population Centers

Vulnerable populations include those facilities that house or could receive individuals with special needs to conduct day to day activities. These areas include:

- Hospitals and care centers
- Schools
- Nursing homes and assisted living facilities

	Facility	Nearest Community	Latitude	Longitude	Will These Natural Hazards Impact the Facility?		
					Wildfire	Flood	Severe Winter Storm
1.	Birch Creek Adult Foster Care	Pendleton	45.634110	-118.865260	No	No	Yes
2.	Blue MTN Christian Fellowship Church and School	Milton-Freewater	45.591434	-118.263825	No	No	Yes
3.	Columbia Care Cottage Foster	Hermiston	45.838700	-119.328000	No	No	Yes
4.	Country Living AFH	Pendleton	45.361149	-118.480358	No	No	Yes
5.	Durham's Adult Home Care	Milton-Freewater	45.592843	-118.293308	No	No	Yes
6.	Ferndale Elementary School	Milton-Freewater	45.980796	-118.401062	No	No	Yes
7.	Geneva House	Hermiston	45.521372	-119.124958	No	No	Yes
8.	Helix School	Helix	45.851155	-118.652946	No	No	Yes
9.	Heritage Cottage	Milton-Freewater	45.581838	-118.230017	No	No	Yes
10.	Heritage House Foster Care	Milton-Freewater	45.950100	-118.382000	No	No	Yes
11.	Heritage Manor	Milton-Freewater	45.565475	-118.230535	No	No	Yes
12.	Heritage Villa	Milton-Freewater	45.581307	-118.231156	No	No	Yes
13.	Milton-Freewater Head Start	Milton-Freewater	45.957968	·118.379409	No	No	Yes
14.	SDA Church and School	Athena	45.481867	-118.293976	No	No	Yes
15.	SDA School	Milton-Freewater	46.000079	-118.232665	No	No	Yes
16.	Sister's Retirement Inn	Milton-Freewater	45.584396	-118.231610	No	No	Yes
17.	TLC at Sandy's Acres	Hermiston	45.872154	119.290782	No	No	Yes

* Note: The Impact Analysis reviewed each facility and where it is located and whether the facility could be directly impacted by a wildfire, flood or severe winter storm. In many cases, the facility is near areas that have the possibility of having a wildfire, flood or severe winter storms and so was marked as being impacted. The degree of impact is not being assessed at this time.

For an updated listing of all adult foster care and related type facilities call 541-278-4161, Oregon DHS, Aging and People with Disabilities, 1555 Southgate Place, Pendleton, OR 97801.

APPENDIX B: Community Wildfire Protection Plans: Blue Mountains CWPP, Mill Creek CWPP and West County CWPP

(See attachments of the scanned original plans)

APPENDIX C: Umatilla County Flood Mitigation Plan 2006

(See attachment of the scanned original plan)

APPENDIX D: Flood Fight Report and 2003 Revisions

(See attachment of the scanned original plan)

APPENDIX E: Stakeholder Surveys – Collected in 2009

(See attachment of the scanned surveys)

APPENDIX F: Natural Hazard Mitiliggation Plan – Planning Chornology

(See attachment of the scanned chronology)

APPENDIX G: OPDR Economic Analysis of Natural Hazard Mitigation Projects in 2009

(See attachment of the scanned original Economic Analysis)

Chapter 10. City Addendums

The following City Mitigation Plans are provided here as part of the County's Mitigation Plan. The three City Addendum titles will be placed on separate pages to provide reference to and a place holder for the actual scanned document. The actual appendix document will be scanned and added to the final PDF version of the Mitigation Plan.

ADDENDUM 1: City of Adams, adopted April 14, 2009

ADDENDUM 2: City of Pilot Rock, adopted September 1, 2009

ADDENDUM 3: City of Umatilla, adopted July 2, 2009

ADDENDUM 1: City of Adams, adopted April 14, 2009

(See attachment of the scanned original plan)

ADDENDUM 2: City of Pilot Rock, adopted September 1, 2009

(See attachment of the scanned original plan)

ADDENDUM 3: City of Umatilla, adopted July 2, 2009

(See attachment of the scanned original plan)